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Marianne James
California State University, Los Angeles
Editor

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PREDICTORS OF STOCK RETURNS: SOME EVIDENCE FROM AN EMERGING MARKET

Joseph Abrokwa, University of West Georgia
Paul Nkansah, Florida A&M University

ABSTRACT

This study documents the predictive ability of five variables (dividends per share, dividend price ratio, price earnings ratio, book to market ratio, and size) on common stock returns using evidence from the emerging market country of Ghana. It sought to determine if the predictive ability of these variables documented in several international studies going back many decades could be replicated using data from the Ghana Stock Exchange.

The study found that of the five variables in the study, only dividends per share had a significant predictive effect on stock returns. From the study, it is concluded that higher stock returns are associated with higher dividends in the emerging market environment of Ghana; this result is consistent with prior research.

Also, the hypothesized relations between stock returns and dividend price ratio, price earnings ratio, size and book to market ratio were confirmed, but these relations were not found to be statistically significant.

Keywords: Stock returns, dividends, emerging markets, Ghana Stock Exchange.

INTRODUCTION

This study examines the relationship between stock returns and five variables, namely, dividends per share, dividend price ratio, price earnings ratio, book to market ratio, and size using data from emerging market country of Ghana. The study uses evidence from the Ghana Stock Exchange from the period from 2007 to 2013.

By way of background, Ghana is located in West Africa and has an estimated population of 25 million (Central Intelligence Agency) [CIA], 2014). Ghana gained independence from England in 1957 and has been striving to develop a market economy ever since. Its economy is dominated by the production of gold, cocoa, and recently oil. Ghana's brisk economic growth, averaging more than 8 percent during the past five years, political stability, and oil discovery in 2007 has raised its profile among investors (Reuters, 10/31/13).

The Ghana Stock Exchange is relatively small by international standards. It was established in July 1989 and trading commenced in November 1990. As of October 2014, there were 35 companies listed on the exchange. Listings on the exchange are regulated by the Listing Rules of the Ghana Stock Exchange, The Companies Code, Act 179, and L. I. 1728 of the Securities and Exchange Commission Regulations of Ghana, 2003.

The relationship between stock returns and dividends per share, dividend price ratio, price earnings ratio, book to market ratio and size has been studied in several countries (Fama and French, 1995; McManus et al, 2004; Pontiff and Schall, 1998; Jaffe et al, 1989). These studies go back a number of years. However, no such studies have been done to date for Ghana, an emerging economy that has seen a lot of local and foreign investor interest within the past five years owing to its rapid economic growth and discovery of oil. Therefore, this study seeks to examine the effect of these variables on stock returns using evidence from the Ghana Stock Exchange.

Specifically, the study seeks to determine if these variables can be used to predict stock returns on the Ghana Stock Exchange. Indeed, if these variables can be used to predict stock market returns, investors can use this information to make greater profits.

Also, whereas earlier studies focused primarily on the relationship between stock performance and one or two of these variables, this study examines all these five variables together. Furthermore, the study contributes to the literature on predictors of stock returns by examining the issue from an emerging market perspective and examining the effect of several predictors together.

LITERATURE REVIEW

There have been many studies going back several decades that have sought to identify the variables that can predict stock returns. These variables have included dividends per share, dividend price ratio, price earnings ratio, book to market ratio, and size. The studies have generally examined the relation between one or two of these factors and stock returns, and have mainly involved the industrial countries, like the United States, United Kingdom, Canada, Japan and Australia.

Aggarwal et al. (1992) examined the price to book ratio effect in the Japanese market using evidence from the Tokyo Stock Exchange from 1968 to 1983. They observed that stocks with high price to book value ratios earn low returns whereas stocks with low price to book ratios have high returns.

Aono, K. & T. Iwaisako (2010) examined the predictive ability of price earnings ratio using data from the Tokyo Stock Exchange from 1997 to 2009. They found that the performance of price earnings ratio in forecasting stock returns in Japan was weaker than that found in comparable studies in the United States.

Using data from the New York Stock Exchange, American Stock Exchange and NASDAQ from 1963 to 1992, Fama and French (1995) have studied the behavior of stock prices and earnings in relation to size and book to market equity. They found that size and book to market equity are related to profitability and returns; firms with low book to market equity (high stock prices relative to book) are associated with sustained strong profitability and stock returns, and the converse is also true.

Banz (1981) studied the relationship between return and market value of common stock using data on all common stock quoted for at least five years on the New York Stock Exchange from 1926 and 1975. He concluded that smaller firms have higher risk adjusted returns on average than larger firms.

Jaffe et al. (1989), examined the relation between earnings yield, market values and stock returns and concluded that, there was significant earning price and size effects in US market when estimated across all months during the period from 1951-1986. The study also found that, there was difference between January and the rest of the year as the coefficient on both earning price ratio and size were significant in January but in the case of the other months, only earning price coefficient was significant outside January.

Kheradyar S., I. Ibrahim & F. Mat Nor (2011) used data from the Malaysia Stock Exchange from January 2000 to December 2009 to investigate whether financial ratios (including dividend yield, earnings yield and book-to-market ratios) can predict stock returns.

Their results revealed that financial ratios can predict stock returns and that the book-to-market ratio had a higher predictive power than dividend yield and earnings yield respectively.

Lewellen, J, (2004), studied whether financial ratios like dividend yield can predict aggregate stock returns using New York Stock Exchange data from 1946 to 2000. His results showed that dividend yield predicted market returns during the period 1946-2000, and also that book to market ratio and earnings yield could predict market returns.

Miller, J.E. & F.W. Bacon (2006) used information on 1059 stocks gathered from the website http://multexinvestor.com, and regressed the percentage change in stock price over the past 52 weeks on dividend yield, book-to-market ratio, Beta, market capitalization and change in earnings per share. They found that dividend yield was useful in predicting the change in stock price over the 52-week period at the 99% confidence level.

McManus et al. (2004) have also examined the role of the payout ratio in the relationship between stock returns and dividend yield in the United Kingdom stock market. They examined stock returns in the London Stock Exchange over the period from 1958 to 1997. They found that payout ratio did indeed have an important impact on the significance of dividend yield in explaining stock returns.

Finally, Pontiff and Schall (1998) have also examined book to market ratios as predictors of market returns in the United States market. Using data for the Dow Jones industrial average from 1926 to 1994, they found that the predictive ability of book to market ratios appears to stem from the relation between book value and future earnings.

VARIABLES AND THEIR DETERMINATION

The variables used in the study to explore stock returns are dividend price ratio, dividends per share, price earnings ratio, book to market ratio, and size. These variables were identified in the literature where previous studies used one or two of them to predict stock returns. In this section, we define the variables and the theoretical reasons for their inclusion.

Dividend Price Ratio (DPRICER) – Dividend Yield

Dividend Price Ratio (dividend yield) is defined as the dividends per share divided by price per share. Several studies have investigated the association between dividend yield and stock returns (Lewellen, 2004; McManus et al, 2004; Pointiff and Schall, 1998; Miller and Bacon, 2006). Based on these studies, it is hypothesized that the higher the dividend price ratio, the higher the stock returns.

Dividends per Share (DPS)

The dividends per share is defined as: Total dividends divided by number of outstanding shares. This variable, though not commonly used in the prior studies, is included in this study because it is disclosed in the annual reports, and is therefore readily available to the average investor to use in predicting stock returns. As with the dividend price ratio (dividend yield), it is hypothesized that high dividends per share for the prior year are associated with high current year stock returns.

Price Earnings Ratio (PER)

The association between price earnings ratio and stock returns have been documented in several international studies (Lewellen, 2004; Aono and Iwaisako, 2010; Aggarwal et al. 1992; Miller and Bacon, 2006). In general, high price earnings ratios suggests that investors are expecting high earning growth in future compared to the companies with low price earnings ratios. It is computed as: Price Earnings Ratio = Price Per Share / Earnings Per Share.

In line with these studies, it is hypothesized that firms with low price earnings ratios will outperform those with high price earnings ratios.

Book to Market Ratio (BMR)

Studies of the relationship between book to market ratio and stock returns include Fama and French (1995), Aggarwal et al. (1992) and Kheradyar et al. (2011). From these studies, it is hypothesized that firms with low book to market equity (high stock prices relative to book) are associated with high stock returns, and firms with high book to market equity are associated with low returns. The ratio is calculated as: Book to Market ratio = Book Value/ Market Value.

Size (SIZE)

Size is the market capitalization of the company and is defined as:
Size = Number of outstanding shares × Price per share.

Based on prior studies (Banz, 1981; Fama and French, 1995), it is postulated that small firms have higher stock returns than large firms.

Stock Returns (STOCKR)

Based on prior studies, stock returns (on common stock) are defined as:
Total Stock Return = $((P_1 - P_0) + D)/P_0$
Where
P_0 = Initial Stock Price
P_1 = Ending Stock Price (Period 1)
D = Dividends

HYPOTHESES AND METHODOLOGY

As alluded to earlier, this study seeks to examine the relationship between stock returns and five variables, namely, dividends per share, dividend price ratio, price earnings ratio, book to market ratio, and size using data from the emerging market country of Ghana. The study uses evidence from the Ghana Stock Exchange from the period from 2007 to 2013. Specifically, the following hypotheses are investigated:

H1 *The higher the dividends per share, the higher the stock return.*

H2 *The higher the dividend price ratio, the higher the stock return.*

H3 *Firms with high price earnings ratios have low stock returns.*

H4 *The lower the book to market ratio, the higher the stock return.*

H5 The smaller the size of the firm, the higher the stock returns.

H6 At least one of the five variables examined in the study has significant effect on stock returns.

The first five hypotheses, H1 to H5, are tested using Pearson correlation. The last hypothesis, H6, is tested using multiple linear regression analysis. Since the variable SIZE is severely skewed (Banz, 1981), it is log-transformed for use in the multiple linear regression model shown below.

$$Y_t = \beta_0 + \beta_1 X^1_{t-1} + \beta_2 X^2_{t-1} + \beta_3 X^3_{t-1} + \beta_4 X^4_{t-1} + \beta_5 X^5_{t-1} + \varepsilon$$

Where

t = Time period

Y= Stock returns (STOCKR)

X^1 = Dividends per share (DPS)

X^2 = Dividend price ratio (DPRICER)

X^3 = Price earnings ratio (PER)

X^4 = Book to market ratio (BMR)

X^5 = lnSIZE

DATA

The source of the data for the study was the World Wide Web, the Ghana Stock Exchange website, individual company websites and the website www.annualreportsghana.com. The study uses stock return data for all companies listed continuously on the Ghana Stock Exchange from the period 2007 through 2013. The sample size comprised of 7 years of data for each company, in all the sample size was 154; though the sample size is smaller than that of previous studies, (due to limited size of the Ghana Stock Exchange), it is enough to perform statistical analysis.

ANALYSIS OF RESULTS

Preliminary analysis of the data showed an extreme outlier for one of the values for stock return (STOCKR). The COOK's distance for this outlier was 1.178 which exceeded the recommended cut-off point of 1 so the case corresponding to this outlier was excluded from further analysis.

Table 1 shows the descriptive statistics of the variables used in the study. Table 2 shows the results of the Pearson correlation analysis. From this table, it can be seen that dividends per share (DPS) and dividend price ratio (DPRICER) have a significant positive relationship with stock return (STOCKR). On the other hand, price earnings ratio (PER), book to market ratio (BMR), and size (SIZE) have insignificant inverse relationship with stock return. However, in terms of the nature of the relationship, all the hypothesized directions in hypotheses H1, H2, H3, H4, and H5 are supported. Similar results have been obtained in prior studies (Pontiff and Schall, 1998; McManus et al, 2004).

Table 1
DESCRIPTIVE STATISTICS

	N	Minimum	Maximum	Mean	Std. Deviation
DPS	153	.000	4.503	.217	.526
DPRICER	153	.000	4.732	.226	.763
PER	153	-275.000	1200.000	23.273	111.611
BMR	153	.012	5.348	.653	.806
SIZE	153	4513.156	21930000.000	871681.608	2851149.117
STOCKR	153	-.949	27.511	.841	3.306

Table 2
CORRELATIONS

		DPS	DPRICER	PER	BMR	SIZE	STOCKR
DPS	Pearson Correlation	1	.501**	-.050	-.188*	.076	.338**
	Sig. (2-tailed)		.000	.538	.020	.349	.000
	N	153	153	153	153	153	153
DPRICER	Pearson Correlation	.501**	1	-.057	-.009	-.035	.239**
	Sig. (2-tailed)	.000		.482	.917	.670	.003
	N	153	153	153	153	153	153
PER	Pearson Correlation	-.050	-.057	1	-.127	.033	-.033
	Sig. (2-tailed)	.538	.482		.117	.685	.682
	N	153	153	153	153	153	153
BMR	Pearson Correlation	-.188*	-.009	-.127	1	-.142	-.113
	Sig. (2-tailed)	.020	.917	.117		.079	.163
	N	153	153	153	153	153	153
SIZE	Pearson Correlation	.076	-.035	.033	-.142	1	-.033
	Sig. (2-tailed)	.349	.670	.685	.079		.690
	N	153	153	153	153	153	153
STOCKR	Pearson Correlation	.338**	.239**	-.033	-.113	-.033	1
	Sig. (2-tailed)	.000	.003	.682	.163	.690	
	N	153	153	153	153	153	153

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 3
ANOVA

Model	Sum of Squares	df	Mean Square	F	p-value
Regression	211.915	5	42.383	4.298	.001
Residual	1449.651	147	9.862		
Total	1661.567	152			

a. Dependent variable: STOCKR
b. Predictors: DPS, DPRICER, BMR, PER, lnSIZE
c. R^2 = .128
d. Adjusted R^2 = .098

Table 4
COEFFICIENTS

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	p-value
(Constant)	2.268	2.420		.937	.350
DPS	1.859	.602	.296	3.090	.002
DPRICER	.366	.398	.084	.919	.360
BMR	-.412	.388	-.100	-1.061	.291
PER	-.001	.002	-.023	-.297	.767
lnSIZE	-.136	.190	-.071	-.716	.475

In regards to using the five variables to predict stock returns, Tables 3 and 4 show the results of the multiple regression analysis. The overall regression with R^2 = .128 is significant at the 1% level but only dividends per share (DPS) has significant effect on stock returns. In addition, a stepwise regression was run using all the five predictor variables to find the best variable to predict stock returns. Again, the best predictive variable was dividends per share with an R^2 = .114.

CONCLUSION

This study documents the predictive ability of five variables (dividends per share, dividend price ratio, price earnings ratio, book to market ratio, and size) on common stock returns using evidence from the emerging market country of Ghana. It sought to determine if the predictive ability of these variables documented in several international studies going back many decades could be replicated using data from the Ghana Stock Exchange.

The study found that of the five variables in the study, only dividends per share had a significant predictive effect on stock returns. From the study, it is concluded that higher stock returns are associated with higher dividends in the emerging market environment of Ghana; this result is consistent with prior research and is a well-established fact in the literature (McManus et al. 2004).

Also, the hypothesized directions in the first five hypotheses were all supported. That is, the hypothesized relations between stock returns and dividend price ratio, price earnings ratio, size and book to market ratio were confirmed, but these relations were not found to be statistically significant.

The implications of these results are that the average investor on the Ghana Stock Exchange can earn significantly higher returns by investing in stocks with high dividends per share or high dividend yields.

The primary limitation of this study is the smallness of the sample. Owing to the small size of the Ghana Stock Exchange and the economic environment prevailing in Ghana, the stock market in Ghana is not very liquid. Because of this, the study uses annual data instead of the daily or monthly data used for comparable studies. Despite these limitations, the central results of this study remain valid.

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THE PRIVATE SECURITIES LITIGATION REFORM ACT AND LITIGATION BACKED INVESTOR SPECULATION

Ansley Chua, Kansas State University
Bruce Haslem, Southern Utah University

ABSTRACT

For some investors, shareholder litigation is a real option that allows them to partially recover losses, albeit at the expense of other shareholders. We examine the market response to the passage of the PSLRA, which decreased the value of this option, to test whether shareholder litigation affects the valuation of firms and the willingness of investors to speculate on a firm's market value. We find that in firms where speculation is most likely to exist, such as those trading at abnormally high valuations; the reaction to these reforms was significantly more negative and was related to factors that would affect the likelihood and payoffs of litigation. From a policy standpoint, PSLRA had the benefit of decreasing the value of investor speculation.

INTRODUCTION

It is generally accepted that when you prevent investors from suffering negative outcomes in their investments ex post, you lower the incentive they have to carefully investigate those investments ex ante. This increase in moral hazard allows investors to pay less attention to the risk of an investment; instead shifting the focus to only the potential upside payoff. Unfortunately, this idea has come to the forefront of economic discussion as we debate the relative costs and benefits of government bailouts for industry, or distortions in real estate prices due to government backing of mortgages. In this paper, we investigate empirically whether changes in one such ex post remedy available to investors, shareholder lawsuits, affects the price that investors attach to a company's equity and their willingness to speculate on market information.

Cornell (1990) shows that any litigation creates a valuable real option for a plaintiff, regardless of the merits of the case. But unlike derivative lawsuits in state courts, where one shareholder sues the firm on behalf of all shareholders of the firm, securities litigation only protects those shareholders who purchased their shares after some event or announcement misleads the market about the underlying value of the firm. For instance, if the CEO of a firm announces quarterly results that are inflated by accounting manipulations, it is assumed that only those investors who purchased the shares based on the false information were harmed. In effect, when there is greater uncertainty surrounding the validity of information regarding the firm, securities litigation makes the stock more valuable for new shareholders, who have the ability to recover damages, than it is for existing shareholders who not only don't have that option, but will also bear the cost of the damages paid to the eligible shareholders. Coffee (2006) does an excellent job in describing the limitations and wealth shifting aspects of shareholder litigation.

However, do investors consider the value of this option when setting the price they are willing to pay for a firm's equity? That remains an open question. Like all options, shareholder litigation is at best a zero sum game between the two types of investors in the absence of any externalities, and at its worst, it is a net loss for both parties as the lawyers take their portion and the firm suffers reputational losses. While the option might increase the willingness of new investors to speculate on the stock given their higher valuation, it doesn't guarantee that there will be a change in overall firm value due to the option. The new equilibrium price would depend on several factors, such as difference in the price elasticity of demand for the new buyers, who have the option to sue, versus the price elasticity of supply for the existing shareholders who do not, or the proportion of investors who will bear the cost of damages relative to the number of eligible investors who will receive the payout. Moreover, it might be difficult to imagine individual investors, who following the release of new information, consider the likelihood it is fraudulent and what the payoff would be in a lawsuit if it were.

To examine the impact this option has on investor's willingness to speculate, we examine the market response to the Private Securities Litigation Reform Act (PSLRA), which limited the ability of shareholder defendants to recover damages. If the option to sue encourages speculation, we expect to find a more negative reaction to the passage of PSLRA for those firms that are most likely to be over-valued at the time of its passage, and thus have the highest potential payouts in litigation. While this seems obvious, the evidence from previous papers examining the market reaction to the law's passage has been mixed. We suggest that this is due to the prior research being focused on the changes in valuation of firms in the four industries with the highest incidence of litigation, as well as the quality of governance within those firms. Certainly, there is a high correlation between a firm's industry, its quality of governance, and the likelihood of a lawsuit. However, like all options, the option to sue will only be exercised when there are potential damages, which are based on overvaluation in the stock's price. Therefore, we predict that the market reaction to the passage of PSLRA will be primarily related to those factors that define payoffs in litigation, even after controlling for other factors such as industry, governance and information opacity that contribute to its likelihood. We also expect that the willingness to speculate spans industries, and that if shareholder litigation does encourage speculation, we will find the most negative reaction to the law's passage in the most over-valued firms, regardless of their industry.

In this paper we do not suggest that shareholder litigation is the cause of over-valuation. Companies release information continuously, any of which might lead investors to change their valuation of the firm and speculate on the information being accurate. Our contribution is that we show shareholder litigation makes speculation less costly and exacerbates an existing price bubble as the value of the option is also incorporated into the price of the shares. This is especially true as the variance in signal quality increases, and this litigation option becomes more valuable to new investors who are in a better position to speculate on it being accurate, knowing that they can recover a portion of the cost of misrepresentation.

While the contribution of this paper is that we show shareholder litigation affects the ex-ante pricing within markets and can exacerbate bubbles, the importance of our results lies in highlighting the pricing distortions created by enabling speculation. Certainly, some existing shareholders will correctly time the market and sell out at a higher price to a speculator, who is willing to pay more based on the ability to recover damages, and they will receive an undeserved benefit from shareholder litigation. Unfortunately, those who benefit from the artificially high prices are not the ones who pay the damages. Instead, it is the firm's long-term, buy and hold investors who must pay the damages to those shareholders who purchased shares during the fraud period. This reduces the profitability of long-term investing relative to active attempts at market timing. In addition, if market speculators push the price of securities above their true intrinsic value, they implicitly lower the firm's cost of equity financing; potentially distorting the firm's investment decisions and leading to over-investment. In light of recent papers, such as Cheng, Huang, Li and Lobo (2010), that suggest shareholder lawsuits can be positive weapons in the corporate governance arsenal, our paper highlights one negative consequence of this tool.

Our paper builds upon an existing literature that has examined the market's response to the passage of PSLRA. In the early 1990s, large decreases in a firms' stock price were often followed by a race to the courthouse, in the hopes of becoming the lead plaintiff in a class-action lawsuit against the firm. It was a common view that lawsuits were often filed against firms, with the plaintiffs hoping to find the evidence to support the claims through the discovery process. Additionally, firms faced large legal costs when defending or settling these fraud lawsuits, regardless of whether any fraud had been committed. To lessen the impact on firms, the Private Securities Litigation Reform Act (PSLRA) was passed in 1995. This reform made four major changes to the existing statutes. Each lessened the likelihood or value of a successful lawsuit; effectively decreasing the value of the option to sue.

Certainly, for those investors with legitimate claims and injury from fraud, the reforms made it more difficult to obtain redress. However, by making it easier for managers to issue unbiased forecasts, rather than the worst case forecast which prevents liability, these reforms may have improved the information available to investors, while also significantly decreasing the risk and costs of frivolous litigation reaching court. Overall, the passage of the reform was thought to be a positive event for the market in general, as documented by Spiess and Tkac (1997) and Ali and Kallapur (2001), who show that there was a positive market reaction during the legislative passage and signing of the reform. However, Spiess and Tkac (1997) also document an industry effect in the initial reactions. Although disputed by Ali and Kallapur (2001), they find negative abnormal returns for those firms in industries with the highest numbers of lawsuits before the reforms. These findings were supported by Johnson, Kasznik and Nelson (2000), who find that there was a positive reaction to the reforms for most of the high- tech firms in their sample, but there was a negative reaction on average for those firms most likely to be sued.

Our paper diverges from this prior research by showing that when analyzing the impact of these reforms, it is important to consider potential payoffs instead of focusing on industry and governance characteristics. Even for companies that are likely to be sued, when the costs of litigation exceed the potential payoffs, you may find a positive reaction to the passage of the law. We find that the share price reaction to the legislative introduction of the law was significantly related to factors that would influence the potential payoff in a lawsuit. Damages in shareholder litigation are a function of two factors. First is the difference between the firm's inflated value and its "true" long-term value. We proxy for this by taking each firm's market to book ratio at the passage of PSLRA, and normalizing it by the average market to book ratio for that firm over the five preceding years to get a measure of abnormal valuation. The second factor adjusts damages based on "in and out" trades, which is the number of shares purchased during the class period that were then subsequently sold during the class period. The estimate of these "in and out" shares is based on daily volume as a percent of overall float during the class period. When firms have a higher percentage of their outstanding shares trading daily, the estimate of the number of shares damaged will be higher. This should lead to higher damage estimates in litigation. However, it is also means that shares purchased early in the class period are more likely to be treated as in and out trades, and to the extent that overvaluation is higher earlier in the class period, then that could actually decrease damage estimates.

We find that our proxies for these two values are significant predictors of the share price reaction to the passage of PSLRA, even after controlling for other potential factors used to predict litigation risk such as the governance characteristics of the firm, analyst coverage or industry. In fact, after dividing our firms into high (and low) litigation risk portfolios based on industry, we find that consistent with previous research, firms with greater litigation risk did have more negative stock reactions, but it was mainly focused in those firms with abnormally high valuations. Overall, firms trading at low valuation ratios relative to their historical averages reacted positively on average, while there was a significantly negative price response for those firms trading at high relative values. This result is consistent with investors incorporating the option to sue into their valuations, and that this option becomes more valuable as the price rises above its historical average valuation ratios. To the extent that these higher valuations are due to speculation as commonly suggested in the media or literature, it appears that having shareholder litigation as an option contributes to investors being willing to push these values higher. These results are robust to other measures of over-valuation, such as scaled price to book or price to cash flow measures.

An alternative hypothesis could be suggested that it is easier for firms with less analyst coverage or worse governance to cheat. So by making it more difficult to sue, the reforms increased the likelihood that managers of these firms would commit a fraud in the future. And because the existing, long-run shareholders bear the cost of litigation, we would thus expect to see more negative reactions on the part of investors in these firms. However, and contrary to this alternative hypothesis, we do not find the quality of governance or analyst coverage to be significant explanatory variables in any of the quartiles other than the most over-valued. This result is consistent with our hypothesis, where uncertainty regarding the accuracy of the signal increases the probability of a lawsuit and thus its expected value. But like an out of the money option, it wouldn't be exercised without a positive expected payoff based on overvaluation and is therefore not significant in explaining the market response to the passage of PSLRA.

Finally, our results are also economically significant. Based on our overvaluation measure, the average overvaluation for the firms in the highest scaled, market to book quartile was \$272.87 million. At the introduction of PSLRA, this overvaluation was reduced by an average of \$11.75 million, or -4.3 percent. As a comparison, Cox, Thomas and Bai (2008) calculate provable losses of securities class actions prior to PSLRA to have a mean of \$382 million (median equal to \$55 million) and the average settlement to be thirteen percent of provable losses (nine percent median). And Bajaj, Mazumdar and Sarin (2000) find that the amount paid in a settlement relative to the size of potential damages was as high as 15.73% for settlements greater than one hundred million.

HYPOTHESIS ON THE IMPACT OF PSLRA ON FIRM VALUE

As a response to the common perception that nuisance litigation was imposing significant costs on business, Congress introduced the Private Securities Litigation Reform Act on January 4, 1995 with broad, bipartisan support for the bill, including that of President Clinton. And after Congress passed the PSLRA on December 6, 1995, it was expected that it would be quickly enacted. However, on December 19, 1995, President Clinton unexpectedly vetoed the bill, even though there was more than enough support within Congress to override the presidential veto on

December 22, 1995, making it a law. Because of this widespread support, there was little doubt that the bill would eventually pass, which is why we, as well as previous studies, have focused on the introduction date of January 4th as the key date in measuring the market response to PSLRA.

The reforms contain four major changes that significantly affect the ability and incentives of shareholders to sue the firm. The first change creates a "safe harbor" for forward looking statements as long as these statements include adequate cautionary statements. This allows managers to release more information to investors, while making it more difficult for shareholders to use managerial announcements as the cause for a shareholder lawsuit. Second, PSLRA delays the discovery process until after the defendant firm's motion for dismissal. This clause prevents so called "fishing expeditions", where investor-plaintiffs used the discovery process in order to find cause for their lawsuits. This decreases the probability that a suit will be heard, effectively decreasing the likelihood of shareholders recovering damages from the firm. Third, PSLRA limits the amount of liability of corporations. Prior to PSLRA, firms were potentially liable up to three times the damages under the Racketeer Influenced and Corrupt Organizations (RICO) Act. The passage of PSLRA limits the liability of a firm to only the actual monetary damages of the investor. Fourth, under PSLRA, the plaintiff who has the largest stake in the proceedings is given preference to become the lead plaintiff in a class action, and extra compensation to lead plaintiffs beyond their costs is prohibited. By taking preference away from the first plaintiff (and their law firm) who files, this clause was meant to eliminate the races to the courthouse following a decrease in a firm's stock price. Collectively, the passage of PSLRA decreased both the probability of winning the litigation and the potential payoff, therefore lowering the ex-ante value of the litigation option.

Following the release of noisy information into the market, each investor must decide both the validity of the information and the impact it would have on firm value. If some investors (who buy shares after the information release) are able to recover losses in the event that the information is eventually revealed to be false, then the stock is more valuable to them than it is to the existing shareholders of the firm who would have to pay those future damages. If buyers set prices in the market, this could lead to the stock price being higher than its fundamental value. However, it is not certain that this difference in valuation will affect the value of the stock. Because the damages are just a shift in wealth from one set of a firm's shareholders to another set, in the absence of deadweight costs such as legal fees or reputational costs, the overall value of the firm will be unchanged. Thus, the net impact of being able to recover damages will be determined by the price elasticity of demand for new buyers versus the price elasticity of supply for existing shareholders, as well as the proportion of each type. As these things are unobservable, we instead test empirically whether the option to litigate affects market prices by examining the impact the passage of PSLRA had on equity prices when the value of this option was reduced.

If investors do consider this option to sue when determining the price of a firm's equity, we hypothesize that the market reaction to PSLRA will be related to factors that affect potential damage payoffs in litigation. When determining damages in a shareholder lawsuit, participants calculate the difference between the price of a firm's stock during the class period, when the fraudulent information was available to market participants but not yet known to be untrue, and the average price of the stock measured in the period following the revelation of the fraud. The higher price a stock trades at during the class period relative to its post-revelation average, the greater the potential damages in a lawsuit.

This damage estimate is then reduced based on a second factor, which is “in and out” trading during the class period. Because many of the shares purchased at the beginning of the class period will not be held until the end of the class period, these shares are not thought to be damaged by the revelation of fraudulent information. Therefore, damage estimates are reduced downward based on the percentage of trades thought to be in and out during the class period. This reduction is a function of daily volume relative to the total number of shares the firm has available for trading, or the float. When daily volume increases as a percentage of float, it is considered more likely that shares purchased early in the class period would have been sold by the end of the period and potential damages based on price differences early in the class period are reduced. To the extent that overvaluation is greater early in the class period, this could have a marginal negative impact on damage estimates.

Therefore, if investors do consider the option to litigate in setting prices, we hypothesize that the market reaction to the passage of PSLRA will be significantly more negative when the firm is over-valued relative to its historical average and when the firm has a higher percentage of shares trading daily (higher potential damages). This will be true even after controlling for other variables found to be significant predictors of abnormal returns in previous studies, such as industry, governance quality or information opacity. The two main hypotheses we test in this paper are as follows:

H1 *Because shareholder litigation is a real option, the market reaction to the passage of the PSLRA will be related to factors that affect payoffs in litigation.*

H2 *Because options become more valuable as they are deeper in the money, we expect that the market response to the passage of the PSLRA (which reduced the value of this option) will be most negative for those firms trading at the highest valuations relative to their long-term norms.*

On the date PSLRA was introduced, we cannot identify specific firms that were over-valued for use in our tests. Instead, we proxy for this using the market-to-book equity (M/B) ratio, recognizing that previous studies have shown that the market to book ratio can reflect many things, such as industry, potential firm growth or agency problems within the firm. To control for this, we do not focus solely on whether the firm has a high market-to-book ratio; which may or may not be higher than its usual multiple. Instead, we divide each firm’s M/B ratio by its long-term valuation to find those firms where new information or speculation is more likely to have inflated the value of the firm beyond its average levels. We would expect that the option value to sue will be highest for those securities in which high value signals have lead investors to price the shares at higher multiples than usual for that security. We also run the same tests using price to earnings ratios, and our results are robust to the difference in valuation measurement.

These higher multiples could be caused by the announcement of unexpectedly high earnings, a change in perceived rate of growth, or a multitude of other information events to which investors must assign a likelihood of being truthful. Whether caused by speculation, or by rational analysis of the data, this overvaluation is a necessary condition for the option to be valuable. If there is no overpricing, there are no damages to recover in a lawsuit and the option is worthless, regardless of the industry, corporate governance or other factors that typically explain the likelihood of a shareholder lawsuit. We also would suggest that if these high relative valuations are not due to speculation within the market, there is no reason to predict differential market reactions to the introduction of the PSLRA based on firm value.

DATA AND RESEARCH METHODOLOGY

We begin by utilizing all firms listed in CRSP and Compustat at the time of the reform passage in 1995, and then remove all financial and utility firms. We also remove those firms whose price was below five dollars, and are left with a sample of 3,580 firms that we use in measuring the market's reaction to the reforms. We test the effect of the passage by first determining which firms are overvalued relative to their historical levels. As in Barber and Lyon (1997), we determine the M/B ratio of all of the firms by calculating the book-to-market ratio based on market value of equity at the end of the previous calendar year, t-1, and book value of equity reported on a firm's balance sheet in the same calendar year. We average these M/B ratios for the five fiscal years prior to 1995 to estimate the historical M/B values for each of the firms. We define the level of overvaluation as the scaled market to book for each firm at the beginning of 1995 as:

$$ScaledM / B_i = \frac{M / B_{i,1994}}{M / B_{i,Historical}} \quad (1)$$

Where $M/B_{i,1994}$ is the M/B_i of firm i as of December of 1994 and $M/B_{i,historical}$ is the average M/B of firm i over the prior five years. If Scaled M/B_i is greater than one, then the firm's valuation level is higher than its long-term fundamental value. Since we group our firms based on the Scaled M/B relative to other firms, the market level of over/under valuation will only increase or decrease the Scaled M/B for all firms and not affect the relative over/under valuation of the firms in relation to each other.

For robustness, we also sort the firms along two other dimensions. First, we sort the firms by their actual M/B and group them into quartiles. And because the law was passed eleven months after the initial introduction of the legislation, the level of overvaluation may have changed during that time. In order to control for that, we also sort the firms by the November 30, 1995, M/B and scaled M/B characteristics and rerun the study. In each case, the firms with the highest valuations are in the fourth quartile, while those with the lowest are in the first.

Panel A of Table 1 shows the descriptive statistics for each of the portfolios. We see that after sorting our firms into quartiles based upon their scaled M/B, firms in the highest quartile have market to book ratios 41 percent higher than their long-term average. There is significant variation between quartiles, with the third quartile only slightly above its long-term average, while the other two quartiles were trading below their long-term averages. We also find that when the portfolios are sorted solely on M/B the scaled M/B increases monotonically and when the portfolios are sorted by scaled M/B, the M/B of the portfolios likewise increases monotonically. This suggests that even though the composition of the groups change, there is significant overlap between the groups. However, it is worth noting that the firms with the largest market capitalizations are in the third scaled M/B quartile; not the fourth. So although an alternative explanation could be offered suggesting that larger firms are more complex and are thus more likely to have fraud occur, we would then expect to see the most negative reaction to the reforms occurring in the third quartile if that were the case.

In Panel B, we examine industry representation within the quartiles and find that three specific industries dominate the highest valuation quartile. The first is the business equipment industry, which contains firms involved with software development and personal computing, followed by the personal and business service industries. The third is the healthcare industry, which includes the pharmaceutical and bio-tech sectors. These industries coincide with those that Spiess and Tkac (1997) found to have had a negative reaction to passage of PSLRA.

Table 1
DESCRIPTIVE STATISTICS OF EACH OF THE QUARTILES

Panel A shows the equally weighted quartile portfolios when ranked as of year-end 1994. Market Value is the number of shares outstanding multiplied by the share price on December 30, 1994. Book Value is the equity book value. M/B is the market-to-book ratio of the firms based on the book value at the end of the prior fiscal year. Scaled M/B is the M/B scaled by the firm specific average M/B over the previous 5 years. Each panel is broken down into M/B groupings as well as Scaled M/B groupings. Panel B shows the number of firms from each industry that is in the specific quartile. Differences in number of observations are due to some firms' SIC code not corresponding to one of Fama-French's 30 industry classification.

Panel A:

	Quartile	No. Obs.	Market Value	Book Value	M/B	Scaled M/B
Market-to-Book	Low	894	461.57	399.47	1.058	0.857
	2	895	1,300.93	721.46	1.775	0.923
	3	895	1,356.88	493.14	2.722	0.955
	High	896	1,717.13	332.97	8.642	1.098
Scaled Market-to-Book	Low	895	621.05	285.16	2.611	0.563
	2	894	1,140.97	461.82	2.846	0.847
	3	896	1,764.21	680.50	2.842	1.018
	High	895	1,311.00	519.24	5.907	1.406

Panel B:

	Scaled M/B Quartile			
Industry	Low	2	3	High
Food Products	19	28	22	18
Recreation	38	30	19	21
Printing and Publishing	13	20	16	20
Consumer Goods	20	32	24	25
Apparel	19	11	12	10
Healthcare, Medical Equipment, Pharmaceutical Products	115	91	66	56
Chemicals	11	16	33	24
Construction and Construction Materials	33	49	47	47
Steel Works, Etc.	6	29	26	25
Fabricated Products and Machinery	32	36	42	55
Electrical Equipment	31	25	37	34
Automobiles and Trucks	8	21	20	30
Petroleum and Natural Gas	37	60	50	35
Communication	45	31	31	21
Personal and Business Services	118	94	102	97
Business Equipment	81	81	88	145
Business Supplies and Shipping Containers	5	17	32	26
Transportation	25	28	34	27
Wholesale	51	61	49	41
Retail	89	53	62	41
Restaurants, Hotels and Motels	42	27	14	27
Other	57	54	70	70

Consistent with Spiess and Tkac, we examine the market reaction around four event dates. January 4, 1995 was the date the legislation was first introduced in Congress, and December 6, 1995 was the date of the vote passing the final version of the law. December 19, 1995 was the date President Clinton unexpectedly vetoed the bill and on December 22, 1995 Congress overrode the veto and passed the legislation into law. The a priori expectation of the reactions for the high scaled market to book portfolio is: A negative reaction on January 4, December 6 and December 22 and a positive reaction on December 19.

The valuation impact on firms was measured using standard event study methodology. For robustness, we report abnormal returns surrounding each event using the Fama French (1993) and Carhart (1997) four factor models, the market model, as well as raw returns. Since our quartiles are formed on the basis of the market to book ratio, we also estimate the abnormal returns based on the four factor model without the inclusion of the HML loading factor. Other than when calculating raw returns during our event windows, the parameters used for predicting stock returns were estimated over 125 trading days beginning 140 days before the start of the event window. For easy comparison to the results of prior studies, we estimate abnormal returns over three event windows; (-1,1), (-1,0), (0,1), similar to prior studies examining the market response to the PSLRA. Although we only report the results for the period beginning the day before the event date to the day following the event date, our results were similar using any of the three event windows.

We then examine whether the level of overvaluation retained an ability to explain market returns after controlling for other factors previously linked to shareholder litigation, such as industry, the quality of corporate governance and analyst coverage. As a measure of governance quality, we obtain values from Gompers, Ishii and Metrick's (2003) governance index. Peng and Roell (2008) and Johnson, Ryan and Tian (2009) show that managers have more incentive to disclose false information when a greater portion of their compensation is equity based. Therefore, we include a variable measuring the percentage of each CEO's salary that comes from option and restricted stock grants from Execucomp. We then utilize IBES to obtain the number of analyst estimates for each firm, as analyst coverage is often used as an indicator for the information opacity of a firm. Finally, a growing literature is developing that uses the skew of stock returns to measure the willingness of investors to take on additional risk through the purchase of stocks with lottery type attributes. As we are also looking at speculative type behavior, we include the skew of each firm's return as well, measured using daily returns for the year prior to the introduction of PSLRA.

The intersection between the Gomper's, Ishii and Metrick data set, IBES, Execucomp and our previous sample contains 821 firms. We utilize the four factor adjusted returns as the dependent variable in each of our models, although the results are similar using our other returns measures as well.

EMPIRICAL RESULTS

Table 2 reports the abnormal returns at the introduction of the PSLRA. Panel A shows the overall market reaction. Contrary to previous studies, we find a negative reaction to the introduction of the law using raw returns and the market model estimates of abnormal returns. Panel B shows the abnormal returns of each of the quartiles when sorted by the standard market to book ratio. We find, consistent with our hypothesis, that regardless of how abnormal returns are calculated, there is a monotonic decrease in the returns from the smallest market to book quartile to the largest. Additionally, we find that the difference between each of the three quartiles and the fourth quartile is statistically significant. Panel C shows the abnormal returns of each of the quartiles when sorted by the scaled market to book ratio. Again, we find consistent with our hypothesis that there is a monotonic decrease in abnormal returns in the groups. We also find that the differences between the first two quartiles and the fourth quartile are always significant, but the significance is lost in the difference between the third and fourth quartiles. These results are consistent with our hypothesis that there was a strong relationship between overvaluation and market reaction when there was a decrease in the value of the option to sue. Firms with high M/B and high, scaled M/B reacted more negatively to the introduction of the PSLRA.

Table 2
ABNORMAL RETURNS AT ANNOUNCEMENT OF LEGISLATION

Abnormal returns are calculated using the four factor model as specified by Fama and French (1993) and Carhart (1997), the four factor specification minus the HML factor, and the standard market model. Market-to-book quartiles for Panel B are calculated by ranking the market-to-book ratios and grouping the firms within quartiles. Scaled market-to-book quartiles for Panel C are calculated by finding the monthly average M/B for each firm from 1990-1994 and scaling the market to book on the announcement date by each firm's average MB. The scaled MB are then sorted and grouped into quartiles. In order to estimate the Fama-French Carhart factor loadings, we used daily returns from June 1994 until November 1994 to estimate loading factors. The (-1,1) event window results are shown, although other event windows had quantitatively similar results. Mean 4-x is the mean difference between the High quartile and the respective quartile. The final column shows the p-value for a t-test of difference of means between the High quartile and the respective quartile. *,**, and *** represent 10 percent, 5 percent and 1 percent significance respectively.

Panel A: All Firms

	Mean	p-value
Four Factor	0.0014	0.1939
Four Factor - HML	0.0016	0.1410
Market Model	-0.0042***	0.0000
Unadjusted Returns	-0.0032***	0.0008

Panel B: M/B

	Quartile	Mean	p-value	Mean High - x	p-value
Four Factor	Low	0.0084***	0.0001	-0.0145***	0.0000
	2	0.0036*	0.0676	-0.0098***	0.0016
	3	-0.0002	0.9131	-0.006*	0.0608
	High	-0.0062***	0.0098		
Four Factor - HML	Low	0.0096***	0.0000	-0.0177***	0.0000
	2	0.0049**	0.0113	-0.0129***	0.0000
	3	-0.0001	0.9620	-0.008**	0.0138
	High	-0.0081***	0.0012		
Market Model	Low	0.0053***	0.0059	-0.0199***	0.0000
	2	-0.0005	0.7491	-0.0141***	0.0000
	3	-0.0067***	0.0003	-0.0079***	0.0053
	High	-0.0146***	0.0000		
Unadjusted	Low	0.0068***	0.0004	-0.0209***	0.0000
	2	0.0004	0.8029	-0.0145***	0.0000
	3	-0.0059***	0.0011	-0.0082***	0.0034
	High	-0.0141***	0.0000		

Panel C: Scaled M/B

	Quartile	Mean	p-value	Mean High - x	p-value
Four Factor	Low	0.0177***	0.0000	-0.0252***	0.0000
	2	0.0003	0.8601	-0.0078***	0.0066
	3	-0.0050***	0.0080	-0.0025	0.3602
	High	-0.0075***	0.0004		
Four Factor - HML	Low	0.0186***	0.0000	-0.0259***	0.0000
	2	-0.0003	0.8690	-0.0070***	0.0193
	3	-0.0046**	0.0144	-0.0027	0.3244
	High	-0.0073***	0.0005		
Market Model	Low	0.0118***	0.0000	-0.0245***	0.0000
	2	-0.0047*	0.0881	-0.0080***	0.0021
	3	-0.0110***	0.0000	-0.0017	0.4941
	High	-0.0127***	0.0000		
Unadjusted	Low	0.0124***	0.0000	-0.0243***	0.0000
	2	-0.0035*	0.0510	-0.0084***	0.0012
	3	-0.0097***	0.0000	-0.0022	0.3883
	High	-0.0119***	0.0000		

Table 3
ABNORMAL RETURNS AT ANNOUNCEMENT OF LEGISLATION SORTED BY LITIGATION RISK OF INDUSTRY

Abnormal returns are calculated using the four factor model as specified by Fama and French (1993) and Carhart (1997), the four factor specification minus the HML factor, and the standard market model as well as raw returns. Scaled market-to-book quartiles are calculated by finding the monthly average M/B for each firm from 1990-1994 and scaling the market to book on the announcement date by each firm's average MB. The scaled MB are then sorted and grouped into quartiles, and then separated based on whether they are in an industry found in previous studies to have a higher risk of shareholder litigation. In order to estimate the Fama-French Carhart factor loadings, and the market model estimation, we used daily returns from June 1994 until November 1994 to estimate loading factors. The (-1,1) event window results are shown, although other event windows had quantitatively similar results. High – Low is the mean difference between the high litigation risk firms in that quartile and the other firms in that quartile, with the p-value of a t-test of difference of means given. Mean Q4-x is the mean difference between the High quartile and the respective quartile, with the p-value for a t-test of difference of means between the High quartile and the respective quartile given. *,**, and *** represent 10 percent, 5 percent and 1 percent significance, respectively.

Panel A: Four Factor Model

	Quartile	N	Mean	High - Low	p-value	Mean Q4 - x	p-value
High Lawsuit Risk Industries	Low	476	0.0208	0.0049	0.327	-0.0303***	0.000
	2	398	-0.0029	-0.0047	0.265	-0.0065	0.166
	3	403	-0.0050	-0.0007	0.846	-0.0045	0.306
	High	501	-0.0095	-0.0049	0.237		
Low Lawsuit Risk Industries	Low	414	0.0159			-0.0205***	0.000
	2	487	0.0018			-0.0063*	0.088
	3	483	-0.0042			-0.0003	0.927
	High	384	-0.0046				

Panel B: Four Factor - HML

	Quartile	N	Mean	High - Low	p-value	Mean Q4 - x	p-value
High Lawsuit Risk Industries	Low	476	0.0198	0.0046	0.366	-0.0282***	0.000
	2	398	0.0000	-0.0006	0.868	-0.0084*	0.063
	3	403	-0.0041	0.0015	0.688	-0.0043	0.342
	High	501	-0.0084	-0.0019	0.660		
Low Lawsuit Risk Industries	Low	414	0.0152			-0.0217***	0.000
	2	487	0.0006			-0.0071*	0.055
	3	483	-0.0056			-0.0009	0.812
	High	384	-0.0065				

Panel C: Market Model

	Quartile	N	Mean	High - Low	p-value	Mean Q4 - x	p-value
High Lawsuit Risk Industries	Low	476	0.0134	0.0034	0.457	-0.0293***	0.000
	2	398	-0.0072	-0.0047	0.191	-0.0087**	0.031
	3	403	-0.0144	-0.0063**	0.050	-0.0015	0.720
	High	501	-0.0159	-0.0072*	0.061		
Low Lawsuit Risk Industries	Low	414	0.0100			-0.0187***	0.000
	2	487	-0.0025			-0.0062*	0.068
	3	483	-0.0081			-0.0006	0.845
	High	384	-0.0087				

Panel D: Unadjusted Returns

	Quartile	N	Mean	High - Low	p-value	Mean Q4 - x	p-value
High Lawsuit Risk Industries	Low	476	0.0142	0.0038	0.394	-0.0295***	0.000
	2	398	-0.0065	-0.0055	0.121	-0.0088**	0.026
	3	403	-0.0131	-0.0062*	0.055	-0.0022	0.582
	High	501	-0.0153	-0.0077**	0.044		
Low Lawsuit Risk Industries	Low	414	0.0104			-0.0180***	0.000
	2	487	-0.0010			-0.0066**	0.048
	3	483	-0.0069			-0.0007	0.827
	High	384	-0.0076				

Table 3 shows the returns for the same scaled, market to book quartiles, except each quartile is split into two sub-portfolios based on whether the firm is in a high litigation risk industry. Previous research has found that the market reaction was more negative for these firms, and in general, our results would support that. However, we find that it again depends on the level of market valuation. There is a positive reaction to the law in the lower scaled valuation quartiles whether you are in a high risk industry or not. However, among firms in the higher valuation quartiles, those in the high risk portfolios suffered significantly more negative returns than the low risk firms. These results are consistent with the option to sue increasing investor's willingness to speculate, and certainly it is worth more to those shareholders in industries with higher occurrences of shareholder litigation. However, even among the high risk firms, the same monotonic relationship exists that also is found among low risk firms. The higher the valuation of the firm, the more negative the market response to the introduction of the PSLRA.

Table 4
ABNORMAL RETURNS AT KEY DATES FOR PASSAGE OF LEGISLATION

Abnormal returns are calculated using the four factor model as specified by Fama and French (1993) and Carhart (1997). Scaled market-to-book quartiles for Panel A are calculated by finding the monthly average M/B for each firm from 1990-1994 and scaling the market to book on the announcement date by each firm's average MB. The scaled MB are then sorted and grouped into quartiles. Panel B groups the firms into returns skewness quartiles. The previous (I think you did this so I don't know how long). In order to estimate the Fama-French Carhart factor loadings, we used daily returns from May, 1995 until October, 1995 to estimate loading factors. The (-1,1) event window results are shown, although other event windows had quantitatively similar results. Mean 4-x is the mean difference between the 4th quartile and the respective quartile. The t-test column shows the p-value for a t-test of difference of means between the 4th quartile and the respective quartile. *,**, and *** represent 10 percent, 5 percent and 1 percent significance, respectively.

Panel A:

Event Date	Scaled M/B Quartile	Mean	p-value	Mean 4-x	p-value
12/6/1995	Low	-0.0044*	0.068	0.0046	0.144
	2	-0.0031	0.103	0.0032	0.238
	3	-0.0034*	0.054	0.0035	0.183
	High	0.0002	0.917		
12/19/1995	Low	-0.0025	0.251	0.0038	0.198
	2	0.0030*	0.076	-0.0017	0.542
	3	0.0011	0.500	0.0002	0.920
	High	0.0014	0.504		
12/22/1995	Low	-0.0011	0.653	-0.0012	0.700
	2	-0.0011	0.587	-0.0012	0.665
	3	-0.0012	0.502	-0.0011	0.677
	High	-0.0022	0.263		

Panel B:

Event Date	Scaled M/B Quartile	Mean	p-value	Mean 4-x	p-value
12/6/1995	Low	-0.0004	0.862	-0.0020	0.477
	2	-0.0040*	0.060	0.0016	0.561
	3	-0.0039*	0.056	0.0014	0.585
	High	-0.0024	0.204		
12/19/1995	Low	-0.0015	0.427	0.0053**	0.033
	2	-0.0010	0.652	0.0048*	0.073
	3	0.0017	0.367	0.0021	0.397
	High	0.0039**	0.021		
12/22/1995	Low	0.0033	0.106	-0.0057**	0.029
	2	-0.0011	0.622	-0.0013	0.633
	3	-0.0053***	0.009	0.0029	0.252
	High	-0.0024	0.140		

Table 4 shows the abnormal returns around the three December event dates. We report only abnormal returns using the four factor model, but other models were also estimated and were quantitatively similar. As mentioned in the methodology section, these firms have been resorted and grouped based on their M/B and scaled M/B at the end of November as the time between introduction and passage was nearly a full year. We find the results are not as strong as at the

Table 5
ANALYSIS OF SCALED MARKET TO BOOK ON ABNORMAL RETURNS AT INTRODUCTION OF PSLRA

Cross sectional regression of abnormal returns calculated using the Fama and French (1993) and Carhart (1997) four-factor specification, against the value of scaled market to book ratio. Scaled market-to-book ratios are calculated by finding the monthly average M/B for each firm from 1990-1994 and scaling the market to book on the announcement date by each firm's average market to book ratio. Control variables includes the Gompers, Ishii and Metrick (2003) governance index (GIM), the number of analysts (# Analysts), as well as indicators for those industries previously identified in other studies to have had significantly different reactions at the announcement of the PSLRA. p-values are in parenthesis. *,**, and *** represent 10 percent, 5 percent and 1 percent significance, respectively.

	Abnormal Returns: Fama-French four factor adjusted					
	1	2	3	4	5	6
Scaled M/B	-0.0180***	-0.0179***	-0.0117***	-0.0239***	-0.0196***	-0.0123**
	(0.000)	(0.000)	(0.004)	(0.000)	(0.000)	(0.014)
Turnover Percent	0.2095	0.2355	2.017***	0.6597**	1.3064***	1.8113***
	(0.207)	(0.159)	(0.000)	(0.017)	(0.000)	(0.000)
Return Skewness		-0.0002				-0.0002
		(0.130)				(0.282)
GIM			0.0003			-0.0007
			(0.615)			(0.263)
No. Analyst Estimates				0.0001		0.0003
				(0.776)		(0.150)
% Option Compensation					0.0015	0.0046
					(0.783)	(0.509)
Industry Fixed Effects:						
Healthcare	0.0074*	0.0073*	-0.0014	0.0082*	0.0055	0.0064
	(0.052)	(0.057)	(0.795)	(0.058)	(0.303)	(0.326)
Services	-0.0013	-0.0015	0.0026	-0.0014	-0.0018	0.0043
	(0.711)	(0.659)	(0.637)	(0.741)	(0.729)	(0.499)
Electronics	0.0143***	0.0142***	0.0101**	0.0179***	0.0195***	0.0080
	(0.000)	(0.000)	(0.046)	(0.000)	(0.000)	(0.174)
Retail	0.0034	0.0033	-0.0030	0.0051	-0.0008	-0.0064
	(0.425)	(0.450)	(0.587)	(0.288)	(0.894)	(0.313)
Intercept	0.0153***	0.0153***	0.0008	0.0174***	0.0096*	0.0043
	(0.000)	(0.000)	(0.898)	(0.000)	(0.068)	(0.588)
Observations	3,546	3,546	1,016	2,315	1,182	675
R-squared	0.018	0.019	0.055	0.032	0.052	0.071

introduction date. While the sign of the average reaction is what we predicted for the highest valuation quartile, the monotonic relationship between quartiles disappears, as does the significance of the difference between groups. This is likely due to the market already incorporating information relevant to the legislation into prices over the course of the year. Despite this information leakage, we still find in the cross-section that the level of overvaluation is still a significant determinant of the market's reaction.

However, the market reaction to President Clinton's veto on December 19th is very important. Because we are focusing on firms trading at very high valuations, it would be reasonable to suggest that on any random day they would revert back towards their long-term means, and a negative abnormal return over any window should not be a surprise. However, after initially indicating his support for the PSLRA, President Clinton unexpectedly vetoed it instead. In this case, our hypothesis would suggest that the reaction would be positive for speculators, and we would see a negative reaction for low market to book stocks and a positive reaction for high valuation firms. This is indeed what we find, and again, our results support our hypothesis that shareholder litigation encourages speculation in the market.

We then analyze whether our univariate evidence is robust to the introduction of other variables that have been found to be significant factors in explaining the market's response to the PSLRA. Table 5 reports the results of a regression of abnormal returns around the introduction date, January 4, on the Scaled M/B and other explanatory variables. When Scaled M/B and share turnover are the only variables included, the coefficient on Scaled M/B is negative and highly significant, while contrary to our prediction, there is a positive, albeit insignificant, relationship

Table 6
ANALYSIS OF HIGH SCALED MARKET TO BOOK QUARTILE DUMMY ON ABNORMAL RETURNS AT INTRODUCTION OF PSLRA

Cross sectional regression of abnormal returns calculated using the Fama and French (1993) and Carhart (1997) four-factor specification, against an indicator variable that equals one for those firms in the highest scaled, market to book quartile. Control variables includes the Gompers, Ishii and Metrick (2003) governance index (GIM), the number of analysts (# Analysts), as well as indicators for those industries previously identified in other studies to have had significantly different reactions at the announcement of the PSLRA. p-values are in parenthesis. *,**, and *** represent 10 percent, 5 percent and 1 percent significance, respectively.

	Abnormal Returns: Fama-French four factor adjusted					
	1	2	3	4	5	6
Scaled M/B	-0.0126***	-0.0126***	-0.0060*	-0.0127***	-0.0070**	-0.0074*
	(0.000)	(0.000)	(0.061)	(0.000)	(0.047)	(0.051)
Turnover Percent	0.2179	0.2544	2.0407***	0.7282**	1.4382***	1.7908***
	(0.191)	(0.128)	(0.000)	(0.009)	(0.000)	(0.000)
Return Skewness		-0.0058**				-0.0029
		(0.020)				(0.396)
GIM			0.0002			-0.0008
			(0.747)			(0.192)
No. Analyst Estimates				0.0000		0.0003
				(0.976)		(0.144)
% Option Compensation					0.0002	0.0043
					(0.969)	(0.535)
Industry Fixed Effects:						
Healthcare	0.0076**	0.0074*	-0.0017	0.0096**	0.0062	0.0057
	(0.048)	(0.054)	(0.767)	(0.027)	(0.244)	(0.383)
Services	-0.0010	-0.0013	0.0021	-0.0011	-0.0027	0.0039
	(0.772)	(0.701)	(0.696)	(0.793)	(0.609)	(0.542)
Electronics	0.0139***	0.0137***	0.0090*	0.0167***	0.0172***	0.0075
	(0.000)	(0.000)	(0.073)	(0.000)	(0.001)	(0.207)
Retail	0.0040	0.0039	-0.0026	0.0063	-0.0001	-0.0058
	(0.356)	(0.366)	(0.634)	(0.195)	(0.980)	(0.362)
Intercept	0.0011	0.0025	-0.0084	-0.0024	-0.0075**	-0.0042
	(0.506)	(0.157)	(0.110)	(0.330)	(0.014)	(0.534)
Observations	3,546	3,546	1,016	2,315	1,182	675
R-squared	0.013	0.014	0.050	0.020	0.040	0.067

between turnover and the share price reaction at the introduction of PSLRA. This is consistent with our hypothesis that when the overvaluation of the firm is higher, the more negative the impact on firm price will be because of the decrease in the value of the option to litigate. We then add in the various control variables separately, and finally, altogether in the model. And we find that adding the additional explanatory variables changes neither the sign nor the significance of the scaled market to book variable, while the coefficient on turnover retains its sign and gains in significance. In addition, we find that firms in the healthcare and electronics sectors had a significantly positive reaction, consistent with Ali and Kallapur (1997), and inconsistent with Spiess and Tkac (1997). Also, we find that the reaction was more positive for firms with greater analyst coverage. The quality of corporate governance was not a significant factor in any specification.

The relationship between turnover and the reaction to the law is contrary to our predictions, and we propose two potential explanations for why it exists. First, with higher turnover, the likelihood that any one share will be treated as damaged from early in the fraud declines. This is because it will be assumed that it was traded during the class period, and while it is still damaged, the damage estimate will be based on the estimated overvaluation on that date. To the extent that overvaluation is greater early in the fraud period relative to the price at the end, turnover actually can decrease the potential damage estimates for that investor. Alternatively, if investors expect to trade out of their speculative position before a fraud is revealed, then higher turnover allows them to do so without having as much impact on prices for that security.

Table 7
CROSS-SECTIONAL ANALYSIS OF SCALED MARKET TO BOOK ON ABNORMAL RETURNS AROUND FINAL PASSAGE OF PSLRA

Cross sectional regression of abnormal returns calculated using the Fama and French (1993) and Carhart (1997) four-factor specification, against the scaled market to book ratio for each firm. Scaled market-to-book ratios are calculated by finding the monthly average M/B for each firm from 1990-1994 and scaling the market to book on the announcement date by each firm's average market to book ratio. The market to book ratio is calculated based on the price as of November 30, 1995. Control variables includes the Gompers, Ishii and Metrick (2003) governance index (GIM), the number of analysts (# Analysts), as well as indicators for those industries previously identified in other studies to have had significantly different reactions at the announcement of the PSLRA. p-values are in parenthesis. *,**, and *** represent 10 percent, 5 percent and 1 percent significance, respectively.

	Event Date		
	12/6/1995	12/19/1995	12/22/1995
Scaled M/B	-0.0005**	0.0112**	0.0064
	(0.032)	(0.438)	(0.204)
Turnover Percent	-1.6349***	2.4322***	-0.0866
	(0.000)	(0.000)	(0.798)
Return Skewness	0.0003*	-0.0001	-0.0002
	(0.091)	(0.223)	(0.754)
GIM	0.0008*	-0.0007**	-0.0001
	(0.670)	(0.035)	(0.123)
No. Analyst Estimates	0.0001	0.0004	0.0003
	(0.215)	(0.387)	(0.871)
% Option Compensation	-0.0070*	-0.0054***	-0.0009***
	(0.074)	(0.008)	(0.004)
Industry Fixed Effects:			
Healthcare	0.0096	-0.0160	0.0147
	(0.149)	(0.997)	(0.826)
Services	-0.0075**	-0.0011	-0.0000
	(0.021)	(0.252)	(0.972)
Electronics	-0.0112	0.0062	-0.0002
	(0.547)	(0.120)	(0.662)
Retail	0.0032	-0.0091*	-0.0022
	(0.894)	(0.069)	(0.122)
Intercept	0.0009*	-0.0132	-0.0096**
	(0.093)	(0.111)	(0.024)
Observations	673	673	673
R-squared	0.093	0.111	0.024

When examining the range of values for the Scaled M/B ratio, we find that there is not a lot of dispersion in the measure of overvaluation. It could be possible that rather than the level of valuation being important, it is whether or not you are overvalued (and thus in the money) that matters. In order to test this, we create an indicator variable that is equal to one if the firm is in the largest quartile, and zero otherwise. Table 6 reports the results using the same specifications as before, with the exception that the high Scaled M/B dummy was used instead. Consistent with our earlier results, we find that being in the highest valuation quartile lead to a significantly more negative reaction on January 4. When we include the additional variables, the coefficient on the dummy variable remains significant and negative, and the coefficient on turnover remains positive and significant in most specifications. The coefficients on the control variables remained consistent with the previous model specifications using the each firm's actual Scaled M/B value.

In Table 7, we report the results of regressing our Scaled M/B ratio on the abnormal returns surrounding the three December event dates. We find that the coefficient on the scaled market to book ratio is, as predicted, significant and negative on December 16, the day of the final congressional vote. Again, and consistent with our hypothesis, the reaction to the presidential veto was significantly more positive for firms with higher levels of overvaluation. And on the date the veto was over-ridden, they reacted more negatively, but not significantly so. These results clearly support our hypothesis that when the probability of passage increased and the option value to litigate decreased, the market reacted negatively for those firms which were overvalued. And when

Table 8
ANALYSIS OF MARGINAL IMPACT OF GOVERNANCE ON ABNORMAL RETURNS FOR SCALED MARKET TO BOOK QUARTILES

Cross sectional regression of abnormal returns calculated using the Fama and French (1993) and Carhart (1997) four-factor specification, on portfolios sorted based on scaled market to book values of the firms. Control variables includes the Gompers, Ishii and Metrick (2003) governance index (GIM), the number of analysts (# Analysts), as well as indicators for those industries previously identified in other studies to have had significantly different reactions at the announcement of the PSLRA. p-values are in parenthesis. *,**, and *** represent 10 percent, 5 percent and 1 percent significance, respectively.

	Scaled M/B Quartiles			
	Low	2	3	High
Turnover Percentage	2.4432*	0.5366	1.1048	2.2514***
	(0.098)	(0.601)	(0.105)	(0.006)
Return Skewness	-0.0007	-0.0003	0.0000	0.0000
	(0.365)	(0.416)	(0.874)	(0.985)
GIM	0.0000	-0.0004	0.0004	-0.0027**
	(0.0997)	(0.715)	(0.679)	(0.011)
No. Analyst Estimates	-0.0003	0.0003	0.0000	-0.0099***
	(0.707)	(0.391)	(0.961)	(0.006)
% Option Compensation	0.0099	0.0093	0.0117	-0.0083
	(0.662)	(0.454)	(0.319)	(0.500)
Industry Fixed Effects:				
Healthcare	0.0126	0.0123	-0.0042	0.0070
	(0.485)	(0.297)	(0.714)	(0.620)
Services	0.0225	-0.0109	0.0020	0.0014
	(0.340)	(0.412)	(0.836)	(0.894)
Electronics	0.0447	0.0064	0.0145	0.0009
	(0.151)	(0.642)	(0.129)	(0.916)
Retail	0.0005	-0.0004	-0.0084	-0.0176
	(0.978)	(0.975)	(0.417)	(0.255)
Intercept	-0.0047	-0.0067	-0.0172	0.0025
	(0.838)	(0.563)	(0.120)	(0.830)
Observations	105	166	218	186
R-squared	0.117	0.047	0.055	0.149

the probability of passage decreased and the option value to litigate increased, the firms which were overvalued received a more positive market reaction.

Overall, these results confirm our two hypotheses that the market does incorporate the option to sue into prices, and that the response to key events during the passage of the PSLRA would be dependent on factors that determine the value of payouts in litigation. But prior research has shown that corporate governance and the information environment of the firm will play a role as well. Certainly, the option to sue should be most valuable when there is greater uncertainty regarding the truthfulness of information released by the firm. But similar to high- risk industries, an alternative hypothesis could be suggested that firms with worse corporate governance or information environments would also be the most likely to cheat in general, and given that PSLRA made it more difficult to punish them, investors of these firms would react more negatively in general to the introduction of PSLRA. In this case, we should see a direct relationship between a firm's corporate governance and information environment and the initial market reaction to the introduction of the law. However, our model would indicate that these factors are marginal and most relevant when investors are speculating on the firm's value to begin with. If there is no mispricing, there are no damages to recover regardless of how bad governance is.

Therefore, we predict that these factors are more important for firms in the highest valuation quartile, where speculation is the most likely to be occurring. In Table 8, we report the results of a regression of our return measure on the governance index variable, number of analysts, and other control variables for the firms in each of the four quartiles. Consistent with our hypothesis, we find that in our highest valuation quartile, firms with fewer analysts and worse corporate governance had a significantly more negative reaction to the introduction of PSLRA.

On the other hand, this was not the case in the other three quartiles where they were insignificant factors in explaining the market's response. This is again consistent with a real option explanation, and when combined with the results in Table 3, does not support the market reaction being based solely on litigation becoming more likely for firms in high risk industries, firms having bad governance, or firms having poor information environments. While these factors are relevant, there must be overvaluation for a shareholder lawsuit to have value.

CONCLUSION

Shareholder lawsuits allow speculators to invest in firms based on uncertain information with the belief that they may be able to recover a portion of their losses through litigation. By passing PSLRA, Congress effectively decreased the option value to sue, and reduced the anticipated payoff from speculation. Our findings show that during the events leading up to the passage of PSLRA, the market response depended a great deal on the level of overvaluation for a firm. We find that when the reform bill was introduced, decreasing the value of the option to litigate, firms who were more likely to be overvalued and had relatively low turnover suffered worse losses in the market. As these factors are used to determine payoffs in shareholder litigation, we conclude that the option to sue was incorporated into market prices. Not surprisingly, this option was most valuable for investors in high litigation risk industries, and those with worse information environments. Therefore the losses were exacerbated by these factors, but for the most part only for those with the highest levels of overvaluation where there was the potential for a positive payoff in litigation. For firms trading closer to their long-term valuation levels, corporate governance or industry has little ability to predict the market response to the securities litigation reforms.

These results give credence to the belief that the ability to sue ex post increases the willingness to speculate on firm value ex ante. Potentially, this could also distort the cost of raising equity for firms, leading firms to over-invest in marginal projects. Also, our results illustrate a heretofore overlooked negative cost imposed upon markets by shareholder litigation, in comparison to the potential benefits it creates as a deterrent against managerial malfeasance.

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POTENTIAL FINANCIAL EFFECTS OF THE 2015 CORPORATE TAX REFORM OF JAPAN TO ELECTRONICS COMPANIES WITH COMPARISON TO SOUTH KOREA

Abraham R. de Guzman, Ritsumeikan Asia Pacific University
Won Jae Kim, Ritsumeikan Asia Pacific University

ABSTRACT

In an effort by the Japanese government to restore its weak economy, majority of corporate tax amendments and reforms since 2011 were driven towards reducing the financial burden on companies. We focus on the potential financial effect(s) of the corporate tax reforms mentioned in the following documents: (1) Basic Policies for the Economic and Fiscal Management and Reform 2014 (the "Honebuto no Houshin") and (2) the discussion paper outlining views on future corporate tax reform (the "Discussion Paper") released by the Corporate Tax Discussion Group (CTDG) of Japan's Government Tax Commission. We simulate how the 2015 tax reforms for Japan impact its electronics-manufacturing industry financially by assuming the specific tax changes on the reported historical financial information from 2002 to 2014 of the 12 actively traded electronics-manufacturing corporations (12EMC) in the Tokyo Stock Exchange (TSE). Likewise, a similar simulation is performed for South Korea's 2015 tax reforms and selected electronics-manufacturing corporations.

We hypothesize that the tax reforms individually and/or collectively will result to: (H1) potential tax benefits for Japan; and (H2) potential tax losses for South Korea, i.e. in line with the amendments' intentions to create economic virtuous cycles and encourage fair competition for Japan and South Korea. Simulation results prove contrary to expectation for Japan as its electronics-manufacturing industry suffered overall potential losses after applying the tax reform items to 12EMCs' historical financial data. Therefore, the expectations for the 2015 corporate tax amendments do not show positive economic impact due to the two major amendments – (1) the reduced effective corporate tax rate; and (2) the net operating losses (NOL) allowable deduction – being dependent on the profitability of corporations. On the other hand, as expected and inasmuch as the South Korean tax reforms are created to prevent monopoly by promoting usage of excess earnings, overall potential losses were noted for its electronics-manufacturing companies' historical financial data.

Keywords: Japan, South Korea, tax reform, and electronics industry

BACKGROUND

Since the great Tohoku earthquake of 2011, the Japanese government's corporate tax reforms have been directed towards the recovery of Japan's economy. Taxation aids are particularly visible on how the government immediately approved a bill in 2011 to reduce the effective tax rate for corporations despite the concurrent approval of the Special Restoration Tax Law requiring the payment of surtaxes. Furthermore, upon the re-election of Shinzo Abe as

Prime Minister on December 2012, contained in his Abenomics initiatives is the early termination of the aforementioned corporate surtax. Moreover, the scheduled 35.64 percent effective corporate tax rate was implemented a year ahead by April 1, 2015. Developments and discussions about Japan's corporate taxation reforms during 2014 also leaned towards simplified and industry-neutral taxation rules.

The Japanese Cabinet approved the "Basic Policies for the Economic and Fiscal Management and Reform 2014" or the *Honebuto no Houshin* on June 24, 2014. It targets to reduce the effective corporate tax rate in the range of 20 to 30 percent over the next years with the first reduction scheduled for the 2015 tax reform. A reduction in corporate tax rate must be coupled with and increased taxable base for the Japanese government to maintain a consistent stream of government revenues. As a result, the Corporate Tax Discussion Group (CTDG) of Japan's Government Tax Commission recommended the abolishment or reduction of the following benefits being enjoyed by eligible corporations: (1) tax incentives (special depreciation, tax credit and etc.); (2) net operating loss ("NOLs") deductions; (3) dividend income non-taxation; (4) depreciation methods; (5) deduction of local tax payment for corporate income tax calculation; (6) preferential tax measures for SMEs; and (7) local tax regime.

Purpose of the study

We analyze how the 2015 tax reforms for Japan impact its electronics-manufacturing companies financially by simulating the specific tax changes on the reported historical financial information of corporations within the industry. Moreover, corporate tax reforms for South Korea are examined and executed for its selected electronics-manufacturing companies. The simulation results are then utilized to ascertain whether amendments intentions occurred for the collected historical data. This aims to guide corporate decision makers as to the appropriate preparation they may do in response to tax changes, and inspire further researches for items, which may not be considered in this study.

Scope and limitation

We attempt to measure potential individual and net collective financial impacts of the 2015 corporate tax reform on Japanese companies by re-computing amended taxable items of historical financial data from 2002 to 2014 for the top 12 actively trade electronics-manufacturing corporations (12EMC). See Appendix 1 for the list of 12EMC's financial performance for 2014.

On the other hand, we also simulate the 2015 corporate tax reform of South Korea to its two actively traded electronics-manufacturing companies (SKEMC): (1) LG Electronics, Inc., and (2) Samsung Electronics Co. Ltd.

REVIEW OF RELATED LITERATURE

Japan's Electronics Industry

According to Japan Electronics and Information Technology Industries Association (JEITA) statistics for 2014, the country's total electronics production amounted to JPY11.80 trillion or six (6) percent of the JPY207.63 trillion global output.

From 2002 to 2007, Japan's electronics industry (JEI) maintained a relatively constant level of production, exports, and imports. However, due to the adverse financial collapse spawned by the 2008 Lehman shock to industries worldwide, JEI's production plummeted from JPY18.58 trillion to JPY13.61 trillion by 2009. In response to the previous, the Japanese government approved an industrial competitiveness enhancement act to establish organizations that will support companies who incurred sizable losses (Ono, 2010). However, this revitalization for companies was short-lived due to the Tohoku Earthquake on March 2011. JEI's productivity went down from JPY15.33 trillion to JPY13.04 trillion. The 2011 earthquake halted JEI's operations for several months. Inasmuch as JEI's production accounts for 20 percent of global semiconductor sales as well as 60 percent of the total supply of wafers to manufacturers, the material impact of the production stoppage was felt by the world (PwC Japan, 2011). The following years, continuing production declines were recorded for JEI even amidst growth in global demand for smartphones and tablets. Furthermore, market leaders for video screen and television appliance – Sony, Panasonic, and Sharp – lose their shares to two growing powerhouses from South Korea, Samsung and LG electronics, holding 23 percent and 13 percent of the world's total market coverage (Viera, G., 2012). This shift can also be seen in Japan's increasing imports for electronics from 2012, see Figure 1.

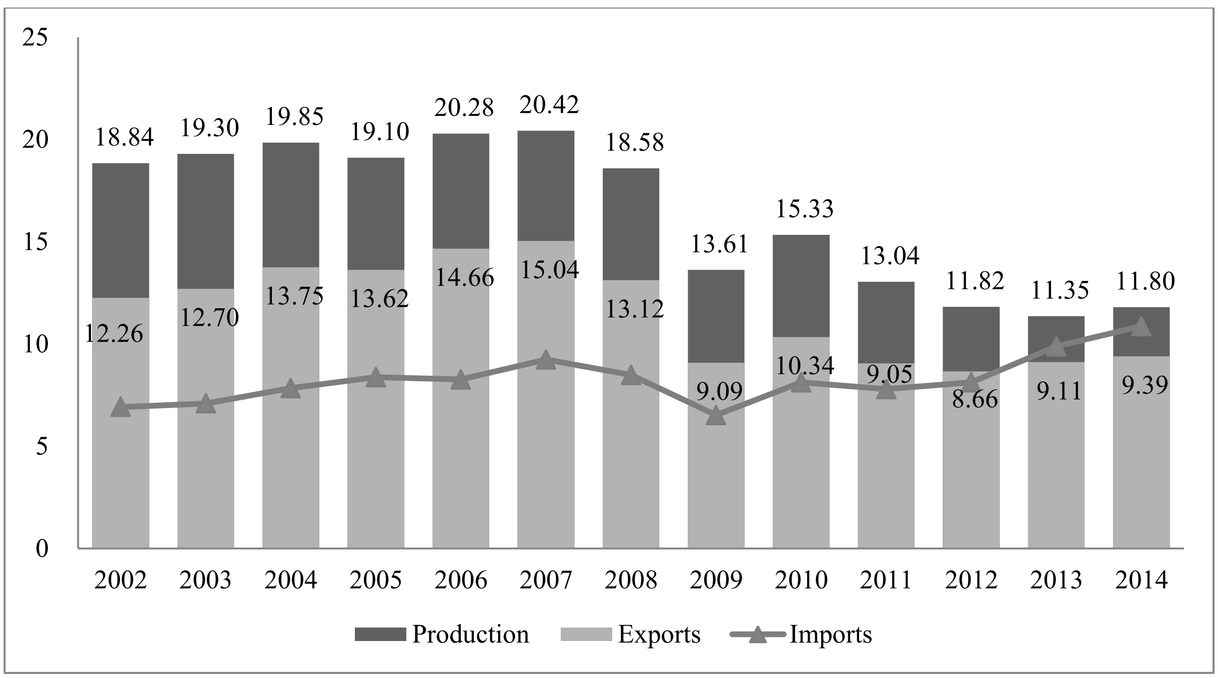


Figure 1: Production, Exports, and Imports by Japan's Electronics Industry
from 2002 to 2014 (in trillions JPY)

Japan's 2015 Corporate Tax Reform

The ruling majority parties of the legislative body of Japan, i.e. the Liberal Democratic Party and Komeito (The Liberal Democratic Party of Japan, 2015), approved the 2015 Tax Reform Proposal (2015TRP) of Japan. It targets to provide measures to help reach *economic virtuous cycles* for Japanese corporations by reducing the effective tax rate starting fiscal year

2015 (PwC Japan, 2015). Cross matching the approved tax reforms with the proposed tax base expansion measures by the CTDG after the approval of the 2014 *Honebuto no Houshin* on 24 June 2014 are presented on table 1 below.

Table 1 **STATUS OF CTDG PROPOSED MEASURES AFTER APPROVAL OF JAPAN'S 2015 TAX REFORM**	
Tax measure	Status
1. Tax incentives (special depreciation, tax credit and etc.)	Approved
2. Net operating losses (NOL/s) deductions	Approved
3. Dividend income non-taxation	Approved
4. Depreciation methods	Pending
5. Deduction of local tax payment for corporate income tax calculation	Pending
6. Preferential tax measures for SMEs	Approved
7. Local tax regime	Approved

Provisions contained in the 2015TRP officially took effect by April 2015 as published in Japan's Ministry of Finance Tax Reform Policy web pages. Detailed discussion of the reduced effective corporate tax rate and corresponding tax measures to increase the tax base follows and are presented in appendix 2.

Reduced Effective Corporate Tax Rate (RECTR) and Local Tax Regime

Starting fiscal year 2015, the effective corporate tax rate of 35.67 percent drops to 33.06 percent. This new rate further decreases to 32.26 percent by fiscal year 2016. The local tax regime base widening measure by the CTDG – increases in the size based taxes, i.e. value added base, and capital base tax rates – are already considered in the aforementioned effective rates.

Net Operating Losses (NOL) Deduction

Under the old tax system, corporations incurring net losses from operations were allowed 80 percent of which to be deducted on the succeeding income earning years, with any creditable excess permitted to be carried over within nine (9) years following the initial recognition of the NOL credit. According to the tax reform, net operating losses by corporations are only 65 percent creditable for fiscal years 2015 and 2016 with the same carryover period provision for any excess credits over nine years. Consequently, by fiscal year 2017, any operating losses incurred will only be 50 percent deductible from succeeding income earning years matched by a year increase in carryover period of up to 10 years.

Dividend Income Exclusion (DivEx)

For fiscal year 2014 and earlier, dividends income exclusion percentages almost parallel to the *equity method* and *market method* for subsidiary accounting. Under the equity method, a parent corporation holding 20 percent or more interest in a subsidiary has significant influence over the financial and operating activities of the investee (Weygandt, Kimmel, Kieso, 2013). Congruently, dividends from subsidiaries under significant influence are recorded as a deduction from the recognized investment amount in the balance sheet of the parent company. Alternatively, market method has dividends received from investments without significant influence posted as other income in the income statement of the parent (Macabacus LLC, 2015). Specifically, under Japan's old rule, 25 percent or more interest guarantees the complete exclusion of dividends received from subsidiaries. On the other hand, dividends from investments below 25 percent control are allowed 50 percent exclusion for tax purposes.

However, the new rule carrying the intention of increasing the taxable base for corporations became stricter in defining subsidiary control requirement to allow 100 percent dividends income exclusion. A parent corporation must now own more than one third interest over its investee to claim an entire exclusion of dividends income. Furthermore, the new tax reform creates two new levels for partial exclusion of dividends income, i.e. five (5) percent to less than 1/3 ownership to claim for 50 percent exclusion, and less than five (5) percent ownership for 20 percent exclusion.

Tax incentives changes – Permanent Research & Development Incentive (PR&D)

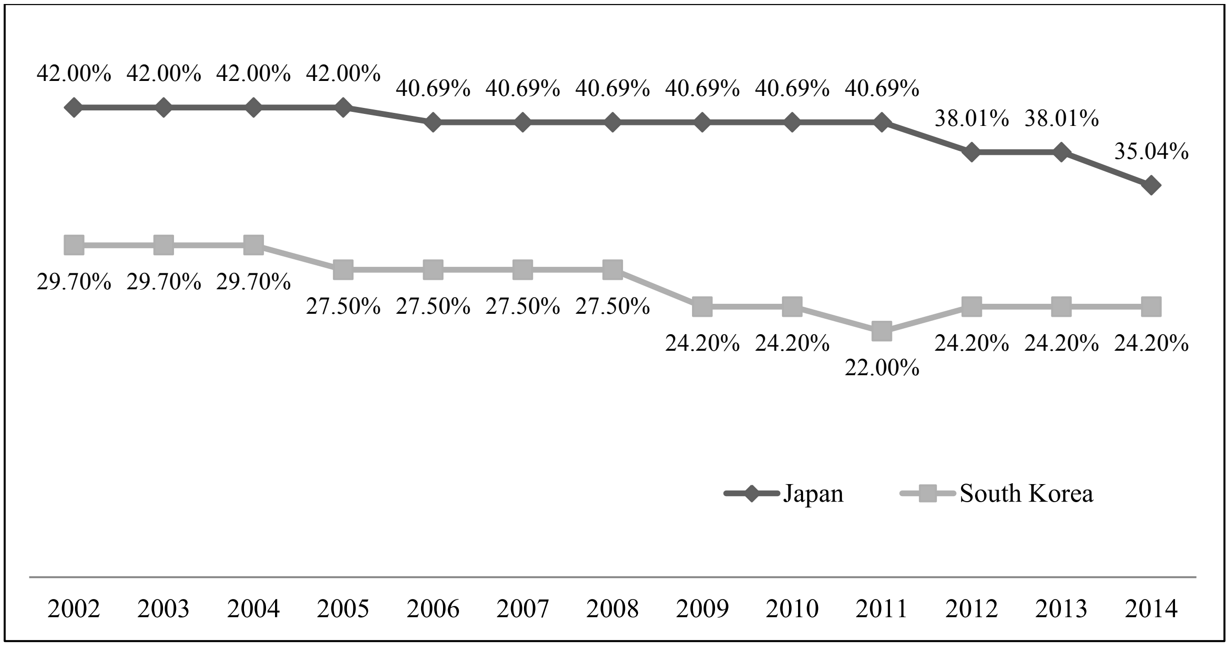
According to the old corporate tax rules, corporations were given incentives equivalent to eight (8) percent to 10 percent of their Research & Development (R&D) expenditures subject to a creditable limit amounting to 30 percent of the corporate tax obligation for the year under consideration. Any excess incentives after reaching the creditable limit were then permitted to be credited or carried-over towards the succeeding corporate income tax paying year. Conversely, under the new tax reform, the aforementioned 30 percent creditable limit for R&D tax incentives is further reduced to 25 percent, with any corresponding excess no longer valid for carry-over the following year.

Tax incentives changes – Temporary Research & Development Incentive (TR&D)

On top of the PR&D, corporations are provided additional temporary R&D tax credits valid within April 1, 2013 to March 31, 2017. These TR&Ds are equal to whichever is higher of (a) five (5) percent to 30 percent of the corporation's incremental R&D; or (b) R&D costs in excess of 10 percent of average sales multiplied by a mechanically calculated *tax credit ratio* that changes depending on the relationship of R&D expenditures and average sales. The higher amount between the two aforementioned is then subject to a creditable limit matching to 10 percent of the corporate tax obligation for the year under consideration. Upon enforcement of the tax amendments by fiscal year 2015, there are no changes concerning the rules of the TR&D except for the non-renewability of its period of enforcement.

Japan and South Korea's historical effective corporate tax rates

The comparison of historical effective corporate tax rates between Japan and South Korea is presented in Figure 2. Japan's trend reflects its government aim to reduce the effective corporate tax rate. On the other hand, the lowest effective corporate tax rate recorded for South Korea was for 22 percent in 2011, which immediately increased back to the current 24.20 percent by 2012.



Source: KPMG, 2015

Figure 2: Effective Corporate Tax Rates for Japan and South Korea from 2002 to 2014

South Korea's 2015 Corporate Tax Reform

Features of the 2015 corporate tax reforms for South Korea include changes targeted to increase government revenues via additional surtax, revision of penalties for noncompliance with certain administrative procedures, and reduction of the tax incentive for R&D.

Additional Surtax to facilitate the use of Retained Earnings (ASRE)

To encourage utilization of excess retained earnings to fund facility investments, salary increases, and more dividends distribution, the South Korean government levies a 10 percent surtax to corporations with excess earnings amounting to 50 billion Korean Won (KRW) and belonging to industries subject to the Act of Monopoly Regulation and Fair Trade (Samil PwC, 2014). Detailed information concerning the surtax computation is presented in Appendix 3.

Administrative Purposes Tax Reforms (APTR)

Tax administration reforms concerning changes in foreign tax credit rules, particularly, credit limitation, indirect foreign tax credit, and extended period for submission of foreign tax credit reports, were approved for tax year 2015 (Samil PwC, 2014). Moreover, penalty changes relating to the extension of corporate tax return filing and non-compliance with reporting requirement of overseas property holdings were added.

Research and Development Tax Credit (R&DTC)

Starting tax year 2015, the operative tax credit rate for R&D has been lowered (Samil PwC, 2014), so from three (3) percent tax credit, large corporations can only credit approximately two (2) percent of their R&D expenditures.

HYPOTHESES

Considering the potential financial impact of the corporate tax reforms, the simulation was performed using historical financial information from 2002 to 2014 of the corporations within the electronics-manufacturing industries for the two countries. We, therefore hypothesize that:

H1 *the 2015 corporate tax reform of Japan, in line with the intention of creating economic virtuous cycles, will bring an overall potential tax benefit for its electronics-manufacturing companies.*

H2 *the 2015 South Korean tax reform will result to potential tax losses for its electronics companies in accordance with Mill's 1848 concept of equality of sacrifice, wherein levied amount is proportionate to earned benefits. Specifically, South Korean changes are promulgated to protect its industry from monopoly by certain corporation/s and promote usage of excess corporate earnings to invest in facilities, pay higher salaries, and distribute more dividends.*

These are the a-priori expectations based on the primary intentions of the tax reforms. Results contrary to expectations for Japan would mean that the approved tax base widening measures by CTDG are then significant with regard to the historical financial data of the 12EMC. On the other hand, outcomes opposite the expectations for South Korea will not occur because the tax reforms focuses on means to discourage monopoly via excess earnings, i.e. obligations will either remain the same or become higher due to probable penalties or noncompliance to certain rules in the amendments.

METHODOLOGY

To simulate the potential financial effect of the tax reforms presented in the previous sections, we have performed the following simulation procedures:

1. Gathered the financial records of the 12EMC and SKEMC for the period covered, i.e. from 2002 to 2014
2. Performed descriptive statistics to ensure integrity of data
3. Normalized data for consolidation purposes
4. Simulated the effects of applicable tax reforms:
    a. Applied the reduced effective tax rate to historical taxable income
    b. Computed the NOLs deductions for corporations incurring losses
    c. Computed if dividends received from affiliates are deductible from tax obligation
    d. Computed applicable R&D incentives
5. Consolidated results and determined if the individual and combined effects of the tax reform/s will support the creation of economic virtuous cycles for Japan's 12EMC, and promote usage of excess earnings for SKEMC.

Financial records were derived from the S&P Capital IQ web-based online database using Japanese Yen (JPY) as the functional currency for simulation purposes. Consequently, to ensure completeness and integrity of information we used for the simulation, we performed descriptive statistics of data inputs and had the information verified in the published reports of the respective sampled corporations. See tables 6 to 9 for the variable label dictionaries and descriptive statistics summaries.

Table 2
VARIABLE LABEL DICTIONARY FOR 12EMC SIMULATION DATA

Variable label	Description
firm	
1	Alps Electric Co. Ltd. (Alps)
2	Canon Inc. (Canon)
3	Fujifilm Holdings Corporation (Fujiflim)
4	Hitachi Ltd. (Hitachi)
5	Nikon Corporation (Nikon)
6	Panasonic Corporation (Panasonic)
7	Pioneer Corporation (Pioneer)
8	Ricoh Company, Ltd. (Ricoh)
9	Sharp Corporation (Sharp)
10	Sony Corporation (Sony)
11	Toshiba Corporation (Toshiba)
12	Yamaha Corporation (Yamaha)
year	Tax year
nectr	New effective corporate tax rate
oectr	Historical effective corporate tax rate
tct	Tax obligation
ni	Net income
di	Dividend income
r&d	Research and development
rev	Revenues

Table 3
DESCRIPTIVE STATISTICS FOR 12EMC SIMULATION DATA

Variable	Obs	Mean	Std. Dev.	Min	Max
firm	156	6.5	3.46317	1	12
year	156	2008	3.753708	2002	2014
newectr	156	0.3232154	0.0021386	0.3226	0.3306
oldectr	156	0.4024615	0.0197906	0.3504	0.42
tct	156	57073.24	53446.2	1507	264258
ni	156	21444.16	187450.5	-787337	488332
di	156	6846.795	6737.063	281	34272
rd	156	221431.5	178277.8	21736	615524
revenue	156	3526646	2933116	356616	1.03E+07

Table 4
VARIABLE LABEL DICTIONARY FOR SKEMC SIMULATION DATA

Variable label	Description
firm	
1	LG Electronics Inc. (LG)
2	Samsung Electronics Co. Ltd. (Samsung)
year	Tax year
ectr	Historical effective corporate tax rate
tct	Tax obligation
payroll	Salaries paid
tdp	Dividends paid
r&d	Research and development

Table 5
DESCRIPTIVE STATISTICS FOR SKEMC SIMULATION DATA

Variable	Obs	Mean	Std. Dev.	Min	Max
firm	26	1.5	0.509902	1	2
year	26	2008	3.815757	2002	2014
ectr	26	0.2631538	0.0254522	0.22	0.297
tct	26	161495.1	191068.7	18154.56	742938.1
payroll	26	1531069	935316.3	546977	4110159
tdp	26	60484.29	60713.96	0	245197.3
rd	26	458792.9	393015.1	38619.45	1578978

Simulation procedures and assumptions - Japan

Reduced effective corporate tax rate simulation

To arrive at taxable income, we divided the historical effective corporate tax rate to the applicable corporate tax obligation for the years covered by the simulation, i.e. 2002 to 2014. Consequently, we multiplied the new effective corporate tax rate to the computed income for tax purposes. The resulting difference between the actual income tax obligation and the computed tax obligation under the new effective corporate tax rate is the recognized potential tax benefit for the simulation.

Net operating losses (NOL) deduction

We applied the new rules for the previous year/s' incurred losses. Moreover, we further assumed that there is no government involvement under the process of tax credit timing. The simulation was done under the assumption that corporations had received permission to use any cumulative tax credit amount for the immediately following income reporting year.

Dividend Income

All dividends accounted for under the equity method, i.e. treated as a deduction in the Investment account of the Balance Sheet, are 100 percent deductible. On the other hand, dividends income recognized in the Income Statement are considered as dividends from corporations wherein the parent only holds below five (5) percent control of the investee.

Research & Development (R&D)

All reported R&Ds are applicable for permanent and temporary tax incentives. Although the creditable amount for tax purposes is stipulated as within the eight (8) percent to 10 percent range, we assumed that all corporations would receive the maximum creditable limit for R&D incentives. This is due to the fact that electronics-manufacturing companies reported relatively consistent R&D amounts annually based on their historical financial data. Moreover, their industry is a significant contributor to Japan's growth with production of JPY11.8 trillion or six (6) percent of world's electronics output (JEITA, 2014).

Simulation procedures and assumptions - South Korea

Additional surtax to facilitate use of corporate retained earnings

We performed the same procedures done for the Japanese corporations' simulation in computing for the taxable income of South Korean corporations. From the two methods mentioned in the South Korean tax reform, we applied the second one in the simulation, wherein:

((Taxable income for the year x 30%) – (the total amount of payroll increases and dividend payments)) x 10%

The second method is preferred due to the fact that the first method requires information that are not available from public information, e.g. interest income received on refunds of overpaid national taxes, statutory reserve transfers, disallowed donations, etc.

Administrative Purposes Tax Reforms (APTR)

Tax administration reforms were not considered in the quantitative simulation of potential financial effects as any amount resulting from these penalties is contingent on the future probabilities of delayed submission or noncompliance of the sampled corporations.

Research & Development (R&D)

All reported R&D expenditures are applicable for tax incentives simulation.

SIMULATION RESULTS

The consolidated corporate tax reform simulation results for Japanese electronics corporations are presented in Table 6. As expected, reductions in the effective corporate tax rate result to potential tax benefits for recomputed financial data from 2002 to 2014. Conversely, reductions of allowable tax incentives or exclusions (limitation on NOL deduction, reduced dividend income exclusion, and reduction of R&D tax incentive) result to potential tax losses. Overall, 12EMC incurred a potential tax loss amounting to JPY971 billion, contrary to our first hypothesis (H1) that the electronics-manufacturing companies of Japan will have an overall potential tax benefit after the simulation. Among the four major tax reform items of Japan, the reduction of the effective corporate tax rate, and the limitation on the NOL deduction, are the significant figures in the simulation. Both reforms resulted to more than JPY1.75 trillion, or four (4) percent of the industries JPY42.77 trillion contributions to the Japanese economy for 2014.

From an individual company standpoint, Canon is the highest potential benefit gainer with JPY263 billion. This is due to the fact that it is not affected by the reduction on the NOL limit. In other words, Canon is the sole corporation within the industry that did not report any loss from 2002 to 2014. Next to Canon are two corporations who only reported a loss for one period within the simulation, Ricoh and Fujifilm. Since Canon, Ricoh, and Fujifilm are the top performing corporations within the simulation period, it proves how greatly favorable the reduced effective corporate tax rate reform is for profitable corporations.

On the other hand, Panasonic is the largest potential loss receiver with JPY545 billion. This loss is attributable to Panasonic reporting net losses six times (2002 to 2003, 2009 to 2010, and 2012 to 2013) for the past 13 years. Next to Panasonic are Sharp, Hitachi, and Sony*, reporting large losses for over three (3) periods during the simulation period. These losses are also reflected in the declining productivity of JEI, see figure 1. Results for Panasonic, Sharp, Hitachi, and Sony exemplifies how significantly unfavorable the NOL tax reform is for corporations that will report net losses in the coming years. Thus, the NOL reform heavily contradicts the creation of economic virtuous cycles brought about by the reduced effective tax rate for non-performing corporations.

**Note: Although historical data used in the simulation for Sony contains its other profitable segments like financial services, music, and pictures. Majority of Sony's results still relates to its core electronics-manufacturing segments.*

Table 6
CONSOLIDATED CORPORATE TAX REFORM SIMULATION RESULTS FOR JAPAN'S 12EMC
from 2002 to 2014 (in millions JPY)

	Net assets	Reduced corporate tax rate	Limitation on NOL deduction	Reduced dividend income exclusion	Change in R&D tax incentive	Potential Tax Benefit (Losses)
Alps Electric Co. Ltd.	230,380	21,269	(23,142)	(3,734)	(5,464)	(11,071)
Canon Inc.	3,140,758	414,002	-	(48,060)	(102,917)	263,025
FUJIFILM Holdings Corp.	2,198,223	124,025	(11,532)	(30,809)	(30,508)	51,176
Hitachi Ltd.	3,852,464	300,812	(368,142)	(25,379)	(78,094)	(170,803)
Nikon Corporation	546,812	40,096	(5,907)	(6,338)	(10,412)	17,439
Panasonic Corporation	1,586,438	201,978	(669,739)	(25,328)	(52,047)	(545,136)
Pioneer Corporation	77,816	20,988	(98,380)	(9,618)	(5,055)	(92,065)
Ricoh Company, Ltd.	1,094,396	112,804	(13,368)	(14,363)	(28,165)	56,908
Sharp Corporation	207,173	88,168	(314,171)	(19,654)	(22,041)	(267,698)
Sony Corporation	2,787,256	271,509	(294,820)	(75,722)	(68,900)	(167,933)
Toshiba Corporation	1,652,327	146,765	(147,093)	(56,049)	(37,427)	(93,804)
Yamaha Corporation	274,842	16,577	(18,016)	(5,377)	(4,141)	(10,957)
Total	**17,648,885**	**1,758,993**	**(1,964,310)**	**(320,431)**	**(445,171)**	**(970,919)**

The results for the SKEMC tax reforms simulation are presented in table 7. The nature of the tax reforms greatly affects the results as the major change, i.e. the additional surtax for corporations with net equity in excess of more than KRW50 billion, is geared towards prevention of monopoly by a single firm within the industry. In other words, Mill's 1848 concept of equality of sacrifice was observed under South Korea's government revenue collection reform. As a result, SKEMC posted potential losses amounting to JPY225 billion in our simulation, with Samsung sharing over 80 percent or JPY186.94 billion of these potential losses.

Table 7
CONSOLIDATED CORPORATE TAX REFORM SIMULATION RESULTS FOR SKEMC
from 2002 to 2014 (in millions JPY)

	Net asset	Additional Surtax	Change in R&D tax incentive	Potential Tax Benefit (Losses)
LG Electronics Inc.	1,425,926	(15,599)	(23,058)	(38,657)
Samsung Electronics Co. Ltd.	18,449,653	(90,708)	(96,228)	(186,936)
Total	**19,875,579**	**(106,307)**	**(119,286)**	**(225,593)**

CONCLUSION

In conclusion, ceteris paribus, our simulation with potential tax losses of JPY971 billion corroborates that the collective corporate tax reforms of Japan negatively impacts its electronics-manufacturing companies. This is due to the fact that the two largest reforms are dependent on the financial performance of the corporations. For the reduced effective corporate tax rate, more benefits result for corporations reporting consistent positive bottom lines. On the other hand, the NOL tax reform produce more disadvantages for corporations who suffer net losses. This is due to the fact that a mere three percent reduction in effective corporate tax rate cannot offset the impact of a 15 percent and 30 percent reduction in allowable tax deduction from reported net losses.

As expected, South Korea's tax reform aim on neutralizing certain corporation's monopoly of an industry is apparent in the negative impact of JPY225 billion potential losses for its electronics-manufacturing industry players.

Furthermore, the simulation results are aimed at corporate decision makers to help them plan their financial planning efforts in anticipation of the respective potential financial consequences of the examined tax reforms. Accordingly, further investigation is recommended as more changes are expected for Japan and the electronics industry. Additional research can study on specific government policies and its impact on the performance of electronics companies. These policies can include but are not limited to government subsidy, fiscal policies, pump priming, income tax holiday(s) (ITH) and policy mix. On the other hand, an augmented study by introducing more competition and looking into movements in companies' financial performance when the Hirschman Herfindahl index changes are applicable. For broader scope, explore the role of Peoples Republic of China and Taiwan, Republic of China in the global electronics arena. Last, investigate impulse response of the private sector on fiscal policies amendments.

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Appendix 1

12EMC's REPORTED REVENUES FOR 2014

in millions Japanese Yen (JPY)

	Name of firm	Revenues
1	Alps Electric Co. Ltd. (Alps)	684,362
2	Canon Inc. (Canon)	3,727,252
3	FUJIFILM Holdings Corporation (Fujiflim)	2,094,291
4	Hitachi Ltd. (Hitachi)	8,330,966
5	Nikon Corporation (Nikon)	980,556
6	Panasonic Corporation (Panasonic)	7,736,541
7	Pioneer Corporation (Pioneer)	498,051
8	Ricoh Company, Ltd. (Ricoh)	2,195,696
9	Sharp Corporation (Sharp)	2,927,186
10	Sony Corporation (Sony)	6,682,274
11	Toshiba Corporation (Toshiba)	6,502,543
12	Yamaha Corporation (Yamaha)	410,304
	Total	**42,770,022**

Appendix 2

DETAILS OF THE 2015 CORPORATE TAX REFORM OF JAPAN PLOTTED IN THE CORPORATE TAX COMPUTATION FORMULA

Corporate tax item	Ref	Effect	Old rule	New Rule
Gross Income				
Less: Allowable deductions	*NOL*	1. Decrease allowable credit 2. Increase carryover period	80% credit 9 years carryover period	2015 to 2016 - **65%** credit 9 years carryover period 2017 onwards - **50%** credit 10 years carryover period
Exclusions/Exemptions	*DivEx*	Stricter subsidiary ownership requirement for higher exclusion	Subsidiary ownership 25% or more = Dividends 100% excluded less than 25% = Dividends 50% excluded	Subsidiary ownership **1/3 or more** = Dividends 100% excluded **5% to > 1/3** = 50% excluded **less than 5%** = Dividends **20%** excluded
Equals Taxable Income				
Multiply: Effective Corporate Tax Rate	*RECTR*	Decrease	35.67%	**33.06%** - 2015 **32.26%** - 2016 onwards
Equals Corporate Tax Obligation				
Add: Surtax/es				
Less: Tax incentives or credits	*PR&D*	Reduced creditable amount	<u>Permanent R&D incentive</u> Credit amount = 8% to 10% of R&D Limitation of credit = 30% of Corporate Tax Obligation Carryover of excess = one year	<u>Permanent R&D incentive</u> Credit amount = 8% to 10% of R&D Limitation of credit = **25%** of Corporate Tax Obligation Carryover of excess = **no longer applicable**
	TR&D	Non-extension of applicable period	<u>Temporary R&D incentive</u> Period: April 1, 2013 to March 31, 2017 Credit amount, whichever is higher of: a) 5% to 30% of incremental R&D; or b) R&D costs in excess of 10% of average sales, times the *tax credit ratio** Limitation of credit = 10% of Corporate Tax Obligation	<u>Temporary R&D incentive</u> Period: **Not extended** Credit amount: No change Limitation of credit = No change
Equals Corporate Tax Obligation Payable				

Source: PwC Japan and Ministry of Finance Japan, 2015

**Note:* Ratio is a mechanical calculation which increases the credit depending upon the relationship between the amount of R&D costs and average annual sales

Appendix 3

DETAILS OF THE 2015 CORPORATE TAX REFORM OF SOUTH KOREA PLOTTED IN THE CORPORATE TAX COMPUTATION FORMULA

Corporate tax item	Ref	Effect	Old rule	New Rule
Gross Income Less: Allowable deductions Exclusions/Exemptions				
Equals Taxable Income Multiply: Effective Corporate Tax Rate				
Equals Corporate Tax Obligation Add: Surtax/es	*ASRE*	Additional Tax Obligation for corporations not meeting the RE requirement	None	Additional surtax to facilitate the use of Retained Earnings Choose either of the two (2) methods with choice being irrevocable for three (3) consecutive years 1. (taxable income *(*Note 1)* x 80% – Investments *(*Note 2)*, i.e. payroll increases and dividend payments) x 10%; or 2. (taxable income x 30% – Investments, i.e. payroll increases and dividend payments) x 10%
Less: Tax incentives or credits	*R&DTC*	Reduced creditable amount	Credit amount = 3% of R&D	Credit amount = 2% of R&D
Equals Corporate Tax Obligation Payable				

Source: Samil PwC, 2014

**Note 1:* Taxable income shall be adjusted to: (1) include dividends received from subsidiaries, interest income received on refunds of overpaid national taxes, and the amount of depreciation expenses incurred in facility investments made in the current year; and (2) exclude corporate taxes (excluding this surtax), NOLs, statutory reserve transfers, disallowed donations, etc.

**Note 2:* Investment will include tangible and intangible fixed assets for business use. However, overseas investment and investment made to acquire equity will be excluded from the scope of investment for these purposes.

DISENTANGLING THE IFRS 1 DISCLOSURE: OBSERVATIONS FROM THE EARLY ADOPTION OF IFRS IN CANADA

Theresa DiPonio, Robert Morris University

ABSTRACT

The objective of this study is to investigate whether the method employed to analyze the implementation of International Financial Reporting Standards (IFRS) is consequential as to our ability to evaluate IFRS as a financial reporting vehicle. In this study, IFRS 1 reconciliations are deconstructed to exhibit the financial magnitude of optional exemption choices permitted under IFRS 1, standard-to-standard differences, and equity component switching. Findings from this study demonstrate that optional exemption choices and equity component switching comprise the larger part of the financial magnitude of IFRS adoption. Evidence from this study should prompt standard setters, regulators, practitioners, investors, and researchers to carefully consider how IFRS is being applied and the extent to which it is being adopted when assessing the standards for any attainment of relevance, quality, and comparability.

INTRODUCTION

Studies of International Financial Reporting Standards (IFRS) adoption have demonstrated an increase in accounting quality (Ball, Robin, Wu 2003; Capkun, Cazavan-Jeny, Jeanjean, Weiss 2008; Gassen and Sellhorn 2006). High quality financial reporting has demonstrated a reduction in information asymmetries for investors (Street and Bryant 2000; Tarca 2004; Ashbaugh and Pincus 2001; Gordon, Jorgensen, and Linthicum 2010). The International Accounting Standards Board (IASB) has designed standards intended to reduce information asymmetries amongst external users of the financial statements, primarily investors (Haller, Ernstberger, and Froschhammer 2009) and more broadly amongst countries (Barth, Landsman, and Lang 2008). However, any assessment of IFRS as a reporting vehicle should consider how the standards are applied (Kvaal and Nobes 2010; Schipper 2005) and the extent to which IFRS is adopted.

The research objective of this study is to employ disaggregation methods to investigate the implementation of IFRS. IFRS adoption is not a monolithic event. The implementation of IFRS entails management choices permitted under in IFRS *1 First Time Adoption of International Financial Reporting Standards*, remeasurement of all accounts in accordance with IFRS, and material reclassifications (equity component switching) of accounts within the statement of financial position. The transition to IFRS is a significant disclosure-enhancing event (Cormier 2013; Fifield, Finningham, Fox, Power, and Veneziani 2011; Karamanou and Nishiotis 2009) and as such any evaluation by standard setters, regulatory agencies, practitioners, and researchers of the IFRS global framework should carefully consider management discretionary choices as well as pronouncement differences upon transition to IFRS. Due to the complexity of disentangling the IFRS 1 disclosure, the current body of literature is limited as to studies which disaggregate the IFRS transition by IFRS 1 choices, standard-to-standard differences, and equity component switching (material reclassifications).

This study examines the transition to IFRS by voluntary adopters in Canada. Canada provides an interesting platform for the study. Effective January 1, 2011, the Canadian Accounting Standards Board (AcSB) required all Canadian Publicly Accountable Enterprises (PAE) to adopt IFRS for financial reporting. With the 9th largest economy based on Gross Domestic Product (GDP) (Economy Watch, 2012), Canada is a formidable economic force and presents an opportunity to examine the implementation of IFRS in a large market-oriented economy. Canada also provides an optimal setting to examine a country with long-term convergence efforts as a precursor to the transition. Prior research has investigated country contexts which are divergent from IFRS (Cormier, Demaria, Lapointe-Antunes, and Teller 2009; Hung and Subramanyam 2007; Lantto and Sahlström 2009). Finally, the Canadian transition to IFRS is of vital importance to the Financial Accounting Standards Board (FASB), the Securities Exchange Commission (SEC), and U.S. constituents as Canadian GAAP was closely aligned with U.S. GAAP.

Empirics are presented which disentangle the financial magnitude of implementation choices, GAAP-to-GAAP differences, and equity component switching. Data hand-collected from IFRS 1 reconciliations reveal business combinations, share-based payments, and cumulative translation differences as the optional exemption choices most frequently exercised by sample firms. The financial effect of the cumulative translation difference resulted in an overall decrease to retained earnings of $13.4 million for firms in the sample. (All amounts are reported in Canadian dollars.) In sample, firms experienced an average decrease to retained earnings of $1.2 million per firm. The analysis of pronouncement differences revealed IFRS 2 *Share-Based Payments* and IAS 12 *Income Taxes* as the standards having the most frequent effect on sample firms. The largest remeasurement effect on total stockholders' equity was a result of the application of IAS 16 *Property, Plant, and Equipment*, IAS 40 *Investment Property*, and IAS 12 *Income Taxes* at an increase of $19.6 million, an increase of $4.9 million, and a decrease of $6.7 million, respectively. For all sample firms, the change in total stockholders' equity as reported totaled $16.4 million. However, disaggregation methods revealed that $13.6 million of the total adjustment to stockholders' equity was attributed to equity component switching which decreased retained earnings and bypassed the income statement.

In Henry's 2009 study of SFAS 159 *The Fair Value Option of Financial Assets and Liabilities*, firms avoided recognition of realized security losses on the income statement by using the adoption of the provision to report the remeasurement to fair value as an adjustment to the opening balance of retained earnings. Employing this finding analogously for the transition to IFRS coupled with the evidence provided in the present study, these findings may alert standard setters and regulators as to opportunistic equity component switching under the veil of IFRS adoption.

As evidenced by the present study, optional exemption choices and equity component switching comprise the larger part of the financial magnitude of IFRS adoption. Evidence provided in this study demonstrates how optional exemption choices selected by first-time IFRS adopters conceals the impact of IFRS which may compromise the comparability objective of the IFRS Conceptual Framework (IASB 2010). Disaggregating the implementation of IFRS should be of interest to standard setters and regulators as a critical technique to assess how IFRS is being applied and which aspect of the implementation of IFRS – IFRS 1 optional exemption choices, standard-to-standard differences, or equity component switching bears the greatest financial impact of IFRS adoption. Understanding the true effects of IFRS are crucial as standard setters, practitioners and firms weigh the benefits of IFRS against the costs of adoption.

The remainder of this study is organized as follows. The next section discusses IFRS 1. The following section describes the data collection and sample. The following section presents analyses of equity components. The last section concludes the study.

IFRS 1

Authoritative Guidance

IFRS 1 *First Time Adoption of International Financial Reporting Standards* sets the precedent for financial reporting under IFRS, overrides transitional provisions included in other IFRS, and prescribes detailed disclosures. The IFRS 1 disclosure entails detailed reconciliations and explanations of the transitory financial effects from Canadian GAAP (CA GAAP) to IFRS.

IFRS 1.39 requires the first IFRS financial statements to include a reconciliation of equity reported under national GAAP to equity under IFRS at the date of transition to IFRS and at the end of the latest period for comparative information presented in the first IFRS financial statements. For this study, the reconciliation of equity is of particular interest. According to IFRS 1.40, the reconciliations have to be sufficiently detailed in order to enable users to understand the material adjustments to the balance sheet and income statement.

IFRS 1 requires entities to apply, retrospectively, all IFRS standards effective at the end of their first IFRS reporting period. The standard requires the opening presentation of IFRS statement of financial position and the comparative financial statements be prepared in accordance with the recognition, measurement, presentation and disclosure requirements of these standards. The Canadian Securities Administrators (CSA) requires the presentation of an opening IFRS statement of financial position in the first IFRS interim financial report. In the opening statement of financial position, a Canadian company must:

- Recognize all assets and liabilities required by IFRS
- Derecognize all assets and liabilities not permitted by IFRS
- Classify all assets, liabilities and components of equity in accordance with IFRS; and
- Measure all assets and liabilities in accordance with IFRS

All adjustments, when applicable, should be recognized through retained earnings, or other equity items, at the transition date (CICA 2011).

IFRS 1 also establishes two categories of exceptions to the retrospective rule: mandatory and optional exemptions. Mandatory exemptions prohibit retrospective application of IFRS due to insufficient measurement reliability. Optional exemptions grant relief from IFRS requirements in which the costs of compliance exceed the benefits to the users of the financial statements. The optional exemptions represent choices of accounting policies under IFRS which may have significant impact on an entity's future financial results (Jermakowicz and Gornik-Tomaszewski 2006).

Optional Exemption Choices

As previously mentioned, firms adopting IFRS must comply with IFRS 1. IFRS 1 permits the election of exemption choices in specific areas where the cost of complying with IFRS 1 may exceed the benefit to financial reporting or where retrospective application is impractical. For example, at the transition date to IFRS, IFRS 1 permits firms to elect to maintain assets at historical cost, a previous GAAP valuation, or remeasure assets to fair value. If a firm exercises the option to remeasure a property, plant, or equipment asset to fair value, the fair value would surrogate for the historical or depreciated cost of the asset as the deemed cost at the transition date. These exemption choices represent compromises of the IFRS measurement system upon adoption. Any compromises of the IFRS system upon adoption should be of concern to both regulators and investors (Capkun, Cazavan-Jeny, Jeanjean, and Weiss 2011). In a 2007 report on the European Union implementation of IFRS, the Institute of Chartered Accountants in England and Wales (ICAEW) noted comparability was impeded among and between first-time adopters. The report also stated that these implementation differences will have an effect on future periods of financial reporting (ICAEW, 2007).

Table 1 presents the optional exemption choices by entity count extracted from the disclosures. The optional exemption choices which were most frequently exercised by sample firms were business combinations, share-based payments, and cumulative translation differences. On average, firms exercised 2.72 optional exemptions. The choices selected as well as the number of choices exercised bring into question the extent to which a firm adopts IFRS.

Table 1
OPTIONAL EXEMPTION CHOICES

Optional Exemptions	Firm Count
Business combinations	25
Share-based payment transactions	25
Fair value or revaluation as deemed cost	7
Deemed cost of oil and gas assets	2
Leases	1
Employee Benefits	5
Cumulative translation differences	19
Investment in subsidiaries, jointly controlled entities, and associates	1
Compound financial instruments	1
Designation of previously recognized financial instruments	1
Decommissioning liabilities	5
Service concession arrangements	1
Borrowing Costs	10
Total Number of Optional Exemption Choices made by Sample Firms	**103**

DATA COLLECTION AND SAMPLE

IFRS was mandated effective January 1, 2011. However, early adoption was permitted subject to approval of the CSA. Quarterly financial statements, management discussion and analysis reports, and annual financial statements were obtained from company websites, SEDAR, EDGAR, and the TMX website. The audit opinion letter, accounting policy disclosure, and required IFRS 1 disclosure were reviewed for explicit language regarding early adoption. Reconciliation data for this study was hand-collected.

The sample consists of 39 Canadian PAEs deemed "pure" early adopters from a population of 69 PAEs which sought early adoption of IFRS. "Pure" early adopters are defined as those companies which met the following criteria:

- Audit opinion letter stated presentation, "in accordance with International Financial Reporting Standards."

- Financial statement note on "Basis of presentation" cited compliance and conversion to International Financial Reporting Standards as issued by International Accounting Standards Board as well as the entity's transition date.
- Financial statement note disclosure on adoption of International Financial Reporting Standards contained are conciliation from Canadian GAAP to IFRS of the statement of financial position at the transition date.

Although PAEs opting for early adoption were required to seek CSA permission, there were no additional reporting requirements for early adopter firms. The process and reporting requirements, for example adherence to IFRS 1, were the same for early adopter and compulsory complaint firms.

The firms presented in this study were regulated by five provincial regulators: Alberta, British Columbia, Ontario, Quebec, and Saskatchewan. Sample firms were overwhelmingly represented by the mining industry which is consistent with prior literature on Canadian early adopters (Blanchette, Racicot, and Girard 2011). The industry classifications represented in the sample were: Mining (n=28), Utilities (n=2), Manufacturing (n=5), Information (n=1), Real Estate, Rental, and Leasing (n=2), and Professional, Scientific, and Technical Services (n=1).

ANALYSES OF EQUITY COMPONENTS

The majority of research has examined IFRS by comparing national GAAPs to IFRS through various analyses primarily examining earnings through comparability indices (Fifield et al. 2011; Haller et al. 2009) and key financial ratios (Lantto and Sahlström 2009, Blanchette et al. 2011). A growing body of literature has also tested the value relevance of accounting information delivered by the IFRS reporting system (Horton and Serafeim 2010; Christensen, Lee, and Walker 2009, Schadewitz and Vieru 2007; Gjerde, Knivsflå, and Sættem 2008). However, the true market valuation of the earnings and book value reconciliations are observable only in the year of transition when financial statements are prepared both under local GAAP and IFRS. These differences are reported in aggregate in the change in total stockholders' equity (Hung and Subramanyam 2007). Without a complete deconstruction of the how IFRS is being applied, evidence from the present study brings into question our ability to evaluate earnings as reported under the IFRS system or interpret results from tests of market reaction.

Decomposition of Equity Adjustments

Table 2 presents the decomposition of reported adjustments to equity by IFRS standard. The standard affecting the most firms in the sample (n=20) was IFRS 2 *Share-Based Payments*. This standard had a magnitude effect on the adjustment to contributed capital of $41 million and a corresponding effect of -$41 million to the adjustment to retained earnings. The primary difference between IFRS 2 and CA GAAP 3870 was the way in which these options are measured. CA GAAP required the entire award of options to be measured at the intrinsic value whereas IFRS subjects these options to separate value tranches measured at fair value using an option price model. However, the true effect of the standard-to-standard difference is altered by an optional exemption permitted by IFRS 1 which allows the first-time adopter to not apply IFRS 2 to equity instruments granted after November 7, 2002 that vested before transition to IFRS. If a company applies the exemption, a reclassification adjustment is recorded which transfers the amount out of contributed capital into retained earnings. As demonstrated by this example, these equity components are not only affected by pronouncement differences, but choices made at adoption and switching among equity components.

IAS 12 *Income Taxes*, IAS 16 *Property, Plant, and Equipment*, IAS 40 *Investment Property*, and IFRS 1 *Cumulative Translation Differences* represent the standards with the largest magnitude effect on the retained earnings adjustment at -$6,898 billion, $19,580 billion, $4,930 billion, and -$13,428 billion, respectively. The negative tax effect is consistent with evidence from a study by Fifield et al. conducted in 2011 which examined IFRS reconciliations in the context of the U.K., Italy, and Ireland. IFRS 1 *Cumulative Translation Differences* represents the standard with the largest magnitude effect on the adjustment to accumulated other comprehensive income at $13,426 billion.

Table 2
DECOMPOSITION OF REPORTED ADJUSTMENT TO EQUITY COMPONENTS BY STANDARDS

Standard affecting reported adjustment to contributed capital	Effect by Standard (in millions)	Count of firms affected by standard	Average adjustment by firms affected by standard (in millions)
IFRS 2 Share-based Payment	41.129	19	2.165
Total reported adjustment to contributed capital	41.129		
Standards affecting reported adjustment to retained earnings			
IFRS 2 Share-based Payment	-41.464	20	-2.073
IFRS 6 Exploration for and Evaluation of Mineral Assets	32.427	3	10.809
IAS 11 Construction Contracts	-150.809	2	-75.405
IAS 12 Income Taxes	-6,898.00	8	-862.25
IAS 16 Property, Plant, and Equipment	19,580.47	3	6,526.82
IAS 17 Leases	-263.282	1	-263.282
IAS 18 Revenue Recognition	-793.503	3	-264.501
IAS 19 Employee Benefits	-834.64	4	-208.66
IAS 21 Foreign Exchange Rates	-36.161	4	-9.04
IAS 23 Borrowing Costs	-14.729	1	-14.729
IAS 36 Impairment of Assets	-29.345	3	-9.782
IAS 37 Provisions, Contingent Assets and Liabilities	-307.746	5	-61.549
IAS 38 Intangible Assets	7.318	1	7.318
IAS 39 Financial Instruments	234.533	5	46.907
IAS 40 Investment Property	4,930.44	2	2,465.22
IAS 41 Agriculture	288.879	1	288.879
IFRS 1 Deemed Cost	507.884	3	169.295
IFRS 1 Decommissioning Liabilities	-0.003	1	-0.003
IFRS 1 Cumulative Translation Differences	-13,428.06	11	-1,220.73
IFRS 1 Business Combinations	32.194	8	4.024
Total reported adjustment to retained earnings	2,816.40		
Standards affecting reported adjustment to accumulated other comprehensive income			
IAS 12 Income Taxes	156.755	1	156.755
IAS 21 Foreign Exchange Rates	-13.618	1	-13.618
IAS 39 Financial Instruments	-29.816	5	-5.963
IFRS 1 Cumulative Translation Differences	13,426.33	11	1,220.58
IFRS 1 Business Combinations	-7.554	1	-7.554
Total reported adjustment to accumulated other comprehensive income	13,532.10		

The Effect of Equity Component Switching

Table 3 eliminates the effect of equity reclassifications and presents the decomposition of the adjustments to equity components without component switching. In comparing Tables 2 and 3, continuing with the example of IFRS 2 *Share-based Payments*, the number of firms affected by the standard decreased from 20 to 2. After eliminating the switching effect, the magnitude effect on the adjustment to contributed capital decreased from $41 million to -$2 million and the cumulative adjustment to retained earnings increased from -41.464 million to 2.074 million. Removing the equity component switching effect divulges the true standard-to-standard financial effect.

IAS 12 *Income Taxes*, IAS 16 *Property, Plant, and Equipment*, and IAS 40 *Investment Property* continued to represent the standards demonstrating the largest magnitude effect on the retained earnings adjustment at -$6,741 billion, $19,580 billion, and $4,930 billion, respectively. Analysis of the adjustment to accumulated other comprehensive income after eliminating the switching effect revealed a decrease in the magnitude adjustment from $13,532 billion to -$7 million. This observation should put regulators, standard setters, practitioners, and researchers on notice that the way in which we analyze and measure equity components could be consequential to our ability to evaluate a GAAP change.

Table 3
DECOMPOSITION OF ADJUSTMENT TO EQUITY COMPONENTS BY STANDARDS WITHOUT SWITCHING

	Sum of Effect by Standard (in millions)	Count of firms affected by standard	Average adjustment by firms affected by standard (in millions)
Standard affecting reported adjustment to contributed capital			
IFRS 2 Share-based Payment	-2.409	2	-1.205
Total reported adjustment to contributed capital	-2.409		
Standards affecting reported adjustment to retained earnings			
IFRS 2 Share-based Payment	2.074	2	1.037
IFRS 6 Exploration for and Evaluation of Mineral Assets	32.427	3	10.809
IAS 11 Construction Contracts	-150.809	2	-75.405
IAS 12 Income Taxes	-6,741.25	8	-842.656
IAS 16 Property, Plant, and Equipment	19,580.47	3	6,526.82
IAS 17 Leases	-263.282	1	-263.282
IAS 18 Revenue Recognition	-793.503	3	-264.501
IAS 19 Employee Benefits	-834.64	4	-208.66
IAS 21 Foreign Exchange Rates	-49.779	4	-12.445
IAS 23 Borrowing Costs	-14.729	1	-14.729
IAS 36 Impairment of Assets	-29.345	3	-9.782
IAS 37 Provisions, Contingent Assets and Liabilities	-307.746	5	-61.549
IAS 38 Intangible Assets	7.318	1	7.318
IAS 39 Financial Instruments	210.206	3	70.069
IAS 40 Investment Property	4,930.44	2	2,465.22
IAS 41 Agriculture	288.879	1	288.879
IFRS 1 Deemed Cost	507.884	3	169.295
IFRS 1 Decommissioning Liabilities	-0.003	1	-0.003
IFRS 1 Cumulative Translation Differences	0	0	0
IFRS 1 Business Combinations	24.64	8	3.08
Total reported adjustment to retained earnings	16,399.25		
Standards affecting reported adjustment to accumulated other comprehensive income			
IAS 12 Income Taxes	0	0	0
IAS 21 Foreign Exchange Rates	0	0	0
IAS 39 Financial Instruments	-5.489	4	-1.372
IFRS 1 Cumulative Translation Differences	-1.73	1	-1.73
IFRS 1 Business Combinations	0	0	0
Total reported adjustment to accumulated other comprehensive income	-7.219		

Summarizing the Switching Effect

Table 4 summarizes the switching effect. The largest switching effect was within the adjustment to retained earnings at $13,582 billion. Of this amount, $13,428 billion (Table 2) related to cumulative translation differences, an optional exemption choice exercised under IFRS 1. This exemption permits firms to zero out balances of cumulative translation differences for all foreign operations at the transition date. Under Canadian GAAP, these differences were recorded in accumulated other comprehensive income as unrealized gains and losses. Upon transitioning to IFRS, the majority of the firms (n=16), in sample, elected to reclassify aggregated unrealized gains and losses to retained earnings, an earned capital account. More specifically, for the firms represented in the population of early adopters, $13,428 billion (Table 2) of unrealized translation differences bypassed the income statement and were reclassified to retained earnings.

Table 4
VARIATIONS OF ADJUSTMENT TO EQUITY COMPONENTS AND SWITCHING EFFECT

	As Reported (in millions)	Without Component Switching (in millions)	Switching Effect (in millions)
Adjustment to contributed capital	41.129	-2.409	-43.538
Adjustment to retained earnings	2,816.40	16,399.25	13,582.86
Adjustment to accumulated other comprehensive income	13,532.10	-7.219	-13,539.32
Change in equity	16,389.62	16,389.62	0

Summary of Standard Effects on all Components of Equity as Reported

Table 5 presents a summary of the magnitude adjustments to the components of equity as reported disaggregated by the IFRS standard effect. Table 5 combines the financial magnitude adjustments by standard from Table 2 and reconciles these adjustments to the financial magnitude on total stockholders' equity. IAS 16 *Property, Plant, and Equipment* demonstrated the largest percentage of change in total stockholders' equity at 119 percent of the overall change in stockholders' equity. IAS 16 permits the revaluation of property, plant, and equipment to fair value which explains the positive adjustment of remeasurement of $19,580 billion to total stockholders' equity.

As discussed in section titled, Summarizing the Switching Effect, the IFRS 1 election for cumulative translation differences increases accumulated other comprehensive income by $13,426 billion and decreases retained earnings by $13,428 billion. However, upon examination of the effect of this standard on the adjustment to total stockholders' equity, the remeasurement effect is relatively minimal at a decrease of $1.7 million resulting in an overall decrease to total stockholders' equity of .01056 percent. More specifically, the real effect of transition is obscured at the stockholder's equity level of analysis.

CONCLUSION

The preceding deconstruction of the implementation of IFRS exhibits the complexity of adopting IFRS. The decomposition of equity components provides an opportunity to observe adoption effects concealed at aggregated stockholders' equity. Magnitude adjustments disaggregated by pronouncement differences permits a more comprehensive understanding of the particular standards which are associated with the adjustments to equity components. Further, only when equity components are decomposed can reclassifications (component switching) among the components be observed. Component switching reveals the implementation effects of IFRS on equity. As demonstrated in the study, underlying the switching effect (implementation choices) are the true GAAP-to-GAAP differences which can only be observed upon disaggregation.

An examination of the exercised optional exemptions brings into question the extent to which IFRS is adopted. The extent to which IFRS is adopted is crucial to the larger assessment of whether the IFRS reporting system reduces information asymmetry and increases accounting quality. Consideration of the modifications and limitations of the implementation of IFRS has great bearing on our ability to measure any improvement IFRS may contribute to financial reporting.

By examining the IFRS transition in a comparable country context to the United States, this study provides preliminary evidence which compels attention from standard setters and regulators as to how IFRS is being applied. If the magnitude of the IFRS transition is primarily comprised of management choices and equity component switching as the evidence from this study suggests, standard setters and regulators may want to investigate this trend further as they weigh the costs of adopting IFRS versus the benefits the IFRS reporting system. At a minimum, findings from this study should prompt standard setters, regulators, practitioners, investors, and researchers to carefully consider how IFRS is being applied and the extent to which it is being adopted when assessing the standards for any attainment of relevance, quality, and comparability.

Table 5
SUMMARY OF STANDARD EFFECT ON ADJUSTMENT TO EQUITY COMPONENTS

	Adjustment to Equity Components as Reported (in millions)				
	Contributed capital	Retained earnings	Accumulated other comprehensive income	Total Stockholders' Equity	Percentage of Change in Equity by Standard
IFRS 2 Share-based Payment	41.129	-41.464	-	-0.336	0.00%
IFRS 6 Exploration for and Evaluation of Mineral Assets	-	32.427	-	32.427	0.20%
IAS 11 Construction Contracts	-	-150.809	-	-150.809	-0.92%
IAS 12 Income Taxes	-	-6,898.00	156.755	-6,741.25	-41.13%
IAS 16 Property, Plant, and Equipment	-	19,580.47	-	19,580.47	119.47%
IAS 17 Leases	-	-263.282		-263.282	-1.61%
IAS 18 Revenue Recognition		-793.503		-793.503	-4.84%
IAS 19 Employee Benefits	-	-834.64	-	-834.64	-5.09%
IAS 21 Foreign Exchange Rates	-	-36.161	-13.618	-49.779	-0.30%
IAS 23 Borrowing Costs	-	-14.729		-14.729	-0.09%
IAS 36 Impairment of Assets	-	-29.345	-	-29.345	-0.18%
IAS 37 Provisions, Contingent Assets and Liabilities	-	-307.746	-	-307.746	-1.88%
IAS 38 Intangible Assets	-	7.318	-	7.318	0.04%
IAS 39 Financial Instruments	-	234.533	-29.816	204.716	1.25%
IAS 40 Investment Property	-	4,930.44	-	4,930.44	30.08%
IAS 41 Agriculture	-	288.879	-	288.879	1.76%
IFRS 1 Deemed Cost	-	507.884	-	507.884	3.10%
IFRS 1 Decommissioning Liabilities	-	-0.003	-	-0.003	0.00%
IFRS 1 Cumulative Translation Differences	-	-13,428.06	13,426.33	-1.73	-0.01%
IFRS 1 Business Combinations	-	32.194	-7.554	24.64	0.15%
Total Adjustments to Equity Components	41.129	2,816.40	13,532.10	16,389.62	100.00%

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LIQUIDITY IN LEBANESE COMMERCIAL BANKS AND ITS DETERMINANTS

Rim El Khoury, Notre Dame University

ABSTRACT

The last global financial crisis reemphasized the importance of liquidity for the well-functioning of the banking sector and the financial markets. Given the importance of banks in the Lebanese financial markets, this paper aims to identify the determinants of liquidity of Lebanese commercial banks for the period from 2005 to 2013.

Results show that bank liquidity is positively related to bank size and interbank rate, and negatively related to loan growth rate, inflation and the financial crisis. The impact of capital, economic growth, unemployment, short term interest rate, and lending interest rate on liquidity is not conclusive. No difference was found between listed and unlisted banks.

INTRODUCTION

Banks, due to their role as financial intermediaries, are exposed to many types of risks such as credit risk, liquidity risk, capital risk, and interest rate risk. Liquidity risk is defined as banks' ability to fund their assets and meet their obligations, without incurring unacceptable level of losses (BCBS, 2008). By transforming short term deposits into medium to long term loans, banks are exposed to liquidity risk. Therefore, banks must be ready to meet the retirements of deposits by holding some liquid assets. Although liquid assets reduce liquidity risk, they have an opportunity costs since they generate low or no return.

Before the crisis, banks did not consider liquidity risk a priority as compared to other types of risks such as default, capital, and interest rate risk. However, the financial crisis had changed the whole picture by highlighting the importance of liquidity management, with the failure, resolution, or forced merger of some banks (Teply, 2011). In response to the crisis, the Basel committee on Banking Supervision (BCBS) - whose aim is to enhance the financial stability and to improve the quality of banking supervision methods- issued, in December 2010, new guidelines for managing liquidity risk and Basel III introduced new requirements which force banks to hold higher level of capital and liquid assets.

In Lebanon, given the absence of a secondary market, banks dominate the financial sector. Thus, the aim of this paper is to identify the determinants of liquidity of Lebanese commercial banks, which is important to the well-being of banks' operations, the economy, and the country as a whole. This topic has returned to be a hot topic since the financial crisis.

The outline of this paper is as follows: Section 2 provides a literature review, while section 3 presents the data, defines the variables, and specifies the econometrical model. Empirical determinants of bank's liquidity are presented and discussed in Section 4. Finally, section 5 concludes.

LITERATURE REVIEW

Overview of Banking Sector in Lebanon

Regulated by Banque du Liban (BDL), the banking sector continues to be the backbone of the Lebanese economy, being ranked 12th worldwide in 2011 (World Economic Forum, 2011-2012) and 29th in 2013 (World Economic Forum, 2013-2014) in terms of soundness. Total assets of this sector grew by 8.5% in 2013 to represent 379% of the size of GDP at the end of the year, while deposits increased by 9% to represent 312.2% of GDP. These two ratios are among the highest in the world, highlighting the growth and the importance of this sector. Furthermore, this sector is the major provider of capital to business, where loans accounted for 109% of GDP in 2013 (IDAL, 2014). It is also the supporter of the government's debt through the purchase of government Treasury bills. As of 2013, the total number of commercial banks operating in Lebanon reached 56 (Financial Access Survey [FAS], 2014).

The Lebanese banks were able to remain shielded from the global financial crisis of 2008. One of the factors that enabled them to remain resilient and to operate normally is the liquidity. Subject to the high reserve requirements set by BDL, the Lebanese banking sector was able to enjoy high liquidity by all standards, well above regional and international benchmark. Measured by net primary liquidity divided by total deposits, this ratio reported a high level of 30.9% in 2010, slightly decreasing to 29.1% in 2011, before reaching 31.6% and 30.7% in 2012 and 2013 respectively. This high liquidity ratio is mainly due to higher liquidity in foreign currency as compared to domestic currency. For example, in 2013, this ratio reached 20% in domestic currency versus 35.3% in foreign currency.

Liquidity can be also measured by a mirror image, which is loan to deposit ratio, whereby a high ratio suggests low liquidity. This ratio reached 37.7% in 2013, lower than the regional average of 70.2%, the emerging market average of 77.1%, and the global average of 83.1% (Bank Audi, 2014). All these ratios are highlighting the strong liquidity position that the Lebanese banking sector is enjoying.

Theories of Bank Liquidity

Liquidity is defined as the ability of the bank to meet its obligations and to finance any increase in assets, without incurring unacceptable losses (BCBS, 2008). Banks' primary function is to collect deposits and lend them. Therefore, banks are transforming short term deposits into long term and illiquid assets, exposing themselves to liquidity risk. If a large part of depositors demanded their money, the bank might be forced to liquidate its illiquid assets at unfavorable price or borrow at unfavorable costs. The result of a liquidity shortage is a loss of value, which might lead to a solvency crisis (Aspachs, Nier, & Tiesset, 2005) or even to default (Ozdincer & Ozyildirim, 2008). In fact, the absence of liquidity might lead to a liquidity risk. Liquidity risk can be of two types: funding liquidity risk and market liquidity risk. First, funding liquidity risk is defined as the bank's risk of not being able to meet its future cash flows without affecting its operations. Second, market liquidity risk is defined as the risk of not being able to offset or eliminate a position because the market is not deep or disrupted. These two types of risks are interacted in the crisis period (Drehman & Nikolaou, 2013); for example, the exposure to funding liquidity risk might lead to asset sales or a decrease in the price of assets, leading to market liquidity risk. Similarly, the exposure to market liquidity risk might lead to higher margin, leading to funding liquidity risk. Thus, these two risks work together.

To avoid liquidity risk, Aspachs et al. (2005) suggested three mechanisms that banks can use. First, banks can hold a high amount of liquid assets, such as cash, balances with central banks, short term securities, and reverse repo. Liquid assets serve as a buffer against liquidity risk by reducing the probability that a deposit withdrawal will threaten the viability of the bank. Second, banks can use their liability side of the balance sheet by borrowing from other banks in case of liquidity demand, thus relying on the interbank market. Third, banks can use again their liability side of the balance sheet by relying on the central bank as a lender of last resort.

Vento and La Ganga (2009) emphasized that liquidity risk is not an isolated risk. It is the result and the cause of other risks within the banking sector. For example, credit risk might lead to liquidity risk and liquidity risk might lead to legal risk.

Empirical Overview of Determinants of bank Liquidity

Although liquidity was an old topic, this theme regains its importance following the financial crisis of 2007. Many researchers and international organizations tested the determinants of liquidity which are listed in chronological order starting from 2005.

Aspachs et al. (2005) investigated the determinants of liquidity of 57 UK-resident banks, using quarterly data from 1985 to 2003. They found that interest margin and loan growth rate negatively affect bank liquidity, while profitability and bank size do not have a significant impact. They also found that liquidity is negatively related to real GDP growth and the policy rate.

Fielding and Shortland (2005) examined the determinants of excess liquidity in the Egyptian banking sector. They found that the level of economic output, discount rate, and the violent political incidence have a positive effect on liquidity, and cash to deposit ratio and economic reform have a negative effect.

Valla, Saes-Escorbiac, and Tiesset (2006) investigated the determinants of liquidity of English banks using both bank specific and macroeconomic variables. Concerning the bank specific variables, they found that liquidity is negatively related to the probability of obtaining support from the central bank, the interest rate margin measuring the opportunity costs of holding liquid assets, loan growth, and bank profitability. No clear relationship was found between bank size and liquidity. Concerning the macroeconomic variables, they found that liquidity is negatively related to the business cycle measured by GDP and the monetary policy effect measured by short term interest rate.

Lucchetta (2007) investigated the importance of interest rate on bank's risk taking and the decision to hold liquid assets in European countries and found a positive relationship between interbank rate and liquidity and a negative relationship between monetary interest rate and liquidity. Furthermore, he found a negative impact of loans divided by total assets, and loan loss provision divided by net interest revenue, and a positive impact of bank size.

Bunda and Desquilbet (2008) analyzed the liquidity of 1107 commercial banks in 36 emerging countries between 1995 and 2000, using bank specific variables, market and macroeconomic variables, and exchange regimes. They found that liquidity is negatively related to (i) bank size as measured by total assets, (ii) lending interest rate, (iii) and the presence of financial crisis. On the other side, liquidity is positively related to (i) capital adequacy ratio as measured by equity divided by total assets, (ii) presence of regulation obliging banks to be liquid, (iii) public expenditures divided by GDP, (iv) inflation rate, and (v) Exchange rate regime. Banks in extreme regimes (floating or hard pegs) are more liquid than countries in intermediate regimes.

Rauch, Steffen, Hackethal, and Tyrrel (2010) investigated the determinants of liquidity of German's 457 state owned saving banks over 1997 to 2006 and found that liquidity is negatively related to monetary policy interest rate, level of unemployment, bank size measured by number of customers, and bank profitability. At the same time, saving quotas and liquidity in the previous period positively affect liquidity.

In the same year, Moore (2010) analyzed the liquidity of commercial banks in Latin America and Caribbean countries, and found that liquidity positively depends on current macroeconomic situation, and negatively depends on cash to deposit ratio and money market interest rate.

Vodova (2011) investigated the factors affecting the liquidity of 22 banks operating in Czech Republic using a panel data from 2001 to 2009. By considering four firm specific variables and eight macroeconomic variables, he found that capital adequacy, lending interest rate, interbank interest rate, and non-performing loans positively affect bank liquidity, while inflation rate, GDP growth, and financial crisis negatively affect bank liquidity. However, bank size has an ambiguous impact, and unemployment, interest margin, bank profitability, and repo rate have no significant impact on banks' liquidity.

The positive impact of capital adequacy on liquidity has been confirmed by Bonfim and Kim (2012). They used a regression analysis on a panel data covering European and North American banks in 2002-2009 and found that the impact of bank specific variables such as size, performance, and loan deposit ratio depends on the type of liquidity measure used. However, they found that the bank size has a positive impact on liquidity.

In the same year, Fadare (2011) aimed to identify the determinants of liquidity in Nigerian banks from 1980 to 2009 by using a linear least square method. They found that monetary policy rate and lagged loan to deposit rate significantly predict banking liquidity.

All these empirical evidences suggest that commercial bank liquidity is determined by bank specific factors (capital adequacy ratio, profitability, size, etc…), macroeconomic factors (interest rates, economic cycle, etc…) and other factors such as regulations, financial crisis, and political accidents.

DATA

This study is based on the annual observations of 23 commercial banks covering a 9 year period between 2005 and 2013. Bank specific data were obtained from BANKSCOPE, which includes the financial statistics of all banks; the data was complemented with the annual reports of Lebanese banks. As for macroeconomic data, they were obtained from many sources such as International Financial Statistics of International Monetary Fund (IMF) and Banque du Liban website (central bank of Lebanon). Although there exists 56 commercial banks in Lebanon in the year 2013 (FAS, 2014), the banks included in this study are only those having observations for at least 6 years on BANKSCOPE. Due to some missing information, the obtained data is unbalanced panel data.

VARIABLES

Dependent Variable

Liquidity can be achieved by (1) holding a portfolio of assets that can be easily converted into cash without a significant loss of value (cash, reserves, or government securities), (2) holding significant volume of stable core deposits (nonvolatile deposits), and (3) maintaining credit line with financial institutions implying the ability to borrow anytime needed.

Because there is no consensus on the best way to measure liquidity, this study will use four different liquidity ratios as the dependent variable, similar to many studies (Moore, 2010; Vodova, 2011).

1. Liquid assets/Total assets (L1): where liquid assets include cash, deposits with central banks and other banks, short term government securities and reverse repos. The higher the ratio, the higher the liquidity, and the higher the capacity of banks to absorb liquidity shocks. However, a higher ratio can be interpreted as a measure of inefficiency, since liquid assets have lower yield. Therefore, it is important to have a good balance between liquidity and profitability.
2. Liquid assets/ customer deposits (L2): this ratio captures the bank's ability to meet its obligations in terms of funding and bank's sensitivity to deposit withdrawals. The denominator here is replaced by only deposits ignoring the fact that banks can borrow from other banks in case of liquidity needed. Although some studies used in the denominator deposits of households, deposits of banks and other financial institutions, and short term debt securities, this ratio will not be used in this study due to many missing information from Bankscope. Similar to L1, a higher ratio signals a better capacity to absorb liquidity risk, and a lower sensitivity to deposits withdrawals.
3. Loans/ Assets (L3): This ratio measures the percentage of banks' assets tied up in illiquid loans. Contrary to the above two measures, a higher ratio suggests a lower bank's liquidity.
4. Loans/ deposits and short term financing (L4): This ratio relates illiquid assets with liquid liability with similar interpretation as L3, where a higher ratio suggests lower liquidity.

Although these ratios are not able to always capture all liquidity, they are widely used because they are easy to calculate and interpret.

Independent Variables

The selection of variables was based on the cited empirical studies, limited by data availability. The independent variables will be divided into two broad categories: (1) bank specific determinants and (2) macroeconomic determinants. The bank specific factors include capital adequacy ratio (+), bank size (?), loan growth (-), and nonperforming loans (-). The macroeconomic factors include growth of real gross domestic product (-), inflation rate (+), liquidity premium (-), short term interest rate (+), interbank rate (+), real interest rate on lending (-), and unemployment (+). In addition, two dummy variables will be included, to represent the financial crisis period and to differentiate between listed and unlisted banks. Other variables such as political events, exchange rate regime and economic reform are excluded since these variables made no sense in Lebanese conditions.

This study considers four bank specific factors as follows:

1. Capital Adequacy Ratio (CAP) (+): The impact of capital adequacy on liquidity and liquidity creation is debatable, especially in emerging countries. Liquidity creation is defined as transforming less liquid assets into more liquid liabilities. The more liquidity is created, the greater is the possibility and magnitude of losses associated with meeting the liquidity demands of customers by disposing illiquid assets. On one side, and under the hypothesis of 'risk absorption', higher capital ratio will improve banks' ability to absorb risks associated with liquidity creation, thus increasing the bank's ability to create more liquidity (Repullo, 2004). On the other side, under the 'financial fragility-crowding out' hypotheses, higher bank capital may hinder creation because it makes the bank's capital structure less fragile or because it crowds out deposits. Capital adequacy ratio is measured as Equity Capital/ Total Assets (Bonfim & Kim, 2012) with a positive effect on liquidity ratios, since solvent banks are found to be more liquid.

2. Bank size (SIZE) (+/-): The impact of size on bank liquidity is not clear. On one side, according to the 'too big to fail' hypothesis, large banks tend to be less liquid. If large banks see themselves as too big to fail, they will be less motivated to hold liquid assets. By benefiting from an implicit guarantee (assistance of Lender of less resort), large banks tend to invest more in riskier assets and hold less liquid assets (Lucchetta, 2007). On the other side, small banks are more likely to be involved in traditional intermediation activities and hold small liquid assets (Rauch et al. 2010; Bunda & Desquilbet, 2008). Bank size is measured as the natural logarithm of total assets following many studies (Bonfim & Kim, 2012; Vodova, 2011; Horvath, Seidler, and Weill, 2014).
3. Loan growth (GROWTH) (-): Loans are considered as the principal activity of most commercial banks as they generate the most important source of revenue. However, they are illiquid. Therefore, an increase in the demand for loans will lead to less liquid assets, resulting in a negative relationship between loan growth and banks' liquidity (Pilbeam, 2005). Loan Growth is measured as the annual growth rate of gross loans. Banks which specialize in lending activity tend to have higher exposure to liquidity risk, thus a lower liquidity ratio (Bonfim & Kim, 2012; Valla et al. 2006).
4. Nonperforming loan Ratio (NPL) (-): Non performing loans are loans that are not up to date in terms of payment of interest and principal. Thus, they measure the quality of bank assets. The presence of large proportion of non-performing loans might lead to liquidity problem since depositors and foreign investors might lose their confidence in the bank (Bloem & Gorter, 2001). Therefore, non-performing loans as a proportion of gross loans have an expected negative impact on bank liquidity.

This study will not include any measure of profitability such as net interest margin, return on equity or return on assets as independent variables since they are considered to be more or less codetermined with asset liquidity. In fact, many studies found that liquidity has an impact on bank profitability.

In addition to the bank specific variables, 7 macroeconomic variables are included in this study.

1. Real GDP growth rate (GROWTH) (-): Economic cycle affects banks' activities; demand for loans is higher during expansion and lower during downturns. Therefore, in expansion, the number of profitable investments is higher, which induces banks to lend more, resulting in less liquid assets (Valla et al. 2006). This variable was used by many studies (Aspachs et al. 2005; Valla et al. 2006; Vodova, 2011). It is measured as the percentage change in Gross Domestic Product (GDP) using constant prices and is taken from the International Monetary Fund, World Economic Outlook Database.
2. Inflation (INF) (+): An increase in inflation will reduce the real rate of return, creating market frictions and credit rationing. The result is fewer loans, reduction in intermediary activity and a higher amount of liquid assets held by banks. Therefore, a positive relationship is expected between inflation rate and liquidity. Furthermore, since loans made by banks are long term loans, their nominal values are sticky and highly affected by inflation. Therefore, a higher inflation will motivate banks to hold liquid asset to reduce their vulnerabilities to inflation. This variable was used by Vodova (2011) and Bunda and Desquilbet (2008). Inflation is defined as the percent change in the index using end of period consumer prices and is taken from the International Monetary Fund, World Economic Outlook Database.
3. Liquidity premium (LP) (-) = Defined as the difference between interest rate on loans and interest rate on deposit, LP is expected to have a negative impact on bank liquidity. Higher interest rate margin will motivate banks to lend more and to hold less liquid assets (Aspach et al. 2005; Valla et al. 2006). This variable is obtained from International Financial Statistics (IFS).
4. Short term interest rate (INT) (+): Short term interest rate is the rate paid on money market securities. A higher short term interest rate will motivate banks to invest more in these short term instruments, which will improve their liquidity positions. Therefore, a positive relationship between short term interest rate and liquidity is expected (Pilbeam, 2005). Given that Treasury bills are considered as the most liquid and safest assets, short term interest rate is measured as the interest rate on 3 month T-bill and is obtained from BDL statistics. This variable is especially important in the case of Lebanon since Lebanese banks are the main supporters of the government's debt through the purchase of government Treasury bills.

5. Interbank Interest rate (IRB) (+): This variable represents the illiquidity cost since banks lacking liquidity can borrow in the interbank market to meet their cash needs. It was used by Lucchetta (2007) who argued that the higher this rate is, the more expensive is the cost of illiquidity and the more liquid the banks are. This variable is obtained from BDL statistics.
6. Real Interest rate on loans (RL) (-): It is calculated as the lending interest rate adjusted for inflation as measured by the GDP deflator and is obtained from World Development Indicators (WDI), which is the primary World Bank database. A negative relationship is expected since the higher the lending interest rate is, the more profitable the loans are, which will push banks to lend more and to maintain less liquid assets. However, with the presence of asymmetric information, Stiglitz and Weiss (1981) found that adverse selection will lead to credit rationing, so that banks' liquidity might increase with the presence of high interest rates.
7. Unemployment rate (+): This variable is obtained from World Development Indicators (WDI) and is included because an increase in unemployment rate will reduce the demand for loans, enabling banks to be more liquid.

Furthermore, a number of other macroeconomic variables were evaluated to be included in the model, such as discount rate, deposit interest rate and lending interest rate. However, due to significant correlation among the variables, they were dropped from the model in order to avoid muticollinearity problem.

Table 1
EXPLANATORY VARIABLES AND EXPECTED SIGNS

EXPLANATORY VARIABLES	NOTATION	DEFINITION AND SOURCE	EXPECTED SIGNS
Dependent variables			
Liquid assets/Total Assets	(L1)	Liquid assets/Total assets (BANKSCOPE)	NA
Liquid assets/ Deposits	(L2)	Liquid assets/ Total Deposits (BANKSCOPE)	NA
Loans/ Assets	(L3)	Net Loans/ Total assets (BANKSCOPE)	NA
Loans/Dep and Short term Funding	(L4)	Net loans/ Deposits and Short term funding (BANKSCOPE)	NA
Bank-specific variables			
Capital Ratio	(CAP)	Equity/Assets (BANKSCOPE)	Positive
Size	(SIZE)	Ln of Total Assets (BANKSCOPE)	Positive/Negative
Loan Growth	(GLOAN)	Change in Gross loans (BANKSCOPE)	Negative
Non-Performing Loans ratio	(PL)	Non-Performing Loans/ Gross Loans (BANKSCOPE)	Negative
Macroeconomic variables			
Economic Growth	(GROWTH)	Real GDP Growth Rate (WEO)	Negative
Inflation	(INF)	Percentage change in inflation using end of period prices (WEO)	Positive
Liquidity Premium	(LP)	Lending Interest Rate – Deposit Interest Rate (IFS)	Negative
Short term Interest Rate	(INT)	Interest rate on 3 month T-bills (BDL)	Positive
Interbank Rate	(IRB)	Interbank (BDL)	Negative
Real Interest on Loans	(RL)	Lending interest – % change in GDP deflator (WDI)	Negative
Unemployment	(UMP)	Unemployment Rate (WDI)	Positive
Dummy variables			
Dummy 1	(D1)	1 during the crisis (2008-2010), 0 otherwise	Negative
Dummy 2	(D2)	1 if listed bank, 0 otherwise	Positive

In addition to the above mentioned variables, two dummy variables are included:

8. Dummy variable 1 (D1): This variable is used to distinguish the period before the financial crisis from the period after. It is equal to 1 during the financial crisis (2008-2012), and 0 otherwise (2005-2007 period and 2013 period). The negative impact of the financial crisis on the liquidity ratio had been highlighted in many studies (Bunda & Desquilbet, 2008; Vodova, 2011).
9. Dummy Variable 2 (D2): This variable is used to distinguish listed banks from unlisted banks. It is equal to 1 if banks are listed, 0 otherwise. Nguyen, Skully, and Perera (2012) found that listed banks usually hold more liquid assets than non-listed banks.

MODEL

In order to identify the determinants of the liquidity of Lebanese commercial banks, a panel data regression analysis is used, which takes the following equation:

$$Y = \alpha + \beta_{it} X_{\text{it}} + \varepsilon_{\text{it}} \qquad (1)$$

Where Y is the dependent variable measuring liquidity for bank i in time t, X_{it} is a vector of explanatory variables for bank i in time t, α is a constant, β is slope of the variable and εi is the error term.

Since we are dealing with a panel data, some tests using STATA software will be performed in order to choose the suitable model for our data.

Descriptive Statistics

Table 2 presents the descriptive statistics for the dependent and independent variables involved in the regression, including mean, standard deviation, minimum and maximum. The results show that most variables comprise 170 observations except growth in loans, NPL (due to missing reported figure from Bankscope), and unemployment (due to unavailable data). Variables containing loans such as growth in loans and net loans divided by total assets present larger standard deviation with 22.44112 and 10.19225 respectively as compared with other variables. It revealed that the quantity of loans has more significant variance than other variables.

Table 2
DESCRIPTIVE STATISTICS

VARIABLES	OBS	MEAN	STD DEV	MIN	MAX
L1	170	.2899883	.1285224	.07225	.8395045
L2	170	.3541414	.1631921	.0905254	1.353085
L3	170	28.09981	10.19225	8.622	63.51
L4	170	32.09844	11.56946	11.318	68.69
CAP	170	8.592488	2.962659	3.494	35.773
SIZE	170	8.258256	1.328531	3.818459	10.90703
GLOANS	158	19.29766	22.44112	-49.68	122.05
NPL	149	11.88389	12.16183	.34	74.79
GROWTH	170	5.537059	3.847166	1	10.3
INF	170	5.354876	1.849306	.517	7.212
LP	170	2.00126	.342959	1.476667	2.490833
INT	170	4.67225	.5069485	3.926667	5.22
IRB	170	3.227941	.5532571	2.75	4
RL	170	4.660176	3.462081	-.8462127	11.8559
UMP	155	22.56516	.5413539	21	22.8

Unit Root Test

Before proceeding with the regression, some tests are needed. First, the stationary of the data will be tested using a Fisher test- a unit root test for unbalanced panel data as suggested by Maddala and Wu (1999).

Results reported in Table 3 show that the null hypothesis of non-stationary (or presence of unit root) is rejected for all variables except short term interest rate, interbank rate, and liquidity premium. Since the dependent variable is stationary, we are less likely to get spurious results even if some variables are not stationary.

Table 3
FISHER TEST FOR A PANEL UNIT ROOT TEST USING ADF

VARIABLES	Chi2(46)	P-Value
L1	138.0735	0.0000
L2	151.8448	0.0000
L3	237.2095	0.0000
L4	254.2093	0.0000
CAP	221.8591	0.0000
SIZE	109.1474	0.0000
GLOANS	82.2865	0.0008
NPL	146.7197	0.0000
GROWTH	87.8911	0.0002
INF	256.6205	0.0000
LP	0.6695	1.0000
INT	13.8646	1.0000
IRB	12.0708	1.0000
RL	108.2474	0.0000
UMP	971.2679	0.0000

To confirm this, stationary of errors will be tested using Fisher test. For example, using L1 as the dependent variable, results show a p-value of 0.0003, rejecting the null hypothesis of non-stationary. Thus, we can conclude that there are no unit roots in the panel under the given test conditions (included panel mean and time trend for bank variables and time trend for macroeconomic variables).

Choice of Regression

The estimation used should take into consideration the special features of the panel data. In static relationship, the literature applies pooled OLS, fixed effect, or random effect model. To choose between the fixed effect (FE) and the random effect (RE), Hausman test (1978) for the exogeneity of the unobserved error component is used. Rejecting the null hypothesis suggests that RE is inconsistent and FE model is better. Results in Table 4 show that accepting or rejecting the null hypothesis depends on the dependent variable. Thus, the analysis is divided into 2 parts: L1 and L2 as the dependent variables on one side, and L3 and L4 as the dependent variables on the other side.

First, using L1 and L2 as the dependent variables, the null hypothesis is rejected (Prob>Chi2 is less than 0.05), concluding that the fixed effect is more efficient than random effects. The results suggest that each bank has its own individual characteristics that may have an influence on the liquidity. Next, to choose between fixed effect and pooled OLS, the Restricted F test reports a p-value of 0.0000, suggesting that fixed effect is better than pooled OLS. Therefore, the choice of FE indicates the importance to control for all time-invariant difference between banks. Given that fixed effect model will be used for L1 and L2, the next step is to use a joint test to see if time fixed effects are needed. The null hypothesis is that all time fixed effects coefficients are equal to zero. The Prob>F reported in Table 4 is lower than 0.05, rejecting the null hypothesis and suggesting the need to include time fixed effect in our model.

Second, using L3 and L4 as the dependent variables, the null hypothesis cannot be rejected (Prob>Chi2 is more than 0.05), indicating that the random effect is more efficient estimator. Then, to choose between random effect and pooled OLS, Breush and Pagan LM test (1980) is used, with a null hypothesis that variance across entities is zero. Prob>Chibar2 reported in the last row in Table 4 is lower than 0.05, concluding that a simple pooled OLS regression cannot be used. Therefore, a random effect model is run when L3 and L4 are used as dependent variables.

Since some studies suggest the presence of a dynamic model, where bank liquidity position might persist over time, a dynamic model will be run by including the lagged dependent variable among the independent variables.

Table 4
HAUSMAN TEST, F-TEST, TESTPARM AND LM TEST

TESTS	L1	L2	L3	L4
Hausman Test: Ho: difference in coefficients not systematic				
Chi2(8)	29.23	29.37	0.54	1.10
Prob	0.0003	0.0003	0.9998	0.9975
F-test that all u_i=0				
F(21,95)	11.01	9.50	27.01	26.83
Prob>F	0.0000	0.0000	0.0000	0.0000
Testparm				
F(3, 95)	8.40	10.59		
Prob>F	0.0004	0.0001		
Breusch and Pagan Lagrangian multiplier test for random effect				
Chibar2(01)			117.96	116.35
Prob>chibar2			0.0000	0.0000

Multi-Collinearity

To detect multicollinearity, a correlation matrix for all independent variables is conducted. Multicollinearity is considered a serious problem if the correlation coefficients are more than 0.8 (Cooper & Schindler, 2010). Results in Table 5 suggest that muticollinearity is not a problem given that all coefficients are less than the cut-off point set by Cooper and Schindler (2010).

Serial Correlation

Serial correlation, or correlations between errors, should be tested since it might cause smaller standard errors and higher R-squared. Since the Durbin Watson test can be used only in time series, Lagram-Multiplier test derived by Wooldridge (2002) is applied to test autocorrelation in panel-data. Given the null of no serial correlation, the results in Table 6 show that the data has no first order autocorrelation when L1 and L2 are used as the dependent variables since the probability is higher than 0.05. However, when L3 and L4 are used as the dependent variables, results indicate the existence of first order autocorrelation (prob<0.05).

Since serial correlation is considered to be a problem in macro panels with long time series, and since our data is made of only few years, we can conclude that autocorrelation is not a problem. However, for more reliable results, regressions run will be adjusted for autocorrelation, especially in the case of L3 and L4.

Table 6
WOOLDRIDGE TEST FOR AUTOCORRELATION IN PABEL DATA

WOOLRIDGE TEST	L1	L2	L3	L4
F(1,21)	4.007	2.313	33.259	38.552
Prob>F	0.0584	0.1432	0.0000	0.0000

Heteroscedasticity

To detect the presence of heteroscedasticity, Wald Test as suggested by Baltagi (2008) is employed. The null hypothesis is homoscedasticity, or constant variance, meaning that the variance of the error is the same for all individuals. Table 7 reports a P-value lower than 0.05, rejecting the null hypothesis and concluding the presence of heteroskedasdicity regardless of the dependent variables. Therefore, the regression coefficients will be adjusted for heteroskedasdicity.

More specifically, when L1 and L2 are used as the dependent variables, the fixed effect regression used will be adjusted for heterosckedasticy by using robust standard errors known as Huber/White estimators and will be also adjusted for autocorrelation by including robust and clustered standard errors (White, 1980; Rogers, 1993). As for L3 and L4, a fixed effect model is not the best estimator. With the presence of heterosckedasticy and autocorrelation, the generalized least square (GLS) can be used since standard errors estimates can be robust to disturbance as heteroscedastic, contemporaneously cross-sectionally correlated, and autocorrelated of type AR(1). However, GLS is feasible only if the number of entities (N) is less than number of periods (T). Given that our data is made of 22 banks and only 9 years, the latter is not appropriate. Furthermore, Beck and Katz (1995) argued that GLS tends to produce unacceptably small standard errors estimates. Instead, they advocate the use of Prais-Wisnten regression, with panel corrected standard errors. Therefore, Prais-Winsten regression will be used, with panel-specific AR (1) to adjust for autocorrelation and heteroskedastic panels corrected standard errors.

Table 7
MODIFIED WALD TEST FOR GROUP-WISE HETEROSCEDASTICITY

TEST	L1	L2	L3	L4
Chi2(7)	926.52	1622.55	11966.64	9563.15
Prob	0.0000	0.0000	0.0000	0.0000

EMPIRICAL FINDINGS

Presentation of Findings

The empirical evidence on the determinants of banks' liquidity is based on unbalanced panel data. Although two models are presented for each dependent variable, the analysis will be based on the best model.

Using L1 and L2 as the dependent variables, the first model reports the fixed effect technique with robust and clustered standard errors to control for heterosckedasticity and autocorrelation respectively and with the inclusion of time dummies (as shown by Testparm test). The second model (Model 2) reports the dynamic model with robust standard errors where the lagged dependent variable will be included within the independent variables to see whether banks' liquidity exhibits certain degree of persistence over time. Table 8 suggests a high coefficient of determination (within R2 of 0.4972 and 0.5376) and the estimated model fits the panel data as shown by the high F test in case of model 1 and the high Wald test in case of model 2.

To test whether residuals are serially correlated at specified range (1-1; 1-2) and at specific lag 2, Table 9 reports Cumby and Huizinga test (1992) where a p-value higher than 0.1 indicates the presence of serial correlation.

Results show that the residuals from Model 1 are not serially correlated when L1 and L2 are used as the dependent variable. Since the residuals of Model 2 appear to be serially correlated, the analysis will be based on Model 1. Some variables were omitted due to collinearity and they are represented by a coefficient of 0.

By comparing the results for L1 and L2, the regression using L2 as the dependent variable has a higher explanatory power. The findings revealed that these two liquidity ratios are affected by similar factors given a very close number and signs of significant variables. Thus, the discussion of results based on L1 and L2 will be combined together.

Determinants of liquidity measured by L3 and L4 are shown in Table 10. These two ratios have reverse interpretations than L1 and L2, since a higher value means lower liquidity. Thus, a positive impact on liquidity is represented by a negative sign of the coefficient. Similarly, two models are run with L3 and L4 as dependent variables. The first model reports the Prais-Winsten regression with AR (1) and heteroskedastic panels corrected standard errors (Model 1) , while the Model 2 reports the dynamic model with robust standard errors.

Comparing the results for L3 and L4 suggests that these two liquidity ratios are affected by similar factors. Therefore, the discussion of results for both L3 and L4 will be combined together. Table 11 reports Cumby and Huizinga test (1992) when L3 and L4 are used as the dependent variables. Although that the regressions were adjusted for autocorrelation, results show that the residuals are serially correlated for all ranges and for all lags. Due to the presence of serial correlation, results obtained using L1 and L2, are considered to be more reliable than those obtained using L3 and L4.

Table 8 DETERMINANTS OF BANK'S LIQUIDITY (L1/L2 AS DEPENDENT VARIABLES)								
	L1 as the dependent variable				L2 as the dependent variable			
	Model 1 (Fixed Effect, Robust and Clustered with Time Dummies)		Model 2 (Dynamic Model, Robust with Time Dummies)		Model 1 (Fixed Effect, Robust and clustered with time dummies)		Model 2 (Dynamic Model, Robust with time dummies)	
	Coef.	P>t	Coef.	P>t	Coef.	P>z	Coef.	P>z
CAP	.0133667	0.016**	.004366	0.421	.0161149	0.013**	.0096844	0.194
NPL	-.0012276	0.130	-.0008112	0.244	-.0014834	0.146	-.000691	0.367
SIZE	.1786031	0.060*	.1430619	0.045**	.2602682	0.019**	.2475066	0.018**
GLOANS	-.0008658	0.005***	-.0009595	0.006***	-.0010824	0.004***	-.001306	0.002***
GROWTH	.0062644	0.145	-.0240094	0.000***	.0096887	0.070*	-.0312075	0.000***
INF	-.0237275	0.003***	-.0792122	0.000***	-.030631	0.002***	-.1104813	0.000***
IRB	.1148101	0.002***	.1402029	0.004***	.1606745	0.000***	.2194733	0.003***
INT	0		0		0		0	
LP	0		0		0		0	
RL	.0093243	0.012**	.0234917	0.000***	.012162	0.006***	.0335087	0.000***
UMP	0		0		0		0	
Dummy 1	-.0459299	0.072*	.0462082	0.168	-.0615855	0.046**	.0661668	0.119
Dummy 2	0		0		0		0	
Lagged L			.4117442	0.029**			.3742853	0.067*
Year 1	0		0		0		0	
Year 2	.1145303	0.019**	0		.1633077	0.005***	0	
Year 3	0		0		0		0	
Year 4	0		0		0		0	
Year 5	0		0		0		0	
Year 6	0		0		0		0	
Year 7	-.0301311	0.036**	-.1029898	0.000***	-.0319471	0.102	-.1315789	0.000***
Year 8	0		0		0		0	
Year 9	0		0		0		0	
Cons	-1.584576	0.073*	-.9783167	0.132	-2.358101	0.022**	-1.913112	0.047**
Obs	128		91		128		91	
Within R^2	0.4972				0.5376			
F (12,21)	12.09	0.000***			15.90	0.000***		
Wald Chi			93.82	0.000***			81.90	0.0000

***, **, and * = significant at the 1% level, 5% level, and 10% level respectively
Variables with a coefficient of 0 were dropped because of collinearity.

Table 9 CUMBY-HUIZINGA TEST FOR AUTOCORRLEATION (L1/L2 AS DEPENDENT VARIABLES)								
	L1 as the dependent variable				L2 as the dependent variable			
	Model 1 (Fixed Effect, Robust and Clustered with Time Dummies)		Model 2 (Dynamic Model, Robust with Time Dummies)		Model 1 (Fixed Effect, Robust and clustered with time dummies)		Model 2 (Dynamic Model, Robust with time dummies)	
Range Specified	**Chi2**	**P-value**	**Chi2**	**P-value**	**Coef.**	**P-value**	**Coef.**	**P-value**
1-1	1.754	0.1854	16.091	0.0001	0.522	0.4699	16.868	0.0000
1-2	3.195	0.2024	18.097	0.0001	1.640	0.4405	19.117	0.0001
Lag Specified								
2	1.672	0.1959	11.379	0.0007	1.234	0.2667	12.566	0.0004

Table 10 DETERMINANTS OF BANK'S LIQUIDITY (L3/L4 AS DEPENDENT VARIABLES)								
	L3 as the dependent variable				**L4 as the dependent variable**			
	Model (PW with Panel AR1 and heteroskedastic)		**Model 2 (Dynamic Model, Robust)**		**Model 1 (PW with Panel AR1 and heteroskedastic)**		**Model 2 (Dynamic Model, Robust)**	
	Coef.	**P>z**	**Coef.**	**P>z**	**Coef.**	**P>z**	**Coef.**	**P>z**
CAP	-.2170271	0.456	-.11613	0.714	.0339292	0.917	.170694	0.638
NPL	-.0665023	0.213	-.0064641	0.869	-.0848806	0.196	-.0084807	0.840
SIZE	-2.008349	0.035**	-7.863646	0.039**	-1.452805	0.121	-9.265285	0.028**
GLOANS	.040313	0.008**	.1073009	0.000***	.0397814	0.030**	.1119529	0.000***
GROWTH	-.1462954	0.205	.0268978	0.906	-.0966553	0.460	.0763645	0.756
INF	-.3486168	0.121	1.89368	0.002***	-.4296815	0.085	2.303425	0.001***
IRB	-.6945789	0.511	-3.354049	0.023**	-.192025	0.875	-3.519557	0.038**
INT	3.091329	0.045**	-1.591749	0.259	3.178667	0.071*	-2.336809	0.108
LP	-12.47713	0.000***	0		-14.26727	0.000***	0	
RL	.436649	0.008***	-.5189146	0.035**	.494083	0.008***	-.6344441	0.017**
UMP	2.6735	0.000***	0		2.616408	0.000***	0	
Dummy 1	2.836048	0.007***	-1.379885	0. 338	3.181476	0.008***	-1.757885	0.244
Dummy 2	-2.314856	0.343	0		-.1552198	0.953	0	
Lagged L			.6971631	0.000***			.7154974	0.000***
Cons	0		82.99239	0.033**	0		94.77832	0.028
Obs	128		91		128		91	
R^2	0.8023				0.8585			
Wald Chi	975.70	0.0000	168.01	0.0000	1923.43	0.0000	215.64	0.0000

***, **, and * = significant at the 1% level, 5% level, and 10% level respectively
Variables with a coefficient of 0 were dropped because of collinearity.

Table 11 CUMBY-HUIZINGA TEST FOR AUTOCORRLEATION (L3/L4 AS DEPENDENT VARIABLES)								
	L3 as the dependent variable				**L4 as the dependent variable**			
	Model (PW with Panel AR1 and heteroskedastic)		**Model 2 (Dynamic Model, Robust)**		**Model 1 (PW with Panel AR1 and heteroskedastic)**		**Model 2 (Dynamic Model, Robust)**	
Range Specified	**Chi2**	**P-value**	**Chi2**	**P-value**	**Coef.**	**P-value**	**Coef.**	**P-value**
1-1	14.786	0.0001	15.953	0.0001	12.858	0.0003	16.244	0.0001
1-2	14.820	0.0006	17.083	0.0002	12.863	0.0016	17.293	0.0002
Lag Specified								
2	12.883	0.0003	13.196	0.0001	11.566	0.0007	13.516	0.0002

Determinants of Bank liquidity as measured by L1 and L2

Starting with the bank specific variables, first, capital positively affects bank's liquidity, consistent with the assumption that banks with sufficient capital should be liquid, in line with previous studies (Vodova, 2011). Higher capital ratio might act as a positive signal to the external public, which will attract more deposits, enabling banks to be more liquid. Second, the positive and statistically significant impact of bank size on liquidityis consistent with the assumption that small banks focus more on traditional activities such as transforming deposits into loans. By focusing on loans, small banks tend to hold little investment securities, leading to low cash and reserves balance, consistent with Bonfim and Kim (2012) and Lucchetta (2007). Although non-performing loan ratio has the expected sign, the coefficient is not significant. As for the last bank specific variable (loan growth), it has a negative and significant impact, in line with our expectation and consistent with Aspachs et al. (2005) and Valla et al. (2006). The higher the amount of loans provided, the more is the amount of illiquid assets, and the lower is the liquidity. This significant impact reveals that the dependency of Lebanese commercial banks on loans.

Moving to the macroeconomic variables, the economic growth is not significant. Second, the negative significant coefficient of inflation rate might suggest that inflation lowers bank liquidity because it deteriorates overall macroeconomic conditions, consistent with Vodova (2011). Third, the interbank interest rate is positive and significant, suggesting that a higher rate encourage banks to maintain their money in the interbank market as part of liquid assets. Furthermore, a higher rate increases the illiquidity costs if banks need to borrow in the interbank market, pushing banks to be more liquid, consistent with Vodova (2011) and Lucchetta (2007). Fourth, although we expect the short term interest rate to have a positive and significant sign given the dominance of Lebanese commercial banks participation in the Treasury bills market (banks are the major financer of Lebanese government), this variable was dropped from the model because of collinearity. Fifth, the positive effect of real interest rate on lending is surprising. While RL is significant, LP's significance could not be tested due to collinearity. Although it is expected that higher rates on lending encourage banks to lend more and to hold less liquid assets, the positive relationship is consistent with Bunda and Desquilbet (2008) and Vodova (2011), which can be explained with the presence of credit crunch and credit rationing.

Moving to the dummy variables, dummy 1 is negative, indicating that the financial crisis had a negative impact on bank liquidity.

More specifically, result shows that liquidity increases in year 2006 and decreases in year 2011. Dummy 2 is insignificant indicating that listed banks do not differ from unlisted banks.

Determinants of Bank liquidity as measured by L3 and L4

Though the residuals are serially correlated, it is still important to analyze the results obtained in Table 10. The model included four bank-specific variables, with only bank size and growth of loans are significant, while capital position and quality of loans are non-significant. Size is significant with a negative impact on L3 and L4, consistent with the previous finding that smaller banks tend to focus more on lending activities, which lead to lower liquidity. On the other hand, larger banks tend to focus more on investment activities, which lead to higher liquidity. The loan growth has a positive and significant sign, coherent with the fact that loans are illiquid and the higher they grow, the less is the bank liquidity.

As for the macroeconomic variables, only four variables are significant. First, the rate on T-bills has a positive and significant impact on bank loans, illustrating the role of T-bill rate as a benchmark rate. A higher rate leads to an increase in cost of borrowings and lending rates which motivates banks to lend more and to reduce the liquid assets.

Liquidity premium has a negative and significant coefficient. Although unexpected, it supports Bunda and Desquilbet (2008) findings that higher spread will not encourage banks to lend more, due to the existence of credit rationing, similar to the findings obtained using L1 and L2 as the dependent variables. Contrary, the real interest rate on lending has a positive and significant sign, supporting the positive impact of T-bill rates. Finally, unemployment has a positive and significant coefficient in Model 2, suggesting that bank liquidity decreases with unemployment.

As for the dummy variables, results in Table 10 are consistent with the results obtained in Table 8. The financial crisis negatively affects the liquidity of banks, regardless of the measure used.

CONCLUSION

In conclusion, the paper aims to identity the determinants of the liquidity of the Lebanese banks between 2004 and 2013, by using a panel data regression, and four different measures of liquidity. Using four bank specific variables, seven macroeconomic variables and two dummy variables, only few variables proved to be significantly important in determining banks' liquidity. First, the results of this paper show that banks' characteristics explain part of their liquidity. Higher liquidity tends to be associated with bank size and lower growth of loan. These variables are significant regardless of the dependent variables. Second, the paper finds that the impact of macroeconomic indicators on bank liquidity depends on the dependent variables used. Bank liquidity decreases with inflation and increases with real interest rate and interbank rate when L1 and L2 are used as dependent variables. Moreover, bank liquidity decreases with short term interest rate, real interest rate, and unemployment, and increases with liquidity premium when L3 and L4 are used as dependent variables. The impact of real interest rate and liquidity premium on liquidity supports the presence of credit rationing in the Lebanese banking sector, while the impact of interbank rate proves the dependency of the Lebanese banks on the interbank market in case of liquidity shortage. The impact of short term interest rate demonstrates the use of T-bill as a benchmark rate.

Third, the paper supports the persistence of liquidity in the banking sector given the significance of the lagged liquidity. Fourth, the paper finds that the financial crisis has a negative impact on bank liquidity as shown by the significance of Dummy 1. Finally, no significant difference exists between listed and unlisted banks as shown by the insignificance of Dummy 2.

These findings are important in many aspects. The study concludes that bank specific fundamentals must be monitored; since more liquid assets are required as the bank size increases. The central bank regulations also greatly affect the liquidity of Lebanese commercial banks (such as the interbank rate). Moreover, monetary policy needs be monitored due to the undesirable effects of inflation on liquidity. Besides, the negative impact of financial crisis on banks liquidity suggests the need for Lebanese banks to carefully forecast the liquidity requirements as anticipation for future events. Lastly, the unstable political environment needs to be solved to improve liquidity. The results suggest that some of the variables affecting Lebanese banks liquidity may be controlled by the government. The paper is a just a stepping stone and future researches are needed to focus on qualitative factors such as political instability, the currency circulation and salary and wages levels as probable determinants.

ENDNOTES

1 The GLS random model with robust and clustered standard errors adjusted for heterskedasticity and autocorrelation was run. The explanatory power was 0.3220 for L3 and 0.3007 for L4 supporting Beck and Katz (1995)'s recommendation to use Prais Winsten regression instead of GLS regression.

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UNDERSTANDING THE LIMITATIONS OF FINANCIAL RATIOS

Joseph Faello, Mississippi State University

ABSTRACT

The purpose of this paper is to provide financial statement users and accounting academics with some useful insights when working with financial ratios. Initially, the uses and benefits of financial ratios and the limitations of using financial ratios are discussed from the financial statement users' and accounting academics' perspectives. Then, practical advice is provided to both financial statement users and accounting academics alike to mitigate the limitations of using financial ratios. Financial statement users and accounting academics will find the issues discussed in this paper useful in their work with financial ratios.

Keywords: Financial ratios, Comparability, Homoscedasticity, Outliers

INTRODUCTION

Financial ratios play an important role in the analysis of financial statements and accounting research. However, the use of financial ratios comes with its hazards. Both accounting academics and financial statements' users need to understand the problems and limitations in working with financial ratios. The purpose of this paper is to address these issues and to provide guidance on how to mitigate the problems surrounding financial ratios. Both accounting academics and financial statement users will find this study useful in their dealings with financial ratios.

The study is organized as follows:

1. Uses and benefits of financial ratios;
2. Limitations of financial ratios;
3. Dealing with the limitations of financial ratios; and
4. Conclusion.

USES AND BENEFITS OF FINANCIAL RATIOS

Financial ratios play an important role in financial reporting. A ratio "expresses the mathematical relationship between one quantity and another," (Kieso et al. 2013, p. 245). A financial ratio consists of a numerator and a denominator, relating two financial amounts. The two financial amounts can be from the balance sheet (e.g. current ratio), or from the income statement (e.g. times interest earned), or from both the balance sheet and the income statement (e.g. return on total assets).

Financial ratios help explain financial statements. For example, financial ratios assist in benchmarking a firm's performance with other firms in the same industry. Further, financial ratios help financial statement users in identifying problem areas with a company's operations, liquidity, debt position, or profitability. From this benchmarking and assessment of a firm's performance, financial ratios help in assessing the firm's overall risk (CICA, 1993). Prior research supports the use of financial ratios as a means to predict firms' performance, specifically stock returns and return on assets (e.g., Soliman, 2008; Nissim & Penman, 2001; Fairfield & Yohn, 2001).

Financial ratios are frequently used in loan contracts between a firm (borrower) and a financial institution (lender) as a means to limit the firm's activities. A borrower has an incentive to engage in activities that benefit his or her self-interests at the expense of the firm's overall value, resulting in the lender inserting accounting numbers in the debt contract (i.e., debt covenant) to restrict the borrower's value-reducing activities (Watts & Zimmerman, 1986). For example, the loan contract may stipulate that the firm must maintain a current ratio of at least 2:1. In this manner, the firm is encouraged to effectively manage its current assets and current liabilities, for example, by collecting its accounts receivables on a timely basis.

For financial statement users, financial ratios not only provide information about where a firm has been, but also provides guidance about where it is headed in the future. For example, negative trends in financial ratios over time could indicate a firm is in decline and provide insights into predicting corporate failure. The Canadian Institute of Chartered Accountants (CICA, 1993) in their Research Report titled "Using Ratios and Graphics in Financial Reporting," summarizes these and additional benefits of financial ratio analysis (see Appendix 1).

From an academic perspective, financial ratios play an important role in modeling. A variable of interest (dependent variable) is estimated in a linear regression model by key independent variables that are frequently financial ratios. Many bankruptcy prediction models utilize financial ratios (Altman & Hotchkiss, 2006).

In summary, financial ratios provide important information about a firm's past performance, predicting a firm's future performance prospects, assessing management's decision-making, risk assessment, and are a critical tool employed in lending agreements to control a firm's activities. In addition, accounting academics use financial ratios in modeling the key variable of interest in their research studies.

LIMITATIONS OF FINANCIAL RATIOS

Inherent in the use of financial ratios are limitations that if not understood could result in drawing incorrect conclusions from the results. Significant limitations in the use of financial ratios are discussed below.

A financial ratio consists of a numerator and a denominator. If either the numerator or denominator is misstated, then the financial ratio will be in error. Misstatement of either the numerator or denominator could be the result of human error. For example, an error could be made in collecting the firms' financial statement data. Alternatively, the firms could be employing earnings management techniques (e.g., manipulating accruals) that results in the data itself being misstated. Prior accounting research provides evidence that firms' managers manipulate accruals to portray firms' financial results in a more positive manner (e.g., Healy & Wahlen, 1999; McNichols, 2000). In either case, financial statement users and academics would obtain results from their analyses that could lead to erroneous conclusions.

Financial ratios derived from a particular firm's financial statements are based on accounting principles, accounting methods, and accounting classifications chosen by the firm. These choices may not be consistent over time or between firms, thus compromising comparability. Financial statement users and researchers alike need to understand that the availability of accounting choices under generally accepted accounting principles (GAAP) may provide firms with greater flexibility in financial reporting, but it also can lead to a decline in comparability of a firm's financial results over time and between other firms.

The relation between the numerator and denominator variables in financial ratios poses special problems to accounting researchers. Often, the researcher assumes a relationship or proportionality between the two variables. However, little attention is paid to the distributional properties of ratios (Foster, 1986).

Prior research studies on the distributional properties of financial ratios find that financial ratio data may not be normally distributed, but rather can be severely skewed (Deakin, 1976; Frecka & Hopwood, 1983; Foster, 1986). The implications of non-normality are that the basic assumptions of ordinary least squares (OLS) regression are not valid; that is, the OLS estimators are not the best linear unbiased estimators (Gujarati, 2003). For example, one assumption is that the variance is equal or constant for all observations (homoscedasticity). Skewness causes a breakdown in homoscedasticity resulting in a condition known as heteroscedasticity (unequal variance). The importance of maintaining the validity of OLS assumptions is that these assumptions are necessary to draw inferences about the population under investigation that are statistically valid with hypothesis testing. Otherwise, hypothesis testing becomes more complex (e.g., use of non-parametric methods).

Another cause of heteroscedasticity is the effect of outliers. An outlier is defined as "an observation (or subset of observations) which appears to be inconsistent with the remainder of that set of data" (Barnett & Lewis, 1994, p. 7). Financial ratio data are prone to include outliers. As the denominator of an observation for a particular financial ratio approaches zero, the financial ratio becomes extremely large. Frecka's and Hopwood's Table 1 (Frecka & Hopwood, 1983, p. 117) provides 10 ratio values. With the numerator kept constant with a value of "2.0," the denominator is reduced from a value of "1.0" to "0.10." The ratio value changes from a value of 2.0 (i.e., 2.0 divided by 1.0) to a value of 20 (i.e., 2.0 divided by 0.10). Thus, a decline in value of 0.90 in the denominator has a tenfold effect on the financial ratio. Frecka and Hopwood (1983, pp. 126-127) find that including an outlier with a value of 100 in a sample that has a mean equal to 4 results in weighing that observation 2,304 times more than the average observation. The effect of an outlier on small samples is even more profound. Frecka and Hopwood (1983, p. 127) state that including an observation with a current ratio of 100:1 in an industry of 9 firms that would normally have a mean of 2.0 and a variance of 1.0, changes the sample mean and variance to 12.89 and 1,068, respectively.

Overall, the limitations of financial ratios must be addressed prior to drawing any meaningful conclusions from the results. Methods on how to deal with these limitations are discussed in the next section.

DEALING WITH THE LIMITATIONS OF FINANCIAL RATIOS

The methods on how to deal with the limitations of financial ratios are discussed from two perspectives: (a) financial statement users' perspective; and (b) accounting researchers' perspective.

Financial Statement Users' Perspective

From the perspective of financial statement users, the limitations of financial statement ratios affect the comparability of a firm's financial results. For example, a firm that changes its inventory valuation method from last-in, first-out (LIFO) to first-in, first-out (FIFO) will lack comparability with other firms that use LIFO. Thus, comparing inventory turnover ratios between firms is compromised. Financial statement users can address this issue by reviewing the accounting principles of the firm with the accounting change. Generally, a summary of the firm's accounting principles is provided in the first or second notes to the financial statements. Further, additional information about the accounting change would be described in a separate note (e.g., inventory valuation note). Comparability is enhanced because the effects of the accounting change on earnings would be explained in the note, allowing the financial statement user to adjust for these effects and compare inventory turnover ratios with other firms in the industry using LIFO. Note that comparing the firm's inventory turnover ratio with its own inventory turnover ratio in the previous year is not compromised because changes in accounting principles are applied retrospectively, meaning the comparative year's amounts are prepared on the same FIFO basis as the current year's amounts. Thus, financial statement users should always review the accounting principles included in the financial statements of firms whose financial amounts are used to calculate and compare financial ratios.

However, not all accounting changes are accounted for retrospectively. A change in accounting estimate is accounted for prospectively, meaning prior period results are not adjusted for the change. The reasoning for this treatment is that a change in accounting estimate is based on new information and should affect only reported results in the current period and going forward. Examples of changes in accounting estimates are changes to the estimate for uncollectible accounts receivable and changes to depreciation expense due to changes in the useful lives or salvage values of property, plant, and equipment assets.

One effect of a change in accounting estimate is to either increase or decrease earnings. For example, a decrease in the rates for uncollectible accounts receivable, an extension to an asset's useful life, and an increase to an asset's salvage value, all have the effect of increasing operating income. Financial statement users should review the firm's notes to its financial statements for additional information provided about any changes to accounting estimates. Further, the changes to accounting estimates should be consistent with the economic substance of transactions affecting the firm. For example, during a recessionary period, a firm's customers have a greater likelihood not to pay accounts receivable, thus one would expect the rate for uncollectible accounts receivable to increase and not decrease.

Financial statement users should be concerned with the direction of accounting estimates (i.e., either income increasing or income decreasing). Generally during the fourth quarter of a firm's annual fiscal period, the firm's managers make decisions concerning accounting estimates that affect the reported results for the annual fiscal period (e.g., determine allowance for doubtful accounts receivable). If the adjusting entries at year-end are predominantly income-increasing, then it is important that these adjustments faithfully represent the underlying economic substance of events affecting the firm. Otherwise, the managerial intent for the adjustments comes into question. For example, accounting managers can make income-increasing accruals sufficient enough to earn income-based bonuses that are stipulated in their employment contracts. Oyer (1998) finds a non-linear relationship between employees' compensation and accounting earnings. That is, employees earn their bonuses once a certain threshold of accounting earnings has been attained, usually occurring during the fourth quarter. Thus, a strong incentive exists for managers to record income-increasing accruals or utilize other income-increasing earnings management techniques in order to obtain higher compensation.

Since financial statement users cannot observe a firm's internal accounting-related decisions, other techniques must be employed to reduce the risk of relying on unreliable accounting figures that are used in computing financial ratios. First, financial statement users should have a general understanding of how economic and other factors affect a firm's financial results. For example, a home builder's financial results is more likely affected by increasing interest rates than firms in other industries or a firm operating in a highly regulated industry is more likely affected by changes in governmental regulation. Information about these effects can be found in the management discussion section of the firm's annual report for a public company. Second, the compensation agreements of key personnel need to be scrutinized for potential incentives to manage earnings. This information is also provided in the firm's annual report for public companies. Third, key covenants in contracts entered into by the firm that use accounting measures need to be reviewed with particular attention paid to "thresholds" that have been marginally exceeded. Information concerning accounting thresholds used in contracts affecting the financial statements should be disclosed in the firm's financial statement notes. For example, a bank loan covenant may stipulate the firm must maintain a current ratio of 2:1. If the year-end current ratio is 2.05:1 and the firm has reduced its allowance for doubtful accounts receivable, then the risk of earnings management increases.

Overall, the financial statement user needs to take a proactive approach when relying on financial amounts employed in financial ratio analysis.

Accounting Researchers' Perspective

From a researcher's viewpoint, a major limitation in working with financial ratios is the effect of outliers on the statistical results. An outlier represents an observation that is inconsistent with the remainder of the data set (Barnett & Lewis, 1994, p.7). The inclusion of a few outliers could result in the sample's mean and variance and regression's variable coefficients being significantly different from the results that are truly representative of the data set.

In dealing with outliers, Foster (1986) provides five alternatives:

1. Deleting the outlier because it is unrepresentative of the data set;
2. Retaining the outlier because it represents an extreme example of an underlying characteristic of the data set;
3. Making adjustments to the data for the underlying economic and accounting factors that are believed to cause the extreme observation(s); e.g., impute interest payments for "off balance sheet financing" debt;
4. "Winsorizing" the data set's extreme observations; and
5. "Trimming" the data set by deleting a certain percentage or a certain number of the top and bottom observations.

In addition, data can be transformed to alleviate the harmful effects of outliers. When applying these alternatives in a particular research study, a considerable amount of judgment is required in order to not create results that are unrepresentative of the underlying economic phenomena. Given the effect of a single outlier on the sample's mean and variance, the methodology in handling outliers becomes extremely important.

A first step is to understand the nature of outliers. The nature of an outlier can be classified as either "random" or "deterministic" (Barnett & Lewis, 1994, p. 42). The source of a deterministic outlier is either measurement error or in execution, and the proper response is to correct it or reject it (Barnett & Lewis, 1994, p. 42).

For a random outlier, the response is more complex because its underlying nature is not readily apparent. One response is to accommodate the outlier in the existing research model or to revise the model to incorporate the effects of outliers (Barnett & Lewis, 1994). A logarithmic data transformation is an example of a model revision. Other responses are to winsorize or trim the data set or to outright reject the outlier.

Winsorizing the data involves assigning the outlier a lesser weight. Ghosh and Vogt (2012, p. 3456) state:

> *A common procedure has been to replace any data value above the ninety-fifth percentile of the sample data by the ninety-fifth percentile and any value below the fifth percentile by the fifth percentile. The assumption seems to be that the outlier does not look right and estimates will be improved if the outlier is made to look like other data.*

Further, Ghosh and Vogt (2012, p. 3456) state the implication of this line of reasoning as "the outlier value must be incorrect" and "the value is replaced by a more plausible value." The fault with this logic occurs when the outlier does truly represent an important characteristic of the sample data and thus, should not be altered.

Another winsorizing procedure is the "skipped Huber method." Under this method, a distance from the median is used as a basis to rein in outliers. Specifically, values that are greater than 5.2 median absolute deviations from the median are adjusted to this threshold value (Connor & Herbert, 1999; Martin & Simin, 2003).

Trimming the data set involves deleting a certain percentage or a certain number of the top and bottom observations. For example, Ettredge et al. (2005) deleted the top 1% and bottom 1% of the observations in their study. Generally, this approach is based on rules of thumb that are particular to the research discipline. Deleting a specifically identifiable outlier implies it does not fit with the pattern of the data set. Thus, its presence in the sample increases the likelihood of non-representative results.

When applying these procedures, it is important that the researcher exercises due care because the procedures in dealing with outliers are not an exact science. Further, the researcher should use a comprehensive approach in dealing with the effects of outliers. A comprehensive approach entails examining the research study's results in raw data form, with the deletion of specifically identifiable outliers, and with the use of data trimming, winsorizing, or transformation. The primary goal of this analysis is to generate a research model and results that provide the researcher with the best linear unbiased estimators.

The researcher must identify the outliers as a first step in order to employ the comprehensive approach. One method of identifying outliers is to generate a series of plots involving the independent and dependent variables, predicted values, and residuals. The residuals are the differences between the observed values and predicted values for the dependent variable. Important plots to study are: dependent versus independent variables; residuals versus independent variables; and residuals versus predicted values.

Plotting the dependent variable versus the independent variables is useful in identifying gaps between a particular observation (i.e., potential outlier) and the primary cluster of observations. Although useful, this analysis does not provide insights into how the observation in isolation or jointly with other potential outliers influences the research model's results (Belsley et al. 1980). Further, the combined effects of more than one independent variable on the dependent variable cannot be separated with this analysis meaning it is only relevant with a simple regression model.

A starting point for checking violations of the model's assumptions, including homoscedasticity, linearity, and existence of outliers, is to plot residuals versus independent variables or residuals versus predicted values (Chatterjee & Price, 1991, p. 24). Plotting residuals versus the independent variables is of value only with a simple regression model because of the inability to separate the combined effects of the independent variables. The largest residuals, both positive and negative, should be considered as outliers in this analysis. However, in empirical accounting research, simple regression models are rare because most studies involve multiple independent variables.

When examining residuals a form of standardization is recommended to provide greater comparability of residuals. The studentized residuals are the most common form of standardized residuals (Hair Jr. et al., 1998, p. 172). Examining studentized residuals versus predicted values is the preferable plotting technique to identify outliers in a multiple regression study. The "ideal" plot for the researcher is a "null plot." As Hair Jr. et al. (1998, p. 173) state:

> *The null plot shows the residuals falling randomly, with relatively equal dispersion about zero and no strong tendency to be either greater or less than zero.*

A "pattern" in the plot indicates the violation of the constant variance of the error terms assumption (homoscedasticity). The violation of this assumption is called heteroscedasticity and results in a lack of statistically valid hypothesis testing. Two common patterns of heteroscedasticity are diamond-shaped or triangle-shaped patterns (Hair Jr. et al., 1998, p.175). A diamond-shaped pattern indicates more variation exists in the mid-range of the sample than at the tails. A triangle-shaped pattern indicates the residuals increase or decrease with increases in the predicted values. In both cases, the constant variance assumption is violated and the researcher should question the validity of hypothesis tests.

As is the case with most accounting research studies, sample sizes can be quite large with the number of observations in the thousands. Thus, visually identifying outliers can be difficult through an analysis of plots. Three statistical tests provided by most statistical packages are the Levene's Test, Mahalanobis Distance, and Cook's Distance.

The Levene's Test is a test for homoscedasticity for groups of data. The null hypothesis for this test is that the variances are equal across the groups. Field (2005, p. 98) explains:

> *Therefore, if Levene's test is significant at $\rho \leq .05$ then we can conclude that the null hypothesis is incorrect and that the variances are significantly different — therefore, the assumption of homogeneity of variances has been violated. If, however, Levene's test is non-significant (i.e. $\rho > .05$) then we must accept the null hypothesis that the difference between the variances is zero — the variances are roughly equal and the assumption is tenable.*

A breakdown of the homoscedasticity assumption (i.e., heteroscedasticity) could be caused by the effects of outliers. Thus, a significant Levene's Test indicates the existence of heteroscedasticity and increases the likelihood of finding outliers in the sample.

In some cases, the effect of a single outlier can strongly influence the results of the researcher's multiple regression model. This observation is called an influential observation and it is important that the researcher identifies it. The Mahalanobis Distance statistic can be used to detect the outliers that are considered influential observations. The Mahalanobis Distances "measure the distance of cases from the mean(s) of the predictor variable(s)," (Field, 2005, p. 165). Also, Mahalanobis Distances possess the statistical properties for statistical testing. Hair Jr. et al. (1998, p. 66) recommend a conservative .001 significance level as a threshold to identify these influential cases.

The Cook's Distance is a statistic that measures the effect of a single observation on the research model. Specifically, it measures the influence of a single observation "based on the total changes in all other residuals when the case is deleted from the estimation process," (Hair et al. 1998, p. 218). Hair Jr. et al. (1998, p. 225) prescribe a rule of thumb of greater than 4 / (n – k – 1), (where "k" is the number of independent variables and "n" is the sample size), as a threshold to identify influential observations for small or large sample sizes. Other researchers use as a rule of thumb a Cook's Distance of ≥ 1.0 as an indicator of an influential observation (Field, 2005, p. 165).

After identifying the outliers by the procedures indicated above, the researcher can apply the following techniques in dealing with the outliers' effects on financial ratio data:

1. If the financial ratios used as independent variables in the research model exhibit skewness, then the researcher should consider a data transformation. Foster (1986, p. 103) and Frecka and Hopwood (1983, p. 122) find logarithmic transformations reduce skewness for certain financial ratios. However, Frecka and Hopwood (1983, p. 117) find the maintenance of OLS normality assumptions are best achieved by deleting the outliers.
2. A comparison of the statistical results using the raw data, transformed data, raw data with specific outliers deleted, and trimmed data or winsorized data needs to be conducted. The researcher needs to carefully analyze the results to find the best fitting research model.

Lien and Balakrishnan (2005) conduct a simulation exercise of a simple regression model and provide results for the raw data, trimmed data, and winsorized data. On the one hand, they find that the trimmed data results show little change in the value of the independent variable's co-efficient from that of the raw data's results, but there is a substantial reduction in the explanatory power of the model (i.e., lower R^2). On the other hand, the winsorized data results show a higher value for the independent variable's co-efficient, when compared to the raw data's and trimmed data's results. However, the explanatory power of the winsorized data model is maintained (i.e., higher R^2 than trimmed data model). Overall, these results indicate that the researcher needs to exercise judgment and make trade-offs when deciding on how to deal with the effect of outliers in financial ratio data.

CONCLUSION

Financial statement users and accounting researchers need to understand the problems and limitations in working with financial ratios. The purpose of this study is to recognize these issues and to provide both financial statement users and accounting researchers with useful hints when working with financial ratios.

From the financial statement users' perspective, financial ratios provide important information about a firm's past performance, predicting a firm's future performance prospects, assessing management's decision-making, risk assessment, and are a critical tool employed in lending agreements to control a firm's activities. All of these uses are dependent on the comparability of a firm's financial ratios with itself and between firms over time. Comparability is enhanced when financial statement users take a proactive approach in their work with financial ratios. A proactive approach involves scrutinizing firms' financial statement notes for the consistent application of accounting principles and estimates. Changes to either accounting principles or accounting estimates should be properly disclosed and be supported by the underlying economic substance of events affecting the firm. Special attention should be directed at the relation between income increasing accruals and managers' performance contracts based on earnings.

From the accounting researchers' perspective, a major limitation in working with financial ratios is the effect of outliers on the statistical results. The inclusion of a few outliers could result in the sample's mean and variance and regression's variable co-efficients being significantly different from the results that are truly representative of the data set. Specifically, the effect of outliers is to invalidate the constant variance assumption (homoscedasticity) of OLS regression. This condition is known as heteroscedasticity. The importance of maintaining the validity of OLS assumptions is that these assumptions are necessary to draw inferences about the population under investigation that are statistically valid with hypothesis testing.

The accounting researcher needs to develop a methodology to first identify the outliers. Plotting studentized residuals versus predicted values is a first step to identify outliers in a multiple regression study. Hair Jr. et al (1998) provide guidance in this area. For large sample sizes, statistical techniques such as Levene's Test, Mahalanobis Distance, and Cook's Distance are available with most statistical packages. Field (2005) and Hair Jr. et al. (1998) provide guidance on the use of these techniques.

Next, after identifying the outliers, a comprehensive approach is required in dealing with the effect of outliers. A comprehensive approach entails examining the research study's results in raw data form, with the deletion of specifically identifiable outliers, and with the use of data trimming, winsorizing, or transformation. The primary goal of this analysis is to generate a research model and results that provide the researcher with the best unbiased estimators. Overall, the accounting researcher needs to exercise considerable professional judgment and due care throughout this process.

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Appendix 1

BENEFITS OF USING FINANCIAL RATIOS

1. Ratios can provide a greater awareness of the interrelationship of individual financial statements and a greater understanding of the financial statements themselves by summarizing data in a form that is more easily understood, interpreted and compared.

2. Ratios can facilitate comparisons with external measurements, such as industry-wide norms, and help identify an entity's strengths and weaknesses.

3. Ratios can facilitate comparisons over time, such as changes in long-term trends of financial position, operations and cash flows.

4. Ratios can provide an informed basis for making investment-related decisions by comparing an entity's financial performance in relation to another entity in the same industry and the industry as a whole.

5. Because they are determined by dividing one financial variable by another, ratios downplay the impact of size and allow evaluation over time or across companies without undue concern for the effect of size differences.

6. Ratios can identify the stability of relationships within an entity over time and common relationships among entities within a given industry.

7. Ratios can be used to support the viability of extending credit. For example, a small closely-held entity may ask a supplier for trade credit or approach a bank for a loan. In such cases, credit managers and bank loan officers may be able to use ratio analysis on the financial statements to gain insights into the past, present, and future prospects of the individual applicants. These insights may help potential creditors predict the future cash flows of prospective borrowers and make credit decisions on a more rational basis.

8. Ratios can serve as benchmarks against which the financial strength of an entity is measured; for example, debt covenants often specify limits in terms of financial ratios.

9. Ratios can be used as an initial indicator to determine if there are specific problems that need to be investigated further, such as aging of accounts receivable and inventory turnover.

10. Ratios can assist auditors and other users in evaluating the reasonableness of the amounts shown in the financial statements. Analytical review procedures can help the auditor in gaining an understanding of the client's business, plan the engagement, identify unexpected relationships among accounting data and provide substantive audit evidence.

    Reproduced from: The Canadian Institute of Chartered Accountants, "Research Report: Using Ratios and Graphics in Financial Reporting," The Canadian Institute of Chartered Accountants, 1993, p. 13.

FINANCIAL REPORTING QUALITY OF FAMILY-CONTROLLED SMALL AND MEDIUM-SIZED ENTITIES: A JAPANESE CASE STUDY

Muneaki Fujibayashi, Osaka Prefecture University
Hirofumi Kojima, Osaka Prefecture University
Mineo Tsuji, Osaka Prefecture University

ABSTRACT

Japan has not yet adopted International Financial Reporting Standards (IFRS) for small and medium-sized entities (SMEs). Consequently, differences in accounting standards and practices prevail between large corporations and SMEs in Japan. We argue that the apparent auditor role of the National Tax Agency of Japan could drive some of the observed differences in earnings quality between large corporations and SMEs. To address this, we examine the financial reporting quality (FRQ) of Japanese SMEs and consider whether they engage in accrual- or tax/cash-based earnings management activity. We first examine the characteristics of 153 Japanese firms conforming to the European Union definition of an SME. We then consider a smaller sample of 20 firm-year observations and formulate a hypothesis regarding a particular insurance contract. We find that the FRQ of family-controlled SMEs tends to be higher if they purchase insurance with cash after forecasting their insurance payments. This is because SMEs can more easily make the decision to purchase insurance than can large corporations, plus Japan's accounting standards for SMEs accord with the Corporation Tax Act, and therefore their current net income is their taxable income. As a result, good performing SMEs tend to choose the managerial accounting activity that allows their accounting profits to decrease as a means of reducing taxes payable.

INTRODUCTION

According to the IASB (2014), Japan has not yet adopted International Financial Reporting Standards (IFRS) for small and medium-sized entities (also enterprises) (SMEs). Nor have there been any deliberations on whether unlisted companies should use IFRS for SMEs in their financial reporting, such that SMEs not required to use IFRS currently employ Japanese accounting standards. As a result, differences in accounting standards and practices between large corporations and SMEs prevail in Japan (Tsuji & Fujibayashi, 2013, 18) such that financial institutions often have no faith in the financial statements prepared by SMEs.

According to the Small and Medium Enterprise Agency (2010, 92–99), the most common potential user requiring SMEs to disclose their financial statements is a financial institution (78.7%), followed by the Credit Guarantee Corporation (38.3%) and the company president (12.1%). Financial institutions in Japan usually request that SMEs in need of finance submit a copy of their financial statements annexed to their final tax returns to which a tax office superintendent has affixed a receipt seal. Considering there is no requirement under the Companies Act for auditors to audit the financial statements, we consider that one of the practical roles of the National Tax Agency is that of an auditing firm.

In this paper, we argue that the apparent auditor role of the National Tax Agency of Japan could drive some of the differences in earnings quality between large corporations and SMEs. To do this, we examine the financial reporting quality (FRQ) of Japanese SMEs and consider whether they engage in accrual- or tax/cash-based earnings management activity.

LITERATURE REVIEW AND HYPOTHESES

Even though they are not necessarily SMEs, Prencipe et al. (2014, 363) categorize prior studies of family firms in the areas of management and business across four theoretical frameworks; agency theory, stewardship theory, the resource-based view of the firm, and socioemotional wealth theory.

An agency relationship is a contractual arrangement under which one or more persons, or principal(s), engage another person, the agent, to perform some service on their behalf, a process that invariably involves delegating some decision-making authority to the agent (Jensen & Meckling, 1976, 308). Villalonga & Amit (2006, 387) refer to the potential owner–manager conflict as Agency Problem I, and point out that in the case of a firm with a single large shareholder and a fringe of small shareholders, this can be mitigated because of the greater incentive of the large shareholder to monitor the manager. There is also the possibility of a second type of conflict, that is, the conflict between controlling family owners and other owners, known as Agency Problem II. If the single large shareholder is an individual or a family, there is a greater incentive for both expropriation and monitoring, which is likely to lead to Agency Problem II overshadowing Agency Problem I.

Using an agency theory framework, some studies have considered the FRQ of family firms and/or SMEs (Prencipe et al., 2014). For example, Wang (2006), Ali et al. (2007), and Cascino et al. (2010) find that family firms report better-quality earnings. Concerning the earnings management of family firms, Jaggi & Leung (2007) and Jaggi et al. (2009) show that audit committees or independent corporate boards constrain earnings management, while Jiraporn & DaDalt (2009) suggest that family firms are less likely to manage earnings. Elsewhere, Tong (2010) reveals that family firms have higher-quality reporting, as reflected by lower absolute discretionary accruals, whereas Yang (2010) argues that earnings management increases with the level of insider ownership in family-controlled firms. Lastly, Prencipe & Bar-Yosef (2011) show that in family-controlled firms, independent board directors have a weaker effect on earnings management.

In the mid-1990s, some Japanese listed company studies considered the relationship between the firm owner–manager and the choice of accounting method. For instance, Holthausen & Leftwich (1983), Watts & Zimmerman (1986), and Okabe (1994, 93–106) hypothesize that in terms of a closer relationship between financial accounting and taxation, a firm controlled by managers will adopt the accounting method that enables it to delay (hasten) the recognition of revenues (expenses). Empirically, this should correspond with a firm with a relatively large proportion of shares held by its directors. The findings in these studies indicate that while the first hypothesis was not rejected, the second hypothesis was, as was a third hypothesis that a manager-controlled firm will adopt an accounting method that enables the firm to increase its income figures because of its adoption of the diminishing balance method.

Earlier studies on earnings quality in Japan largely concern the cash flow statement. Kamata (1998) explains that the calculation of cash flow rarely depends on subjective judgments, and that because cash flow is not as intricate as income, it is a comparable measure for the performance of an entity. To assess the ability of an entity to circulate funds, Sato (1998) places a special emphasis on the cost of inventories and receivables, and their provisions and the depreciation method. It is necessary to understand these inflows to analyze earnings quality, after which it then becomes possible to assess the profits available for dividends.

In terms of the institutional context, under the Stock Exchange Law, Japanese corporations have disclosed a form of cash flow statement since April 1987. However, this was prepared merely on an individual basis, treated as an element outside the financial statements, and accordingly was not subject to auditing. The major amendment of the Ministry of Finance Consolidation Regulation, in accordance with the Business Accounting Deliberation Council Opinion, is the legal requirement for consolidated statements from fiscal year 1999-2000 onward (Articles 8-2 & 76 Ministry of Finance Consolidation Regulation) (Kuroda, 2001, 1857–1858). Nonetheless, neither the Commercial Code nor the Corporation Tax Act requires all businesses/companies to prepare cash flow statements (Sakurai, 2001, 1693). In fact, the legal requirements concerning the preparation of the cash flow statement remain unchanged, even though the titles of the acts that govern them have changed (to the Financial Instruments and Exchange Act and the Companies Act, respectively).

It is common to conceive of the legal framework for accounting in Japan as a triangular legal system (Arai & Shiratori, 1991, 5). In this regard, the principle of the definite settlement of accounts has resulted in negative effects on financial reporting. It is natural that managers attach importance to tax savings and that they attempt to minimize costs on tax return adjustments regarding any difference in taxable income and net income as reported in the financial statements. The accounting behavior of managers thus likely results in a phenomenon whereby financial statements for reporting purposes are prepared in conformity with the accounting rules in the Corporation Tax Act. As a result, the amount of reported income in financial statements under the Commercial Code may be lower. This argument for the reduction in reported income finds support from the viewpoint of the protection of creditors. However, despite much criticism, the principle continues at least partly because of its economic rationality (Sakurai, 2001, 1724–1725).

The Commissioner's Directive on Interpretation of the Corporation Tax Act regulates the taxable treatments concerning payable insurance fees for term insurance (Article 9-3-5). The taxable treatment of fees for long-term smoothing insurance paid by corporations is by the Direct Corporation Taxation Division 2-2, as issued on June 16 1987, and most recently amended by the Corporation Taxation Division 2-3 issued on February 28 2008. Such a term insurance contract stipulates that the corporation itself is the contractor and that a director or an employee is the insured. Accordingly, corporations capitalize half of their fees and recognize the remainder as expenses in financial accounting and as deductible from taxable income.

Based on the above discussion, our first hypothesis is:

H1: The FRQ of family-controlled SMEs tends to be higher if they purchase insurance with cash.

In practice, a corporation must pay cash for term insurance. This is because in accordance with the Ordinance for Enforcement of the Insurance Business Act in Japan, banks must refrain from providing an agency or intermediary service for the conclusion of an insurance contract, wherein the policyholder or insured person is the borrower of a business loan, in consideration of any fees or other remuneration (Article 212; Japanese Bankers Association, 2012). Therefore, SMEs must either purchase an insurance contract for cash monthly or prepay it in cash yearly. Besides insurance contracts, Japanese SMEs can adopt a small-scale enterprise mutual aid system provided, for example, by the Organization for Small & Medium Enterprises and Regional Innovation (2015), founded the act of the same name by the Independent Administrative Agency in 2004. Through this, an SME is able to adjust its annual insurance fees each fiscal year. The interest on the term insurance, some part of which is off-balanced, then appears identical to a term deposit.

The Commissioner's Directive on the Interpretation of the Corporate Income Tax Law allows all or part of any (pre)paid insurance cost to be deductible from taxable income (9-3-4, etc.). In relation to the deduction, in 2012 the Supreme Court decided a case to seek the revocation of reassessments, etc. regarding income tax (Case No. 2009 (Gyo-Hi) 404). This is summarized such that "…where companies paid premiums under endowment insurance contracts, which had been concluded by designating the beneficiaries of death benefits as the companies and the beneficiaries of maturity insurance benefits as the representatives of the companies indicated in the judgements such as where half of paid premiums was treated as loans to the representatives, whereas the remaining half was treated as premiums and included in deductible expenses in the companies' accounting, the latter half cannot be regarded as the amount expensed for the obtaining such revenue …" (Supreme Court, 2012). Following this judgement, entities increasingly appeared to purchase insurance contracts for tax saving purposes.

Using a sample of both public companies and family firms, given the Corporation Tax Act (Articles 22 and 74(1)), Suzuki (2013, 287) hypothesizes that the tax accountants of family firms tend to decrease taxable income more than in public companies. One result shows that regardless of the shareholder structure, tax accountants tend to suggest that clients with good performance should choose an accounting procedure for the repair of fixed assets that enables both accounting profit and taxable income to decrease. In contrast, they tend to suggest that clients with poor performance should choose a method that enables both accounting profit and taxable income to increase.

Based on the above discussion, our second hypothesis is:

H2: Good performing SMEs tend to choose managerial accounting activity that allows their accounting profits to decrease as a means to reduce taxes payable.

Suda (2004, 487–488) considers taxes as the chief consideration in the role of political costs affecting the choice of accounting procedures in Japan, and argues that in contrast to the scale hypothesis confirmed in the US, the significant relationship between firm size and the choice of accounting procedure would disappear with a reduction in the incentive for tax reductions. In particular, Suda (2004, 60–65) argues that a firm with a higher debt-to-equity ratio would prefer an accounting procedure that enables it to establish and maintain trust with a financial institution and, at the same time, increase the amount of income.

Based on the above discussion, our third hypothesis is:

H3: SMEs never decrease their accounting profits (if any) beyond the range of trust with their lenders, particularly financial institutions.

Nakakuki (2002) reviews empirical research on the relationship between accounting information and managerial incentives, chiefly in the US. Overall, the evidence suggests that firms that frequently manage their earnings are larger, have smaller debt-to-equity ratios, and a higher proportion of manager-held shares. Further, smaller firms rarely manage earnings to reduce taxes because they do not have access to suitable financial management techniques and because they emphasize financial reporting. According to Tomioka (2014), some Japanese corporations with more than a billion yen in capital have a much lower ratio of taxes to net income. The Act on Special Measures Concerning Taxation enables these very large firms to reduce their taxes.

However, the Act on Special Measures Concerning Taxation is not only applicable to large companies but also to SMEs. In addition, the Japanese relationship between financial accounting and taxation is very different from that found in the US (OECD, 1987). Even today, managers include many elements, e.g. depreciation, necessary for the calculation of taxable income in the financial statements prepared in advance under the Companies Act. Moreover, Japanese SMEs do not have to prepare cash flow statements. Concerning the disclosure of family firms (Prencipe et al., 2014), Chen & Jaggi (2000) reveal that family-controlled firms exhibit a weaker positive association between the comprehensiveness of financial disclosures and the percentage of independent directors on boards. In other work, Chen et al. (2008) indicate that family firms provide fewer earnings forecasts, but more earnings warnings, while Chau & Gray (2010) demonstrate that there is more (less) voluntary disclosure by firms with larger (smaller) family shareholdings. Based on three Japanese SME cases, Michie (2014) suggests that the cash flow statement is useful for determining whether monies owed to suppliers will be paid when due and for deciding whether the business continues as an SME. A study on the FRQ of US private firms specifies cash flow from operations as an independent variable (Hope et al., 2013, 1724).

Based on the above discussion, our fourth hypothesis is:

H4: Good performing SMEs tend to choose an accounting procedure that allows their accounting profits to decrease based on their cash flows.

Additionally, there is no obligation governing the auditing of SMEs. Although private firms in the UK undergo voluntary audits to reduce agency costs (Dedman et al., 2014), only 6.9% of Japanese SME respondents to a survey indicated that they would hire an accounting advisor ‘now’ or ‘in the future’ (Small and Medium Enterprise Agency, 2010, 47). In the next section, we empirically investigate the financial reporting quality of Japanese SMEs.

SAMPLE AND METHODOLOGY

In this case study, we conduct two analyses. The first analysis reveals the general characteristics of Japanese SMEs, while the second advances a novel hypothesis that these SMEs purchase insurance contracts and other services as a means to reduce taxes. For the first analysis, we sample 153 SMEs using the following criteria: (a) listed in Japan on March 31 2014, (b) balance day of March 31 in 2014, (c) meets the European Union's definition of an SME as a company or group, in line with the Commission Recommendation of May 6 2003 concerning the definition of micro, small, and medium-sized enterprises (2003/361/EC), with fewer than 250 employees and an annual turnover of €50 million or lower or assets of €43 million or lower (€1 = ¥142.13 as at March 31 2014) (EU, 2005, 14), and (d) neither operating profit nor operating cash flow is less than zero.

Table 1 provides selected descriptive statistics of our sample. Appendix A lists the variable definitions. We categorize the variables into four groups: SME size, mandatory financial statement figures and financial ratios, statement of cash flow figures, and shareholders' components.

Table 1
DESCRIPTIVE STATISTICS (153 Japanese SMEs)

Unit: JPY millions

Variable	Min.	Max.	Mean	SD
#EMPLOY	7.00	246.00	124.24	59.18
SALES	366.00	15909.00	4350.51	2655.62
TOTALAS	444.00	58776.00	5327.57	5347.38
COST	52.00	12677.00	2804.74	2172.59
SELLING	149.00	9456.00	1274.71	1236.14
DEPRECI	1.00	1911.00	137.74	183.84
NONOPER	0.00	19105.00	155.67	1542.81
EXTRAOR	0.00	221.00	19.56	34.99
INCOMEBE	–79.00	1477.00	336.78	287.73
TAXES	1.00	689.00	113.75	119.11
INCOME	–95.00	1833.00	226.87	235.85
CFOPER	2.30	2224.00	364.01	335.53
CFINVES	–2076.00	3621.00	–129.91	459.45
CFFINANC	–1795.00	1449.00	–52.99	382.42
CASH	48.00	5919.00	1213.61	936.69
#SHARE	168.00	19671.00	2568.86	3222.02
FOREIGN (%)	0.00	46.50	3.31	7.94
INDIVID (%)	19.30	95.30	60.18	19.32
OPEINCO	0.00	1419.00	324.49	289.03
ORDIINCO	3.00	1477.00	333.56	288.37
NETAS	183.00	13933.00	2917.33	2479.63
EQUITY (%)	4.30	93.90	57.16	20.68
CAPITAL	90.00	4097.00	938.44	710.96
RETEARN	–3157.00	16490.00	1363.92	2315.37
BORROW	0.00	19500.00	939.26	1903.84
ROE (%)	–21.90	122.00	9.84	12.93
ROA (%)	–3.40	29.60	5.00	4.68

For the second analysis, we employ a smaller sample of 20 firm-year observations where monthly financial data are available. We obtain the financial statements for four SMEs operating in a single industry (warehousing) over the period 2009–2013. Each SME is family owned, controlled, and operated, with all shares held by the same family, and all directors from the same family.

Table 2 provides selected descriptive statistics of this smaller sample. Appendix A lists the variable definitions. We categorize the variables into three groups: SME size, mandatory financial statement figures, and statement of cash flow figures. The variables in the first group relate to SME size, namely, #EMPLOY, SALES, and NETAS. All of our sample firms are unlisted and therefore not required to comply with the Financial Instruments and Exchange Act, but do satisfy the definitions in the Companies Act (Article 2), the Corporate Income Tax Law (Article 66(2)), and the Small and Medium-sized Enterprise Basic Act (Article 2).

Table 2
DESCRIPTIVE STATISTICS (20 company-years)

Unit: JPY

Variable	Min	Max	Mean	SD
#EMPLOY	12.00	26.00	20.50	5.30640
SALES	107828432.00	217833196.00	166807400.15	34022574.26
NETAS	372001249.00	655481160.00	530393231.20	107648616.67
ΔNETAS	–25700739.00	20203036.00	–291535.85	12582558.44
LIQAS	22400190.00	241105724.00	127585439.10	66159462.33
ΔLIQAS	–63682345.00	45617454.00	2383984.85	24408394.56
FIXEDAS	273363176.00	441232540.00	375096588.45	61806952.53
ΔFIXEDAS	–26600376.00	16210184.00	–4027845.00	10591206.31
COST	51060306.00	173043094.00	116256664.30	41166018.84
DEPRECI	2862292.00	23256039.00	11176904.30	5505660.35
INSUR	197300.00	2747325.00	785004.15	838277.16
SELLING	22925224.00	65703699.00	43522881.25	14739256.08
NONOPER	0.00	2361677.00	476953.75	596425.58
EXTRAOR	0.00	38041292.00	5738855.15	11215971.65
TAXES	70000.00	13156100.00	2254813.25	3509833.31
INCOMEBE	–21365223.00	34471929.00	4363223.85	15351957.18
INCOME	–21611623.00	21315829.00	2108410.60	12976799.26
CFOPER	–51423.00	121089.00	20741.05	35108.60
CFINVES	–127287.00	12871.00	–18122.60	32182.33
CFFINANC	–12000.00	0.00	–3467.50	4283.56
ΔCASH	–62655.00	48591.00	3129.70	24555.64
CASH	11013.00	188051.00	101053.10	54359.27
CFFREE	–62654.78	27948.30	4356.37	25158.94

The variables in the second group relate to the mandatory financial statements (balance sheet and income statement), including ΔNETAS, LIQAS, ΔLIQAS, FIXEDAS, ΔFIXEDAS, COST, DEPRECI, INSUR, SELLING, NONOPER, EXTRAOR, TAXES, INCOMEBE, and INCOME. For the balance sheet items, we use not only LIQAS but also FIXEDAS when considering the provisions relating to depreciation in the Corporation Tax Act. For the statement of income, we specify expense items such as INSUR and TAXES as variables, along with INCOMEBE and INCOME. The variables in the third group relate to the statement of cash flows, including CFOPER, CFINVES, CFFINANC, ΔCASH, CASH, and CFFREE. Because SMEs are not legally required to prepare a statement of cash flows, we prepared these ourselves. Along with the three kinds of cash flow activities, we specify CFFREE, ΔCASH, and CASH.

For our first analysis of the 153 Japanese SMEs, we analyze the data underlying the descriptive statistics in Table 1 and test our hypotheses using a one-sided test of the Pearson correlation coefficients. In our second analysis of the four Japanese SMEs, we analyze the data underlying the descriptive statistics in Table 2 and test our hypotheses using a one-sided test of the Pearson correlation coefficients. We then see if monthly INSUR forecasts net and taxable income and therefore allows the SMEs to manage their earnings. Finally, to illustrate the purchasing behavior of managers immediately before the end of the accounting period, we conducted several interviews in the last half of 2014 with two national insurance companies and a multinational equipment corporation. Table 3 details the questions used in these interviews.

Table 3
QUESTIONNAIRE ABOUT COMMERCIAL INSURANCE OR PRODUCTS

1	How many commercial insurance contracts or equipment products did you sell in the preceding three years?
2	When your clients bought your goods or services applicable to Q1 in their balance sheet month, how many were commercial insurance contracts or equipment products?
3	How many commercial insurance contracts or equipment products applicable to Q1 have already been surrendered?

RESULTS AND DISCUSSION

Correlation in the first analysis

The results for the 153 firms display some general characteristics of Japanese SMEs. Regarding the three size variables, #EMPLOY and SALES are positively associated with each other (0.518**), while TOTALAS is associated with #EMPLOY (0.163*) and SALES (0.218**), which are both relatively smaller.

Of the expenditure variables in the financial statement figures, #EMPLOY is positively related to COST (0.441**) and SELLING (0.303**). Similarly, SALES is positively related to COST (0.905**) and SELLING (0.483**). In contrast, TOTALAS is positively related to OPEINCO (0.426**), ORDIINCO (0.371**), INCOMEBE (0.353**), and INCOME (0.621**) among the income statement variables, and to NETAS (0.520**), CAPITAL (0.526**), and BORROW (0.776**) among the income statement variables, and to #SHARE (0.330**) among the shareholders' components variables.

Of the cash flow variables, three kinds of cash flows, CFOPER, CFINVES, and CFFINANC, are negatively related with one another; CFOPER–CFINVES, –0.221**, CFINVES–CFFINANC, –0.493**, and CFOPER–CFFINANC, –0.227**. CFOPER is positively related to CASH (0.407**). Concerning shareholders' components, #SHARE is positively related to FOREIGN (0.392**) and negatively related to INDIVID (–0.152**).

TAXES is positively related to all four income measures, OPEINCO (0.820**), ORDIINCO (0.861**), INCOMEBE (0.820**), and INCOME (0.489**), but less so to the three size variables, #EMPLOY (0.213**), SALES (0.287**), and TOTALAS (0.228**). TAXES is also positively related to SELLING (0.216**), which is the only related variable among the expenditure items, including COST. TAXES is positively associated with CASH

(0.529**), RETEARN (0.569**), and CFOPER (0.541**), while it is negatively but weakly associated with CFINVES (–0.145*). TAXES is also weakly but positively associated with SHARE (0.143*) and FOREIGN (0.205**).

In Japan, the traditional definition of an SME places an emphasis on capital stock. The EU's standards for SMEs indicate that the criteria of employee headcount and annual turnover are innovative, although the balance sheet criterion is more conventional. Company size relates to the amount of corporate income, inhabitants, and business taxes. It is natural that the amount of taxes payable relates to income, however measured, but it is interesting that taxes payable is associated with cash and cash equivalents at the end of the accounting period. Taxation demands high financial reporting quality. Additionally, taxes payable is associated with selling and general administration expenses. In order to illustrate their role in reducing taxes, we carry out our second analysis to examine a novel hypothesis concerning insurance.

Correlation in the second analysis

Table 4 details the one-sided test results for the Pearson correlation coefficients in the second analysis. For H4, it is important that CFOPER is negatively related to CFINVES (–0.684**). This indicates that a decision by a manager to invest in fixed assets, that is, in the cash flows from investing activities, follows the forecast of cash flows from operating activities. As a result, CFOPER is negatively related to FIXEDAS (–0.443*). Japanese tax regulations for fixed assets are mostly the same as the accounting standards. Therefore, managers recognize that this sort of investment will enable their taxable income to decrease.

FIXEDAS is negatively associated with both INCOMEBE (–0.570**) and INCOME (–0.505*). This indicates that tangible fixed assets are an essential element of taxation and that taxes payable will increase unless SMEs invest in plant and equipment under the national policy. For example, SMEs can participate in the SME Investment Promotion Tax System in accordance with the Small and Medium-sized Enterprise Basic Act (Article 42-6). However, not all tangible assets are expensed and therefore deductible from taxable income in the current accounting period. The Corporation Tax Act (Article 33(2)) includes a provision that the depreciation of an asset should be on a systematic basis over its useful life. Here, the Corporation Tax Act prescribes the useful life.

These investments in current and fixed assets lead to H2 and H3. While positively related to COST (0.457*) and CFFINANC (0.624**), FIXEDAS is negatively related to TAXES (–0.627**). In contrast, TAXES is positively related to SELLING (0.616**), as well as INCOMEBE (0.739**) and INCOME (0.603**), and negatively related to CFFINANC (0.624**), as well as FIXEDAS. Consequently, we suggest that before the end of each accounting period, managers forecast earnings and then purchase items included in selling and general administration expenses, which are also deductible from taxable income. It is likely then that the use of selling and general administration expenses, apart from their obvious role, is to reduce taxes. More particularly, we need to know the precise day when each item was paid for or accrued.

In Japan, in accordance with the Ordinance for Enforcement of the Insurance Business Act, banks must ensure that they will refrain from providing an agency or intermediary service for the conclusion of an insurance contract, wherein the policyholder or insured person is a borrower of a business loan, in consideration of any fees or any other remuneration (Article 212). Therefore, SMEs must either purchase an insurance contract for cash monthly or prepay it in cash yearly. Besides these insurance contracts, Japanese SMEs can adopt a small-scale enterprises mutual aid system provided by the Organization for Small and Medium Enterprises and Regional Innovation, Japan. The Commissioner's Directive on Interpretation of the Corporate Income Tax Law (9-3-4, etc.) allows all or part of any paid or pre-paid insurance cost to be deductible from taxable income. The Supreme Court has decided this matter (Supreme Court, 2012, 1). The national financial system then enables SMEs to defer income taxes and/or to smooth income in financial accounting, as well as reducing taxes in tax accounting.

However, the amount of managed earnings should not be so excessive that SMEs lose the trust of their stakeholders, especially financial institutions and the tax authorities. As mentioned, financial institutions in Japan usually request that SMEs in need of finance submit a copy of their financial statements annexed to their final tax returns to which a tax office superintendent has already affixed a receipt seal. As long as a systematic relationship exists between these interested parties, it is natural that SMEs will continue to decrease their taxable income in a limited fashion to retain good long-term relations with their lenders in the Japanese main bank system.

For H1, it is important that INSUR negatively relates to CFFREE (–0.803**). Free cash flow is the cash remaining after investment activities and is likely taxable. While an investment in fixed assets is the preferred and most significant way to decrease cash, insurance and small equipment purchases are other measures also available to manage cash. This is shown by the negative relationship between INSUR and CFINVES (–0.569**) and between INSUR and ΔCASH (–0.727**).

Table 4
PEARSON CORRELATION COEFFICIENTS FOR THE SAMPLE SMES

	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v
b) SALES	927**																					
c) NETAS	911**	759**																				
d) ΔNETAS	.158	048	.171																			
e) LIQAS	954**	893**	927**	.153																		
f) ΔLIQAS	070	142	105	398*	222																	
g) FIXEDAS	116	.114	483*	.243	217	008																
h) ΔFIXEDAS	.395*	.319	.408*	.299	.306	.372	.198															
i) COST	922**	803**	970**	.176	922**	064	457*	.464*														
j) DEPRECI	790**	682**	750**	.207	710**	036	347	.651**	849**													
k) INSUR	201	233	121	.028	071	.760**	.055	191	210	136												
l) SELLING	.338	.106	.664**	238	.413*	.044	.958**	321	.646**	.515*	019											
m) NONOPER	653**	468*	587**	.277	602**	124	212	.504*	648**	730**	.018	.349										
n) EXTRAOR	071	120	.018	.665**	095	.224	.067	573**	005	000	089	074	.158									
o) TAXES	.090	060	.285	413*	.152	129	.627**	031	.342	.299	.180	616**	.131	.313								
p) INCOMEBE	.142	096	.283	890**	.176	351	.570**	.191	.309	.297	.133	550**	.290	.560**	739**							
q) INCOME	.144	097	.258	941**	.167	381*	.505*	.234	.273	.270	.108	484*	.308	.578**	603**	983**						
r) CFOPER	313	480*	132	287	337	398*	.443*	094	131	.012	034	330	.033	202	.008	281	335					
s) CFINVES	.048	.177	126	015	.001	298	414*	.502*	094	189	.569**	.378	263	.465*	203	042	.005	.684**				
t) CFFINANC	.117	.163	143	111	014	.054	624**	093	171	025	315	.559**	.107	.091	.549**	.290	.195	.098	.124			
u) ΔCASH	091	163	130	439*	232	986**	026	.395*	088	060	.727**	.060	142	.263	151	382*	411*	406*	308	.069		
v) CASH	922**	866**	902**	.143	984**	231	164	.228	867**	598**	046	.357	512*	095	.088	.136	.137	375	.028	.018	241	
w) CFFREE	011	024	005	313	083	901**	.122	.390*	.071	.041	.803**	093	164	.270	295	370	358	347	334	.329	908**	113

a) #EMPLOY. **. Statistically significant at the 1 percent level (one-sided test). *. Statistically significant at the 5 percent level (one-sided test).

Monthly cash payments for expenses

To see whether SME expenses 'arise in the course of the ordinary activities' (IASB, 1989, par. 4.33) or are artificially inflated to manage earnings, we investigate the payments in cash for expenses by month. All of the SMEs in our sample close their books in December. According to the directors, tax accountants forecast current net income by August. If the forecast income suggests the imposition of higher tax, it is natural that they then attempt to decrease income by December in order to lower taxes. Accordingly, we investigate the payments in cash for expenses by month. Based on H2, our expectation is that payments in the fourth quarter should be relatively larger.

However, because of the accrual principle, payments made in January will also potentially include those from the fourth quarter. Accordingly, we include not only cash payments but also those payments accrued: January plus the fourth quarter in the previous financial year and the fourth quarter plus January in the following financial year. Table 5 provides descriptive statistics of the payments for insurance and other items by month as a percentage of cash flows. As shown, both are relatively larger, and therefore appear to demonstrate the buying behavior of managers immediately before the end of the accounting period as a means of decreasing net and taxable income.

Table 5
DESCRIPTIVE STATISTICS OF THE PAYMENT OF INSURANCE BY MONTH AS A PERCENTAGE OF CASH FLOWS

	Min.	Max.	Mean	SD
Cash outflows on the basis of cash and cash equivalents	20.90	73.70	47.2650	13.14455
Cash outflows on the basis of the accrual principle	15.00	100.00	47.8500	22.37309

Interviews with two insurance companies and a manufacturing corporation

To be confident that the activities of our sample SMEs are not exceptional in Japan, we conducted interviews concerning the relationships between account days and the date of the insurance contract or delivery of equipment in the last half of 2014. We conducted the interviews with the managers of the branches of two national insurance companies and a subsidiary of a multinational manufacturing corporation.

One insurance company responded to the three questions (see Table 3) as follows. (a) Q1: there were 90 commercial insurance contracts during the preceding three fiscal years; (b) Q2: 21 of the 90 contracts (23.3%) were sold to customers in the same month as their balance sheet month; and (c) Q3: only two of the 90 contracts were dissolved. The responses of the other insurance company were as follows. (a) Q1: there were 18 commercial insurance contracts sold during the preceding three years; (b) Q2: 12 of the 18 contracts (66.6%) were sold to customers in the same month as their balance sheet month; and (c) Q3: none of the 18 contracts was dissolved.

For the three questions, the manager of the manufacturing corporation provided us with a table of the number of orders received by month in 2013 and the number and percentage of customers purchasing in the same month as their balance sheet month in both money and order terms. Table 6 provides the essence of these figures together with the monthly percentages of the balance sheet months of Japanese corporations (NTA, 1997).

Table 6
MANUFACTURER PERCENTAGE OF SALES BY MONTH IN THE SAME MONTH AS CLIENT BALANCE SHEET-CLOSING MONTH

Month	(i) Monthly percentage of the number of orders received in the same balance sheet month1)	(ii) Monthly percentage of the amount of orders received in the same balance sheet month1)	(iii) Monthly percentage of the number of Japanese companies with capital of less than one million yen2)	(iv) Monthly percentage of the number of all Japanese companies2)
1	7.0	12.6	4.5	3.6
2	8.1	11.7	8.0	6.7
3	25.8	37.3	21.5	20.6
4	8.2	9.4	5.8	7.4
5	17.6	11.2	6.3	8.2
6	7.7	6.8	12.9	9.6
7	7.0	7.0	5.7	7.7
8	25.0	3.2	7.1	9.0
9	9.6	6.3	7.6	11.0
10	5.3	4.4	3.7	4.3
11	7.5	26.2	3.4	2.7
12	29.3	45.4	13.3	9.3
Total	-	-	100	100

1) During fiscal year 2013.
2) Source is NTA (1997), the most recent year available.

The responses of the manufacturing company to the questionnaire, as shown in Table 6, indicate that the leading month for (i) was December (29.3%) followed by March (25.8%), while that for (ii) was December (45.4%) followed by March (37.3%). In particular, based on the amount of (ii), both November (26.2%) (i.e., just before December) and January (12.6%) and February (11.7%) (i.e., just before March) were larger. Table 7 provides the correlation coefficients between these percentages. This suggests two possibilities: that the interviewee dealt mainly with SMEs, or that only SMEs tend to manage earnings in this way.

Table 7 PEARSON CORRELATION COEFFICIENTS FOR THE ITEMS IN TABLE 6				
	(i)	(ii)	(iii)	(iv)
(i) Monthly percentage of the number of orders received in the same balance sheet month	1			
(ii) Monthly percentage of the amount of orders received in the same balance sheet month	0.621*	1		
(iii) Monthly percentage of the number of Japanese companies with capital of less than one million yen	0.636*	0.604*	1	
(iv) Monthly percentage of the number of all Japanese companies	0.609*	0.385	0.901**	1

**. Statistically significant at the 1 percent level (one-sided test).

*. Statistically significant at the 5 percent level (one-sided test).

It is interesting that one insurance company interviewee told us that their customers who purchased commercial insurance in their balance sheet month usually paid their insurance premiums in annual installments in cash and that they never fell behind in payments. As shown in Table 3, cash flow from operating activities is negatively related to cash flow from investing activities. This obviously suggests that even though SMEs do not typically prepare cash flow statements, managers will still attempt to ensure that cash flow from investing activities moves in the opposite direction to cash flow from operating activities so as to reduce taxes payable (H4). Such tax-based earnings management activities require the same amount of money as the decrease in taxes payable based on cash. As a result, these activities must enable SMEs to maintain a level of cash and cash equivalents consistent with the previous fiscal year. Overall, our findings suggest that the FRQ of SMEs is higher (H1).

SUMMARY AND CONCLUSION

This case study first examined the characteristics of Japanese SMEs and then revealed that the FRQ of family-controlled SMEs tends to be higher if they purchase more insurance with cash, with insurance payments forecast around the previous August. Importantly, it is easier for SMEs to make the decision to purchase insurance than for large corporations. Further, Japan's accounting standards for SMEs align with the Corporation Tax Act, and therefore their current net income is taxable income. As a result, good performing SMEs tend to choose the managerial accounting activity that allows their accounting profits to decrease in order to reduce taxes payable.

However, SMEs do not decrease their accounting profits, if any, beyond the range of trust with their lenders, in particular, financial institutions. As is often the case with SMEs, there is a long-term relationship between the commercial entity and its bank. In the Japanese financial system, each type of financial institution plays a specific role, so a local financial institution will emerge as a vital stakeholder, often requesting SMEs to maintain the same level of cash and cash equivalents as in the previous accounting period.

Consequently, only good performing SMEs can choose an accounting procedure that allows their accounting profits to decrease based on cash flows. It is certain that revenue will decrease because of their tax-saving management. However, after considering the role of insurance companies in the financial system, Japanese governance mechanisms can partly justify SME earnings management. This is why the yield from insurance from the SME perspective is the same as a bank deposit.

The results of our study contrast with those of Hope et al. (2013). One reason is that we do not have accounting information for as many SMEs. In addition, we do not fully reveal the relationship between SMEs and their stakeholders outside banks and the government. For instance, former government officials often take up positions in private enterprise, while government corporations are a hotbed for severance agreements. Moreover, we do not investigate whether individual managers play a significant role in determining the level of tax avoidance that SMEs undertake. These represent promising research subjects for the future.

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Appendix A
VARIABLE DEFINITIONS

Variables	Definitions
#EMPLOY	Number of employees
SALES	Total sales
NETAS	Net assets
TOTALAS	Total assets
ΔNETAS	Change in NETAS in the current year from the previous year
LIQAS	Liquid assets
ΔLIQAS	Change in LIQAS in the current year from the previous year
FIXEDAS	Fixed assets
ΔFIXEDAS	Change in FIXEDAS in the current year from the previous year
COST	Cost of SALES
DEPRECI	Depreciation
INSUR	Insurance payable
SELLING	Selling and general administration expenses
NONOPER	Nonoperating expenses
EXTRAOR	Extraordinary losses
TAXES	Corporate income, inhabitants, and business taxes
INCOMEBE	Current net income before TAXES and tax adjustments
INCOME	Current net income
CFOPER	Cash flow from operating activities
CFINVES	Cash flow from investing activities
CFFINANC	Cash flow from financing activities
ΔCASH	Net increase (decrease) in cash and cash equivalents
CASH	Cash and cash equivalents at end of period
CFFREE	CFOPER plus CFINVES
#SHARE	Number of shareholders
FOREIGN	Percentage of foreign shareholders
INDIVID	Percentage of individual shareholders and others
OPEINCO	Operating income
ORDIINCO	Ordinary income
EQUITY	Percentage of shareholders' equity
CAPITAL	Capital stocks
RETEARN	Retained earnings
BORROW	Borrowings and bonds

BIG 4 AUDITOR OFFICE SIZE, ANALYSTS' ANNUAL EARNINGS FORECASTS AND CLIENT EARNINGS MANAGEMENT BEHAVIOR

Sarah Garven, Morehead State University
Gary Taylor, The University of Alabama

ABSTRACT

Prior research finds support for clients of larger Big 4 audit offices having less aggressively managed earnings as evidenced by a lower likelihood of meeting the earnings benchmarks of small profits and small earnings increases. We extend this research by examining the analysts' forecasts earnings benchmark. The extant literature provides evidence that failing to meet analysts' forecasts results in severe negative market reactions and auditors are less likely to book audit differences that affect the client's ability to meet analysts' expectations. Specifically, we examine the relationship between Big 4 auditor office size and two measures of earnings management relative to analysts' earnings forecasts: (1) minimization of analysts' forecast error and (2) just meeting or beating analysts' forecasts. Using a sample of 9,789 U.S. companies audited by the Big 4 auditors, we find that the reported earnings of clients audited by larger Big 4 offices are associated with increased absolute levels of analysts' forecast error and a decreased likelihood of just meeting or beating analysts' earnings forecasts. These results suggest that auditors in larger Big 4 offices are more likely to constrain management's ability to manage earnings to meet analysts' forecasts, providing further evidence that auditors of the same Big 4 accounting firm are not achieving consistent audit quality across the firm's offices. Our results can be useful for investors, researchers, and regulators interested in auditor influence on analysts' forecast error as well as Big 4 accounting firms seeking to ensure consistency of audit outcomes across offices.

INTRODUCTION

The extant literature provides evidence to suggest that larger audit firm offices provide higher quality audits than smaller audit offices (Francis & Yu, 2009; Choi, Kim, Kim & Zang, 2010; Francis, Michas & Yu, 2013). This study extends the office-level audit quality literature by investigating the association between Big 4 office size and client earnings management related to analysts' annual earnings forecasts. The question of whether larger Big 4 audit offices are more likely than smaller Big 4 audit offices to constrain earnings management around analysts' forecasts is important given that (1) management's zeal to meet consensus analysts' forecasts in recent years has called into question the quality of SEC registrants' reported earnings and the quality of their auditors (Levitt, 1998) and (2) the Big 4 firms audit "more than 98 percent of the global market capitalization of U.S. issuers" (Franzel, 2013).[1]

The office-level audit quality literature has examined audit quality in terms of whether auditors seem to influence earnings management behavior relative to two earnings benchmarks—small positive profits and small earnings increases (Francis & Yu, 2009). Based on these benchmarks, the larger Big 4 offices appear to provide higher quality audits than the smaller Big 4 offices. Specifically, companies audited by auditors associated with the larger Big

4 offices are less likely to report small profits or small earnings increases, indicating less aggressive earnings management behavior. While prior literature indicates that auditors place great importance on preventing management from managing earnings around these two earnings benchmarks, auditors appear to be less concerned about preventing earnings management around the analysts' annual earnings forecasts benchmark (Nelson, Elliott & Tarpley, 2002; Frankel, Johnson & Nelson, 2002; Ng, 2007). Conversely, management appears to place greater importance on meeting analysts' forecasts than avoiding losses and/or reporting small earnings increases (Dechow, Richardson & Tuna, 2003; Brown & Caylor, 2005; Graham, Harvey & Rajgopal, 2005 & 2006). Thus, it is an empirical question whether the association between Big 4 office size and earnings management around earnings benchmarks found in prior literature will hold for the analysts' forecasts benchmark.

We use two measures to assess whether the positive association between Big 4 office size and earnings quality found by Francis and Yu (2009) translates to analysts' annual earnings forecasts: (1) minimization of the absolute value of analysts' forecast error; and (2) just meeting or beating analysts' forecasts. Payne (2008) argues that the absolute value of forecast error will capture management's overall tendency to manage earnings around forecasts. It is very possible that firms seek to minimize positive, as well as negative, forecast error (Payne & Robb, 2000; Graham et al., 2005; Payne, 2008). For example, firms may want to minimize positive forecast errors in order to create accrual reserves for the future (Graham et al., 2005; Payne, 2008). In this study, higher absolute levels of analysts' forecast errors represent lower levels of earnings management.

Because missing analysts' forecasts yields adverse consequences, firms that see that unmanaged earnings will fall short of analysts' annual earnings forecasts may attempt to "push" earnings upward to meet the forecast. Consequently, some firms that just meet or beat analysts' earnings expectations may have managed earnings upwards when the firm may have fallen short of the analysts' annual earnings benchmark otherwise (Reichelt & Wang, 2010). In our study, we use firms that just meet or beat analysts' annual earnings forecast benchmarks to represent higher levels of earnings management.

To test our hypotheses, we conduct OLS and logistic regressions of SEC registrants audited by domestic Big 4 auditors from 2003-2008. We find that larger Big 4 audit offices are associated with increased absolute levels of analysts' forecast error and a decreased likelihood of just meeting or beating analysts' annual earnings forecasts. We interpret these results to suggest that firms audited by larger Big 4 audit offices are less likely to manage earnings to analysts' annual earnings forecasts. In other words, the larger the Big 4 office, the more likely it is that the auditor constrains earnings management related to analysts' forecasts. The results from this paper contribute to our understanding of auditor influence on analysts' forecast error, reinforce the relevance of office-level audit analysis, and provide additional evidence that audit quality does not appear to be uniform across the varying local offices of the Big 4. These results are robust to extensive sensitivity analyses.

BACKGROUND AND HYPOTHESIS DEVELOPMENT

In this section, we review related research and develop our hypotheses. We first discuss the motivations behind earnings management, particularly as they relate to analysts' forecasts. We then consider the association between auditor industry specialization and analysts' forecast error. The audit literature is mixed as to whether or not auditors who are industry specialists are more likely to constrain earnings management relative to analysts' earnings forecasts.[2] Next, we discuss audit firm office-level literature, which in general suggests that audit quality may not be consistent across offices within the same firm. Finally, we state our hypotheses concerning the relationship between Big 4 audit firm office size and client earnings management around analysts' annual earnings forecasts.

Earnings Management Incentives

Earnings management is "a purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain (as opposed to, say, merely facilitating the neutral operation of the process)" (Schipper, 1989, 92). Healy and Wahlen (1999, 370) note that incentives to manage earnings relate to anti-trust or other government regulation, lending and compensation contracts written in terms of accounting numbers, and capital market expectations and valuation. Earnings management can be used to allow the firm/management to: 1) appear less profitable if under regulatory scrutiny by the government, 2) circumvent industry regulation, 3) avoid potential violation of lending contracts, and 4) increase earnings-based bonus awards (Healy & Wahlen, 1999). With respect to capital market motivations, Healy and Wahlen point out that "the widespread use of accounting information by investors and financial analysts to help value stocks can create an incentive for managers to manipulate earnings in an attempt to influence short-term stock price performance" (370-371). Consistent with this capital market incentive, survey studies find that management often engages in earnings management to meet or beat analysts' forecasts (Graham et al., 2005 & 2006).

Empirical and anecdotal evidence indicate firms missing analysts' earnings forecasts can incur substantial penalties. These penalties can include, but are not limited to, lower stock returns, reduced credibility, and reduced CEO compensation (see Levitt, 1998; Matsunaga & Park, 2001; Bartov, Givoly & Hayn, 2002; Skinner & Sloan, 2002; Lopez & Rees, 2002; Graham et al., 2005; Brown & Caylor, 2005; Koh, Matsumoto & Rajgopal, 2008). Failure to meet earnings expectations can also result in costly earnings-based securities litigation (Francis, Philbrick & Schipper, 1998; Payne, 2008). Auditors are aware of management's incentives to manage earnings to forecasted levels (SEC, 1999; Libby & Kinney, 2000; Habib & Hansen, 2008), and can potentially constrain management's ability to do so.[3]

Analysts' Forecast Error and Industry Specialization

Archival research examining auditors who are industry specialists and their influence on constraining earnings management around the analysts' forecast benchmark yields mixed results. Payne (2008) finds that national industry specialist auditors constrain management's ability to manage earnings around analysts' forecasts; specifically, clients of Big N national industry specialists are associated with earnings that increase absolute levels of analysts' forecast error and are less likely to meet or to beat analysts' forecasts. Reichelt and Wang (2010) examine not only national-level industry expertise, but also city-level and joint national- and city-level industry expertise. They find that, when the auditor is a city-level industry expert, either alone or in conjunction with a national industry expert, its clients are less likely to meet or just beat analysts' earnings forecasts by one penny per share. However, their results do not extend to auditors who are only national experts. Behn, Choi, and Kang (2008) do not find an association between national industry specialists and analysts' forecast error in their Big N sample but do find that non-Big N national industry specialists are associated with earnings that decrease absolute levels of analysts' forecast error.

Office-Level Analysis

Individual offices appear to play an important role in determining audit quality (see Ferguson, Francis & Stokes, 2003; Francis, Reichelt & Wang, 2005; Krishnan, 2005a; Jones, Krishnan & Melendez, 2008; Francis & Yu, 2009; Reichelt & Wang, 2010; Choi et al. 2010; Choi, Kim, Qiu & Zang, 2012; Francis et al. 2013). Many argue that, because most audit decisions with respect to a particular client are made by individual practice offices, analyses in audit research should focus on the office-level, rather than the national-level (Wallman, 1996; Francis, Stokes & Anderson, 1999; Reynolds & Francis, 2000; Craswell, Stokes & Laughton, 2002; DeFond & Francis, 2005). Office-level analysis is especially important if audit quality is not uniform across different practice offices within the same audit firm.

Among prior office-level studies is evidence that, within the Big 4, audit quality differs based on office size, with larger offices providing higher quality audits than smaller offices (Francis & Yu, 2009; Notbohm, 2010; Choi et al. 2010; Francis et al. 2013). Francis and Yu (2009) suggest that this association exists because the larger Big 4 audit offices (1) have more collective experience in administering public company (SEC registrant) audits, (2) are expected to have greater expertise than smaller Big 4 audit offices in addressing complex accounting issues and in detecting and deterring aggressive earnings management behavior, (3) have more office-level peers with whom to consult, resulting in a better local support network, and (4) are better equipped to handle staff turnover.

Francis and Yu (2009) investigate the association of office size with client earnings properties (abnormal accruals and likelihood of meeting the small profits and small earnings increases benchmarks) with the objective of determining if there is variation in audit quality across Big 4 practice offices of different sizes. They find that larger offices are less likely to have large abnormal accruals and less likely to report small profits and small earnings increases. These results indicate clients of larger Big 4 audit offices are associated with less aggressively managed earnings, consistent with larger offices providing higher quality auditing. Choi et al. (2010) also examine the relationship between office size and abnormal accruals and, similar to Francis and Yu (2009), find that abnormal accruals are negatively related to office size. Francis et al. (2013) investigate the association between office size and client restatements. They argue that client restatements are a more direct measure of low quality audits than the measures used in the earlier studies. Francis et al. (2013) find that Big 4 office size is negatively associated with client restatements, suggesting that larger offices provide higher quality audits through better enforcement of the correct application of generally accepted accounting principles (GAAP). Lastly, Notbohm (2010) examines if auditor office size is a factor used by the market to assess the assurance value component of auditor reputation. He reports higher earnings response coefficients and lower cost of equity for clients with auditors from larger offices of the Big 4, suggesting that investors perceive that these larger offices provide a higher level of assurance.

The above studies provide evidence that differences in auditor attributes, namely office size, can result in variation in earnings quality and perceptions of earning quality. However, one question regarding audit and earnings quality that studies have not yet addressed is whether the size of a Big 4 audit office influences client earnings management behavior around analysts' forecasts. Specifically, is office size associated with the absolute value of analysts' forecast error and the likelihood of just meeting or beating analysts' forecasts? This is an especially important question given that several studies provide evidence to suggest that auditors focus on constraining earnings management around the small profits and small earnings increases benchmarks (Nelson et al. 2002; Frankel et al. 2002; Ng, 2007) and management focuses on attempting to meet or beat the analysts' earnings forecasts benchmark (Dechow et al. 2003; Brown & Caylor, 2005; Graham et al. 2005 & 2006).

Hypothesis Development

There are three primary observable earnings benchmarks: (1) analysts' forecasts, (2) loss avoidance (small profits), and (3) earnings increases (Graham et al. 2005 & 2006). Recent research suggests that management has much stronger incentives to manage earnings to achieve analysts' forecasts than to achieve small profits and small earnings increases (Dechow et al. 2003; Brown & Caylor, 2005; Graham et al. 2005 & 2006). Management's focus on analysts' annual earnings forecasts likely is related to the potential for a severe market reaction to missing the consensus forecast (Graham et al. 2005 & 2006). In fact, executives believe that missing the consensus forecast leads to a larger negative stock price reaction than when they miss the other two earnings benchmarks (Graham et al. 2006). Brown and Caylor (2005) find evidence consistent with this belief as there is a greater positive (negative) reaction for firms that meet (miss) analysts' forecasts than for firms that meet (miss) the earnings benchmarks of loss avoidance or earnings increases.

Unlike management, auditors, however, appear to be more focused on constraining earnings management related to the reporting of small profits or small earnings increases than for meeting analysts' forecasts (Nelson et al. 2002; Frankel et al. 2002; Ng, 2007). For example, Nelson et al. (2002) interview Big N auditors and report that auditors are more likely to require an adjustment related to an earnings management attempt to increase earnings or avoid a loss than an earnings management attempt to meet analysts' forecasts, despite identifying meeting analyst expectations as the most common incentive for earnings management attempts.

Similarly, Ng (2007) finds that Big 4 auditors are more likely to book an audit adjustment when the adjustment affects the client's ability to achieve positive earnings or earnings that exceed prior year's earnings, and less likely when it affects the client's ability to meet the analysts' consensus forecast. Frankel et al. (2002), in a study of the relation between non-audit fees and earnings management to achieve small earnings increases and to just meet or beat analysts' consensus forecasts, find a significant positive relationship between non-audit fees and just meeting or beating analysts' forecasts but no relationship between non-audit fees and reporting a small earnings increase. The authors suggest that the difference in findings may be due to "managers have[ing] greater incentives to manage earnings to meet market expectations and/or auditors have[ing] less incentives to prevent this behavior" (p. 91).

Audit literature posits various factors that may contribute to influencing the auditors' decision as to whether to book or waive audit differences as the client's earnings approach different earnings benchmarks (Libby & Kinney, 2000; Frankel et al., 2002; Nelson et al., 2002; Ng, 2007; Ng & Tan, 2007). These studies suggest the following as to why auditors may be more likely to waive audit differences that allow the client to meet the analysts' earnings forecasts benchmark: 1) economic incentives/sympathy to client's preferences, i.e., auditors believe managers have a very strong preference for meeting the analysts' forecasts; 2) differential salience of the different thresholds, i.e., the auditor is less likely to focus on the analysts' earnings forecasts threshold when making materiality assessments; 3) differential risk associated with the different thresholds, i.e., auditors perceive a lower risk of litigation associated with missing the analysts' earnings forecasts benchmark relative to the profit/loss benchmark; and 4) differential materiality implications associated with the different thresholds, i.e., the audit difference is less likely to be considered quantitatively material relative to the earnings base in the analysts' forecasts condition than in the small profits condition.

There are two perspectives on the effect of office size on client earnings management behavior around analysts' forecasts. As noted earlier, Francis and Yu (2009) find that clients of larger offices are less likely to achieve the small profits and small earnings benchmarks. Based on Francis and Yu's (2009) arguments and findings, one would expect that larger Big 4 offices are more likely than the smaller offices to identify and report problems in the financial statements and insist on corrections, even if these corrections result in management failing to meet analysts' earnings forecasts. At the same time, as discussed above, the evidence suggests that management has much stronger incentives to manage earnings to achieve analysts' forecasts than to achieve small profits and small earnings increases (Dechow et al. 2003; Brown & Caylor, 2005; Graham et al. 2005 & 2006) and auditors are less likely to insist on corrections that result in missed analysts' forecasts than on those that result in failing to report positive earnings or small earnings increases (Nelson et al. 2002; Frankel et al. 2002; Ng, 2007). Consequently, the positive association between office size and earnings quality found by Francis and Yu (2009) may not translate to a setting in which management appears to have stronger incentives to manage earnings and auditors appear to have a lower propensity to prevent them from managing earnings. Thus, one could argue that auditor influence on the absolute value of analysts' forecast error and just meeting or beating analysts' forecasts will be uniform across the Big 4 offices and that office size will not be associated with these two earnings quality measures.

Given these two different perspectives on the effect of office size on client earnings management behavior around analysts' forecasts, we test the following hypotheses, presented in null form:

***$H1_0$**: There is no association between Big 4 office size and absolute levels of analysts' forecast error.*

***$H2_0$**: There is no association between Big 4 office size and reported earnings that just meet or beat analysts' earnings forecasts.*

RESEARCH DESIGN AND VARIABLE MEASUREMENT

The following models are used empirically to test H_1 and H_2, respectively

$$ERROR = \beta_0 + \beta_1 OFFICE + \beta_2 SIZE + \beta_3 LOSS + \beta_4 NUMEST + \beta_5 ERNCHG + \beta_6 PERSIST + \beta_7 DISP + \beta_8 HORIZON + \beta_9 SHARES + \beta_{10} ABSACC + \beta_{11} MTB + \beta_{12} REVGROW + \beta_{13} ZFC + \beta_{14} TENURE + \beta_{15} CITYEXP + \beta_{16} NATEXP + \beta_{17} INFLUENCE + \beta_{18} GEOSEGS + \beta_{19} OPSEGS + \beta_{20} YEAR + \beta_{21} IND + \varepsilon \quad (1)$$

$$MEETBEAT = \beta_0 + \beta_1 OFFICE + \beta_2 SIZE + \beta_3 LOSS + \beta_4 NUMEST + \beta_5 ERNCHG + \beta_6 PERSIST + \beta_7 DISP + \beta_8 HORIZON + \beta_9 SHARES + \beta_{10} ABSACC + \beta_{11} MTB + \beta_{12} REVGROW + \beta_{13} ZFC + \beta_{14} TENURE + \beta_{15} CITYEXP + \beta_{16} NATEXP + \beta_{17} INFLUENCE + \beta_{18} GEOSEGS + \beta_{19} OPSEGS + \beta_{20} YEAR + \beta_{21} IND + \varepsilon \quad (2)$$

where:

ERROR	=	absolute value of analysts' forecast error defined as the difference between I/B/E/S actual earnings per share in the current year and the most recent mean I/B/E/S consensus analysts' EPS forecast prior to the earnings announcement date;[4]
MEETBEAT	=	1 when actual earnings per share in the current year exactly meet or beat the analysts' mean consensus forecast by one cent per share, and 0 otherwise;
OFFICE	=	natural log of total office-specific audit fees of all SEC-registrant clients per fiscal year;
SIZE	=	natural log of the market value of equity at the beginning of the year;[5]
LOSS	=	1 if net income is less than zero, and 0 otherwise;
NUMEST	=	number of analysts following the company;
ERNCHG	=	absolute value of the change in annual earnings scaled by beginning of year stock price;
PERSIST	=	1 if ERNCHG is within the 20-80th percentile of earnings changes by year, and 0 otherwise;
DISP	=	a measure of analysts' forecast dispersion calculated as the standard deviation across analysts' forecasts divided by the absolute value of the mean EPS forecast;
HORIZON	=	number of calendar days between the forecast announcement date and the subsequent actual earnings announcement date;
SHARES	=	natural log of common shares outstanding at the end of the year;
ABSACC	=	absolute value of accruals calculated as net income minus cash flow from operations scaled by lagged total assets;
MTB	=	market-to-book ratio at the end of the year;
REVGROW	=	change in sales deflated by lagged total assets;
ZFC	=	an index of financial condition based on Zmijewski's (1984) weighted probit bankruptcy prediction model. The financial condition measure is computed using the weighted probit coefficients from Zmijewski's Table 3, Panel B:

$$ZFC = -4.803 - 3.599 * \left(\frac{Net\ Income}{Total\ Assets}\right) + 5.406 * \left(\frac{Total\ Debt}{Total\ Assets}\right) - 0.1\left(\frac{Current\ Assets}{Current\ Liabilities}\right)$$

TENURE	=	1 if auditor tenure is three years or less, and 0 otherwise;
CITYEXP	=	1 if an auditor is the number one auditor in terms of aggregated client audit fees in an industry within that city in a specific fiscal year, and 0 otherwise;
NATEXP	=	1 if an auditor is the number one auditor in terms of aggregated audit fees in an industry within a specific fiscal year, and 0 otherwise;
INFLUENCE	=	ratio of a specific client's total fees (audit fees plus nonaudit fees) relative to aggregated annual fees generated by the practice office that audits the client;
GEOSEGS	=	number of geographic segments reported in the Compustat segments database for the firm in year t;[6]
OPSEGS	=	number of operating segments reported in the Compustat segments database for the firm in year t;
YEAR	=	dummy variables for each year from 2003-2007; and
IND	=	dummy variables representing two-digit SIC codes.

In Equation (1), the dependent variable, ERROR, is measured by the absolute value of forecast error, following Payne (2008). This variable captures management's overall propensity to manage earnings around analysts' forecasts, as managers have incentives to manage earnings both up to and down to the forecasted level (Payne, 2008). The dependent variable, MEETBEAT, in Equation (2) is an indicator variable for reported earnings that exactly meet or beat analysts' earnings forecasts by one cent per share, following Reichelt and Wang (2010) and Payne (2008). MEETBEAT is intended to capture management's propensity to "push" earnings upward when the firm otherwise may have fallen short of its benchmark earnings target (Reichelt and Wang, 2010). Auditor office size (OFFICE) is the variable of interest in the study and, consistent with Francis and Yu (2009) and Francis et al. (2013), is measured by the natural log of total office-specific audit fees of all clients per fiscal year.[7] Similar to these studies, the log of audit fees, rather than aggregate audit fees, is used in the analysis due to skewness in the distribution and some extreme values of aggregate audit fees. As noted by Francis and Yu (2009, 1524), "audit fees are directly related to engagement hours, and offices with higher fees will therefore have more hours of experience in the audits of SEC registrants."

The following variables are included in the models to control for factors shown in prior research to influence analysts' forecast error. SIZE is included to control for information environment asymmetry between large and small firms (for example, large firms are scrutinized more by investors and analysts) (Payne, 2008). The analyst forecast literature has also used SIZE to control for numerous omitted variables (Becker, DeFond, Jiambalvo & Subramanyam, 1998). There is disagreement in prior research on the size effect on analysts' forecast error and meeting or beating forecasted earnings, so we do not make a prediction as to its effect on the dependent variables.

Firms that report losses (LOSS), have significant changes in earnings (ERNCHG), have higher accrual levels (ABSACC), and are financially distressed (ZFC) are expected to provide less predictable earnings (Payne, 2008; Behn et al. 2008).[8] Less predictable earnings would likely lead to increased forecast error and a reduced frequency of just meeting or beating analysts' forecasts. The opposite is expected for high-growth companies (MTB), companies with strong sales growth (REVGROW), and companies with consistent earnings (PERSIST) (Barton & Simko, 2002; Payne, 2008; Reichelt & Wang, 2010; Hill, Johnson, Liu & Lopez, 2015).

Consistent with Barton and Simko (2002) and Hill et al. (2015), the natural log of common shares outstanding (SHARES) is included since firms with a larger number of shares may find it more difficult to meet analysts' forecasts and thus have greater forecast error. As noted by Barton and Simko (2002), a \$.01 deficit in EPS translates into more dollars of actual earnings for firms with many shares as opposed to firms with fewer shares. The number of calendar days between the forecast announcement date and the corresponding actual earnings announcement date (HORIZON) is included because it is expected that a shorter forecast horizon will be associated with less forecast error and thus an increased likelihood of just meeting or beating forecasted earnings (Brown, 2001; Behn et al. 2008).

Finally, we include the dispersion of the analysts' forecasts (DISP) and the number of analysts following the company (NUMEST). Payne (2008) argues that when analysts are in agreement (low dispersion) management is more likely to utilize their discretion over earnings to minimize analysts' forecast error and their firm's earnings will be more likely either to meet or beat analyst expectations as a result. Higher analyst following indicates that companies are followed more closely by Wall Street and thus expected to be more likely just to meet or beat analysts' expectations and to have lower analysts' forecast error (Barton & Simko, 2002; Payne, 2008; Behn et al. 2008; Reichelt & Wang, 2010).

We also include the following six variables as recommended by Francis and Yu (2009) to ensure that the results for office size are not the consequence of correlated omitted auditor – related variables. Client influence (INFLUENCE) is included to control for the auditor's office-level incentives regarding influential clients. DeAngelo's (1981) economic bonding theory indicates that auditors may compromise audit quality in order to retain clients that are economically important to the audit firm. However, Reynolds and Francis (2000) find that Big 4 auditors actually report more conservatively for their larger clients, as the incentive to avoid litigation from misreporting outweighs the incentive to report in a client's favor in order to retain them as a client. Thus, the predicted effect of client influence on the two earnings quality measures is unclear. Auditor tenure (TENURE) is included to ensure that systematic differences in auditor tenure across practice offices do not influence the results associated with office size. Short auditor tenure has been found in previous studies to be associated with lower quality audits (Geiger & Raghunandan, 2002; Johnson, Khurana & Reynolds, 2002).

Auditor national industry expertise (NATEXP) and auditor city-specific industry expertise (CITYEXP) are included to ensure that office size is not capturing an omitted variable regarding auditor industry expertise. Numerous studies have demonstrated that national and city-specific industry experts are associated with higher quality audits (Gramling, Johnson & Khurana, 2001; Owhoso, Messier & Lynch, 2002; Krishnan, 2003; Carcello & Nagy, 2004; Dunn & Mayhew, 2004; Krishnan, 2005b; Payne, 2008; Jones et al. 2008; Reichelt & Wang, 2010).[9] The number of client geographic (GEOSEGS) segments and the number of operating segments (OPSEGS) are included, as engagement offices with clients with multiple geographical segments or operating units are more likely to require assistance from multiple audit practice offices to assist them in completing the audit, which may, in turn, result in a higher quality audit. Therefore, these two variables are included to control for any possible confounding effects of other offices participating with the lead office in the audit engagement.

Consistent with previous studies (e.g., Payne, 2008; Reichelt & Wang, 2010; Choi et al. 2012), we include dummy variables for both year and industry. As noted by Payne (2008), these year and industry dummy variables control for time- and industry-specific commonalities in the coefficients in order to reduce correlation among the regression residuals.

SAMPLE AND RESULTS

The sample covers the six-year period from 2003 through 2008 based on Compustat year definitions.[10] The audit engagement office is determined from the audit report letterhead from the 10-K SEC filing as reported in Audit Analytics. Following Francis and Yu (2009), annual office size is based on total yearly audit fees for each office in Audit Analytics, and the full population of observations is used for the calculation. Additionally, auditor industry leadership is based on the full Audit Analytics population with fee data. However, as in Francis et al. (2005), Jones et al. (2008), and Reichelt and Wang (2010), to ensure that city industry leadership is not determined by too few observations in a city-industry-fiscal year combination, we require a minimum of two observations per city-industry-year combination and further delete observations for which we could not identify metropolitan statistical area information needed for determination of city industry leadership.[11] Additional data reductions include non-Big 4 auditors, financial institutions (SIC codes between 6000 and 6999), observations without IBES analysts' forecasts and actual values or with forecasts announced more than two months before the earnings announcement date[12,13], observations without a matching CIK code, and observations without control variable values. Consistent with Payne (2008), we eliminate non-Big 4 auditors to control for auditor type, and we also eliminate financial institutions as their accrual structure is qualitatively different.

The final sample has 9,789 firm-year observations, representing 2,598 different companies, 255 individual practice audit offices, and 1,309 office-year observations.[14,15] Following Teoh and Wong (1993) and Frankel et al. (2002), we focus on annual earnings because auditors' involvement with quarterly financial statements is limited. All non-dichotomous variables in the models were winsorized at the 1st and 99th percentiles to mitigate the effect of outliers.

Descriptive statistics for this sample are presented in Table 1. The mean absolute forecast error (ERROR) is \$0.084. Approximately 13.3 percent of observations just meet or beat analysts' earnings forecasts (MEETBEAT). On average, almost nine analysts follow a firm in our sample (NUMEST). The mean number of calendar days between the forecast announcement date and actual earnings announcement (HORIZON) is 16.765 days.

Average audit fees (AUDFEES) are \$83.462 million and 23.7 percent of the sample firms have an auditor-client relationship of three years or less (TENURE). A total of 51.9 percent of the sample firms are audited by city industry leaders (CITYEXP), 31.4 percent of the sample firms are audited by national industry leaders (NATEXP), and, on average, a client's total fees represent 6.7 percent of office-level fees (INFLUENCE). Additionally, sample firms have an average of 3.051 geographic segments (GEOSEGS) and 1.486 operating segments (OPSEGS).

On average, our firms are not in financial distress as the mean financial distress score (ZFC) is -2.432. The average price-to-book ratio (MTB) is 3.233, the average dispersion measure (DISP) is 0.068, and the absolute value of total accruals (ABSACC) represents approximately 8.6 percent of total assets. The mean natural log of market value of equity at the beginning of the year (SIZE) is \$7.014 billion and the mean natural log of common shares outstanding at the end of the year (SHARES) is 4.144 million. Approximately 25.4 percent of the firm-year observations reported a loss (LOSS). The mean increase in total revenue deflated by total assets (REVGROW) is 13.2 percent while the average change in earnings (ERNCHG) is 6.5 percent. Additionally, 60 percent of firms are classified as having persistent earnings (PERSIST).

Table 1 POOLED FIRM-YEAR DESCRIPTIVE STATISTICS (2003-2008); N=9,789					
Variables	**Mean**	**St. Dev.**	**25th Percentile**	**Median**	**75th Percentile**
ERROR	0.084	0.163	0.010	0.030	0.080
MEETBEAT	0.133	0.339	0.000	0.000	0.000
AUDFEES	83.462	98.565	24.808	55.763	106.700
OFFICE	17.696	1.116	17.027	17.837	18.486
SIZE	7.014	1.557	5.891	6.870	7.975
LOSS	0.254	0.436	0.000	0.000	1.000
NUMEST	8.786	6.318	4.000	7.000	12.000
ERNCHG	0.065	0.135	0.009	0.021	0.056
PERSIST	0.600	0.490	0.000	1.000	1.000
DISP	0.068	0.149	0.010	0.022	0.054
HORIZON	16.765	8.670	11.000	14.000	25.000
SHARES	4.144	1.145	3.343	3.936	4.762
ABSACC	0.086	0.085	0.033	0.062	0.109
MTB	3.233	4.218	1.581	2.414	3.909
REVGROW	0.132	0.210	0.019	0.090	0.201
ZFC	-2.432	1.618	-3.551	-2.466	-1.462
TENURE	0.237	0.425	0.000	0.000	0.000
CITYEXP	0.519	0.500	0.000	1.000	1.000
NATEXP	0.314	0.464	0.000	0.000	1.000
INFLUENCE	0.067	0.115	0.010	0.025	0.069
GEOSEGS	3.051	2.486	1.000	2.000	4.000
OPSEGS	1.486	1.612	1.000	1.000	1.000

Variable definitions are contained in Table 2.

Table 2 VARIABLE DESCRIPTIONS	
Variable Name	**Description**
ERROR	Absolute value of analyst forecast error defined as the difference between I/B/E/S actual earnings per share in the current year and the most recent mean I/B/E/S consensus analysts' EPS forecast prior to the earnings announcement date.
MEETBEAT	1 when actual earnings per share in the current year exactly meet or beat the analysts' mean consensus forecast by one cent per share, and 0 otherwise.
AUDFEES	Total office-specific audit fees (in millions) of all SEC registrant clients per fiscal year.
OFFICE	Natural log of total office-specific audit fees of all SEC registrant clients per fiscal year.
SIZE	Natural log of the market value of equity at the beginning of the year.
LOSS	1 if net income is less than zero, and 0 otherwise.
NUMEST	Number of analysts following the company.
ERNCHG	Absolute value of the change in earnings per share divided by beginning of year stock price.
PERSIST	1 if ERNCHG is within the 20-80th percentile of earnings changes by year, and 0 otherwise.
DISP	Measure of analysts' forecast dispersion calculated as the standard deviation across analysts' forecasts divided by the absolute value of the mean EPS forecast.
HORIZON	Number of calendar days between the forecast announcement date and the subsequent actual earnings announcement date.
SHARES	Natural log of common shares outstanding at the end of the year.
ABSACC	Absolute value of accruals calculated as net income-cash flow from operations scaled by lagged total assets.
MTB	Market-to-book ratio at the end of the year.
REVGROW	Change in sales deflated by lagged total assets.

Table 2 **VARIABLE DESCRIPTIONS (Continued)**	
Variable Name	**Description**
ZFC	An index of financial condition based on Zmijewski's (1984) weighted probit bankruptcy prediction model. The financial condition is computed using the weighted probit coefficients from Zmijewski's Table 3, Panel B: $ZFC = -4.803 - 3.599 * \left(\frac{Net\ Income}{Total\ Assets}\right) + 5.406 * \left(\frac{Total\ Debt}{Total\ Assets}\right) - 0.1 * \left(\frac{Current\ Assets}{Current\ Liabilities}\right)$
TENURE	1 if auditor tenure is three years or less, and 0 otherwise.
CITYEXP	1 if an auditor is the number one auditor in terms of aggregated client audit fees in an industry within that city in a specific fiscal year, and 0 otherwise.
NATEXP	1 if an auditor is the number one auditor in terms of aggregated audit fees in an industry within a specific fiscal year, and 0 otherwise.
INFLUENCE	Ratio of a specific client's total fees (audit fees plus nonaudit fees) relative to aggregated annual fees generated by the practice office that audits the client.
GEOSEGS	Number of geographic segments reported in the Compustat segments database for the firm in year t.
OPSEGS	Number of operating segments reported in the Compustat segments database for the firm in year t.

Pearson correlations (not reported) were calculated. The results indicate that office size is significantly correlated with ERROR and MEETBEAT in the expected directions. Although the correlations among a few variables are above 0.35, an analysis of the variance inflationary factors (VIFs) for each model reveals that all are well below the commonly recommended 10.00 threshold, indicating that multicollinearity is not a concern.

Table 3 **OLS REGRESSION RESULTS**			
Panel A: Dependent Variable Analysts' Forecast Error (Model 1)			
Variable	Pred.	Coefficient	p-value
Intercept	N/A	- 0.164	<0.001
OFFICE	(+)	0.008	<0.001
SIZE	(?)	0.046	<0.001
LOSS	(+)	0.037	<0.001
NUMEST	(-)	-0.003	<0.001
ERNCHG	(+)	0.219	<0.001
PERSIST	(-)	0.005	0.129
DISP	(+)	0.171	<0.001
HORIZON	(+)	0.000	0.069
SHARES	(+)	-0.055	<0.001
ABSACC	(+)	0.132	<0.001
MTB	(-)	-0.001	<0.001
REVGROW	(-)	0.020	0.010
ZFC	(+)	0.008	<0.001
TENURE	(-)	0.001	0.738
CITYEXP	(+)	0.004	0.160
NATEXP	(+)	-0.004	0.224
INFLUENCE	(?)	0.075	<0.001
GEOSEGS	(?)	0.001	0.180
OPSEGS	(?)	0.000	0.679

Table 3 **OLS REGRESSION RESULTS (Continued)**			
Model F-value = 27.92; p <0.001. Adjusted R^2 = 17.85%. n=9,789. Note: Coefficient p-values represent two-tailed significance. Estimates on fiscal year dummies and industry dummies are not reported for brevity.			
Panel B: Dependent Variable Analysts' Forecast Error (Model 1) Alternate Office Size Measures			
Alternate Office Size Measure	Pred.	Coefficient	p-value
OFFICE2	(+)	0.008	<0.001
OFFICE3	(+)	0.007	<0.001
OFFICE4	(+)	0.005	<0.001
OFFICE2=natural log of total (audit plus non-audit) office-specific fees (in millions) of all SEC registrant clients per fiscal year; OFFICE3=natural log of total number of SEC registrant clients audited by each office per fiscal year. OFFICE4=natural log of total sales of SEC registrant clients by each office per fiscal year.			

Table 3 presents the OLS regression results for the analysts' forecast error test.[16] All p-values are reported as two-tailed probabilities. The model is statistically significant (F-value=27.92; $p < 0.001$) with an adjusted R^2 of 17.85%. Panel A of Table 3 reports results for the main office size variable of interest, OFFICE, the natural log of office-specific audit fees. The coefficient for OFFICE is positive and significant at the $p < 0.001$ level. This result indicates that clients audited by larger Big 4 audit offices are more likely to have increased absolute levels of analysts' forecast error. Among the control variables, of those for which directional predictions are made, eight are significant in the expected direction (LOSS, NUMEST, ERNCHG, DISP, HORIZON, ABSACC, MTB, and ZFC), two are significant in the opposite direction (SHARES and REVGROW), and the remaining are not significant at the $p < 0.10$ level. Of the four variables for which we did not make a directional prediction, SIZE and INFLUENCE are positively significant while GEOSEGS and OPSEGS are insignificant at the $p < 0.10$ level.

Panel B of Table 3 reports results using three alternative measures of office size. OFFICE2 is the natural log of office-specific total (audit plus non-audit) fees. OFFICE3 is the natural log of the total number of SEC registrant clients audited by an office in a fiscal year and OFFICE4 is the natural log of total sales of SEC registrant clients by each office per fiscal year. The coefficients for all these measures are positive and significant at the $p < 0.001$ level, indicating that the office size results demonstrated in Panel A are robust to using alternative office size measures.

Table 4
LOGISTIC REGRESSION RESULTS

Panel A: Dependent Variable Meet/Beat Forecast (Model 2)

Variable	Pred.	Coefficient	p-value
Intercept	N/A	0.369	0.592
OFFICE	(-)	-0.121	0.001
SIZE	(?)	-0.297	<0.001
LOSS	(-)	-0.316	0.002
NUMEST	(+)	0.005	0.476
ERNCHG	(-)	-1.475	<0.001
PERSIST	(+)	-0.077	0.243
DISP	(-)	-0.354	0.156
HORIZON	(-)	-0.003	0.436
SHARES	(-)	0.570	<0.001
ABSACC	(-)	-0.477	0.304
MTB	(+)	0.026	<0.001
REVGROW	(+)	-0.022	0.891
ZFC	(-)	-0.115	<0.001
TENURE	(+)	-0.066	0.384
CITYEXP	(-)	-0.040	0.539
NATEXP	(-)	0.030	0.654
INFLUENCE	(?)	-0.913	0.021
GEOSEGS	(?)	0.008	0.558
OPSEGS	(?)	0.002	0.937

Model $\chi^2 = 350.41$; $p < 0.001$. Pseudo $R^2 = 7.58\%$. n=9,789.
Note: Coefficient p-values represent two-tailed significance. Estimates on fiscal year dummies and industry dummies are not reported for brevity.

Panel B: Dependent Variable Meet/Beat Forecast (Model 2)
Alternate Office Size Measures

Alternate Office Size Measure	Pred.	Coefficient	p-value
OFFICE2	(-)	-0.136	<0.001
OFFICE3	(-)	-0.093	0.008
OFFICE4	(-)	-0.096	0.001

OFFICE2=natural log of total (audit plus non-audit) office-specific fees (in millions) of all SEC registrant clients per fiscal year;
OFFICE3=natural log of total number of SEC registrant clients audited by each office per fiscal year.
OFFICE4=natural log of total sales of SEC registrant clients by each office per fiscal year.

Table 4 presents the logistic regression results for the just meeting or beating analysts' earnings forecasts test. P-values are reported as two-tailed probabilities. The model is statistically significant (χ^2=350.41; $p < 0.001$) with a pseudo R^2 of 7.58%. Panel A of Table 4 reports results for the main office size variable of interest, OFFICE, the natural log of office-specific audit fees. The coefficient for OFFICE is negative and significant at the 0.001 level. This indicates that clients audited by larger Big 4 audit offices are less likely just to meet or beat analysts' earnings forecasts.

Among the control variables, of those for which directional predictions are made, four are significant in the expected direction (LOSS, ERNCHG, MTB, and ZFC), one is significant in the opposite direction (SHARES), and the remaining are not significant at the $p < 0.10$ level. Of the four variables for which we did not make a directional prediction, SIZE and INFLUENCE are negatively significant while GEOSEGS and OPSEGS are insignificant at the $p < 0.10$ level.

Panel B of Table 4 reports results using the three alternative measures of office size. The coefficients for these measures are all negative and significant at the $p < 0.01$ level. The results using these alternative office size measures indicate that the office size results demonstrated in Panel A are robust to alternative office size measures.

In summary, the results of the two models indicate that the earnings of SEC clients audited by larger Big 4 audit offices are of higher quality, as evidenced by audited reported earnings with increased absolute levels of analysts' forecast error and with a reduced likelihood of just meeting or beating analysts' earnings forecasts. Thus, larger audit offices appear to be more likely to constrain earnings management behavior around analysts' forecasts.

SENSITIVITY ANALYSES

We perform numerous sensitivity analyses to verify the robustness of the findings. In untabulated results, we determine that the main results are robust to (1) using median analysts' EPS forecasts in lieu of mean analysts' forecasts, (2) using actual national and city level market shares of audit fees instead of indicator variables to measure industry leadership (3) performing Fama-MacBeth regressions to control for cross-sectional correlation of residuals, and (4) using various specifications of industry classification schemes, namely Fama-French 5, 12, 17, 30, and 48 industry groupings along with one-digit SIC codes.[17]

Additionally, similar to Payne (2008) and Hill et al. (2015), to ensure that the results are not altered by expectations management, we perform an untabulated analysis including an indicator variable for settings in which it appears that analysts' forecasts have been guided downward. After controlling for this effect, the reported results do not change with respect to office size. Also, since it is possible that firms just meeting or beating analysts' forecasts are generating small profits or small increases, the office size results from Equation (2) may simply be mimicking the results from Francis and Yu (2009). To ensure this is not the case, we eliminate from the sample firms that generated small profits or small earnings increases (as defined by Francis and Yu 2009) and re-estimate the logistic equation. Additionally, in a separate analysis, we rerun the logistic equation with the inclusion of indicator variables for small earnings increases and small profits. In both cases, the untabulated results are qualitatively similar to those presented.

In order to ensure that the main results are not associated with the economic downturn of 2008, we run both regression equations for the years 2003-2007. In addition, we rerun both main regressions controlling for client sales volatility. Again, we do not find any qualitative change to the reported results.

Habib and Hansen (2008) propose that additional research is needed to examine earnings benchmarks based on firm characteristics. They suggest examining these benchmarks based on prominent firm characteristics such as small versus large firms, high leverage versus low leverage firms, and high versus low analyst following firms. Based on their suggestion, we perform tests separately for (1) large clients (i.e., firms greater than or equal to median size) versus small clients, (2) high leverage firms (i.e., firms with leverage greater than or equal to median leverage) versus low leverage firms, (3) profit-reporting firms versus loss-reporting firms, and (4) firms with a high analyst following (i.e., firms with analyst followings greater than or equal to median analyst followings) versus firms with a low analyst following.[18]

Not all companies and audit offices appear in all six years of the sample. In order to ensure that the results are not affected by survivorship bias, we run tests separately for (1) companies that appear in all six years and (2) audit offices that appear in all six years. Finally, to examine whether the effect of office size on analysts' forecast error differs systematically between clients with positive forecast errors and negative forecast errors, we split the full sample into two sub-samples based on the sign of the forecast error, and then re-estimate Equation (1) separately for each sub-sample.

Table 5
SENSITIVITY ANALYSES
COEFFICIENT AND P-VALUE FOR OFFICE VARIABLE

		Panel A: Analysts' Forecast Error		Panel B: Just Meeting or Beating Analysts' Earnings Forecasts	
Sub-Sample	n	Coefficient	p-value	Coefficient	p-value
Large Clients	4,895	0.014	<0.001	-0.143	0.014
Small Clients	4,894	0.008	0.001	-0.140	0.008
High Leverage	4,895	0.012	0.000	-0.194	0.001
Low Leverage	4,894	0.007	<0.001	-0.112	0.027
Profit Firms	7,298	0.007	<0.001	-0.132	0.002
Loss Firms	2,491	0.014	0.006	-0.155	0.070
High Follow	5,234	0.010	<0.001	-0.138	0.007
Low Follow	4,555	0.010	0.002	-0.128	0.027
Same Firm	4,818	0.011	<0.001	-0.151	0.007
Same Office	9,507	0.008	<0.001	-0.141	<0.001
Positive Error	6,656	0.008	<0.001	N/A	N/A
Negative Error	3,133	0.012	0.004	N/A	N/A

Table 5 presents the estimation results for the large versus small, high versus low leverage, high versus low analyst following, and profit versus loss-reporting subsamples, as well as the subsamples for the companies and audit offices included in all years of the sample, along with companies with positive or negative forecast errors. For the sake of brevity, only results for the office size variable, OFFICE, are presented. Panel A of Table 5 reports the OLS regression results for the analysts' forecast error tests. In all twelve tests, OFFICE is positive and significant at the $p < 0.01$ level. Panel B of Table 5 presents the logistic regression results for the just meeting or beating analysts' earnings forecasts tests. In all ten tests, OFFICE is negative and significant at the 0.07 level or less.

The results from the sensitivity analyses are all consistent with the main results in that the earnings of clients audited by larger offices are associated with increased absolute levels of analysts' forecast error and reduced likelihood of just meeting or beating analysts' earnings forecasts.

SUMMARY AND CONCLUSIONS

Our study extends prior audit office-level research by examining the relationship between Big 4 auditor office size and two management incentives that influence earnings management behavior around analysts' earnings forecasts: (1) minimization of analysts' forecast error and (2) just meeting or beating analysts' forecasts. The findings are consistent with larger offices producing higher quality audits. Specifically, we find that the earnings of clients audited by larger Big 4 audit offices are associated with increased absolute levels of analysts' forecast error and a decreased likelihood of just meeting or beating analysts' forecasts, suggesting that the larger Big 4 offices are associated with higher client earnings quality. These results support Francis and Yu's (2009) argument that larger Big 4 offices have greater in–house expertise and experience in auditing SEC registrants and thus are more likely to identify, report, and insist on correcting problems in their financial statements.

This study contributes to our understanding of auditor influence on client earnings quality by providing evidence that larger Big 4 offices are more likely than smaller offices to constrain management's ability to manage earnings to analysts' forecasts. As mentioned earlier, several studies provide evidence suggesting that auditors are not as concerned about the analysts' earnings forecasts benchmark. We provide evidence that, in reality, the auditors of larger Big 4 audit offices are concerned about the analysts' earnings forecasts benchmark. This finding is important given that management's zeal to meet consensus analysts' forecasts in recent years has called into question the quality of SEC registrants' reported earnings and the quality of their auditors (Levitt, 1998) and the Big 4 firms audit most of the global market capitalization of U.S. issuers (Franzel, 2013). Furthermore, the study reinforces the relevance of office-level audit analysis and provides additional evidence that audit quality does not appear to be uniform across the different local offices of the Big 4, supporting suggestions that the Big 4 accounting firms need to mandate stricter policies to ensure audit quality consistency across offices and the PCAOB should consider increasing the number of inspections they perform on audits conducted by smaller offices.

Our paper is subject to the following limitations. First, since neither audit quality nor earnings management is observable, we place reliance on proxy measures that, although used in prior literature, are not without criticism. For example, since earnings management is unobservable, we cannot determine if all firms in the sample with low levels of absolute analysts' forecast error or that just met or beat analysts' earnings forecasts achieved these results by managing their earnings. Second, as Francis and Yu (2009) note, although multiple offices may contribute to an audit, the audit is attributed only to the engagement office of record; however, if small offices participate on audits of large offices (and vice versa), such instances would counteract office-size differences and would bias against finding an association between office size and earnings quality. Third, one can argue that the total of office-specific audit fees is a noisy measure of office-size due to the confounding of fees with client characteristics. Although client count and client sales are used in the study as alternative measures of office size and produce similar results, there potentially may be more precise office size measures or measures superior to office size to capture differences in audit quality provided by local auditing firms that to-date have not yet been identified or for which the data is not publicly available at the present time.

Opportunities for future research include examining the association between Big 4 auditor office size and other facets of financial reporting quality, including conservatism, SEC enforcement, auditor litigation, or the cost of debt financing. Future studies could also investigate the relationship between second-tier auditor office size and various measures associated with financial reporting quality. Finally, future research could attempt to determine if the influence of auditor office size on earnings benchmarks extends to interim quarters.

ENDNOTES

1. Based on 2012 year-end data.

2. It is important to note that industry specialization and office size are two different dimensions on which auditors can be sorted.

3. For example, in an experiment, Libby and Kinney (2000) examine whether Big N audit managers expect management to correct earnings after auditors discover quantitatively immaterial earnings misstatements. They find that auditors believe that management has strong preferences for achieving the analysts' consensus forecast as their results indicate that auditors believe that misstatements are less likely to be corrected if they cause earnings to fall below analysts' forecasts. This result implies "opportunistic correction of quantitatively immaterial misstatements to manage earnings to forecasts, and auditor acceptance of this practice" (Libby & Kinney, 2000, 385).

4. Results are qualitatively similar in the OLS and logistic regressions if we use the median instead of the mean consensus analysts' forecast. Additionally, by using the alternative measure of error found in Behn et al. (2008) in which the absolute value of the error is deflated by stock price, we obtain similar results.

5. Results are qualitatively similar in Models 1 and 2 if we use the natural log of beginning year's total assets in place of the market value of equity.

6. Following Francis and Yu (2009), we assign GEOSEGS and OPSEGS a value of 1 if no segment data is reported in Compustat.

7. We also examine three alternative measures of office size: natural log of total fees, natural log of number of clients, and natural log of total sales of clients. See Panel B of Tables 3 and 4 for results.

8. Higher values of the Zmijewski financial condition (ZFC) index indicate more financial distress.

9. Results are qualitatively similar in Models 1 and 2 if we include an indicator variable for joint national and city-specific industry expertise.

10. Fee data is only available in Audit Analytics for fiscal year 2000 financial statements and later. The SEC, in 2000, required all registrants to disclose the most recent year's audit and nonaudit fees in annual proxy statements filed on or after February 5, 2001. We begin the sample period with 2003, the first year of the Big 4, to remove the potential effect of Arthur Andersen.

11. Following Reichelt and Wang (2010) and Francis et al. (2005), in determining city-specific industry expertise, a city is defined as a Metropolitan Statistical Area (MSA). We obtained the geographical city from Audit Analytics and determined its MSA by hand-collecting from the following U.S. Census Bureau website: http://www.census.gov/population/www/metroareas/lists/2007/List4.txt. For the majority of cities not listed on this website, we were able to look up their county on the following website: http://www.citycountyxref.info/index.lasso and then determine their MSA from the U.S. Census Bureau website. Forty-seven different geographical cities, representing 464 observations, are not located within any MSA and were thus removed from the sample before merging with Compustat.

12. As in Reichelt and Wang (2010) and Lim and Tan (2008), this is to ensure that forecasts are not stale-dated.

13. Consistent with Reichelt and Wang (2010), Lim and Tan (2008), and Payne (2008), to calculate analysts' forecast error, we obtain analysts' forecasts from the I/B/E/S unadjusted summary file to avoid problems of lost precision in the EPS decimal places from stock splits (Payne & Thomas, 2003). Actual earnings also come from I/B/E/S to ensure consistency of the earnings construct.

14. The 9,789 firm-years in the sample are audited by 255 different Big 4 offices, which are distributed as follows: PricewaterhouseCoopers (61), Ernst & Young (67), Deloitte (61), and KPMG (66). Each audit office can appear up to six times in the sample (2003, 2004, 2005, 2006, 2007, and 2008).

15. There were 66,355 domestic companies on Audit Analytics from 2003-2008. Observations were excluded because they were (1) audited by non-Big 4 auditors (26,703), (2) financial institutions (18,997), (3) without analysts' annual earnings forecasts (4,188), (4), without matching CIK code (2,275), (5) missing MSA information or had fewer than two observations (1,958), or (6) missing control variables (2,445).

16. Estimates on fiscal year dummies and industry dummies are not reported for the sake of brevity.

17. Fama-French industry definitions were obtained from Kenneth R. French's website: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/changes_ind.html.

18. For the meet or beat loss firms sample, rather than use two-digit SIC codes to represent industry classifications, we assign industries based on one-digit SIC codes. We do this to prevent quasi-separation of data points in the logistic regressions for these two models. As noted by Paul D. Allison in his 2008 paper, "Convergence Failures in Logistic Regression", "the most common cause of quasi-complete separation is a dummy predictor variable such that, for one level of the variable, either every observation has the event or no observation has the event. For those cases in which the problem variable is one of a set of variables representing a single categorical variable, the problem can often be easily solved by combining categories" (p.7).

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AUDIT FEES, EARNINGS MANAGEMENT, AND LITIGATION RISK: EVIDENCE FROM JAPANESE FIRMS CROSS-LISTED ON U.S. MARKETS

Junjian Gu, Nagoya University
HU Dan Semba, Nagoya University

ABSTRACT

Many studies on audit fees have verified that audit fees reflect risk differences across litigation regimes. However, research on the association between audit fees and earnings management from the perspective of different litigation environments has been lacking. Using a sample of Japanese firms cross-listed in U.S. markets, this paper aims to determine the correlation between audit fees and different litigation environments and whether the extent of the correlation between audit fees and earnings management in Japanese litigation environment is different from the U.S. litigation environment. In this paper, we use the propensity score matching model to control for differences in firm characteristics between two litigation environments (Japan and U.S.) and the regression model to test three hypotheses on correlations among audit fees, earnings management risk, and litigation risk. We found that there is a difference in audit fees under different litigation environment and audit fees increase with higher litigation risk. Further analyses show that high earnings management risk is correlated with high audit fees and audit fees originated from earnings management risk is reduced under greater litigation risk environment.

INTRODUCTION

Accounting research on litigation risk and audit fees beganin 1980. Simunic (1980) found that audit fees reflect risk differences across litigation regimes. From 1984 to 1999, researchers had done several empirical research to find evidence linking litigation risk to audit fees. However, their findings are inconclusive due to lack of a large sample of audit fees data (Francis, 1984; Chung & Lindsay, 1988; Chan, Ezzamel & Gwilliam, 1993; Johnson, Walker & Westergaard, 1995; Craswell & Francis, 1999). Seetharaman, Gul & Lynn (2002) used cross-listed firms data and found that U.K. auditors charge higher fees for their services when their U.K. based clients are cross-listed in U.S. markets, but not for U.K. firms cross-listed in non-U.S. markets. The finding suggests that audit fees reflect risk differences across different litigation regimes. Choi, Kim, Liu & Simunic (2009) examined data from 14 countries and asserted that auditors charge higher fees for firms that are cross-listed in stronger legal regimes. Based on previous literature, we can observe that audit fees are influenced by the difference in litigation environment. In other words, litigation risk is an important determinant of audit fees.

Another fundamental determinant of audit fees is earnings management risk. Bedard & Johnstone (2004) found that auditors respond to earnings management risk with *ex ante* increase in planned audit hours and billing rates. Abbott, Parker & Peters (2006) found that audit fees are inversely related to income-decreasing discretionary accruals. They also found that the positive relationship between audit fees and positive discretionary accruals is magnified for high P/E firms. Our paper uses both of these aspects – litigation and earnings management risk – to analyze audit fees.

We find methodology limitation in existing audit fees research when analyzing samples of cross-listed and non-cross-listed firms. For examples, Seetharaman, Gul & Lynn (2002) matched the sample by size and industry, while Choi, Kim, Liu & Simunic (2009) matched the sample by country, year, and industry. They did not analyze the sample using a more rigorous matching model. Recent audit research suggests that the potential threat of selection bias in auditing research is likely to occur when researchers compare large and small accounting firms that have different characteristics. Lawrence, Minutti-Meza, & Zhang (2011) found that after using the propensity score matching (PSM) models, the treatment effect of Big 4 auditors turned to be insignificantly different from those of non-Big 4 auditors with respect to their clients' discretionary accruals.

To the best of our knowledge, empirical research on the association between audit fees and earnings management using Japanese data is still limited. Yazawa (2011) performed research on the association between audit fees and earnings management, but he did not consider the effect of litigation environment on audit fees. In this paper, we consider the effect of audit fees, earnings management risk, and litigation risk using a sample of Japanese firms cross-listed in the U.S. markets to answer several questions: what is the correlation between audit fees and difference litigation environments and whether the extent of the correlation between audit fees and earnings management in one litigation environment is different from that in another litigation environment.

To answer these questions, we use the PSM model to control for differences in firm characteristics between two litigation environments and carried multivariate regression tests to verify three hypotheses about the correlations among audit fees, earnings management risk and litigation risk.

Based on our results, we found that there are differences in audit fees under different litigation environments after using the PSM model, and that audit fees increase with litigation risk. Further analyses showed that the high risk of earnings management is associated with higher audit fees. We also found that the effect of audit fees resulting from earnings management risk (i.e., absolute discretionary accruals) is reduced under higher litigation risk environment.

Compared with prior research, this paper has two distinct characteristics: first, we provide empirical evidence on the relationship between audit fees and earnings management considered from the perspective of different litigation environments; second, we use a sample of Japanese firms cross-listed in U.S. markets and Japanese firms listed only in Japan, which is then matched by the PSM model.

HYPOTHESES DEVELOPMENT

Audit Fees and Litigation Risk

Houston, Peters & Pratt (1999) found that the presence of accounting choices reflects higher risks of accounting irregularities which contribute to higher litigation risk assessments and fee premiums. Seetharaman, Gul & Lynn (2002) documented that U.K. auditors charge higher audit fees when their U.K. clients are cross-listed in U.S. markets, and Seetharaman, Gul & Lynn (2002) attribute this premium mostly to the U.S. high litigation environment. Choi, Kim, Liu & Simunic (2009) asserted that auditors charge higher fees for firms that are cross-listed in stronger legal regimes than for non-cross-listed firms. Using the above rationale, we formulate the first hypothesis:

H1 Audit fees are higher in a higher litigation risk environment.

Previous research in sample matching method did not analyze the sample using a more rigorous matching model (Seetharaman, Gul & Lynn, 2002; Choi, Kim, Liu & Simunic, 2009). This paper resolves the selection bias problem by using the propensity score matching (PSM) method as our research method.

Audit Fees and Earnings Management Risk

Several empirical papers suggested that audit fees are influenced by earnings management risk. Heninger (2001) argued for a positive association between income-increasing abnormal accruals and ex-post auditor litigation. Bedard & Johnstone (2004) found that auditors respond to earnings management risk with ex ante increase in planned audit hours and billing rates. Alali (2011) mentioned that income-increasing discretionary accruals are positively and significantly related with audit fees and that increase in CFO's bonuses represents this positive relationship. These findings indicate that earnings management risk increases would require more audit work, more extensive reviews and closer supervision of staff which would result in higher audit fees. Using the above rationale, we formulate the second hypothesis:

H2 Audit fees are higher in an environment with higher earnings management risk.

We use absolute discretionary accrual to represent the risk of earnings management. This paper uses performance-adjusted discretionary accruals of the modified Jones model as recommended by Kothari, Leone & Wasley (2005).

Audit Fees, Earnings Management Risk and Litigation Risk

Pagano *et al*. (2000) finds that European firms are more likely to cross-list in the U.S. due to better investor protection, more efficient courts and bureaucracy. Several studies suggested that there is a negative correlation between investor protection and earnings management (Shen & Chih, 2007; Cahan, Liu & Sun, 2008), that is, better investor protection can mitigate earnings management. Japanese firms cross-listed on the U.S. major exchanges are subject to more stringent U.S. laws and Securities and Exchange Commission (SEC) regulations, and are therefore exposed to a stronger investor protection environment. It follows that the degree of earnings management of these firms will be diminished. Thus this leads to our third hypothesis:

H3 *Audit fees resulting from earnings management risk is lower under greater litigation risk environments.*

While the hypothesis above is similar in spirit to the earnings management risk hypothesis presented by Abbott, Parker & Peters (2006), there is one important difference that merit discussion. Abbott, Parker & Peters (2006) used high (low) earnings-to-price multiples to represent the high (low) litigation risk. Based on the finding that high-growth firms are more likely to use large accruals to manage earnings (Dechow & Skinner, 2000), they hypothesized that the effect of audit fees resulting from earnings management risk is magnified under greater litigation risk environment. In comparison, we use a firm's cross-listing status to represent both the high litigation risk environment (U.S.) and low litigation risk environment (Japan). The different proxy for litigation risk changes the direction of the hypothesis.

METHOD

Matching Process

The propensity score matching (PSM) model is becoming an increasingly popular research method adopted in the auditing literature. In this paper, we use the PSM model to match the sample on a broad range of firm characteristics to examine whether the difference in audit fees exists under different litigation environment. The PSM model matches observations based on the probability of undergoing a treatment, which in our case is the probability of Japanese firms' public offering to sell their securities in the United States. This matching process has two advantages. First, this model generates a sample in which both the U.S.-listed Japanese firms and non U.S.-listed Japanese firms are matched to have similar characteristics. Second, Li & Prabhala (2007) argued that matching models do not rely on a specific functional form and provide a more direct estimate of the treatment effects.

We use a logistic model to estimate the probability of Japanese firms offering to sell their securities in the United States, as it is the most prevailing approach for estimating propensity scores (Guo & Fraser, 2010; Lawrence, Minutti-Meza & Zhang, 2011). Following prior research (Karolyi 1998; De Medeiros, Erkens & Zhang, 2005; Kung & Cheng, 2012) we estimate the propensity score using the following logistic regression model:

$$\begin{aligned} US_{i,t} = {} & \beta_0 + \beta_1 DMART_{i,t} + \beta_2 FMART_{i,t} + \beta_3 STOCK_{i,t} + \beta_4 SALES_{i,t} \\ & + \beta_5 PROFIT_{i,t} + \beta_6 LNTA_{i,t} + \beta_7 CURR_{i,t} + \beta_8 LEV_{i,t} + Industry\_d + \varepsilon_{i,t} \end{aligned} \tag{1}$$

For firm *i* and fiscal year *t*, where:

US: Dummy variable equaling 1 if a firm was listed on the U.S. markets and 0 otherwise;
DMART: Number of shares issued at the end of period t, multiplied by the closing share price on the same date, divided by the total capitalization, which is the sum of markets values of all sample firms;
FMART: Overseas sales t / net sales t;
STOCK: Stock return, measured by log (stock price t / stock price t-1);
SALES: Net operating revenue growth rate t;
PROFIT: Operating Income t / net operating revenue t;
LNTA: Natural logarithm of total assets at the end of year t;
CURR: Current assets t / current liabilities t;
LEV: (Long term debt t plus debt in current liabilities t) / total assets t-1;

The estimation results are robust to the inclusion of all redundant variables simultaneously or one redundant variable at a time (Lawrence, Minutti-Meza, & Zhang, 2011). As a result, we estimate the propensity score model by including all control variables. In addition, we use propensity score analysis with nonparametric regression (i.e. kernel-based matching). This method uses propensity scores derived from multiple matches to calculate a weighted mean that is used as a counterfactual. As such, kernel-based matching is a robust estimator (Guo & Fraser, 2009).

Regression Model

Our tests on three hypotheses are based on cross-sectional regressions of the natural logarithm of disclosed audit fees on a number of variables, including dummy variables to identify Japanese firms trading on U.S. markets. We use the following cross-sectional regression model:

$$\begin{aligned} LAF_{i,t} = {} & \beta_0 + \beta_1 US_{i,t} + \beta_2 \mathrm{DA}_{i,t} + \beta_3 US * \mathrm{DA}_{i,t} + \beta_4 ROA_{i,t} + \beta_5 CRATIO_{i,t} \\ & + \beta_6 ATURN_{i,t} + \beta_7 DE_{i,t} + \beta_8 LOSS_{i,t} + \beta_9 LNTA_{i,t} + \beta_{10} CURR_{i,t} \\ & + \beta_{11} LEV_{i,t} + Industry\_d + Year\_d + \varepsilon_{i,t} \end{aligned} \tag{2}$$

For firm *i* and fiscal year *t*, where:

LAF: The natural log of audit fees $_t$;
US: Dummy variable equaling 1 if a firm was listed on the U.S. markets and 0 otherwise;
DA: Absolute discretionary accruals $_t$;
*US*DA*: The value of DA times 1 if a firm was listed on the U.S. markets and 0 otherwise;
ROA: Net income $_t$ / total assets $_{t-1}$;
DRATIO: Current asset $_t$ / total assets $_t$;
ATURN: Sales $_t$ / total assets $_{t-1}$;
DE: Long term debt $_t$ / total assets $_t$;
LOSS: Dummy variable equaling 1 if a firm was net loss at the end of year $_t$;
LNTA: Natural logarithm of total assets at the end of year $_t$;
CURR: Current assets $_t$ / current liabilities $_t$;
LEV: (Long term debt $_t$ plus debt in current liabilities $_t$) / total assets $_{t-1}$;

Performance-matched Modified Jones Model

Discretionary accruals are estimated with the performance-matched modified Jones model (Kothari, Leone & Wasley, 2005). The model is estimated by year and by industry, scaled by lagged assets:

$$TA_{i,t} = \beta_0 + \beta_1(1/\text{ASSETS}_{i,t}) + \beta_2(\Delta SALES_{i,t} - \Delta REC_{i,t}) + \beta_3 PPE_{i,t} + \varepsilon_{i,t} \qquad (3)$$

For firm *i* and fiscal year *t*, where:

TA: Total accruals equals (net income before extraordinary items minus operating cash flows from continuing operations t) / total assets t-1;
ASSETS: Total assets $_{t-1}$;
ΔSALSE: Change in sales from year $_{t-1}$ to year $_t$ / total assets $_{t-1}$;
ΔREC: Change in accounts receivable from year $_{t-1}$ to year $_t$ / total assets $_{t-1}$;
PPE: (Net property, plant and equipment in year $_t$) / total assets $_{t-1}$;
ε: Equals the estimated modified discretionary accrual;

From model (3) we can get each firm's estimated modified discretionary accrual and we subtract the estimated modified discretionary accrual of the closest Return on Assets (ROA) firm in the same industry and year. The resulting error term is the performance-matched modified discretionary accrual measure.

Variable definitions are summarized in Table 1.

Table 1
DEFINITION OF VARIABLES

	Model (1)		Model (2)		Model (3)	
	Variable Name	Description	Variable Name	Description	Variable Name	Description
Dependent Variable	*US*	Dummy variable equaling 1 if a firm was listed on the US market and 0 otherwise.	*LAF*	The natural log of audit fees t.	*TA*	Total accruals equals (net income before extraordinary items minus operating cash flows from continuing operations t) / total assets t-1.
Test Variables			*US*	Dummy variable equaling 1 if a firm was listed on the US market and 0 otherwise.	*ASSETS*	Total assets t-1
			DA	Absolute discretionary accruals t	*ΔSALSE*	Change in sales from year t-1 to year t / total assets t-1.
			*US*DA*	The value of *DA* times 1 if a firm was listed on the U.S. market and 0 otherwise.	*ΔREC*	Change in accounts receivable from year t-1 to year t / total assets t-1.
					PPE	(Net property, plant and equipment in year t) / total assets t-1.
Control Variables	*DMART*	Number of shares issued at the end of period t, multiplied by the closing share price on the same date, divided by the total capitalization, which is the sum of market values of all sample firms.	*ROA*	Net income t / total assets t-1.		
	FMART	Overseas sales t / net sales t.	*CRATIO*	Current asset t / total assets t.		
	STOCK	Stock return, measured by log(stock price t / stock price t-1).	*ATURN*	Sales t / total assets t-1.		
	SALES	Net operating revenue growth rate t.	*DE*	Long term debt t / total assets t.		
	PROFIT	Operating Income t / net operating revenue t.	*LOSS*	Dummy variable equaling 1 if a firm was net loss at the end of year t.		
	LNTA	Natural logarithm of total assets at the end of year t.	*LNTA*	Natural logarithm of total assets at the end of year t.		
	CURR	Current assets t / current liabilities t.	*CURR*	Current assets t / current liabilities t.		
	LEV	(Long term debt t plus debt in current liabilities t) / total assets t-1.	*LEV*	(Long term debt t plus debt in current liabilities t) / total assets t-1.		

Sample Selection

La Porta et al. (1998) found that common-law countries (e.g. United States, United Kingdom, Australia, etc.) generally have the strongest legal protection for investors, while French-civil-law countries (e.g. France, Brazil, etc.) and German and Scandinavian-civil-law countries (Japan, Germany, Finland, etc.) have weaker legal regime. In this paper, the litigation environment of United States is stronger than that of Japan. This paper is different from the Seetharaman, Gul & Lynn's (2002) research on audit fees and litigation risk since our study employs sample of Japanese firms which belong to the German and Scandinavian-civil-law countries, which is different from the common-law countries like United States and United

Kingdom. This paper provides a new research perspective on the topic of audit fees and earnings management.

Non-US firms selling their securities in the United States are exposed to liability under U.S. securities laws. As a result, Japanese firms offering to sell their securities publicly in the U.S. provide an ideal opportunity to research firms operating under different litigation environment. We use a sample of Japanese firms cross-listed on U.S. markets and Japanese firms not cross-listed on U.S. markets to account for different litigation characteristics between Japan and United States. Using this data allow our paper to provide an insight for discussing the association between audit fees and earnings management under different litigation risk.

Table 2
SAMPLE SELECTION AND DESCRIPTION

Panel A: Sample Selection

Listed companies for fiscal years 2005 to 2013 (ending in March)	21,095 *
(less) financial companies	-1,423
(less) discretionary accruals data unavailable	-5,226 **
(less) financial data unavailable	-2,191
Total samples	12,255

* Downloaded data from NEEDS Database using the criteria: accounting year-end at the end of March.
** To estimate performance-matched modified Jones model requires more than 20 points of per year or per industry data.

Panel B: Firm-Year and the U.S. listed Percentage by Each Industry and Year

by industry	U.S. listed	firm-year	% of Total
Construction	0	933	0.00
Foods	0	536	0.00
Textiles & Apparels	0	290	0.00
Pulp & paper	0	121	0.00
Chemicals	0	1,110	0.00
Pharmaceutical	0	239	0.00
Glass & Ceramics Products	0	269	0.00
Iron & Steel	0	340	0.00
Nonferrous Metals	0	224	0.00
Metal products	0	387	0.00
Machinery	9	1,126	0.80
Electric Appliances	57	1,275	4.47
Transportation Equipments	18	668	2.69
Precision Instruments	0	236	0.00
Other Products	0	365	0.00
Land Transportation	0	429	0.00
Warehousing & Transportation Services	0	268	0.00
Information & Communication	33	742	4.45
Wholesale Trade	0	1,276	0.00
Retail Trade	0	542	0.00
Real Estate	0	252	0.00
Services	0	627	0.00
Total	117	12,255	

by year	U.S. listed	firm-year	% of Total
2005	13	1,255	1.04
2006	14	1,290	1.09
2007	14	1,337	1.05
2008	14	1,377	1.02
2009	13	1,380	0.94
2010	13	1,392	0.93
2011	13	1,407	0.92
2012	12	1,423	0.84
2013	11	1,394	0.79
Total	117	12,255	

Table 2 presents information on the sample's selection process and descriptive statistics. For our analyses, we use firm-year data from 2005 to 2013. Information about audit fee and U.S. listed Japanese firms is obtained from the EOL database. Other variables are obtained from the NEEDS Financial Quest database. After excluding financial companies, missing data, and restricting our sample to firms with fiscal year ended as of March 31; our final sample consists of 12,255 firm-years. There are only four types (i.e. Machinery, Electric Appliances, Transportation

Equipment, and Information & Communication) of Japanese industry cross-listed on U.S. markets. The percentage of Japanese firm cross-listed on U.S. markets is around 1 percent of total Japanese listed companies in each year.

Table 3
CORRELATIONS AMONG THE VARIABLES

Panel A: Correlation of the variable for U.S. cross listed

	US	*DMART*	*FMART*	*STOCK*	*SALES*	*PROFIT*	*LNTA*	*CURR*	*LEV*
US	1								
DMART	0.540	1							
FMART	0.130	0.192	1						
STOCK	-0.019	0.004	-0.003	1					
SALES	0.001	0.008	0.001	0.035	1				
PROFIT	0.051	0.104	0.015	-0.022	0.075	1			
LNTA	0.241	0.476	0.293	0.040	-0.008	-0.027	1		
CURR	-0.002	-0.003	0.042	-0.026	0.075	0.108	-0.068	1	
LEV	-0.011	0.011	-0.079	0.066	0.159	-0.288	0.155	-0.267	1

Panel B: Correlation of the variable for audit fees

	LAF	*US*	*DA*	*ROA*	*CRATIO*	*ATURN*	*DE*	*LOSS*	*LNTA*	*CURR*	*LEV*
LAF	1										
US	0.402	1									
DA	-0.042	-0.005	1								
ROA	0.043	0.020	-0.186	1							
CRATIO	-0.071	-0.043	0.105	0.075	1						
ATURN	-0.048	-0.049	0.043	0.116	0.324	1					
DE	0.178	0.027	-0.028	-0.177	-0.544	-0.212	1				
LOSS	-0.091	-0.013	0.108	-0.447	0.022	-0.100	0.026	1			
LNTA	0.720	0.241	-0.113	0.118	-0.162	-0.105	0.237	-0.194	1		
CURR	-0.050	-0.002	0.017	0.025	0.122	-0.094	-0.149	0.020	-0.068	1	
LEV	0.136	-0.011	0.057	-0.080	-0.051	0.299	0.552	-0.031	0.155	-0.267	1

Table 3 presents the Pearson correlations among the variables. From Panel A, there is a low level of correlation among the all variables, which means there is no multicollinearity problem. From Panel B, all variables except *LNTA* have low level of correlation.

RESULTS

Logistic model

Table 4
LOGISTIC REGRESSION FOR ESTIMATING PROPENSITY SCORE

U.S. listed	Coefficient	Std. Err.	z-Value	
_cons	-14.078	2.115	-6.660	***
DMART	294.994	83.733	3.520	***
FMART	3.983	1.005	3.960	***
STOCK	-0.753	0.644	-1.170	
SALES	0.736	0.354	2.080	**
PROFIT	-1.944	1.293	-1.500	
LNTA	2.624	0.380	6.900	***
CURR	-0.464	0.146	-3.170	***
LEV	-5.017	1.189	-4.220	***
Industry_d		included		
likelihood		-207.256		
Pseudo R-squared		0.604		
No. Obs.		3,811		

*,**,*** Indicates significance at the 0.10, 0.05 and 0.01 levels, repectively.

Table 4 shows the results of the logistic regression from estimating the propensity score. The logistic model results indicate that 6 variables are significant: *DMART*, *FMART*, *SALES*, *LNTA*, *CURR*, and *LEV*. It shows that Japanese firms with higher participation in the domestic stock markets (*DMART*), greater exposure to the foreign markets (*FMART*), higher sales growth (*SALES*), larger size (*LNTA*), lower liquidity (*CURR*), and lower debt ratio (*LEV*), have a higher tendency to cross-list in U.S. markets.

Descriptive Statistics

Table 5
DESCRIPTIVE STATISTICS

	Full Sample					PSM Sample				
	NON_US_listed		US_listed		Difference in Means	NON_US_listed		US_listed		Difference in Means
Variable Name	Mean	Std. Dev.	Mean	Std. Dev.	(t-statistic)	Mean	Std. Dev.	Mean	Std. Dev.	(t-statistic)
LAF	1.539	0.002	2.782	0.041	48.581 ***	1.558	0.005	2.404	0.048	-19.744 ***
DA	0.472	0.001	0.433	0.003	0.564	0.049	0.001	0.049	0.006	0.029
DMART	0.000	0.000	0.009	0.001	-71.098 ***	0.000	0.000	0.002	0.000	-9.893 ***
FMART	0.162	0.002	0.457	0.029	-14.466 ***	0.289	0.004	0.401	0.049	-2.863 ***
STOCK	-0.016	0.002	-0.055	0.028	2.086 **	-0.021	0.003	-0.063	0.052	1.314
SALES	0.027	0.002	0.028	0.014	-0.069	0.033	0.005	0.056	0.034	-0.518
PROFIT	0.242	0.001	0.326	0.013	-5.659 ***	0.255	0.002	0.305	0.016	-2.533 **
LNTA	4.823	0.006	6.421	0.072	-27.492 ***	4.800	0.011	5.669	0.086	-8.971 ***
CURR	1.913	0.014	1.896	0.115	0.121	2.255	0.027	2.285	0.242	-0.121
LEV	0.528	0.002	0.503	0.017	1.226	0.491	0.004	0.480	0.026	0.356
ROA	0.022	0.001	0.035	0.004	-2.156 **	0.024	0.001	0.044	0.009	-1.955 *
CRATIO	0.546	0.002	0.467	0.012	4.775 ***	0.593	0.002	0.551	0.017	2.100 **
ATURN	1.155	0.006	0.828	0.022	5.375 ***	1.035	0.008	0.896	0.043	2.037 **
DE	0.162	0.001	0.197	0.010	-3.027 ***	0.145	0.002	0.152	0.013	-0.438
LOSS	0.079	0.002	0.043	0.019	1.453	0.106	0.005	0.044	0.031	1.341
No. Obs	12,138		117			3,691		45		
% of Total	99.0%		1.0%			98.8%		1.2%		

*,**,*** Indicate significance at the 0.10, 0.05 and 0.01 level.
Propensity Score Matching sample is matched by Epanechnikov kernel model. (Bandwidth is 0.06, 5% of the treatment observations)

Table 5 presents the descriptive statistics for both the full sample and the PSM sample. The full sample consists of 12,255 firm-years, out of which 117(1.0%) and 12,138 (99.0%) firm-years represent U.S.-listed Japanese firms and non U.S.-listed Japanese firms, respectively. The PSM sample consists of 3,736 firm-years, out of which 45(1.2%) and 3,691 (98.8%) firm-years represent U.S.-listed Japanese firms and non U.S.-listed Japanese firms, respectively. The descriptive statistics for the full sample and PSM sample indicate that U.S.-listed Japanese firms and non U.S.-listed Japanese firms have significantly different audit fees.

Regression Results

Table 6
AUDIT FEES, EARNINGS MANAGEMENT AND LITIGATION ENVIRONMENT ANALYSIS

		Dependent Variable: LAF					
		Full Sample			PSM Sample		
Variable Name	Expected Sign	Multivariate Estimate	t-statistic	p-value	Multivariate Estimate	t-statistic	p-value
_cons		-0.115	-4.930	0.000 ***	-0.222	-6.000	0.000 ***
US	+	0.747	26.200	0.000 ***	0.599	13.180	0.000 ***
DA	+	0.069	2.740	0.006 ***	0.092	1.770	0.077 *
*US*DA*	-	-1.324	-2.660	0.008 ***	-1.195	-1.700	0.090 *
ROA		-0.171	-5.500	0.000 ***	-0.274	-4.610	0.000 ***
CRATIO		0.104	6.730	0.000 ***	0.072	2.430	0.015 **
ATURN		0.014	3.730	0.000 ***	0.044	4.280	0.000 ***
DE		0.128	5.170	0.000 ***	0.154	3.170	0.002 ***
LOSS		0.031	4.250	0.000 ***	0.033	2.620	0.009 ***
LNTA		0.327	106.430	0.000 ***	0.335	60.960	0.000 ***
CURR		-0.001	-0.740	0.458	-0.003	-1.220	0.221
LEV		0.021	1.490	0.137	0.029	1.040	0.300
Industry_d			Included			Included	
Year_d			Included			Included	
Adj R-squared			0.601			0.579	
No. Obs.			12,255			3,736	

*,**,*** Indicate significance at the 0.10, 0.05 and 0.01 level.

In Table 6, we find a positive and significant *US* coefficient of 0.747 in the full sample column and a positive significant multivariate *US* coefficient of 0.599 in the PSM sample, suggesting that the treatment effects of U.S.-listed Japanese firms are significantly different from those of non U.S.-listed Japanese firms with respect to audit fees, even after controlling for client characteristics for both sample groups. We can also confirm the result of Seetharaman, Gul & Lynn (2002), as the *H1* is supported that audit fees increase in higher litigation risk environment.

We also find a positive and significant *DA* coefficient of 0.069 in the full sample column, thus the results from the full sample support the *H2* that audit fees increase with higher earnings management risk. In addition, we find a negative and significant *US*DA* coefficient of -1.324 in the full sample column, thus the results from the full sample support the *H3* that audit fees resulting from earnings management risk are lower under greater litigation risk environments.

The right column of Table 6 presents the results of the PSM sample. We find a positive significant multivariate *DA* coefficient of 0.092, confirming hypothesis that audit fees increasing with high earnings management. Also we find a negative and significant *US*DA* coefficient of -1.195 in the PSM sample column. Although the significance of these two coefficients are a matter of judgment, after client characteristics are controlled for the two sample groups, the results at least provide limited empirical support for *H2* and *H3*.

Robust tests

We also use an alternative matching procedure, coarsened exact matching (CEM). King *et al.* (2011) mention that CEM is a more robust matching technique that is not subject to random matching, because CEM directly matches on all covariates and does not rely on a first-stage propensity score model. DeFond, Erkens & Zhang (2014) document that in their setting, CEM indeed dominates PSM in providing more balanced matches across all matched sample sizes.

We examine the model (1) with CEM method. The dichotomous treatment variable is *US*. We match 9 pretreatment variables (i.e. *DMART*, *FMART*, *STOCK*, *SALES*, *PROFIT*, *LNTA*, *CURR*, *LEV*, and Industry dummy). The result of the CEM sample is presented in Table 7.

Table 7
COARSENED EXACT MATCHING

Descriptive Statistics						Audit Fees, Earnings Management and Litigation Environment Analysis				
	NON_US_listed		US_listed		Difference in Means		Expected	Multivariate		
Variable Name	Mean	Std. Dev.	Mean	Std. Dev.	(t-statistic)	Variable Name	Sign	Estimate	t-statistic	p-value
LAF	1.800	0.033	2.347	0.082	-6.987 ***	_cons		-2.263	-3.800	0.000 ***
DA	0.057	0.007	0.055	0.009	0.118	*US*	+	0.741	6.980	0.000 ***
DMART	0.000	0.000	0.001	0.000	-3.511 ***	*DA*	+	0.840	1.820	0.073 *
FMART	0.181	0.036	0.240	0.084	-0.695	*US*DA*	-	-3.368	-2.240	0.028 **
STOCK	-0.025	0.018	-0.011	0.396	-0.337	*ROA*		-1.083	-1.330	0.187
SALES	0.027	0.008	0.065	0.024	-1.881 *	*CRATIO*		-0.697	-2.000	0.049 **
PROFIT	0.322	0.012	0.295	0.026	0.971	*ATURN*		0.392	3.140	0.002 ***
LNTA	5.241	0.048	5.355	0.094	-1.072	*DE*		-0.734	-1.120	0.267
CURR	1.904	0.070	2.013	0.192	-0.640	*LOSS*		0.000	0.000	0.000 ***
LEV	0.458	0.013	0.450	0.025	0.298	*LNTA*		0.678	8.180	0.000 ***
ROA	0.047	0.004	0.060	0.009	-1.344	*CURR*		0.084	0.960	0.339
CRATIO	0.538	0.019	0.517	0.022	0.513	*LEV*		0.461	0.760	0.452
ATURN	1.172	0.053	0.973	0.052	1.805 *	Industry_d			Included	
DE	0.145	0.011	0.146	0.013	-0.052	Year_d			Included	
LOSS	0.000	0.000	0.000	0.000	-	Adj R-squared			0.626	
No. Obs	77		19			No. Obs.			96	
% of Total	80.2%		19.8%							

*,**,*** Indicate significance at the 0.10, 0.05 and 0.01 level.

The left column of table 7 presents the descriptive statistics for CEM sample. The CEM sample consists of 96 firm-years, out of which 19(19.8%) and 77 (80.2%) firm-years represent US-listed Japanese firms and non US-listed Japanese firms, respectively. The descriptive statistics for the CEM sample also indicate that US-listed Japanese firms and non US-listed Japanese firms have significantly different audit fees.

We find a positive and significant *US* coefficient of 0.741, a positive and significant *DA* coefficient of 0.840, and a negative and significant *US*DA* coefficient of -3.368 in the right column of Table 7, suggesting that the results from CEM sample still support the *H1*, *H2*, and *H3*. As a side note, by comparing the adjusted R^2 of full sample (0.601), PSM sample (0.579), and CEM sample (0.626), we conclude that the CEM method can improve the results of our multivariate tests.

CONCLUSION

This paper examines the correlations among audit fees, earnings management, and litigation risk, using discretionary accruals as a proxy for earnings management risk and cross-listing status of Japanese firms in U.S. markets as a proxy for two different litigation environments. We hypothesize that audit fees increase with high litigation risk. We also hypothesize that audit fees increase with higher earnings management risk. We finally hypothesize that audit fees resulting from earnings management risk is lower under greater litigation risk environment. We test our hypotheses using the propensity score matching sample of 3,736 firm-year data for the year 2005 to 2013.

We found that after using the PSM method, audit fees are still different in each litigation environment and positive relationship exists between audit fees and litigation risk. We also found that higher earnings management risk is associated with higher audit fees. We also found that the audit fees resulting from earnings management risk is lower under greater litigation risk environment. Lastly, we use the coarsened exact matching (CEM) method for the robustness check and the conclusions from three hypotheses are supported. By comparing the adjusted R^2 of the full sample, the PSM sample, and the CEM sample; we concluded that CEM method improve the results of the multivariate tests.

As for the limitation of this paper, we use a single proxy to estimate discretionary accrual. Additionally, earnings management is just a single aspect of audit quality. This paper does not investigate other factors of audit quality such as auditor’s professional experience, financial statements restatements, and economic dependency. For future study, it would be useful to analyze the association between audit fees and other factors of audit quality under different litigation environments.

AUTHORS’ NOTE

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ABNORMAL AUDIT FEES AND AUDITOR SIZE IN THE JAPANESE AUDIT MARKET

HU Dan Semba, Nagoya University

ABSTRACT

Using 9,716 firm-years samples of Japanese listed firms between 2005 and 2011, this study tests the association between auditor size and abnormal audit fees as this is currently missing from the literature. The study utilizes abnormal audit fees as an audit quality proxy, where higher abnormal audit fees are associated with greater auditing efforts that contribute to a higher quality audit. The empirical results show that Big N auditors are positively and significantly associated with a higher level of abnormal audit fees, indicating that the Japanese Big 3 auditors provide higher quality audits than non-Big 3 firms.

INTRODUCTION

Many empirical studies use auditor size as proxy for audit quality (e.g., Becker et al. 1998; Francis, Maydew & Sparks, 1999; Behn, Choi & Kang, 2008). Recent empirical findings show that auditor size (Big N and non-Big N audit firms) does not explain differences in audit quality after controlling for clients' characteristics (Lawrence, Minutti-Meza, & Zhang, 2011). However, Lawrence, Minutti-Meza, & Zhang's (2011) conclusions are disputed by Eshleman & Guo's (2014b) finding that Big N auditors do perform higher quality audits than both non-Big N and mid-tier auditors. In another study exploring the empirical relationship between audit pricing and audit quality, Blankley, Hurtt, & MacGregor (2012) employed financial statement restatements, the same proxy for audit quality as Eshleman & Guo (2014b), and show that audit quality is positively associated with abnormal audit fees.

There is a lack of empirical studies investigating the effect of auditor size on abnormal audit fees as a measure of audit quality. Lawrence, Minutti-Meza, & Zhang (2011) do not employ abnormal audit fees as one of the proxies for audit quality. Other studies, e.g., Hoitash, Markelevich, & Barragato (2007), Choi, Kim, & Zang (2010), Eshleman & Guo (2014a), Asthana & Boone (2012), Blankley, Hurtt, & MacGregor (2012) examine the association between abnormal audit fees and discretional accruals or restatements as a proxy for audit quality. To the best of the author's knowledge, there has not been a study that investigates whether the pricing-based proxy for audit quality – abnormal audit fee – is empirically consistent with the characteristics-based measure for audit quality – auditor size in the setting of Japanese environment.

This study reveals that abnormal audit fees are positively related to auditor size in the Japanese context, suggesting that Japanese Big N auditors provide higher quality audits than non-Big N firms from the perspective of audit pricing. This study contributes to the auditing literature in two ways. First, it attempts to contribute some insight into audit quality in Japan. Despite Japan's economic significance to global investors and its possession of one of the largest stock markets, audit studies do not use its data enough (Hu & Kato, 2015). Furthermore, the cross-country auditing literature excludes Japan due to the miscoding of the auditor identification variable in the global database (Francis & Wang, 2008; Francis, Michas, & Seavey, 2013; Gul, Zhou, & Zhu, 2013).

Second, this study takes place in the unique Japanese setting: low litigation risk but emphasis on reputation, "face," and "trust"; about 15 percent the companies operate on a Keiretsu system; companies tend to rely on debt financing, hold high cash levels, exhibit a lower ROA, and are not easily bankrupted compared to companies in western countries (Hu & Kato, 2014). Francis & Wang (2008) find that only for Big N auditors is the earnings quality (abnormal accruals among others) better when investor protections are stronger, using a sample without Japanese data. This study provides evidence from a country with a lighter regulatory environment compared to Anglo-Saxon countries (Shima & Gordon, 2011), with a lower litigation risk (Skinner & Srinivasan, 2012), and a heavier emphasis on reputation.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Abnormal Audit Fee and Audit Quality

Audit fee represents the value of the resources and costs required to conduct a proper audit that is agreed upon by an audit firm and its client. Abnormal audit fees are defined as the difference between the audit fee paid and the normal or expected audit fee (Knechel et al. 2013). In empirical literature, abnormal audit fees are estimated as residuals from an audit fee regression model using variables representing the clients' characteristics. Abnormally high or low audit fees might indicate the extent of the economic bond between the auditor and its client that potentially decreases the auditor's independence (Blankley, Hurtt, & MacGregor, 2012). However, this study argues that abnormal audit fee is a good indicator of audit quality and I explain the rationale of this argument in the following paragraphs.

The use of abnormal (unexplained) audit fees variable as a proxy for audit quality has several positive characteristics (Hribar, Kravet, & Wilson, 2014). First, audit fees not only represent the estimated cost necessary to conduct an audit, but also partly contain the auditor's estimate on the clients' general business risks. Auditors must factor their clients' internal control quality, business, and litigation risk into their audit fee. Abnormal audit fees can capture audit quality information that is otherwise not reflected in audit opinions or the total audit fee. Second, other commonly used measures of audit quality rely on accounting earnings, which capture other aspects of a firm's characteristics besides audit quality. Using abnormal audit fees attempts to isolate other firms' characteristics in order to provide a better measure of audit quality. From this perspective, abnormal audit fees may be a superior proxy of audit quality.

Additionally, this study adopts abnormal audit fees as an audit quality proxy because of the positive association between abnormal audit fees and accounting quality. Using financial statement restatements as a proxy for audit quality, Blankley, Hurtt, & MacGregor (2012) concluded that there is a positive relationship between abnormal audit fees and audit/accounting quality after controlling for the internal control variable post-SOX. Their study found that higher abnormal audit fees are negatively related to the extent of subsequent audit restatements.

Contrary to previous studies, Blankley et al.'s (2012) findings suggest that higher abnormal audit fees are not always associated with impaired auditor independence.

Auditor Size and Audit Quality

Early empirical research on the audit quality of Big N firms shows that clients of Big N firms tend to have lower levels of discretionary accruals, lower cost of capital, and more credible earnings reports (Teoh & Wong, 1993; Knechel et al. 2013). These findings suggest that Big N firms have higher quality audits than non-Big N firms. The higher quality provided by Big N firms is generally associated with the bigger size of the firms, which allows them to invest more resources in better training materials, standardized audit methodologies, and access to industry and multinational specialists (Eshleman & Guo, 2014b; Lawrence, Minutti-Meza, & Zhang, 2011). The association between Big N firms and higher audit quality is also supported by empirical evidence demonstrating the audit fee premium enjoyed by Big N auditors (Knechel et al., 2013). A more recent study shows that the audit quality of U.S. Big 4 firms is higher than that of mid-tier auditors (Eshleman & Guo, 2014b).

Big N distinction is often used as an audit quality proxy, with Big N firms having higher audit quality than non-Big N firms; however, the significant difference between client characteristics might also have an impact. Using measures of real and perceived audit quality, Boone, Khurana, & Raman (2010) show that Big N audit quality superiority is more likely rooted in investors' perceptions rather than from tangible audit quality differences. Lawrence, Minutti-Meza, & Zhang (2011) attempt to mitigate the endogeneity problem of audit quality by using a propensity matching model to match client characteristics. They find that differences in audit quality proxies between Big 4 and non-Big 4 auditors are largely attributed to clients' characteristics, particularly client size, and argue that many factors contribute to the similar audit quality between Big N and non-Big N firms.

Hypothesis

Empirical models of the relationship between auditor size and audit quality assume that auditors' loss functions determine the degree of audit quality (Sirois & Simunic, 2011). The auditors' loss functions are commonly associated with litigation or reputational loss, and they have more incentives to provide higher quality audits in an environment where the audit failure consequences are severe, for example, in an environment with strong investors' protection, legal enforcement, or in a litigious society. However, the Japanese business environment emphasizes the importance of reputation, as "face" or "trust" (e.g., Fukuyama, 1995); larger companies or auditors have more to lose in case they lose "face" and might have more incentives to hire better auditors or perform higher quality audits.

A fundamental difference between Big N and non-Big N auditors is the different investment strategies with respect to audit technology. Sirois & Simunic (2011) argue that given the same level of audit hours for a comparable audit engagement, the Big N audit firms' superior technology allows them to offer superior audit value. Abnormal audit fees represent the level of auditing effort (and technology) expended by audit firms, where a higher abnormal audit fee is associated with greater auditing effort (and technology) contributing to higher audit quality. Thus, this study hypothesizes that the Japanese Big 3 auditors are positively associated with higher audit quality as indicated by higher abnormal audit fees than non-Big 3 auditors. Notice that From the client's perspective, there are only 3 Big N auditors in Japan (Hu & Kato, 2014; 2015), with a market shares of 26.7%, 24.8%, and 19.3%. The fourth largest has a market share of only 2.4%.

H1: Japanese Big 3 Auditors earn higher abnormal audit fees than non-Big 3 auditors.

RESEARCH METHOD AND DATA

Table 1
SAMPLE SELECTION

Listed companies for fiscal years 2005 to 2012 (ending in March)	18,792
(less) financial companies	-1,255
(less) financial or stock price data unavailable	-5,666
	11,871
(less)Auditor data unavailable	1,174
(less) joint auditor clients	-981
Total samples	9,716

This study uses the sample of Japanese listed companies using Japanese accounting standards from fiscal year 2005 to 2011 obtained from the Nikkei NEEDS Financial Quest database. The sample excludes Japanese firms with a fiscal year ending on a date other than March 31, financial companies, companies with missing data, and companies with joint auditors. The final sample size is 9,716 firm years. Table 1 describes the sample selection procedure.

$$
\begin{aligned}
LAF_{i,t} = {} & \beta_0 + \beta_1 LTA_{i,t} + \beta_2 CR_{i,t} + \beta_3 CA\_TA_{i,t} + \beta_4 ARINV_{i,t} + \beta_5 ROA_{i,t} + \beta_6 LOSS_{i,t} \\
& + \beta_7 LEV_{i,t} + \beta_8 INANG_{i,t} + \beta_9 POLICY + \varepsilon_{i,t}
\end{aligned}
\tag{1}
$$

Where for firm i and fiscal year t: LAF = logarithm of audit fees; LTA = logarithm of end of year total assets;
CR = current assets divided by current liabilities; CA_TA = current assets divided by total assets;
ARINV = sum of accounts receivable and inventory divided by total assets;
ROA = earnings before interest and taxes divided by total assets; LOSS = 1 if the firm incurred a loss, 0 otherwise;
LEV = long-term debt divided by total assets; INTANG = ratio of intangible assets to total assets;
POLICY = 1 if the firm changes accounting principles, 0 otherwise.

This study employs a modified version of the audit fee model in Blankley, Hurtt, & MacGregor (2012) as in equation (1). Abnormal audit fees are first calculated by estimating an audit fee regression model using variables that capture the scope of an audit. Next, the residuals of the estimated audit fee regression are subtracted from the total audit fee to obtain the abnormal audit fee.

After calculating the abnormal audit fee, this study investigates the relationship between audit quality (proxied by abnormal audit fees) and auditor size using the model described in equation (2) using the weighed data sample. This is Rubin's (1985) propensity score, or inverse probability weighting (hereafter, "IPW"; see Hu & Kato, 2015 for details).

$$ABAFEE_{i,t} = \alpha + \alpha_0 BigN_{i,t} + + \varepsilon_{i,t} \tag{2}$$

(See Table 2 for the details of variables.)

Table 2
DEFINITION OF REGRESSION VARIABLES

Variable	Description	Reference	Japanese companies' specific characteristics	Predicted sign to choose Big N
Dependent				
ABAFEE	value of abnormal audit fees estimated by themodel developed by Blankley et al.(2012)	Blankley et al.(2012)		
BigN	1 if the client has a BIGn auditor, and 0 otherwise.	Blankley et al.(2012)		
Independent (size perspective)				
lnASSET	natural logarithm of total asset	Chaney et al. (2004) Francis and Yu (2009) Behn et al. (2008)		+
LIAB	client's total liabilities deflated by total equity	Chaney et al. (2004) Francis and Yu (2009) Khurana and Raman (2004)	○	?
ATURN	asset turnover ratio calculated by sales devided by average total asset	Chaney et al. (2004)		?
CURR	current ratio calculated by current asset devided by current liability	Chaney et al. (2004)		+
CFO	operating cash flow devided by average total asset	Francis and Yu (2009) Choi et al. (2010) Reichelt and Wang (2010)		?
lgACCR	total accruals for the last fiscal year calculated by ordinary profit after tax minus operating cash flow devided by average total asset for the last fiscal year	Reichelt and Wang (2010)		?
CASH	sum of a client's total cash deflated by total assets	Louis (2005)	○	-
Independent (risk perspective)				
LOSS	dummy variable that takes the value of 1 if a firm reports a net loss for the current fiscal year, and 0 otherwise	Chaney et al. (2004) Francis and Yu (2009) Reichelt and Wang (2010)		?
BETA	stock beta clculated over 36 month ending in the month of the fiscal year end	Khurana and Raman (2004)		?
VOLATILITY	client's stock volatility calculated by the standard deviation of 12 monthly stock returns for the current fiscal year	Francis and Yu (2009)		?
lgLOSS	dummy variable that takes the value of 1 if a firm reports a net loss for the last fiscal year, and 0 otherwise	Francis and Yu (2009)		?
SALESVOLATILITY	standard deviation of sales revenue calculated by using a rolling window for three years of data	Francis and Yu (2009)		?
SALESGROWTH	one-year growth rate of a firm's sales revenue	Francis and Yu (2009)		?
CFOVOLATILITY	standard deviation of CFO calculated by using a rolling window for three years of data to estimate	Francis and Yu (2009)		?
SAF2002	Shirata(2003)'s SAF2002 value that indicates the probability of a firm's bankruptcy in Japan	Original	○	-
CONSOL	the number of the consolidated firms of a firm	Yazawa (2010)		+
ROA	return on asset calculated by net income /loss devided by average total asset	Chaney et al. (2004) Butler et al. (2004) Choi et al. (2010)	○	?
SALESABROAD	foreign sales ratio calculated by foreign sales devided by total sales	Original	○	+
KEIRETSU	dummy variable that takes the value of 1 if a firm is classified as Keiretsu company	Original	○	-
IPO9	dummy variable that takes the value of 1 if a firm made initial pubulic offering last 9 years	Original		+
TSE1	dummy variable that takes the value of 1if a firm are listed in the 1st section of Tokyo Stock Exchange(TSE)	Original	○	+

Variables are based on data in Nikkei NEEDS Data-Base.

The advantage of the IPW is that it can be included a lot of covariates that effect audit quality proxy (see equation (3).), while conventional matching method, like nearest neighbor, are limited to use small number of covariates because of the curse of the dimensionality (Li & Prabhala, 2007; Tucker, 2010; Armstrong, Jagolinzer, & Larcker, 2010) .

There are three steps to determine the weighed number used in equation (2). First, use logit regression (3) to estimate β, then use β to estimate $BigN_{i,t}$ (e_i, "propensity score" as the estimated probability of receiving the select treatment, that is, the probability of selecting a Big N as its auditor.). Second, use equation (4) to calculate ie_i, which is the weighted number used to weigh the sample. Third, run equation (2) again after employing the propensity score weighting (ie_i). Note that this study attempts to control several perspectives, including Japanese company/business' unique characteristics, using equation (3). Table 2 provides a detailed description of the regression variables.

$$\begin{aligned} BigN_{i,t} = {} & \beta_0 + \beta_1 \ln ASSET_{i,t} + \beta_2 LIAB_{i,t} + \beta_3 ATURN_{i,t} + \beta_4 CURR_{i,t} + \beta_5 DOCF_{i,t} + \beta_6 \lg ACCR_{i,t} \\ & + \beta_7 CASH_{i,t} + \beta_8 LOSS_{i,t} + \beta_9 BETA_{i,t} + \beta_{10} VOLATILITY_{i,t} + \beta_{11} \lg LOSS_{i,t} \\ & + \beta_{12} SALESVOLATILITY_{i,t} + \beta_{13} SALESGROWTH_{i,t} + \beta_{14} CFOVOLATILITY_{i,t} \\ & + \beta_{15} SAF2002_{i,t} + \beta_{16} CONSOL_{i,t} + \beta_{17} ROA_{i,t} + \beta_{18} SALESABROAD_{i,t} + \beta_{19} KEIRETSU_{i,t} + \beta_{20} IPO_{i,t} \\ & + \beta_{21} TSE_{i,t} + iD + yD + \varepsilon_{i,t} \end{aligned} \tag{3}$$

(See Table 2 for the details of the variables.)

$$ie_i = \frac{z_i}{e_i} \times \frac{N_1}{\sum_{i=1}^{N} \frac{z_i}{e_i}} + \frac{1-z_i}{1-e_i} \times \frac{N_2}{\sum_{i=1}^{N} \frac{1-z_i}{1-e_i}} \tag{4}$$

ie denotes the sampling weights, z denotes the treatment and control group (1 if it is Big N, and 0 otherwise), e denotes the predicted propensity score, N_1 denotes the number of Big N samples and N_2 denotes the number of non-Big N samples. $N=N_1+N_2$

RESULTS

Descriptive Statistics

Table 3
SAMPLE DESCRIPTION AND BIG N PROPORTION FOR EACH INDUSTRY

Industry	firm-years	Big N Proportion (%)
Construction	804	80.08%
Foods	357	74.91%
Textiles & Apparels	255	77.67%
Chemicals	1,019	75.60%
Pharmaceutical	199	82.84%
Glass & Ceramics Products	245	88.21%
Iron & Steel	292	67.17%
Nonferrous Metals	202	84.52%
Metal products	333	65.24%
Machinery	948	71.16%
Electric Appliances	1,040	73.70%
Transportation Equipments	577	74.00%
Precision Instruments	211	81.68%
Other Products	321	70.12%
Land Transportation	370	88.10%
Warehousing & Harbor Transportation Services	151	80.00%
Information & Communication	458	82.34%
Wholesale Trade	972	75.58%
Retail Trade	358	76.76%
Real Estate	213	65.62%
Services	391	77.80%
Total	9,716	

Table 3 provides the sample distribution by industry group and their respective Big N market shares (by client number). The five largest industry groups in the sample belong to the electric appliances, chemicals, wholesale trade, machinery, and construction industries. The average Big N industry market share for the sample is 77%, which indicates the market dominance of Big N auditors across Japanese industries.

Table 4
DESCRIPTIVE STATISTICS OF BIG NS AND NON-BIG NS' CLIENT COMPANIES

	All samples (N=9716)					*BigN (N=7358)*					*Non-BigN (N=2358)*					Difference in Mean		Difference in Median	
	Mean	Std. Dev.	10%	Median	90%	Mean	Std. Dev.	10%	Median	90%	Mean	Std. Dev.	10%	Median	90%	t value		z value	
ABAFEE	-0.020	0.204	-0.251	-0.020	0.210	-0.004	0.210	-0.235	-0.002	0.225	-0.069	0.177	-0.293	-0.074	0.152	-13.642	***	-14.537	***
lnASSET	11.194	1.394	9.580	11.029	13.117	11.311	1.390	9.736	11.111	13.267	10.828	1.340	9.192	10.765	12.527	-14.791	***	-13.569	***
LIAB	1.927	2.331	0.366	1.233	4.007	1.937	2.326	0.363	1.246	4.013	1.896	2.345	0.374	1.188	3.990	-0.742		-1.496	
ATURN	1.119	0.565	0.578	0.985	1.811	1.122	0.564	0.586	0.991	1.802	1.107	0.571	0.557	0.969	1.838	-1.140		-2.174	**
CURR	1.900	1.491	0.866	1.499	3.197	1.909	1.532	0.867	1.489	3.247	1.872	1.355	0.863	1.535	3.116	-1.048		1.359	
CFO	0.001	0.061	-0.066	0.000	0.070	0.002	0.061	-0.064	0.001	0.070	0.000	0.064	-0.072	-0.002	0.072	-0.874		-1.390	
lgACCR	-0.007	0.012	-0.021	-0.007	0.006	-0.007	0.012	-0.021	-0.007	0.006	-0.007	0.013	-0.022	-0.007	0.007	-1.129		-0.810	
CASH	0.131	0.091	0.039	0.110	0.250	0.127	0.091	0.037	0.105	0.247	0.141	0.093	0.044	0.123	0.259	6.609	***	8.226	***
LOSS	0.155	0.362	0.000	0.000	1.000	0.144	0.351	0.000	0.000	1.000	0.192	0.394	0.000	0.000	1.000	5.678	***	5.669	***
BETA	-0.002	0.459	-0.527	0.006	0.507	0.001	0.452	-0.528	0.012	0.502	-0.011	0.480	-0.526	-0.016	0.523	-1.047		-1.958	*
VOLATILITY	0.098	0.056	0.046	0.085	0.164	0.097	0.053	0.046	0.084	0.161	0.103	0.063	0.046	0.088	0.176	5.147	***	3.550	***
lgLOSS	0.154	0.361	0.000	0.000	1.000	0.141	0.348	0.000	0.000	1.000	0.197	0.398	0.000	0.000	1.000	6.609	***	6.594	***
SALES_VOLATILITY	0.094	0.094	0.018	0.065	0.202	0.091	0.090	0.018	0.064	0.197	0.101	0.104	0.020	0.070	0.215	4.598	***	4.209	***
SALES_GROWTH	0.026	0.148	-0.142	0.022	0.178	0.028	0.143	-0.135	0.023	0.176	0.020	0.163	-0.169	0.016	0.186	-2.262	**	-3.462	***
CFO_VOLATILITY	0.035	0.030	0.009	0.027	0.071	0.035	0.030	0.009	0.026	0.070	0.037	0.032	0.009	0.028	0.075	3.402	***	3.285	***
SAF2002	0.953	0.347	0.558	0.964	1.377	0.968	0.332	0.583	0.972	1.387	0.905	0.389	0.489	0.940	1.345	-7.725	***	-5.533	***
CONSOL	4.876	17.375	0.000	0.000	12.000	5.737	19.286	0.000	0.000	14.000	2.191	8.597	0.000	0.000	6.000	-8.655	***	-9.415	***
ROA	0.020	0.043	-0.018	0.022	0.064	0.022	0.041	-0.014	0.023	0.065	0.015	0.048	-0.032	0.019	0.060	-7.306	***	-6.922	***
SALES_ABROAD	7.917	15.351	0.000	0.000	35.170	8.016	15.476	0.000	0.000	35.700	7.609	14.955	0.000	0.000	31.640	-1.122		-0.697	
KEIRETSU	0.144	0.351	0.000	0.000	1.000	0.136	0.343	0.000	0.000	1.000	0.169	0.375	0.000	0.000	1.000	3.944	***	3.941	***
IPO9	0.128	0.334	0.000	0.000	1.000	0.132	0.339	0.000	0.000	1.000	0.115	0.318	0.000	0.000	1.000	-2.244	**	-2.243	**
TSE1	0.501	0.500	0.000	1.000	1.000	0.504	0.500	0.000	1.000	1.000	0.492	0.500	0.000	0.000	1.000	-1.049		-1.049	

***, ** and * indicate significance at the 0.01, 0.05, and 0.10 respectively.

Table 4 provides descriptive statistics for the regression variables and t-test value of difference in mean between Big N and non-Big N clients. From Table 4, it can be observed that the mean and median value for the *ABAFEE* variable is negative for all firms, which indicate that much of auditors regardless of their size earn discounted abnormal audit fee. Furthermore, the *t-test* result for difference in means between Big N and non-Big N shows that the amount of discounted abnormal audit fee (negative sign) of Big N clients is significantly smaller than that of non-Big N at 1% significance level (0.004<0.069). This initial result indicates that clients of Big N firms incur smaller discount of abnormal audit fee (negative) compared to the non-Big N firms, without controlling for other variables.

The characteristics of the sampled firms are also shown in Table 4. 17% of the sampled Japanese firms are classified as keiretsu companies, 12 % went public during the last 9 years, and about 50% of the samples are listed on the first section of the Tokyo Stock Exchange. The comparison of the mean differences between Big N and non-Big N clients shows that 15 out of 21 regression covariates are significantly different, suggesting that it is necessary to employ regression analysis to control for the differences in clients' characteristics.

Table 5
CORRELATION MATRICES: PEARSON CORRELATIONS LEFT BELOW AND SPEARMAN CORRELATIONS RIGHT ABOVE

	ABAFEE	*lnASSET*	*LIAB*	*ATURN*	*CURR*	*DOCF*	*lgACCR*	*CASH*	*LOSS*	*BETA*	*VOLATILITY*	*lgLOSS*	*SALESVOLATILITY*	*SALESGROWTH*	*CFOVOLATILITY*	*SAF2002*	*CONSOL*	*ROA*	*SALESABROAD*	*KEIRETSU*	*IPO9*	*TSE1*
ABAFEE	1	-0.081	0.050	0.056	-0.026	-0.024	-0.118	0.060	0.039	0.067	0.167	0.119	0.089	-0.237	0.127	-0.059	-0.408	-0.090	-0.048	-0.070	0.031	0.042
lnASSET	-0.013	1	0.105	-0.100	-0.077	0.003	-0.035	-0.213	-0.131	0.018	-0.074	-0.137	-0.130	0.062	-0.218	0.047	0.067	0.081	0.127	0.163	-0.158	-0.024
LIAB	0.044	0.075	1	0.216	-0.762	0.030	0.010	-0.338	0.072	-0.030	0.176	0.127	0.125	-0.029	0.053	-0.649	0.064	-0.260	-0.097	-0.101	0.018	-0.052
ATURN	0.008	-0.115	0.120	1	-0.153	0.038	0.033	0.019	-0.078	0.000	0.017	-0.059	0.430	0.153	0.196	0.135	0.003	0.125	-0.209	-0.098	0.152	-0.124
CURR	-0.027	-0.063	-0.346	-0.176	1	-0.004	0.058	0.487	-0.137	0.016	-0.078	-0.098	-0.030	0.052	0.072	0.520	-0.051	0.323	0.119	0.068	-0.002	0.045
DOCF	-0.016	-0.005	0.026	0.040	0.021	1	0.479	0.061	-0.088	-0.057	0.020	0.092	0.046	0.131	0.023	0.043	0.019	0.113	-0.007	-0.007	0.022	0.002
lgACCR	-0.111	-0.035	-0.017	0.071	0.024	0.519	1	-0.018	-0.052	0.034	-0.036	-0.130	0.005	0.069	0.014	-0.003	0.041	0.039	-0.007	0.001	0.037	0.071
CASH	0.027	-0.211	-0.193	-0.007	0.461	0.084	-0.016	1	-0.031	0.018	0.075	0.025	0.129	0.027	0.182	0.275	-0.043	0.193	-0.034	-0.055	0.130	-0.048
LOSS	0.039	-0.131	0.079	-0.065	-0.109	-0.076	-0.056	-0.043	1	0.057	0.208	0.280	0.114	-0.304	0.101	-0.429	-0.093	-0.627	-0.028	-0.021	0.008	-0.013
BETA	0.038	0.029	-0.034	0.000	0.007	-0.045	0.023	0.002	0.050	1	0.024	-0.064	-0.004	-0.024	-0.002	0.006	0.041	-0.048	0.001	0.005	-0.003	0.004
VOLATILITY	0.137	-0.141	0.151	-0.002	-0.070	0.043	-0.056	0.084	0.216	-0.018	1	0.207	0.287	-0.096	0.233	-0.245	-0.101	-0.100	0.031	-0.039	0.094	0.023
lgLOSS	0.113	-0.136	0.176	-0.043	-0.054	0.085	-0.147	0.011	0.280	-0.052	0.229	1	0.141	-0.136	0.122	-0.315	-0.092	-0.302	-0.025	-0.026	-0.003	-0.009
SALESVOLATILITY	0.046	-0.142	0.116	0.475	-0.049	0.043	0.032	0.127	0.098	-0.008	0.233	0.121	1	0.126	0.350	-0.046	-0.066	0.026	-0.006	-0.073	0.153	-0.026
SALESGROWTH	-0.170	0.038	-0.039	0.127	0.068	0.139	0.078	0.075	-0.280	-0.026	-0.064	-0.084	0.187	1	-0.063	0.187	0.215	0.419	0.072	0.011	0.061	0.039
CFOVOLATILITY	0.083	-0.228	0.089	0.186	0.019	0.053	0.038	0.210	0.092	-0.004	0.249	0.120	0.359	-0.019	1	-0.070	-0.110	-0.004	-0.037	-0.057	0.119	0.037
SAF2002	-0.064	0.073	-0.466	0.097	0.390	0.041	0.007	0.267	-0.464	0.001	-0.275	-0.336	-0.085	0.173	-0.132	1	-0.013	0.656	0.042	0.051	0.038	0.020
CONSOL	-0.146	0.300	0.100	-0.021	-0.057	0.007	-0.020	-0.074	-0.062	0.052	-0.079	-0.050	-0.040	0.107	-0.106	-0.023	1	0.117	0.022	0.021	0.022	-0.017
ROA	-0.071	0.122	-0.167	0.072	0.244	0.116	0.063	0.187	-0.699	-0.052	-0.162	-0.315	-0.041	0.355	-0.036	0.703	0.055	1	0.104	0.038	0.059	0.040
SALESABROAD	-0.014	0.148	-0.105	-0.179	0.117	0.000	-0.031	0.002	-0.018	0.015	0.011	-0.017	-0.003	0.047	-0.038	0.072	0.045	0.097	1	0.088	-0.078	0.592
KEIRETSU	-0.058	0.140	-0.078	-0.094	0.037	-0.006	-0.005	-0.061	-0.021	0.006	-0.052	-0.026	-0.077	0.000	-0.059	0.058	0.012	0.039	0.074	1	-0.149	0.068
IPO9	0.036	-0.158	0.037	0.154	0.004	0.032	0.044	0.155	0.008	-0.017	0.134	-0.003	0.190	0.074	0.164	0.006	-0.020	0.013	-0.064	-0.149	1	0.060
TSE1	0.039	-0.024	-0.048	-0.147	0.037	0.007	0.063	-0.052	-0.013	-0.001	0.031	-0.009	-0.038	0.033	0.004	0.033	-0.024	0.040	0.497	0.068	0.060	1

Table 5 presents the Pearson and Spearman correlation coefficients among the variables used in this study. I conclude that the direction of correlations coefficients signs is consistent with the expectation. It also does not find strong multicollinearity effect among the variables.

Results

Table 6 shows the estimation results of the logistic regression model (3), in which 11 out of 21 variables are significant at least the 5% level. These results show that companies with the following characteristics have a higher propensity to select Big N auditors: larger size (*lnASSET*), higher assets turnover (*ATURN*), higher liquidity (*CURR*), hold more cash (*CASH*), have higher sales (*SALESVOLATILITY*) and cash flow volatility (*CFOVOLATILITY*), less potential for bankruptcy (*SAF2002*), have more complex businesses (*CONSOL*), belong to a *keiretsu* (*KEIRETSU*), recently listed (*IPO9*), and are listed in the Tokyo Stock Exchange (*TSE1*).

Table 6
RESULTS OF LOGISTIC REGRESSION (3) TO CALCULATE PROPENSITY SCORE

Big N	Predicted Sign	Coefficient	z-Value	
_cons	?	-2.061	-6.410	***
lnASSET	+	0.257	11.460	***
LIAB	?	0.013	0.930	
ATURN	?	0.142	2.200	**
CURR	+	0.064	2.890	***
DOCF	?	0.246	0.500	
lgACCR	?	0.862	0.330	
CASH	-	-2.343	-7.020	***
LOSS	?	0.151	1.550	
BETA	?	-0.011	-0.190	
VOLATILITY	?	-0.684	-1.380	
lgLOSS	?	-0.059	-0.770	
SALESVOLATILITY	?	-1.000	-3.050	***
SALESGROWTH	?	0.102	0.520	
CFOVOLATILITY	?	2.583	2.760	***
SAF2002	-	0.444	3.420	***
CONSOL	+	0.007	2.320	**
ROA	?	1.300	1.220	
SALESABROAD	+	0.000	-0.030	
KEIRETSU	-	-0.418	-5.910	***
IPO9	+	0.325	3.750	***
TSE1	+	0.186	2.140	**
iD		included		
yD		included		
likelihood		-5033.9588		
Pseudo R2		0.065		
No. Obs		9,716		

***, ** and * indicate significance at the 0.01, 0.05, and 0.10 respectively.

Table 7 RESULTS OF THE LOGISTIC REGRESSION (2)						
	Model 1			Model 2		
	without weight			with weight		
ABAFEE	Coef.	t-Stat		Coef.	z-Stat	
Intercept	0.078	3.060	***	0.108	3.350	***
BigN	0.075	18.080	***	0.078	18.250	***
No. Obs		9,716			9,716	

Models 1 and 2 of Table 7 describe the estimation results of Equation (2) before and after employing IPW, respectively. The *BigN* variable coefficients of both models are significantly positive, suggesting that auditor size is positively associated with abnormal audit fees and demonstrating that the Japanese Big 3 auditors earn higher abnormal audit fees compared to non-Big 3 firms. This result supports my hypothesis which in turn indicates that Big N auditors have higher audit quality compared to non-Big N firms.

ROBUSTNESS TEST

Table 8 RESULTS OF THE ROBUSTNESS ANALYSIS						
Panel A: Analysis using positive and negative abnormal audit fees dataset						
	Model 1			Model 2		
	without weight			with weight		
ABAFEE (+)	Coef.	t-Stat		Coef.	z-Stat	
Intercept	-0.178	-7.410	***	-0.129	-4.080	***
BigN	0.018	4.150	***	0.023	5.460	***
No. Obs	4,475			4,475		
ABAFEE (-)	Coef.	t-Stat		Coef.	z-Stat	
Intercept	0.109	3.470	***	0.108	3.020	***
BigN	0.041	8.740	***	0.045	9.950	***
No. Obs	5,241			5,241		
Panel B: Propensity Score Marching (PSM) *						
	Model 1			Model 2		
	Total Sample			PSM Sample		
	Difference in mean	t-Stat		Difference in mean	t-Stat	
ABAFEE	0.065	13.642	***	0.067	12.768	***
No. Obs	9,716			9,220		
* winsorized at 1% & 99%; Kernel matching-epanechnikov kernel						
Panel C: Coarsened Exact Matching (CEM)						
	Model 1			Model 2		
	Total Sample			CEM Sample		
	Difference in mean	t-Stat		Difference in mean	t-Stat	
ABAFEE	0.065	13.642	***	0.026	1.721	*
No. Obs	9,716			170		
Note: Model 1 and 2 in Panel B and C is different from Panel A.						

Choi, Kim, & Zang (2010) find that when they classify the sample into negative and positive abnormal audit fee data-sets, the positive data-set shows a negative relationship between abnormal audit fees and audit quality (absolute discretionary accruals), while the negative data-set does not show any significance. Hence, this study classifies the sample into the positive and negative abnormal audit fee groups and estimate Equation 2 using those two groups. The results are presented listed in Panel A of Table 8.

To further robustness test of the empirical results, this study applies two matching procedures. First, I employ the Rosenbaum and Rubin's (1983) propensity score matching (PSM) method that is commonly used in accounting literature (e.g., Armstrong, Jagolinzer, & Larcker, 2010). Panel B of Table 8 shows the results of the mean difference of discounted abnormal audit fee between Big N and non-Big N for the PSM matched sample (Model 2) is consistent with the results from the descriptive statistics (Model 1 – see Table 4).

For the second matching procedure, I use the coarsened exact matching (CEM) method (DeFond, Erkens, & Zhang, 2014). In the CEM model, *Big N* is used as the treatment variable and then matched with the 11 significant pretreatment variables from the logistic model (see Table 6). Panel C of Table 8 shows the results of using 170 CEM matched samples as a robustness test. The *t-test* difference in means for the CEM matched sample shows that the abnormal audit fees of the Big N firms are statistically higher than those of non-Big N firms, which also supports my prior hypothesis.

DISCUSSION OF RESULTS

Consistent with prior empirical literature (Blankley, Hurtt, & MacGregor, 2012; Hribar, Kravet, & Wilson, 2014), I assume that higher abnormal audit fee is associated with higher audit effort which translates to higher audit quality. Using a logistic regression model, the results of the logistic regression estimates after considering the inverse probability weighting (IPW) method (Table 7) support this study's hypothesis that Big N firms earn higher abnormal audit fee compared to non-Big N firms. The evidence of this study implies that both the pricing-based and characteristics-based proxy for audit quality – abnormal audit fee and auditor size, respectively – is empirically consistent with each other.

In addition, I perform three additional robustness tests (Table 8) and results of the tests support my hypothesis. In Table 8 Panel A, the sample is split into two groups according to the sign of the *ABAFEE* variable: positive (+) *ABFEE* group and negative (-) *ABFEE* group. For both of these groups, the positive and significant value for *BIGN* coefficient indicates that the higher abnormal audit fee paid to Big N firms is consistent in both positive (premium) abnormal audit fee and negative (discount) abnormal audit fee conditions. Panel B and C show the results of sample matching analysis using the propensity score matching (PSM) and coarsened exact matching (CEM) method respectively. The results from both Panel B and C indicate that Big N firms earn more abnormal audit fee compared to non-Big N firms from their clients. Overall, the results of the robustness tests presented in Table 8 are consistent with my prior hypothesis and provide additional empirical evidence that Big N firms earned higher abnormal audit fee than non-Big N firms which in turn indicates a higher audit quality.

CONCLUSIONS

This study empirically investigates the audit quality difference measured by abnormal audit fees, a pricing-based proxy for audit quality, between the Big 3 and non-Big 3 auditors using a sample of Japanese listed firms between 2005 and 2011. There has been a lack of literature analyzing of the association between the pricing-based audit quality proxy– abnormal audit fee – with the characteristics-based audit quality proxy – auditor size – and this study attempts to contribute empirical evidence to the literature. The IPW method and robustness test results show that auditor size is positively associated with abnormal audit fees, indicating that Big N auditors do earn higher fees than non-Big N auditors. Assuming that the audit fee premium motivates and expands audit efforts, this study empirically demonstrates that large Japanese auditors do provide higher audit quality.

This study's sample is limited to Japanese firms which limit the external validity of my empirical findings to other countries that share similar characteristics with Japanese audit and accounting environment.

AUTHOR'S NOTE

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EARNINGS MANAGEMENT TO REPORT AN ADDITIONAL CENT OF EPS: EVIDENCE FROM PRE- AND POST-SOX PERIODS

Charles E. Jordan, Florida State University-Panama City
Stanley J. Clark, Middle Tennessee State University
Gwen R. Pate, University of Southern Mississippi

ABSTRACT

Prior research suggests certain types of earnings management (e.g., discretionary earnings management) declined noticeably after implementation of the Sarbanes-Oxley Act (SOX) while other forms (e.g., real earnings management) increased in the post-SOX era. The current research examines a form of biased reporting documented in the literature whereby management manipulates income so that EPS can be rounded up to present an additional cent of EPS. In particular, prior researchers found that when they re-calculated firms' EPS amounts, the third digit to the right of the decimal point fell in the numerical range five through nine inordinately more often than would be expected. Thus, the rounding of these calculated EPS figures by management to report them in the financial statements in only two places to the right of the decimal point resulted in EPS being increased by an additional cent much more frequently than should have occurred by chance. We replicate the previous research in this area but do so for distinct pre- and post-SOX periods. The findings reveal clear evidence of this manipulative behavior prior to SOX's implementation but no signs of it afterward, thus suggesting SOX played a key role in the demise of this form of biased financial reporting.

INTRODUCTION

Schipper (1989, p. 92) takes a relatively broad view of earnings management by indicating that the notion really embodies disclosure management "in the sense of a purposeful intervention in the external financial reporting process, with the intent of obtaining personal gain (as opposed to say, merely facilitating the neutral operation of the process)." This view suggests various financial statement items could be the object of manipulation. For example, Cullen et al. (2008) provide evidence that companies with a history of reporting net losses and negative operating cash flows often manipulate sales revenue (rather than earnings) to boost market value.

Even if one confines disclosure management strictly to earnings management, research shows that various forms of earnings are manipulated and for different reasons. For example, income may be managed to ensure that reported earnings per share (EPS) meets analysts' forecasts (e.g., Payne & Robb, 2000). Alternatively, studies (e.g., Guan et al., 2006; Lin et al. 2014) suggest that net income is frequently manipulated upward to reach cognitive reference points for users (e.g., unmanipulated earnings of \$3.94 million would be enhanced to just above \$4.00 million). Regardless of the particular financial statement item being manipulated, a key point of Schipper's (1989) definition of disclosure (earnings) management is management's intervention in the outcome of the financial reporting process rather than their neutral facilitation of it. That is, disclosure (earnings) management results in biased financial reporting.

Recent research suggests that at least some forms of earnings management declined significantly in the U.S. following the implementation of the Sarbanes-Oxley Act of 2002 (SOX). For example, Bartev and Cohen (2009) and Cohen et al. (2008) present evidence that accrual-based earnings management declined markedly after SOX. Aono and Guan (2008), Lin and Wu (2014), and Wilson (2012) indicate that earnings manipulation to reach user reference points in income largely disappeared after SOX. Similarly, Jordan and Clark (2013) provide results suggesting the upward manipulation of sales revenue to reach user reference points vanished after SOX as well.

Although some studies show that particular forms of earnings management declined precipitously after SOX, research also indicates that other types (e.g., real earnings management) actually increased in the post-SOX era (e.g., see Bartev & Cohen, 2009; Cohen et al. 2008). Still, other research suggests "that the regulatory changes initiated under SOX to empower boards and audit committees" produced little, if any, effect on the incidence of earnings management (Ghosh et al. 2010, p. 1145). Thus, SOX's impact on earnings management appears inconclusive at this point, and further research in the area is warranted.

The current article examines a specific form of earnings management documented in the literature whereby income is manipulated so that EPS can be rounded up to report one more cent of EPS (Das & Zhang, 2003; Jorgensen et al. 2014; Miller et al. 2012). The present research replicates the key portion of these studies but does so in both pre- and post-SOX eras to determine if this corporate governance legislation produced any apparent effects on management's propensity to manipulate income to report an additional cent of EPS. The results provide clear evidence of this manipulative behavior prior to SOX but no indications of it in the post-SOX period, thus implying SOX produced a positive impact by contributing to the elimination of this form of biased financial reporting.

The next section discusses the literature relative to the intentional rounding up of EPS and also develops the research question for the study. This is followed by sections on methodology and data and results. The final section contains our discussion and conclusion.

LITERATURE REVIEW

Degeorge et al. (1999) suggest that earnings are managed in order to meet three thresholds considered important to users. For example, the researchers note that earnings might be manipulated to ensure achieving positive income, rather than reporting negative or zero earnings. Another threshold to achieve is generating earnings at least equal to that of the prior period; finally, Degeorge et al. (1999) note that analyst earnings forecasts represent a threshold to which income is managed.

In addition to the three rather obvious earnings thresholds indicated above, other benchmarks have been discovered as well. For example, research (e.g., Carslaw, 1988; Kinnunen & Koskela, 2003; Lin et al. 2014; Skousen et al. 2004; Van Caneghem, 2002) has shown that income has frequently been managed upward to increase the first (left-most) digit in the earnings number by one when the second-from-the-left digit of unmanipulated income is relatively high (e.g., unmanipulated earnings of \$5.94 million would be managed upward to slightly above \$6.00 million). Thomas (1989) notes that even this relatively small upward manipulation around a user reference point (threshold) can produce a significant impact on firm value.

Thomas (1989) observed that EPS numbers were manipulated (rounded) upward to thresholds more frequently than net income figures. As an example, in a large sample of listed U.S. companies, he discovered unusually high rates of EPS numbers reported in multiples of 5 cents and 10 cents; nines occurred in the right-most EPS digit (i.e., the cent position) much less often than anticipated. These findings suggested earnings were often manipulated upward so that EPS could be reported in round numbers (i.e., user thresholds).

Das and Zhang (2003) noted that very small upward manipulations of income can frequently lead to an additional cent of EPS through the rounding of the third digit to the right of the decimal point in calculated EPS numbers. For example, a company with net income of $3,868,800 and 5,200,000 shares of common stock outstanding would have a calculated EPS of $.744. Since EPS numbers are reported only to the cent position (i.e., two digits to the right of the decimal point), traditional rounding would dictate that this calculated EPS be rounded down and reported as $.74 in the financial statements. Yet, if net earnings were manipulated upward by as little as $5,200, the calculated EPS would be $.745, which would be rounded up and reported as $.75 in the financial statements. Das and Zhang (2003) pointed out that the rounding of EPS is not manipulation *per se*; however, managing earnings upward to allow the rounding up of EPS clearly represents biased financial reporting, especially when the rounding up to report an additional cent of EPS results in meeting analysts' forecasts or other thresholds.

Das and Zhang (2003) stated that in the absence of earnings manipulation, the third digit to the right of the decimal point in calculated EPS (hereafter referred to as the third decimal digit) should occur in the numerical range zero through four 50% of the time and in the range five through nine 50% of the time as well. They posited that if management manipulates income upward so that the rounding of EPS results in an additional cent of EPS, the third decimal digit in calculated EPS would appear in the five through nine range significantly more often than expected and in the zero through four range at an abnormally low rate.

Using quarterly data from listed U.S. companies for the period 1989-1998, Das and Zhang (2003) calculated primary (basic) EPS before extraordinary items using the firms' appropriate income and weighted average number of shares provided in COMPUSTAT. In essence, they recalculated the companies' reported EPS, but carried the computation to the third decimal digit. For the firms reporting profits, 54.6% of them had calculated EPS with the third decimal digit falling in the five through nine range. This was significantly higher than the expected proportion (50%), and of course means these firms were able to round up EPS and report one more cent of EPS. Conversely, an abnormally low portion (45.4% versus 50%) of the companies had a calculated EPS with the third decimal digit in the zero through four range. These firms did not get to report an additional cent of EPS.

To ensure their expected proportions (i.e., 50% each for the numerical ranges zero through four and five through nine appearing in the third decimal digit) were appropriate, Das and Zhang (2003) calculated per share amounts for sales, operating income before depreciation, and operating cash flows as control variables. They selected these per share computations as, unlike EPS, there would be no incentive to round them up. The researchers found that the calculated per share amounts for the three control variables all produced third decimal digits that fell in the zero through four and five through nine ranges at frequencies approximating 50%, which suggested that 50% is the appropriate expected percentage for unmanipulated data. Their overall results indicated and the researchers concluded that management frequently manipulates earnings so that EPS can be rounded up to report an additional cent of EPS.

Similar to Das and Zhang (2003), Miller et al. (2012) calculated the quarterly EPS numbers for listed U.S. companies but did so for the period 1995-2010. Not surprisingly, their results closely resembled those of Das and Zhang (2003) in that for firms with positive income, the third decimal digit in calculated EPS ranged from five through nine 53% of the time, with 47% of them falling in the zero through four range. Both of these proportions differed significantly from the expected rate of 50%.

Miller et al.'s (2012) primary contribution to the literature in this area was their discovery that the propensity to manipulate earnings to provide an additional cent of EPS through rounding the third decimal digit rose dramatically the smaller the absolute size of EPS. For example, as noted above, for their full sample of firm-quarters, the third decimal digit occurred in the five through nine range 53% of the time. However, when the sample was pared down to include only firm-quarters with EPS of $.20 or less, the portion in the five through nine range increased to 54.5%. For firm-quarters with EPS of $.05 or less, the frequency in the five through nine range rose to 57.5%.

Jorgensen et al. (2014) also replicated the Das and Zhang (2003) study but used annual data and examined a longer time period (i.e., 1980-2010). EPS was computed and presented under the rules of Accounting Principles Board Opinion (APBO) No. 15 prior to December 1997 and under the rules of Statement of Financial Accounting Standards (SFAS) No. 128 subsequent to November 1997. For the APBO No. 15 period, the third decimal digit in calculated EPS occurred in the five through nine range 53.29% of the time, which was significantly higher than the expected rate of 50%. For the SFAS No. 128 period, the third decimal digit appeared in the five through nine range 51.11% of the time, which although lower than what occurred in the APBO No. 15 era, was still significantly greater than the expected frequency of 50%.

Research Question

Das and Zhang (2003), Miller et al. (2012), and Jorgensen et al. (2014) all provide evidence indicating income is frequently manipulated to allow EPS to be rounded up so that an additional cent can be added to the EPS figure reported in the financial statements. The data for the Das and Zhang (2003) study came entirely from a period (1989-1998) prior to SOX's implementation in 2002. As then SEC chairman Arthur Levitt noted in 1999, this period of time was marked by widespread earnings management in the U.S. (Ketz, 1999). Thus, the findings of Das and Zhang (2003) come as no real surprise. The two later studies, though, contained samples with both pre- and post-SOX data. That is, the Miller et al. (2012) sample period was 1995-2010, while the Jorgensen et al. (2014) sample spanned the 30-year period 1980-2010. Yet, neither study split its sample into distinct pre- and post-SOX eras so that comparisons could be made between the two periods relative to management's propensity to manipulate income to allow the rounding up of EPS to report an additional cent of EPS.

As noted in the introduction, several studies indicate that at least some forms of earnings management declined significantly after the implementation of SOX (e.g., Aono & Guan, 2008; Bartev & Cohen, 2009; Cohen et al. 2008; Jordan & Clark, 2013). This leads to the primary research question in the current study. In particular, did the propensity to manipulate income so that EPS can be rounded up by an additional cent change after SOX? To address this question, tests are performed to detect this form of earnings management in distinct pre- and post-SOX samples. Based on prior research (i.e., Das & Zhang, 2003; Jorgensen et al. 2014; Miller et al. 2012), it is anticipated that, for the pre-SOX period, the third decimal digit of calculated EPS will occur in the five through nine range significantly more often than would be expected by chance. The real point of this study, though, is to ascertain whether SOX seems to have constrained this form of earnings management, which would be suggested if the third decimal digit in the post-SOX era appears in the five through nine range at a significantly lower rate than what is observed for the pre-SOX period.

METHODOLOGY AND DATA

The methodology used in the current study echoes that of the prior research in this area (i.e., Das & Zhang, 2003; Jorgensen et al. 2014; Miller et al. 2012). In particular, for listed U.S. companies with positive income, basic EPS is calculated by dividing income before extraordinary items by the weighted-average number of common shares outstanding; both figures are provided in the Fundamental Annuals files in COMPUSTAT and are the same numbers the companies used to compute their reported year-end EPS figures.

The third decimal digit of calculated EPS represents the key measure being examined. As Das and Zhang (2003) note, absent manipulation, the third decimal digit should occur in the numerical range zero through four approximately 50% of the time and likewise should appear in the range five through nine about 50% of the time as well. If the third decimal digit occurs in the five through nine range significantly more often than expected (and in the zero through four range at an abnormally low rate), anecdotal evidence would exist that management frequently manipulated income upward to ensure that EPS would be rounded up by an additional cent.

Benford (1938) demonstrated that the numbers zero through nine do not appear proportionally in the various digital positions of naturally occurring data (i.e., not contrived by man). In particular, in the two left-most digital positions of a number, low digits (e.g., one or two) have a much higher probability of appearing than high digits (e.g., eight or nine). Nigrini (1999) points out that the expected digital frequencies developed by Benford are scale invariant, which means they hold true even if all numbers in a population are multiplied or divided by a constant. For example, Benford's digital rates would apply if financial numbers denominated in Mexican pesos were divided by the appropriate exchange rate to convert them to U.S. dollars. Studies have shown that unmanipulated income conforms to Benford's digital frequencies (e.g., see Rodriguez, 2004; Jordan et al., 2014).

While net earnings adhere to Benford's rates, EPS would not be expected to demonstrate these same digital distributions since EPS figures are not naturally occurring numbers but instead result from dividing income by a non-constant variable that is unique to each company (i.e., number of common shares). Instead, as Das and Zhang (2003), Miller et al. (2012), and Jorgensen et al. (2014) note, each of the numbers zero through nine should appear in the various digital positions to the right of the decimal point in EPS at proportional rates (i.e., about 10% of the time). Hence, 50% of the third decimal digits of calculated EPS should fall in the numerical range zero through four, while 50% should also occur in the range five through nine.

The frequencies of the numbers appearing in the third decimal digit of calculated EPS are examined for pre- and post-SOX samples. As Miller et al. (2012) demonstrated, the incentive to manipulate earnings to ensure that EPS will be rounded up by an additional penny increases as the size of the EPS figure decreases. For example, adding a penny to EPS of $.10 increases EPS by 10%, while adding a cent to EPS of $1.10 enhances EPS by less than 1%. For this reason, the samples in the current study are confined to companies with calculated EPS between $.01 and $1.00 as these firms would be more inclined to manipulate earnings to add an additional penny of EPS than would a sample of companies with widely diverging amounts of EPS.

The post-SOX sample comprises all firm-years in COMPUSTAT with calculated EPS in the range noted above for the years 2003-2012. The pre-SOX sample contains all firm-years meeting these same parameters but with financial year-ends from December 1997 through December 2000. The pre-SOX sample period begins in December 1997 because this is when companies had to start computing and reporting EPS in conformity with SFAS No. 128. Prior to this date, EPS was calculated under the rules of APBO No. 15, and to cut down on any potential noise, we wanted to ensure that companies in the pre- and post-SOX samples used the same reporting standard for EPS (i.e., SFAS No. 128). The years 2001 and 2002 are excluded from both samples because it was during this period that the egregious financial scandals (e.g., Enron and WorldCom) that eventually led to the passage of SOX came to light. In this period, management likely suspected corporate governance legislation would soon be enacted, and these two years would be considered neither truly pre-SOX nor post-SOX periods, but rather a mezzanine era producing unnecessary noise if examined.

To ascertain whether the numbers in the ranges zero through four and five through nine appear in the third decimal digit of calculated EPS at expected rates for the pre- and post-SOX samples, their actual frequencies are compared to the anticipated rate (50%) using a two-tailed proportions test. To determine whether SOX's implementation appears to have affected management's propensity to manipulate earnings so that EPS can be rounded up by an additional cent, a chi-square test is used to compare the pre- and post-SOX samples relative to the rates of numbers appearing in the zero through four and five through nine ranges.

RESULTS

The pre-SOX sample comprises the 11,440 firm-years in COMPUSTAT's Annual Fundamentals file with calculated EPS ranging from \$.01 to \$1.00 for the period December 1997 through December 2000. The post-SOX sample contains the 20,241 firm-years meeting these same parameters for the period 2003-2012. The post-SOX sample size exceeds that of the pre-SOX sample simply because the pre-SOX period was shorter in duration. Even so, the samples for both periods are sufficiently large enough for statistical testing and are representative of firms existing during distinct pre- and post-SOX eras.

The main objective of this study is to determine whether a difference exists between pre- and post-SOX eras in management's propensity to manipulate earnings to gain an additional cent of EPS by rounding up the third decimal digit. Das and Zhang (2003) have already shown that this form of biased reporting occurred during a pre-SOX period (i.e., 1989-1998). However, their data came largely from firm-quarters where EPS was reported under APBO No. 15, with SFAS No. 128 not becoming effective until late in their sample period. Thus, a question remains concerning whether this manipulative behavior took place prior to SOX when EPS was computed and presented under the current reporting standard (i.e., SFAS No. 128). In addition, no study has tested for this form of earnings management in a distinct post-SOX era.

For the pre-SOX sample, Panel A of Table 1 provides the actual counts and frequencies at which the third decimal digit of calculated EPS occurred in the numerical ranges zero through four and five through nine. For example, the third decimal digit fell in the zero through four range 5,558 times, which represents 48.58% of the total 11,440 firm-years for this period, while 5,882 (51.42%) of the third decimal digits were in the five through nine range. The expected frequency for numbers appearing in each of the two ranges was 50%. Thus, the third decimal digit appeared in the zero though four range less often than expected and in the five through nine range more frequently than anticipated. Panel A also provides the Z statistic and p-level for the proportions test comparing the actual rates with the expected rate of 50%, and a key finding for the pre-SOX sample is that the difference between the actual and expected frequencies is statistically significant (i.e., p-level of .003).

Table 1
THIRD DECIMAL DIGIT FREQUENCIES IN ZERO THROUGH FOUR AND FIVE THROUGH NINE RANGES

Panel A (Pre-Sox Sample): N = 11,440	Numerical Range of Third Decimal Digit: Zero through four	Five through nine
Actual count (n)	5,558	5,882
Actual frequency (%)	48.58	51.42
Expected frequency (%)	50.00	50.00
Z statistic	-3.021	3.021
p-level	.003*	.003*
Panel B (Post-Sox Sample): N = 20,241	Numerical Range of Third Decimal Digit: Zero through four	Five through nine
Actual count (n)	10,144	10,097
Actual frequency (%)	50.12	49.88
Expected frequency (%)	50.00	50.00
Z statistic	.323	-.323
p-level	.747	.747
*significant at .01 level		

Panel B of Table 1 presents the results for the post-SOX sample. Notice that the third decimal digit fell in the zero through four and five through nine ranges 50.12% and 49.88% of the time, respectively. The proportions test reveals that these rates do not differ significantly from the expected frequency of 50% (i.e., p-level of .747). It appears the biased reporting to generate an additional penny of EPS that existed prior to SOX vanished in the post-SOX period.

Table 1 shows a comparison of the actual rates for the third decimal digits appearing in the numerical ranges zero through four and five through nine for the pre- and post-SOX eras to the expected rate of 50%. Table 2, though, presents a chi-square test for a direct comparison of the rates existing in the pre-SOX period with those occurring in the post-SOX period. The chi- square test statistic of 6.86 (p-level of .009) shows that the rates differ at a statistically significant level, thus indicating a change occurred between the periods.

Table 2
CHI-SQUARE TEST COMPARING PRE- AND POST-SOX SAMPLES

	Numerical Range of Third Decimal Digit: Zero through four	Five through nine	Total
Pre-SOX sample	5,558 (48.58%)	5,882 (51.42%)	11,440 (100%)
Post-SOX sample	10,144 (50.12%)	10,097(49.88%)	20,241 (100%)
Total	15,702	15,979	31,681
	Chi-square test statistic = 6.86; p-level = .009		

One final test involved an analysis of the rates at which each of the numbers zero through nine appeared in the third decimal digit of calculated EPS for the pre- and post-SOX periods. As noted previously, each number (zero through nine) should occur in the third decimal digit approximately 10% of the time. Yet, Das and Zhang (2003) found that for their sample a significant discontinuity occurred for the number four, with far fewer fours appearing in the third decimal digit than expected. They surmised this happened because the closer the unmanipulated third digit came to five (i.e., the traditional minimum cutoff for rounding up), the more likely earnings were manipulated to ensure the third decimal digit fell in the range for upward rounding (i.e., five through nine).

For the pre- and post-SOX periods, respectively, Panels A and B of Table 3 provide the actual counts and rates at which each of the numbers zero through nine appeared in the third decimal digit of calculated EPS; also provided are Z statistics and p-levels for proportions tests comparing the actual frequency of each number to the expected rate of 10%. Notice in Panel A the same discontinuity in the number four as observed by Das and Zhang (2003) occurred in the pre-SOX sample. That is, fours appeared in the third decimal digit only 9.18% of the time, which is well below the expected rate of 10%; the discrepancy between the actual and expected rates of fours is statistically significant (i.e., p-level of .002). Using traditional measures of statistical significance, the numbers six (p-level of .070) and eight (p-level of .024) appeared in the third decimal digit for the pre-SOX sample at abnormally high rates. These results are intuitive given both of these numbers fell in the range (five through nine) that would be rounded up.

Table 3
THIRD DECIMAL DIGIT FREQUENCIES FOR NUMBERS ZERO THROUGH NINE

Panel A (Pre-Sox Sample) N = 11,440										
Third decimal digit	0	1	2	3	4	5	6	7	8	9
Actual count (n)	1155	1099	1134	1120	1050	1155	1204	1123	1219	1181
Actual frequency (%)	10.10	9.61	9.91	9.79	9.18	10.10	10.52	9.82	10.66	10.32
Expected frequency (%)	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Z statistic	.326	-1.412	-.297	-.739	-3.028	.326	1.813	-.644	2.258	1.122
p-level	.745	.158	.766	.460	.002*	.745	.070***	.519	.024**	.262
Panel B (Post-SOX Sample) N = 20,241										
Third decimal digit	0	1	2	3	4	5	6	7	8	9
Actual count (n)	2045	1993	2048	2010	2048	1991	2025	2090	1983	2008
Actual frequency (%)	10.10	9.85	10.12	9.93	10.12	9.84	10.00	10.33	9.80	9.92
Expected frequency (%)	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Z statistic	.476	-.722	.545	-.320	.545	-.769	.009	1.511	-.960	-.367
p-level	.634	.470	.585	.749	.585	.442	.993	.131	.337	.714
*,**,*** significant at .01, .05, and .10 levels, respectively										

The findings for the post-SOX sample in Panel B of Table 3 stand in stark contrast to those for the pre-SOX sample in Panel A. More specifically, for the post-SOX era, each number (zero through nine) appeared in the third decimal digit at approximately its expected rate, which suggests that during this period earnings were not manipulated to create desired amounts in this digital position of calculated EPS. Taken together, the results shown in

Tables 1, 2 and 3 indicate a definite decline occurred in management's propensity to manipulate income so that EPS could be enhanced by garnering an additional cent from rounding, and this shift toward more neutral financial reporting corresponds with the implementation of SOX.

DISCUSSION AND CONCLUSION

Prior research (Das & Zhang, 2003; Jorgensen et al. 2014; Miller et al. 2012) showed that management frequently manipulated income so that EPS could be rounded up by an additional penny. In particular, the studies provided evidence that the third decimal digit in calculated EPS occurred in the numerical range five through nine (zero through four) significantly more (less) often than would be expected for unmanipulated data. Since EPS is presented in the financial statements only to the cent position (i.e., second decimal digit), having an inordinate number of firms with the third decimal digit in the five through nine range meant an abnormally high rate of companies were rounding up EPS to add an additional cent to reported EPS.

The current study replicates the prior research in this area but does so using distinct pre- and post-SOX samples to ascertain whether SOX appears to have constrained this biased form of reporting. Not surprisingly given the results of the previous studies, the pre-SOX sample possessed an abnormally high (low) rate of third decimal digits in calculated EPS in the range five through nine (zero through four), suggesting that management during this period often manipulated earnings so that reported EPS could be rounded up instead of down. However, for the post-SOX sample, no anomalies appeared in the rates at which the numbers zero through nine occurred in the third decimal digit. Both individual numbers and groupings of numbers (i.e., zero through four and five through nine) appeared in the third decimal digit at their expected rates. This finding provides anecdotal evidence that this form of biased financial reporting, which existed during the pre-SOX era, disappeared in the post-SOX period.

These results suggest that SOX, with its harsh penalties for fraudulent financial reporting, played a key role in the elimination of this particular form of earnings management. There is, of course, a possibility that factors other than SOX led to the more altruistic financial reporting observed in recent years. For example, Yoon and Miller (2002) found that the propensity to manage earnings is inversely related to operating performance, with managers of poor performing firms more prone to manipulative behavior than managers of companies enjoying strong financial performance. Although the pre- and post-SOX samples in the current study contained only firm-years with positive EPS ranging from \$.01 to \$1.00, there exists a possibility that the profitability of the firms overall differed between the two samples. Thus, the more altruistic financial reporting in the post-SOX sample observed here could be explained if the companies in this sample experienced stronger operating performance than those in the pre-SOX sample. This is not the case, though, as the median returns on investment for the pre- and post- SOX samples of 3.86% and 3.45%, respectively, show that operating performance differed very little between the samples.

Gavious and Rosenboim (2013) and Grasso et al. (2009) indicate the egregious financial scandals in the U.S. made public around the turn of the millennium (i.e., Enron, WorldCom, HealthSouth, etc.) changed the attitudes of management and auditors about the ethicality of earnings management. They suggest these changed attitudes played a more dominant role than SOX in constraining earnings management in the recent past. While the present study sheds little light on this debate, the project could be replicated in a country that enacted corporate governance legislation similar to SOX but did not experience financial scandals on the magnitude of those that plagued the U.S. If the results of such a study echo those of the current research, strong evidence would exist that the corporate governance legislation, and not changed attitudes by management and auditors, caused the more altruistic financial reporting observed recently.

Like most studies, the present research has a few limitations that affect the generalizability of its findings. For example, we confined our analysis to companies with calculated EPS between $.01 and $1.00 because firms with smaller amounts of EPS have more incentive than companies with larger amounts of EPS to manipulate earnings to allow the rounding up of EPS (e.g., see Miller et al. 2012). No inferences should be made from our study about companies reporting EPS outside this range. In addition, we examined data from general samples of listed companies and did not perform any industry-specific analyses. Yet, research (e.g., Datta et al. 2013; He & Yang, 2014) provides evidence indicating that the propensity to engage in earnings management can vary across industries. Thus, it is possible the type of biased financial reporting examined in the current study could still exist in particular industries. Likewise, we did not segregate our samples based of the quality of the companies' auditors. Prior studies (e.g., Burnett et al. 2012; Chen et al. 2005) have shown that audit quality (frequently measured as audit firm size or degree of industry specialization of the audit firm) constrains certain types of earnings management. Separating our samples according to the quality of the companies' auditors might have yielded results different from those obtained (e.g., perhaps earnings manipulation to round up EPS still occurs for companies with lower quality audit firms). Future research could examine these issues.

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TIER 1 CAPITAL RATIOS: THE REGULATIONOF RISKBEHAVIORCONTINUES

Ryan Laiola, California State University Fullerton

ABSTRACT

This study builds on existing research by examining the top bank holding companies (BHCs) in the US economy. Through the guidelines put forth in Basel I, II, & III requirements, The Federal Reserve oversees the largest asset size BHCs and determines the appropriate capital levels for reserves against loan losses. Capital adequacy regulation is aimed at measuring the individual risk levels of banks and allocating reserves for that amount of risk and expected potential loan losses. This study develops an original research model and hypothesis using R square testing to find correlative relationships between the market volatility of returns on equity and the fluctuations of Tier 1 Capital ratios during the time series data collected. This study adds to the subject matter of utilizing a book-value measure of risk and a market-value measure of risk for comparison.

This study examines the effects of regulatory implementation of bank capital adequacy measures and the market pricing of return on equity. Drawing upon a ten-year data series on the balance sheets and adjusted stock returns of the top thirty largest bank holding companies in the United States, this study will use the linear R Square test to provide empirical evidence in support of the argument that capital supervision has either a negative or positive effect on bank risk behavior. The results of this study can be used by regulators and management as a capital planning tool and also add to the discourse on the subject matter.

INTRODUCTION

The recent financial crisis of 2008, which has also been referred to as The Great Recession, stemmed from a liquidity crisis in the financial economic sector. The cause of the recession has largely been pinned on US financial institutions' creations of ever more complex financial derivatives of mortgage-backed securities driving a valuation bubble that eventually burst. Liquidity dried up, and banks became insolvent. As real estate values began to fall, borrowers defaulted on their mortgages and banks began to incur loan losses. This process causes a reduction in assets on a bank's balance sheet, which must be covered by the bank's own capital reserves (or equity funds). When losses outpace or exhaust the capital reserves, the bank becomes balance sheet insolvent and is forced to close its doors.

Banks and other financial institutions that are large enough to be significantly integrated into the economy can cause an economic shock. To further exacerbate this solvency crisis, the interbank market structure can cause a domino effect of bank-to-bank defaults. The debt side of a bank's balance sheet is typically made up of a mix of retail deposits and wholesale debt funding (Farag, Harland, & Nixon, 2013). This was particularly problematic when pre-recessionary debt-to-equity ratios were as high as 30.0:1.0, and capital reserves could not withstand write downs of assets (Fox, 2013).

Regulators had to step in and prop up the financial system through bail-outs known as the Troubled Asset Relief Program through the passage of the Emergency Economic Stabilization Act of 2008. This law allowed the US Treasury up to $700B in purchasing authority to help stabilize the US financial system. Of this amount, the Treasury invested $245B into five different bank programs such as the Asset Guarantee Program, The Capital Assistance Program, and the Capital Purchase Program. Fortunately, these programs achieved many of their stated goals and also returned approximately $28B more than initially invested (US Department of the Treasury, 2013).

Subsequent regulation in 2009 known as the Supervisory Capital Assessment Program (SCAP) allowed for the Federal Reserve Bank to conduct the stress testing. The Federal Reserve annually audits the largest bank holding companies (BHCs), which are typically any BHC that has more than $10B in total assets. Under the Comprehensive Capital Analysis and Review (CCAR) and the Dodd-Frank Act (DFA), the Federal Reserve ensures that certain financial institutions of systemic influence have adequate capital that account for their own idiosyncratic risks in order to sustain external market factors and financial stress (Board of Governors of the Federal Reserve System, 2013).

According to the Federal Reserve Economic Data (FRED), the research division of the Federal Bank of St. Luis, total net loan charge-offs (NCOTOT) exceeded 3% of total loans during the Great Recession, while the historical observations ranged from 0.5-1.5% (Federal Reserve Bank of St. Luis, 2013). Net charge-offs are losses taken on a bank's loan portfolio, net of any recoveries associated with the charge-off. With banks incurring twice the amount of losses in a short period of time, bank failures threatened the US economy and capital reserve requirements were increased by regulators. The effect of this was to force a more conservative capital structure with the intent of inducing risk-averse behavior. Further, the US financial sector has outpaced the growth of the general economy over the past three decades creating some fundamental changes to the landscape of the financial sector. For example, the past three decades have seen the appearance of the shadow banking system, a system of non-bank financial firms that have the same basic functions of a traditional deposit entity (Greenwood & Scharfstein, 2012).

Purpose of the Study

The primary goal of regulatory capital requirements is to force banks to maintain the necessary funds to weather financial stress, absorb losses, and to continue the going concern. The regulations and tests are designed to be forward looking to ensure that banks and other financial institutions have the appropriate capital plan in place to balance the level of credit risk inherent in the loan portfolio. The problem with these regulatory requirements is that forcing a debt-to- equity ratio capital structure places downward pressure on ROE and ROA metrics for shareholders. By forcing banks to increaser their Tier 1 capital, the equity side of the balance sheet expands and thus dilutes equity values, spreading the earning over a larger portion of equity. Arguably, capital regulatory oversight can pressure a board of directors into underwriting riskier loans where they can, in order to boost earnings in other areas when possible.

The purpose of this study is to provide empirical observations and additional discourse to the effects that regulatory enforcement of more stringent capital structures have on financial institutions and their shareholders. In answering this question, this study will build on current research in order to provide bank executives and board directors data to create better strategies for capital planning and market positioning.

Limitations of the Study

The conclusions of this study are limited to the abstract relation between determining a statistically significant level of correlation on stock market variance metrics and the various levels of regulatory Tier 1 Capital to risk-adjusted assets ratio. The stock market and global economy have countless factors that can influence market returns and volatility (VIX) measures. Further, as regulatory definitions change, investors may not quickly or accurately be able to price in the estimated effects. Similarly, investor sentiment can change over time, which may deter from concluding that a correlative relationship exists between the two variables. As an example, investor sentiment can change from news of the Federal Reserve's quantitative easing program being a negative factor (as an indication of an unhealthy economy), to being a positive factor (as an indication of necessary economic reconstruction). Lastly, the time period of data used in this study overlays the most volatile periods in recent history which involved unforeseen macroeconomic factors that had significant influence on the variance of returns in equity markets. The underlying data used in this analysis has a limited linear relationship due to the nature of the time period used.

REVIEW OF AVAILABLE LITERATURE

There has been a great deal of data tracking surrounding bank capital reserves since the Great Recession and the government bailout of the financial sector. Regulatory agencies monitor and keep track of data metrics for compliance and progress report purposes. These metrics include capital requirements, reserve requirements, Tier 1 and Tier 2 minimum capital requirements, leverage ratios, liquidity ratios, and solvency ratios. Ideally, these regulations are designed to curb the risk behavior of management and in turn minimize the total risk exposure of financial institutions. In reviewing how capital reserve requirements affect a bank's return on assets and return on equity metrics, management must develop new strategies to boost returns.

The traditional banking business model plays a crucial role in the functioning of the economy. Not only do they supply payment services for transaction settlement, they also provide loans, or credit standards, to the household and business sectors. The loan creation process is what is known as the 'maturity transformation' process. This is an essential function of a financial institution to the economy in that short-term excess funds are allocated to banks, where they are then turned into long-term loans. Smaller short-term deposits (sources of funding) are aggregated into larger long-term loans (uses of funding). Here, there is a mismatch in the maturity timing of a bank's short-term liabilities (source of funds) and its long-term assets, or loan portfolio (use of funds). Mismanagement of these accounts can result in a liquidity crisis or a 'run on banks'. A noted method for mitigating this risk is to create a well-diversified and stable funding profile which can be sourced through contractual instruments that lock in the invested funds for a specific period of time (Farag, Harland, & Nixon, 2013).

Microprudential regulation seeks to address any negative externalities that can impact a specific bank's risk levels, adjusting their capital reserves to appropriately reflect the risks that they take. This entails the bank's own capital structure, loan credit risk, lending market risk, and liquidity risk. Banks' main function within the economy is to diversify away lending risk, and capital regulation aims at assessing those risks and requiring appropriate 'risk-adjusted' reserves. On the other hand, macroprudential regulation seeks to account for systemic risks such as a build-up in leverage or volatility in the rate of change of the 'maturity transformation.'

In “What We’ve Learned from the Financial Crisis”, Fox notes that banks tend to reduce their debt levels instead of increase their equity when faced with adverse market conditions or higher capital requirements. This can have a negative effect on the overall economic activity level, as banks begin to shrink their debt capital to maintain the appropriate debt-to-equity levels. If banks were forced to sell common shares, they could react to adverse capital constraints by expanding their equity. Another idea presented is to require banks to issue convertible debt (debt instruments that are convertible into equity) in times of crisis (Fox, 2013).

Earlier studies have also noted that bank capital structure can produce conflicting results in risk behavior. As an example, banks tend to view FDIC insurance as a put option per Black-Scholes valuation methodology, thus potentially taking on excessive risk with the safety net of regulatory deposit insurance in the event of default. Option Value Theory generally states that higher volatility of possible outcomes provide a higher value of the exercisable option itself. The premiums for deposit insurance do not reflect the underlying risks and more so, banks have been culprits of moral hazard theory (Marshall & Prescott 2000).

However, in a 2011 study, it was noted that banks with a high degree of ‘franchise value’, that is, a firm that has high earnings or a significant dividend payout, will hold excess capital reserves above regulatory requirements (Harding, Liang, & Ross 2011). Further, for larger banks specifically, it was noted that during the recent financial crisis positive stock returns were related to stronger capital positions. Prior to the recession, stock returns had no correlation to various capital levels; which concludes that adequate bank capital levels are more of an asset in an adverse environment (Demirguc-Kunt, Detragiache, & Merrouche, 2013). Also, Merle found that certain board member characteristics were related to an increase in Tier 1 capital holdings of the bank, effectively reducing capital risk. Simple linear regression was used to find positive correlation between board stock ownership, CEO base pay, and CEO incentive pay and the dependent variable of Tier 1 capital holdings (Merle, 2013).

Progress of Current Research

Some researchers have recognized that at the onset of the financial crisis, a rare opportunity to redesign the global financial system presented itself. This is possibly a once-in-a-generation chance for meaningful reform (Butler, 2009). Capital requirements have been the main tool that regulators have used over the last several decades to help manage risk. The underlying logic in this approach is to force financial institutions to have enough reserves set aside to cover expected and unexpected losses. Thus, the level of financial risk undertaken by banks is lower. Although this theory is straightforward, it can be quite confusing and complex in practice (Krawcheck, 2012). There are numerous ways to measure capital and the appropriate level of capital is debatable. Minimum capital requirements may incorporate a market risk factor and a firm specific risk factor (or credit risk factor) based on either the bank’s own internal models or a set of regulatory risk weights (Hirtle, 2003).

One significant impact that the government bailout of banks (TARP) had on the risk behavior of banks is that certain financial institutions are now considered “too big to fail.” Upon receiving TARP funds, these corporations have been deemed too important to the general economy to allow them to fail, which re-introduces the issue of moral hazard theory. The tendency to take more risk from one party when the majority of potential costs are borne by outside parties is a moral hazard issue. In other words, if the large, systemic banks are likely to be bailed out by public taxpayer funds again, they would be willing to take excessive risks, having less skin in the game.

In 2012, Stan and McIntyre conducted research that show that the government's "too big to fail" policies bestow more risk-taking benefits upon the larger banks than on their smaller counterparts. Although it is arguable that simple scales of economies can produce such benefits, the study used an accounting, rather than a market-based, measure of risk to account for the fact that the smaller banks are not heavily traded in the public equities markets. The empirical findings supported the hypothesis that larger banks are riskier than smaller ones by measurement of variance of returns and by capital to asset ratio measures (Stan & McIntyre, 2012).

As previously stated, the core logic behind regulatory capital requirements is to force banks to have more of their own funds on the books to allow for a cushion against loan losses. It is essentially a book value risk mitigant for a potential market value of risk. Bank capital regulation is largely based on book value accounting. Recently, Bhattacharya conducted research that utilized book value risk measures and book value returns to present evidence that capital requirements have actually increased the risk level of the banking industry. When return on equity is constrained and cannot be properly priced in through efficient market factors, banks are induced to seek high-return-high-risk assets to satisfy the required rate of return on equity. Return on assets has doubled and loss on assets increased 2.5 times since capital regulation halved the loan capacity of banks (Bhattacharya, 2013).

Specific Contribution of Study

Existing studies do not attempt to draw direct relationships between the Tier 1 capital requirement as a percentage of risk-weighted assets to real returns to investors. Tier 1 Capital is book value of accounting; however, a more appropriate measure is to use a ratio of Tier 1 Capital to risk-adjusted assets. Tier 1 Capital is considered core capital. It consists of common equity or stock and reserves taken from retained earnings. The loan assets are then adjusted by exposure risk rating grades and risk parameters to account for potential losses (Federal Reserve Board, 2006). Regulatory requirements have historically been around 4%. According to the Board of Governors of the Federal Reserve System in their 2011 "Comprehensive Capital Analysis and Review: Objectives and Overview", the CCAR seeks to improve the overall risk management, capital management, and capital resources of the largest asset size bank holding companies (Federal Reserve Board, 2011). In other words, banks can take risk, and ultimately are in the business of risk-taking, but they must be regulated to ensure that they take appropriate measures to mitigate their risk taking activities.

This study will determine the relationship of how the equity market reacts and interprets the effectiveness of regulatory capital requirements through the application of simple statistical models. The study will rely on the Efficient Market Theory to make connections with investor perception of risk and their required rate of return on bank equity. By adding to the existing research, this study will apply prior researchers' conclusions and opinions to statistical outputs from this study in order to add to the discourse of the effects of regulatory capital requirements. The results of this study will show that the required rate of return on bank equities should adjust according to regulatory declaration and enforcement of increased Tier 1 Capital and asset risk adjustments. Contributory calculations consist of time-series graphical representations of the largest bank holding companies' trailing twelve months variance of stock returns and the time frame of regulatory Tier 1 Capital to risk-adjusted assets ratio requirements.

RESEARCH MODEL & HYPOTHESIS

Some trends in current research suggest that capital requirements enhance the safety and soundness of bank operations and loan loss reserves, while other trends suggest that hard-set regulatory requirements can create some degree of moral hazard and either increase the risk behavior of banks, or circumvent natural market pricing occurrences of ROE which puts external pressure on management to take on additional risk. To test this hypothesis, a closer look at a traditional measure of market priced return on equity will be used to determine a level of correlation between aggregate investors' required rate of return and the ratio of regulatory Tier 1 Capital to risk adjusted assets ratio. The book value measurement of ROE is traditionally shown as net income divided by shareholder equity. Some researchers have argued that making a book- to-book comparison is appropriate, while others have argued that market values are more relevant and accurate (Lee, Lin, & Yu, 2013). This study will utilize historical market returns on equity since accounting income and capital structure can be manipulated and adjusted, while market pricing is open to aggregate investor behavior and pricing methodologies. The question to be answered is whether or not there is a linear correlation between the regulatory decrees on Tier 1 Capital ratios and market return on equity.

Null Hypothesis: *The statistical relevance of R2 shows that Tier 1 Ratios have a linear relationship with stock market ROE standard deviations.*
H0 = R2 > 0.5

Alternative Hypothesis: *The statistical relevance of R2 shows that Tier 1Ratios do not have a linear relationship with stock market ROE standard deviations.*
H1 = R2 < 0.5

RESEARCH METHODOLOGY

The research is designed around four steps. First, the subject operating banks and bank holding companies (BHCs) will be chosen based on size and regulatory supervision levels. The second step is to collect historical adjusted stock returns on a monthly basis, compute the monthly returns, then compute the monthly trailing twelve months standard deviation to arrive at a measure of market risk for the return on equity. The third step is to collect time series data on the most prominent regulatory requirement – the Tier 1 Capital ratio to risk-adjusted assets. Lastly, the BHC stock volatility will be measured per time period of regulatory capital adequacy requirement.

Subjects of Study and Sample Size

This study seeks to analyze the largest bank holding companies in the US domestic economy with a history data set that has been subject to regulatory scrutiny over the years. An ideal subject company is large enough to have been subject to the Federal Reserve capital requirements (which is largely adopted through the International Bank of Settlements' Basel policy) and has been in operation long enough to predate the Tier 1 Capital ratio requirements. The list was taken directly from the Federal Reserve's CCAR participants, which only applies to banks and organizations with assets of $10 billion or more. This largely excludes community banks and regional banks and targets the more complex national commercial banks that are subject to US regulatory filings.

In a press release from November 1st, 2013, the Federal Reserve board of governors released a revised list of corporations subject to the Comprehensive Capital Analysis and Review program, which is inclusive of the Tier 1 ratio requirement. Thirty BHCs in total are included on the list, of which 12 were added to the coming 2014 program review and Basel III requirements. However, all banks listed have been subject to or participated in Tier 1 ratio measurements. This list represents a forward looking sample of BHCs since the Federal Reserve's press release named these corporations specifically in their future stress testing program (Federal Reserve Board, 2013).

Table 1
SELECTED SUBJECT BHCs

Previous CCAR participants, also participants in 2014	Participants new to CCAR in 2014
Ally Financial Inc.	BMO Financial Corp.
American Express Company	BBVA Compass Bancshares, Inc.
Bank of America Corporation	Comerica Inc.
The Bank of New York Mellon Corporation	Discover Financial Services
BB&T Corporation	HSBC North America Holdings Inc. *
Capital One Financial Corporation	Huntington Bancshares Inc.
Citigroup Inc.	M&T Bank Corp.
Fifth Third Bancorp	Northern Trust Corp.
The Goldman Sachs Group, Inc.	RBS Citizens Financial Group, Inc. *
JPMorgan Chase & Co.	Santander Holdings USA, Inc. *
KeyCorp	UnionBanCal Corp. *
Morgan Stanley	Zions Bancorp
The PNC Financial Services Group, Inc.	
Regions Financial Corporation	
State Street Corporation	
SunTrust Banks, Inc.	
U.S. Bancorp	
Wells Fargo & Company	

HSBC North America Holdings Inc., RBS Citizens Financial Group, Santander Holdings USA, Inc., and UnionBalCal Corporation (denoted *) were excluded from the study due to private ownership which made it impossible to procure and analyze public market data. This remaining list was cross-referenced with other institutions leading BHCs tracking lists such as the FDIC's "Top 50 BHCs" and with The Banker "Top 1000 World Banks, 2013". Both of which measure Tier 1 Capital amounts (Alexander, 2013). The Federal Reserve, by definition of CCAR, has named these BHCs Systematically Important Financial Institutions (SIFIs) by virtue of their total asset size and scope of operations. Lastly, the sample size of approximately twenty- six subjects will allow for statistical relevance of findings from a population.

Data Collection Method

Historical prices were taken from Yahoo! Finance online. Yahoo! Finance's database calculates the adjusted closing price of any stock for the entire public life on the respective market exchange. Yahoo!'s data source is taken from the security's respective exchange such as NYSE, NASDAQ, or NYSE MKT, but then is adjusted for dividends and splits. Thus the adjusted close as published with Yahoo! Finance incorporates the effects of ex-dividend date of distribution and splits and reverse-splits on the stock price which is a more accurate depiction of true returns to stockholders. Data was then collected from the present day (12/2/13 monthly adjusted close) to end of year 2003 (Yahoo! Finance, 2013). This time frame of the last ten years includes a large range of median industry levels of Tier 1 Capital ratios within a range of 9.8% - 13.2%, a new historical high. Then the Tier 1 ratio to risk adjusted assets data was collected on the above listed BHC's for the same time period (BankRegData, 2013).

Statistical Technique Used

This study analyzed the ten-year adjusted monthly closing stock price of the most significant BHCs, those that were categorized by the Federal Reserve as "systematically important financial institutions" (SIFIs), calculated the monthly returns on each stock, and then calculated the trailing twelve-month standard deviation of those returns. The resultant time series data was then graphed and used as a measure of market volatility or risk for the return on equity for BHC investors. The second variable was the historical Tier 1 Capital ratio, defined as core equity capital divided by risk-adjusted total assets for the same subject BHCs. Quarterly data figures were obtained and graphed over the same coinciding time period. Lastly, the R2 statistical test was performed on both variables to predict future outcomes and determine if the hypothesis is valid or null. This shall determine the goodness of fit test of the statistical model presented in this study.

ANALYSIS & RESULTS

Each BHC analysis was conducted on an individual basis to determine a specific linear relationship between the two variables outlined above. R2 analysis was performed on both the dependent and independent variable to determine which banks specifically contributed to the validity of the hypothesis presented here. Each bank has its own market strategy and its own appetite for risk. As indicated in the data collection of the historical Tier 1 Capital ratios, the percent of capital allocated to the risk adjusted assets is different for each BHC. Therefore, the null and alternative hypotheses apply to each individual BHC, not the aggregate list or the industry as a whole. See appendix excel data for detailed analysis results on each BHC. To illustrate an example, the analysis results of BMO Financial follow:

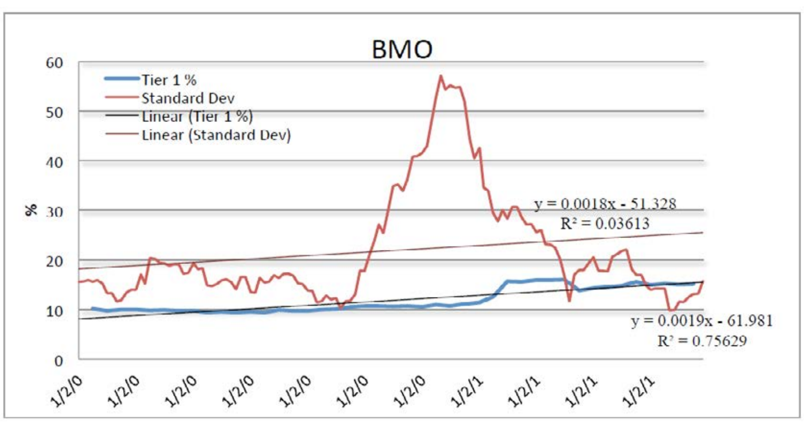

Figure 5

The total findings resulted in the null hypothesis to be null and the alternative hypothesis to be valid. Although some of the BHC findings resulted in an R2 value greater than 0.5 statistical relevance, the values only coincided with the Tier 1 Capital ratio variable. The standard deviation of return on equity did not produce any R2 values above the relevance level of 0.5. The expectation of the this model is to see either a decline in ROE volatility as the Tier 1 Capital ratio increases or to see a linear relationship producing the opposite effect. As each subject BHC was examined for a positive R2 value greater than 0.5, a summary table of the results are as follows:

Table 2
SUMMARY OF RESULTS

BHC	R Square StDev	StDev R > 0.5	R Square: Tier 1	Tier 1 > 0.5
American Express	0.02419		0.59257	x
Bank of America	0.12786		0.83581	x
BBVA	0.16432		0.15237	
BB&T	0.07857		0.60430	
BMO	0.00180		0.75629	x
Capital One	0.01053		0.00040	
Citigroup	0.07115		0.59499	x
Comerica	0.04483		0.48254	
Bank of New York	0.00440		0.83497	x
Discover	0.00223		0.00267	
Northern Trust	0.00332		0.61101	x
Fifth Third Bank	0.04062		0.42078	
Huntington	0.04062		0.76078	x
JPMorgan	0.02277		0.71072	x
Key	0.08117		0.68019	x
M&T	0.03318		0.68550	x
Morgan Stanley	0.44710		0.71072	x
Regions	0.13788		0.61010	x
State Street	0.02780		0.49515	
SunTrust	0.08286		0.73630	x
PNC	0.02919		0.42062	
USBancorp	0.00478		0.64541	x
Wells Fargo	0.05548		0.44358	
Zions	0.13174		0.77155	x

As the null hypothesis is rejected, the alternative hypothesis is accepted. The hypothesis expected to show a linear relationship or correlative effect of Tier 1 Capital ratio requirements to the standard deviation of return on equity. Since the alternative hypothesis is accepted, the implications are that Tier 1 Capital ratio requirements do not have an effect on the riskiness of returns on market value of equity of bank holding companies.

MANAGERIAL IMPLICATIONS

One of the primary functions of executives is the fiduciary duty to maximize shareholder returns. To do this, management needs to invest in future cash flows that add to the present value of the firm, which takes on a certain level of risk. If banks have to hold more capital in reserves (or equity) to account for potential loan losses, then management and stockholders may want the firm to take on higher levels of risk to produce higher returns. A measure of which is the volatility of stock returns. Therefore, this study was aimed at producing empirical data to provide stockholders and managers evidence to support their strategic objectives when picking risk-adjusted assets to invest in.

This data is also relevant to the discourse and objectives of regulators. The main objective of bank capital supervision is to prevent future financial crises and systemic bank failures. The implications of their capital reserve requirements are to prevent banks from incurring excessive loan losses that incur debt-funding default on the part of the bank. The capital reserves provide equity funding that should be exhausted before debt funding is required in the event of adverse economic conditions. As prior research has indicated, regulation can have unintended consequences and may ultimately not achieve the stated objectives of regulatory oversight.

CONCLUSION

There is a significant amount of research regarding the regulatory effects of capital requirements and this study examines several facets of implications of prior studies. This study provided a quantitative test to determine whether or not a book measure of risk (Tier 1 Capital ratio) has a linear relationship on a market measure of risk (standard deviation of return on equity) on a time series data set over the last 10 years. The results of this study did not indicate a statistically relevant relationship between the two variables. These findings conclude that the impact of Tier 1 requirements has not produced any effect on the market risk of such firms. The expectation was to find that market risk declined as Tier 1 Capital increased or that market risk increased as Tier 1 Capital increased. This would conclude that either adequate reserves lower the riskiness of ROE and thus lower the required rate of return on equity, or that adequate capital reserves increase the market risk of ROE due to the increased pressure from stockholders to outpace a mandated capital constraint. This presents an argument that capital reserves are not an efficient use of funds. Many see the new Basel III requirements, as the most valid threat to the banking business model. Banks have more capital, but management has not adjusted their operational business model to incorporate the effects of new and increasing regulation of capital (McKinsey, 2013).

Further research is required to present a clearer relationship between the effects of enforced balance sheet equity expansion on the overall risk levels of the firm, as measured by appropriately priced market factors. Arguably, an increase in capital reserves for a bank may or may not be an indication of risk aversion. A required increase in core capital reserves may be caused by a an increase in market risk of existing assets, since market conditions can change after loan capital is deployed. Management and regulators can increase capital reserves in order to counter balance the perceived market risks. If this were the case, the increases in Tier 1 capital may signal that the BHC has already taken on additional risk. However the temporal cause and effect relationship may be less clearly defined as management may also preemptively increase capital reserves prior to investing in riskier future cash flows via a forthcoming change in lending standards or credit policy. A quantitative analysis may not in fact draw synonymous conclusions. Additional research is needed to better clarify possible relationships between the actual measurements of capital adequacy from regulatory agencies.

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APPENDIX

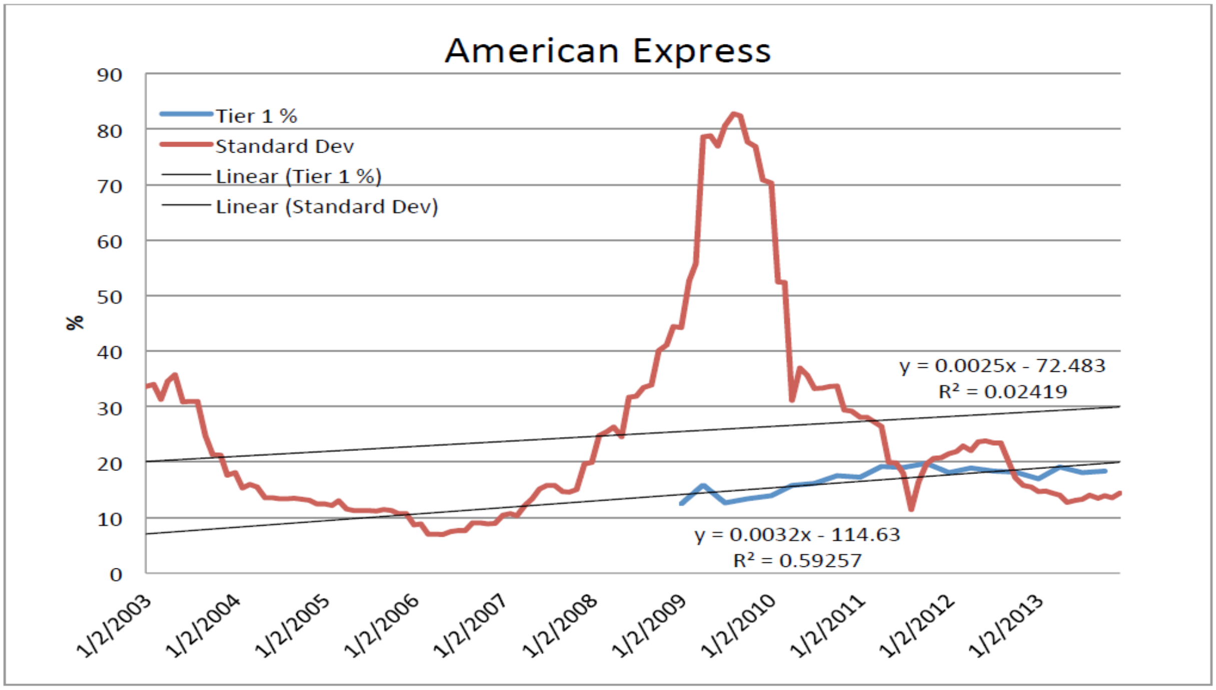
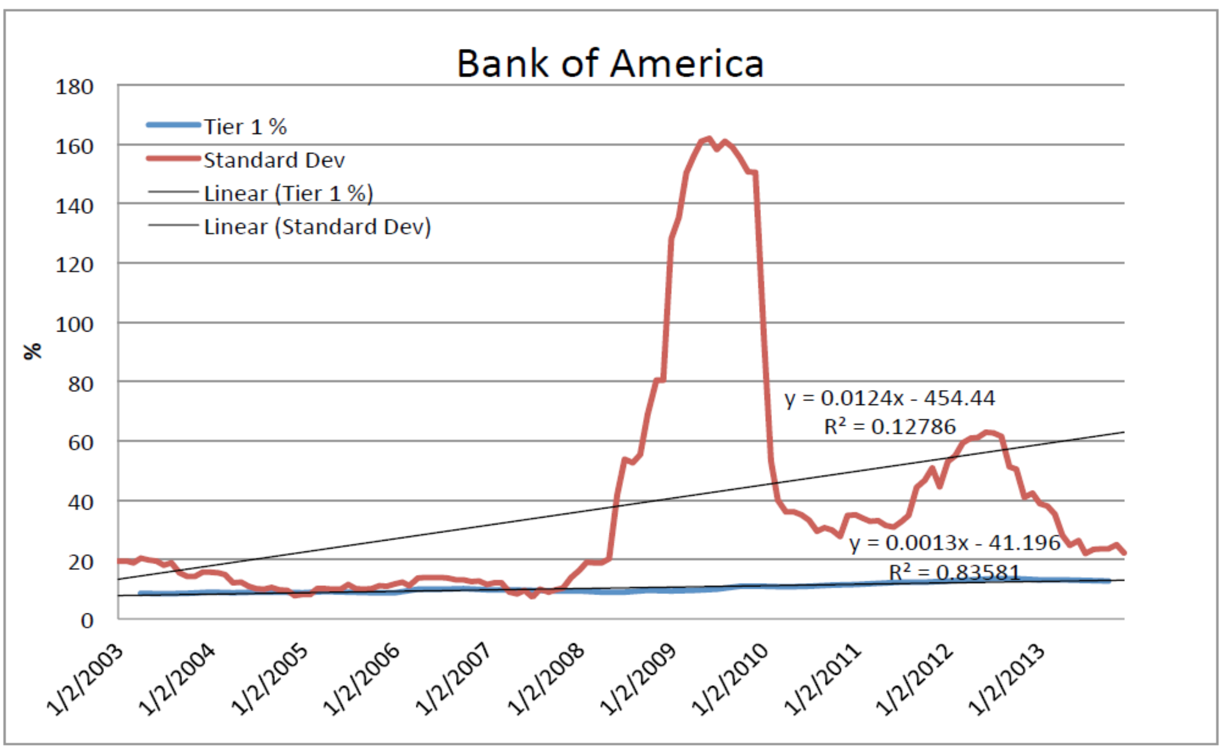


Figure 1



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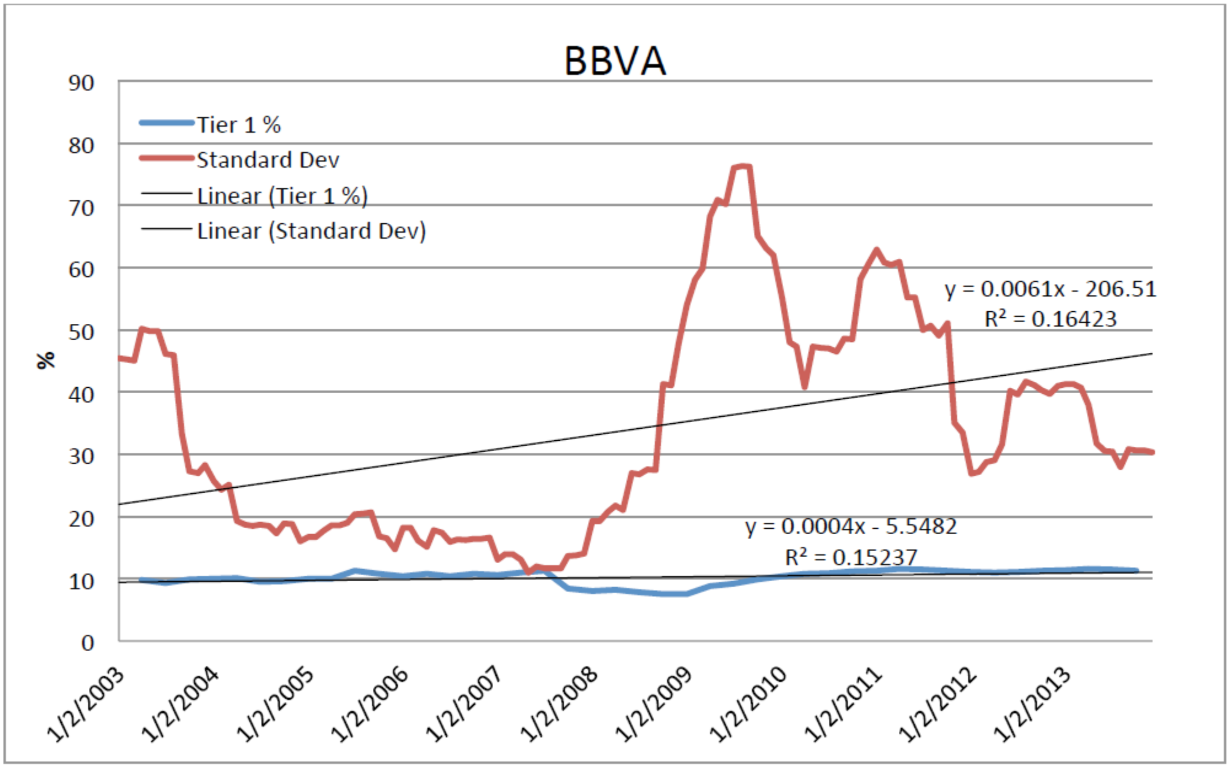

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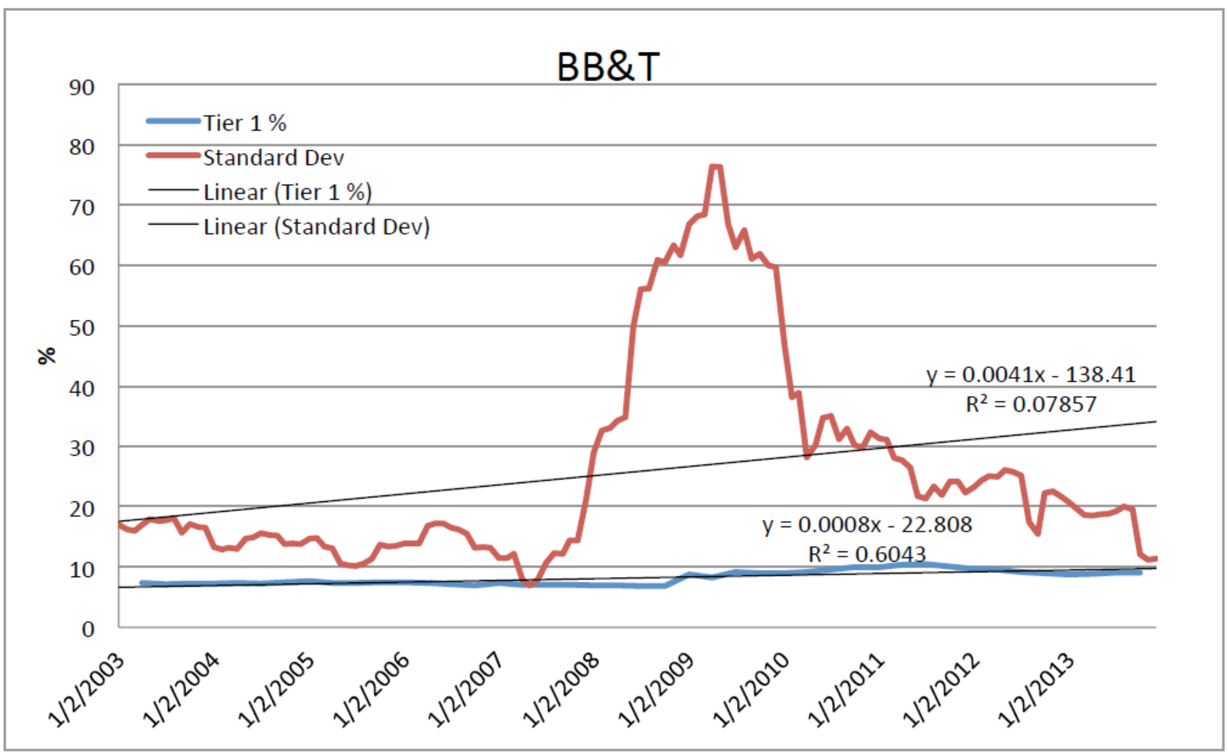

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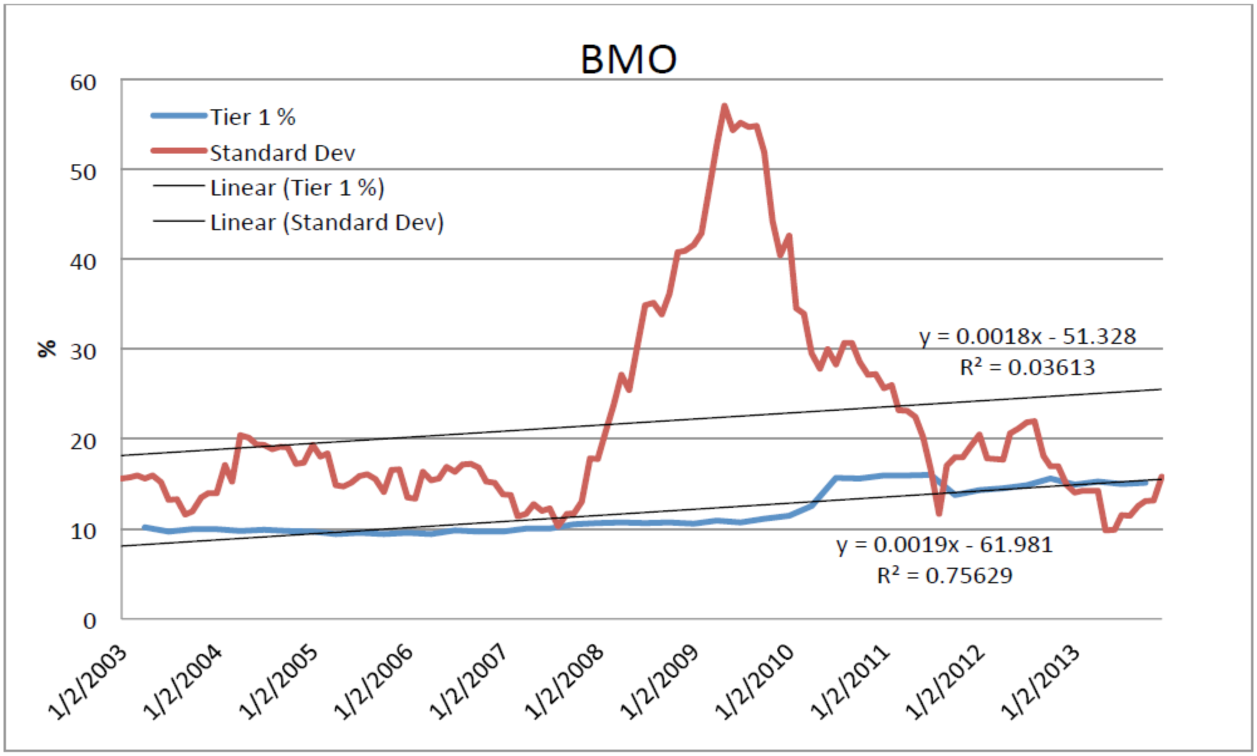

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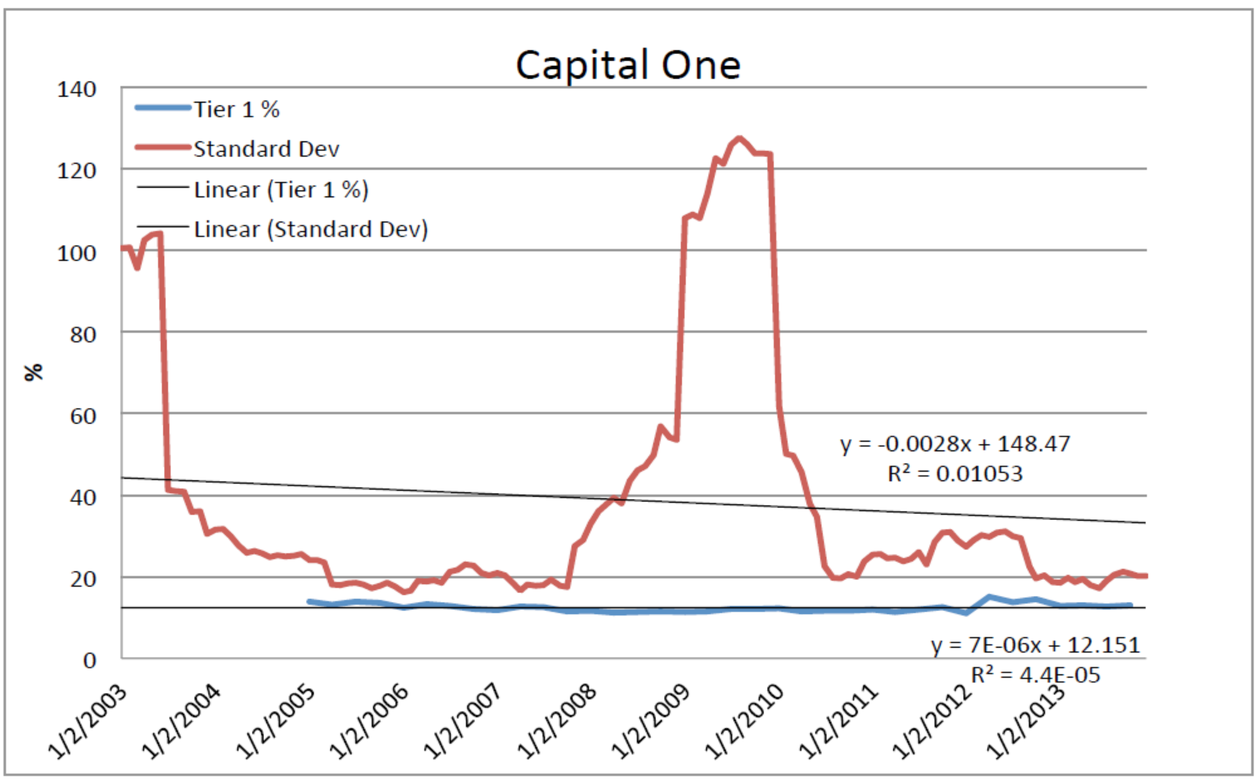

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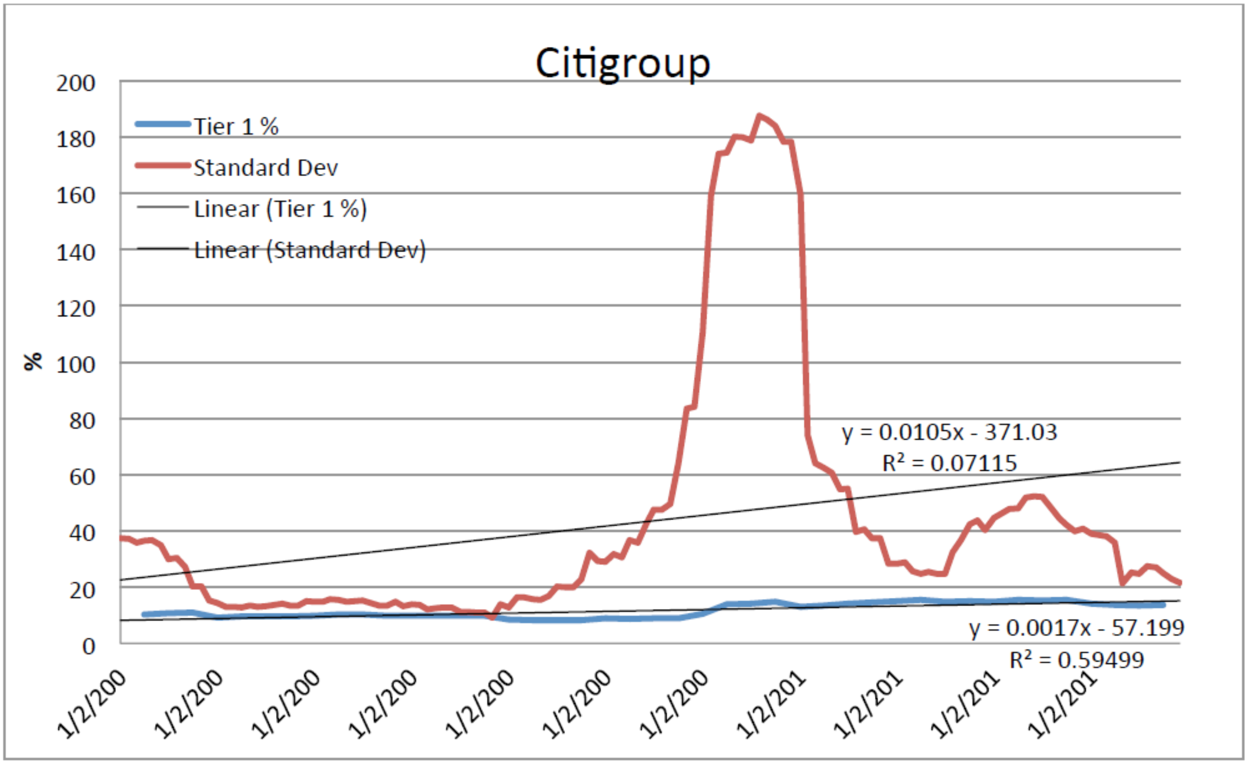

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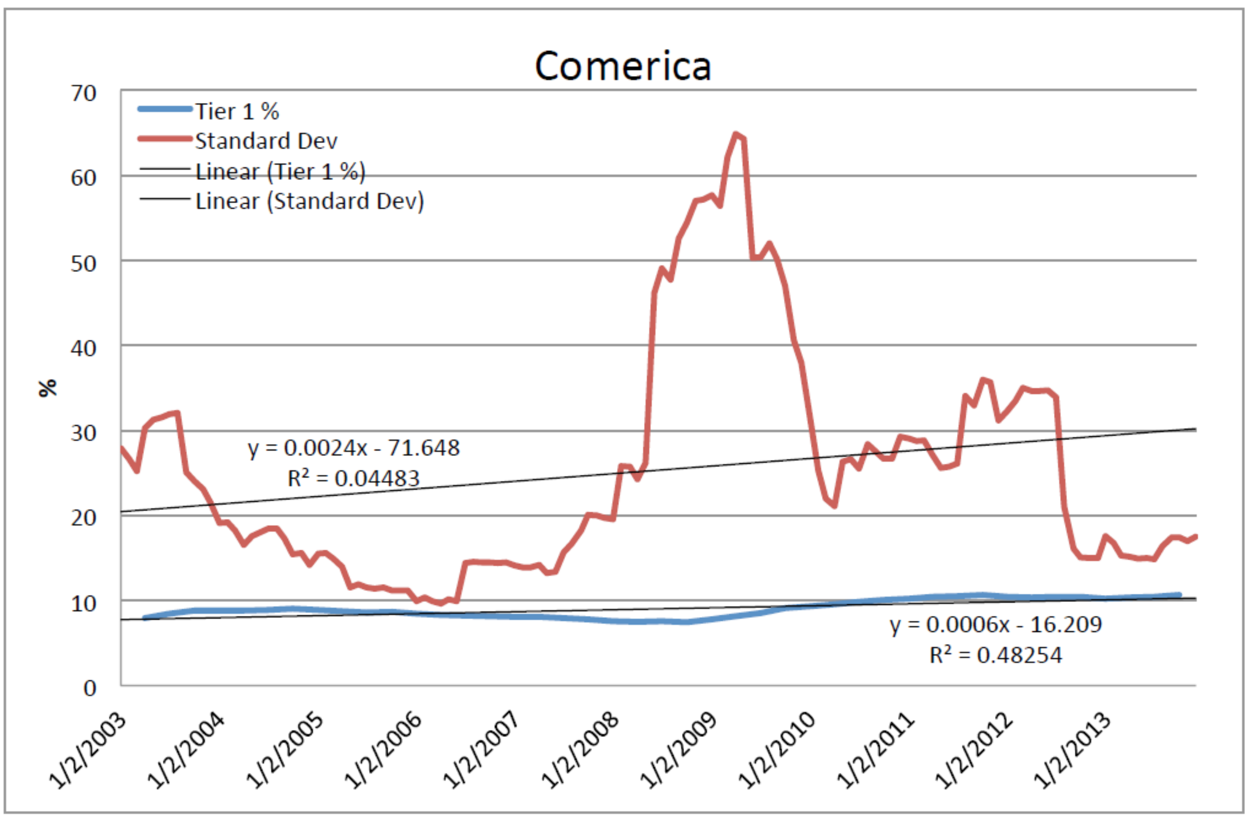

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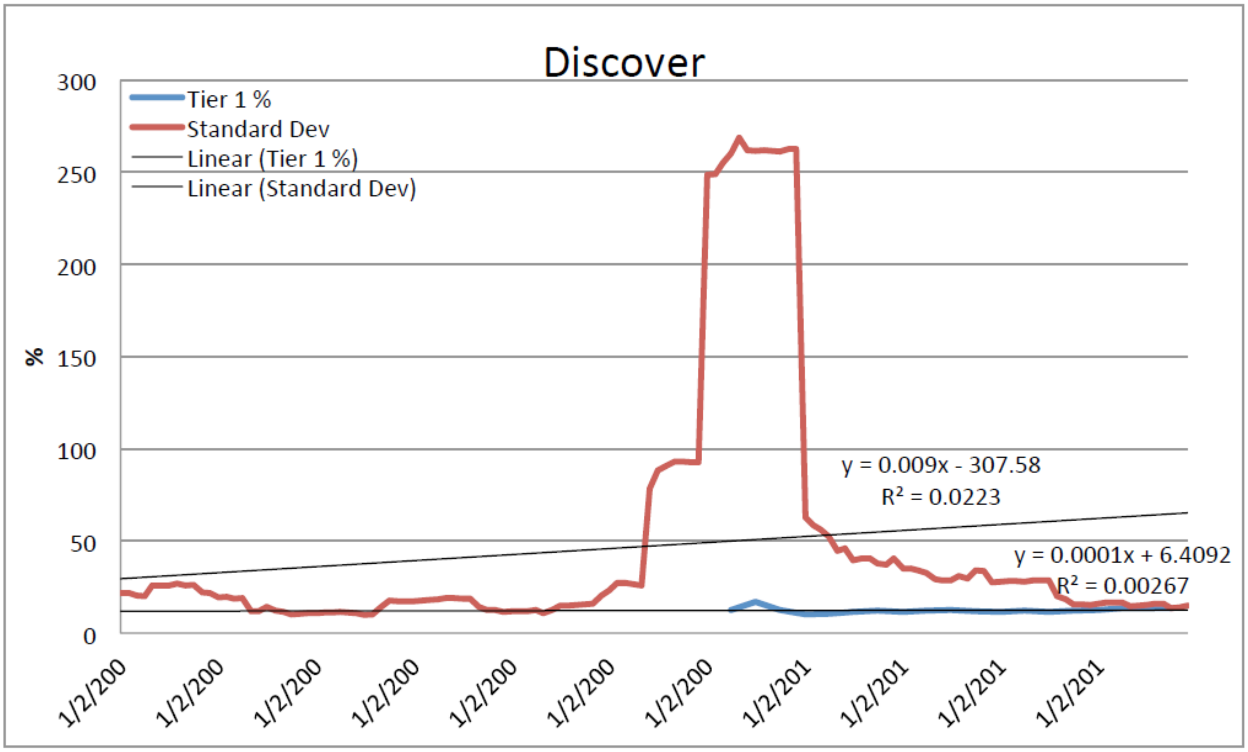

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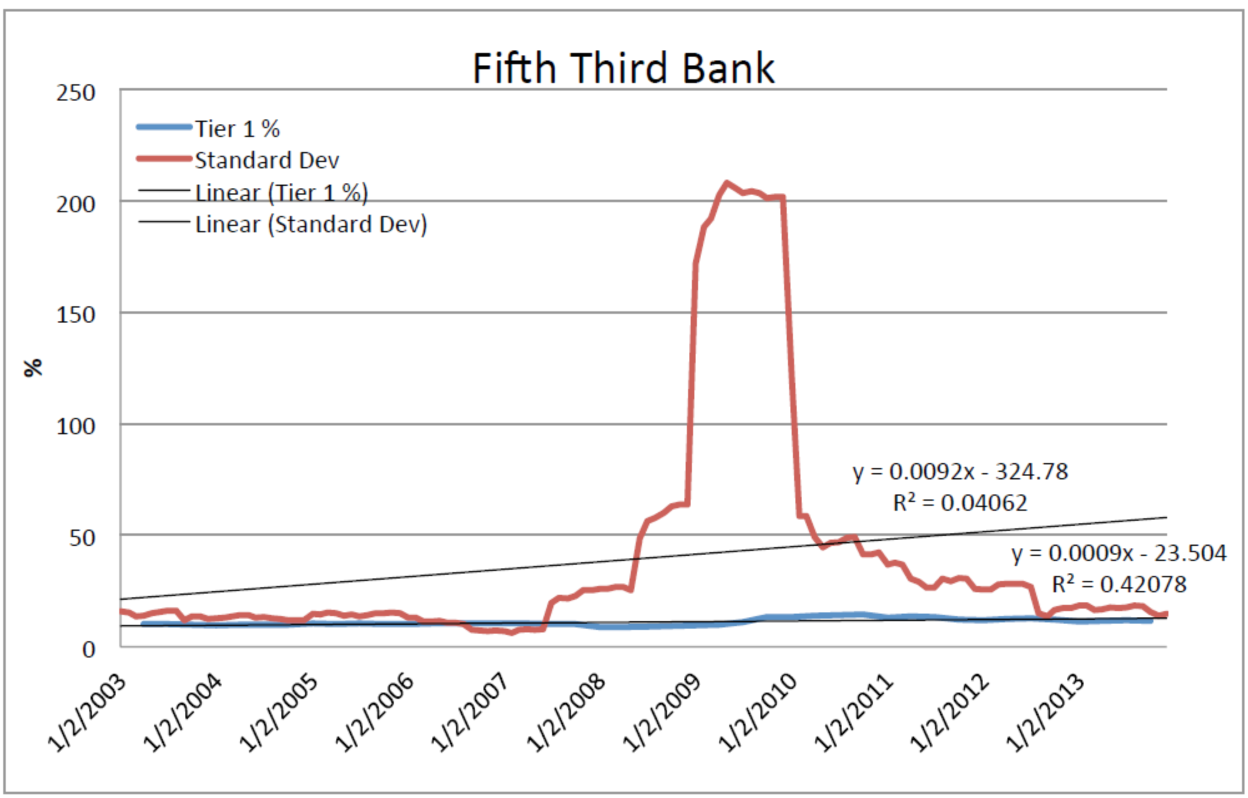

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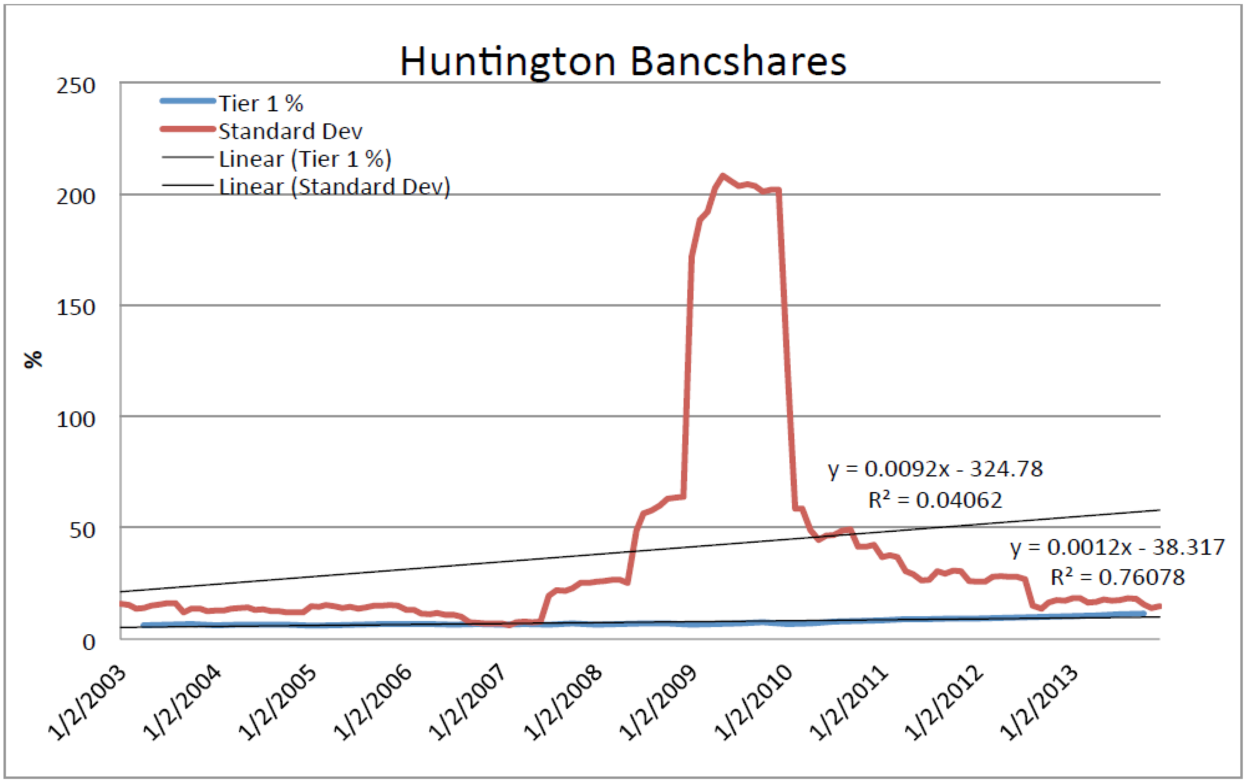

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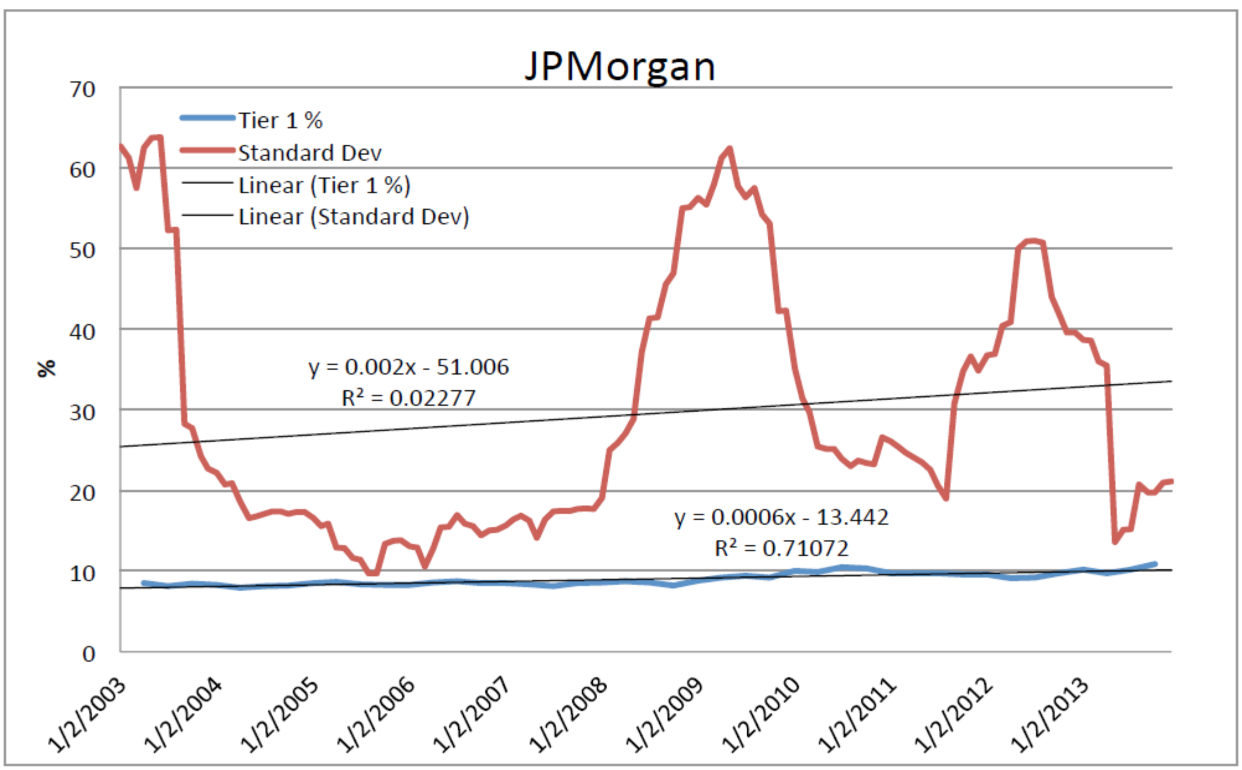

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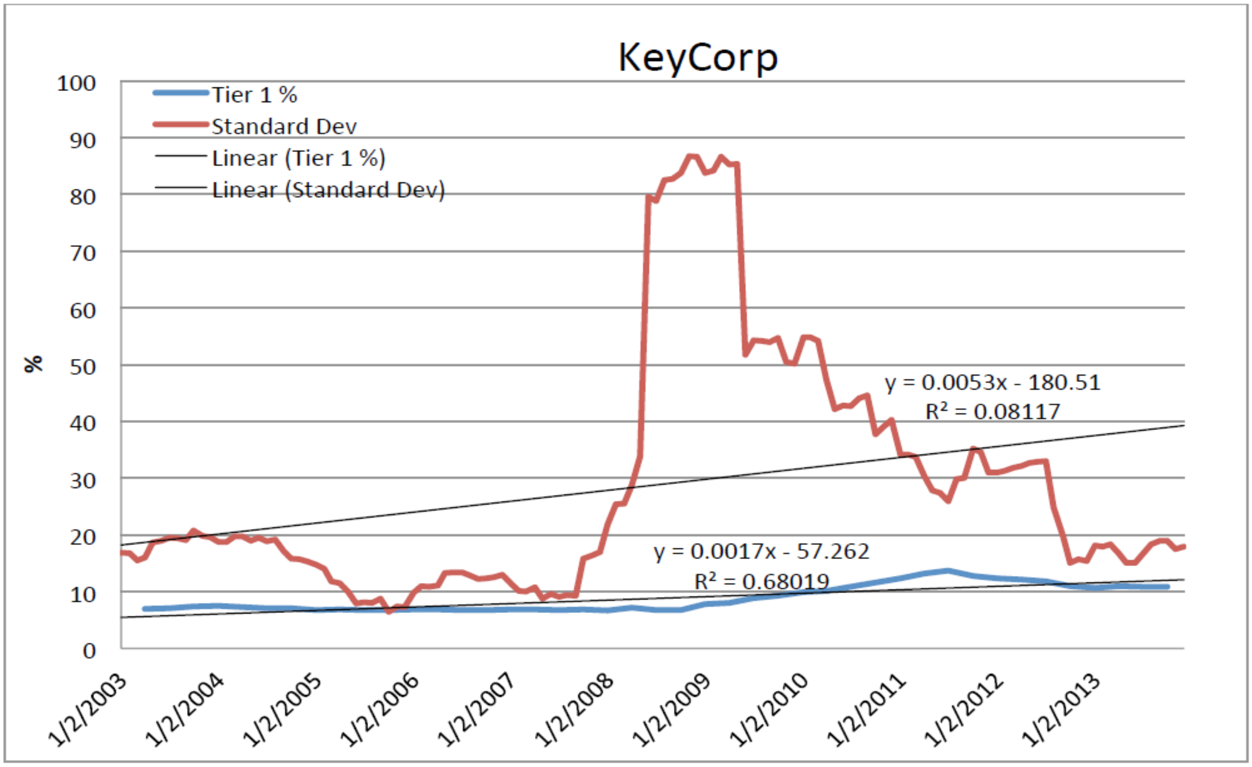

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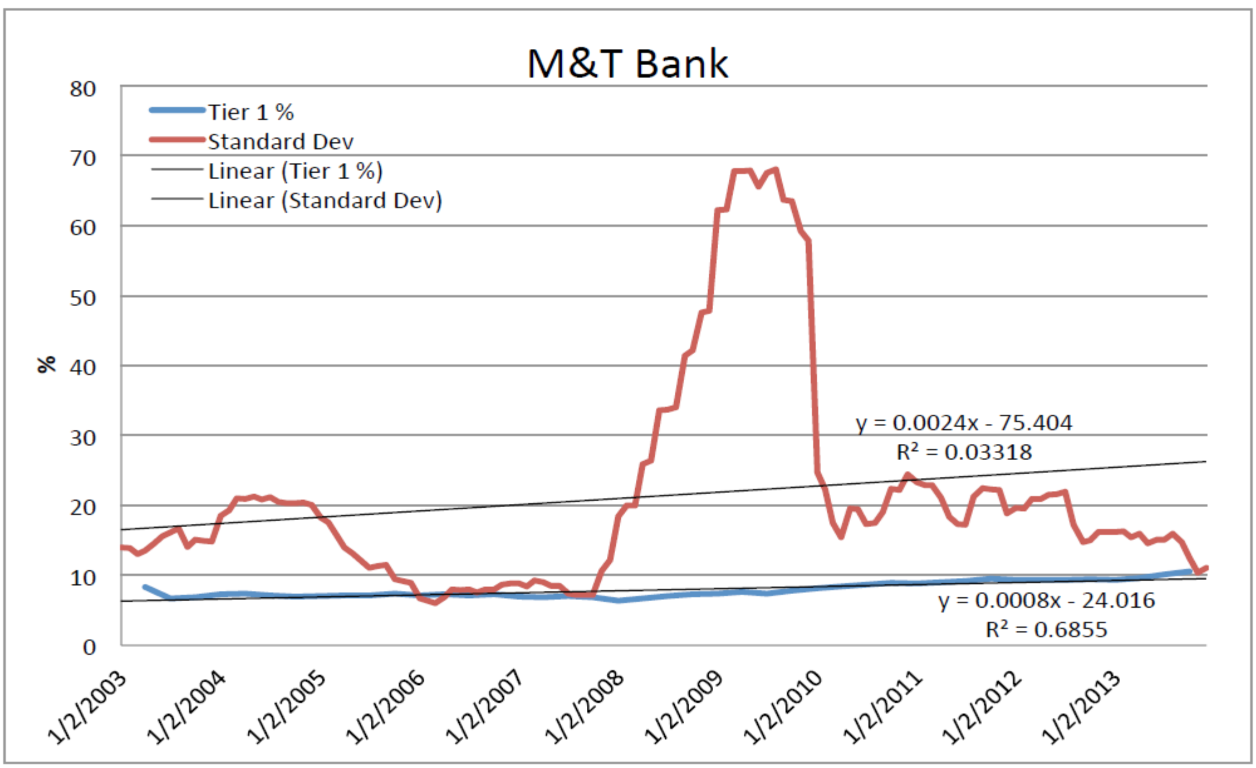

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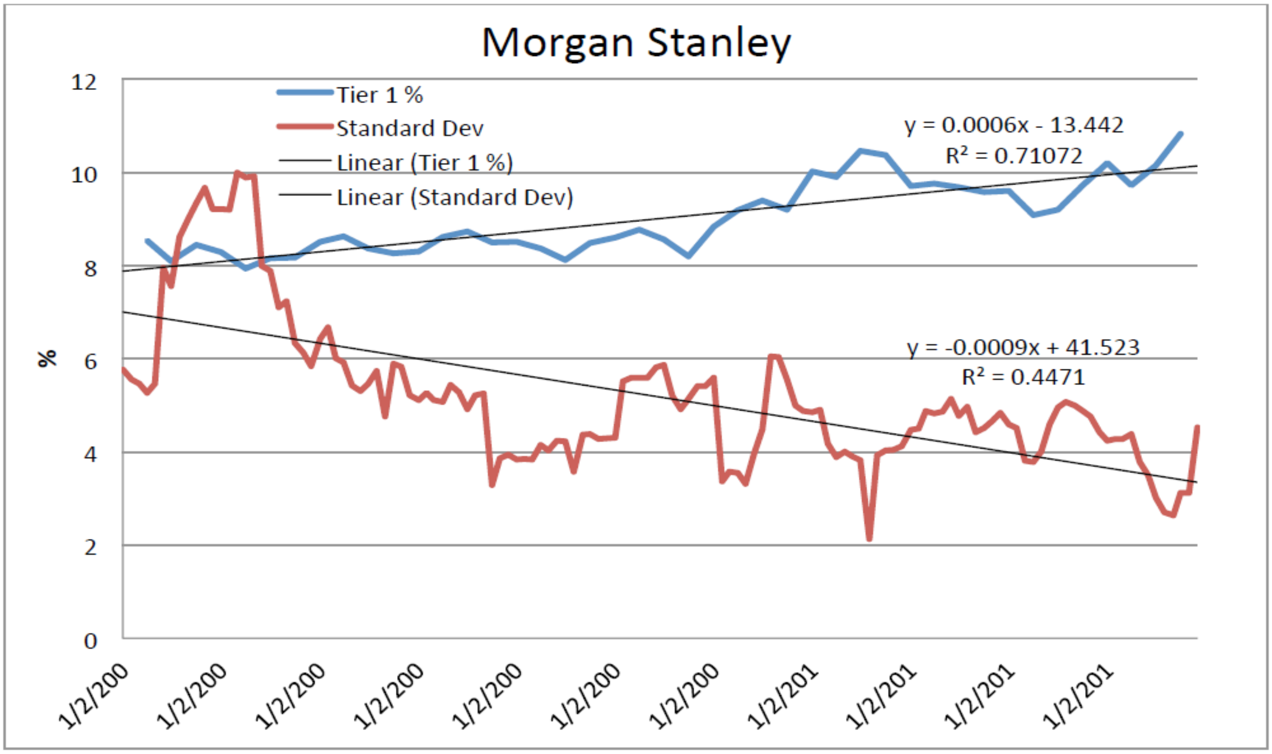

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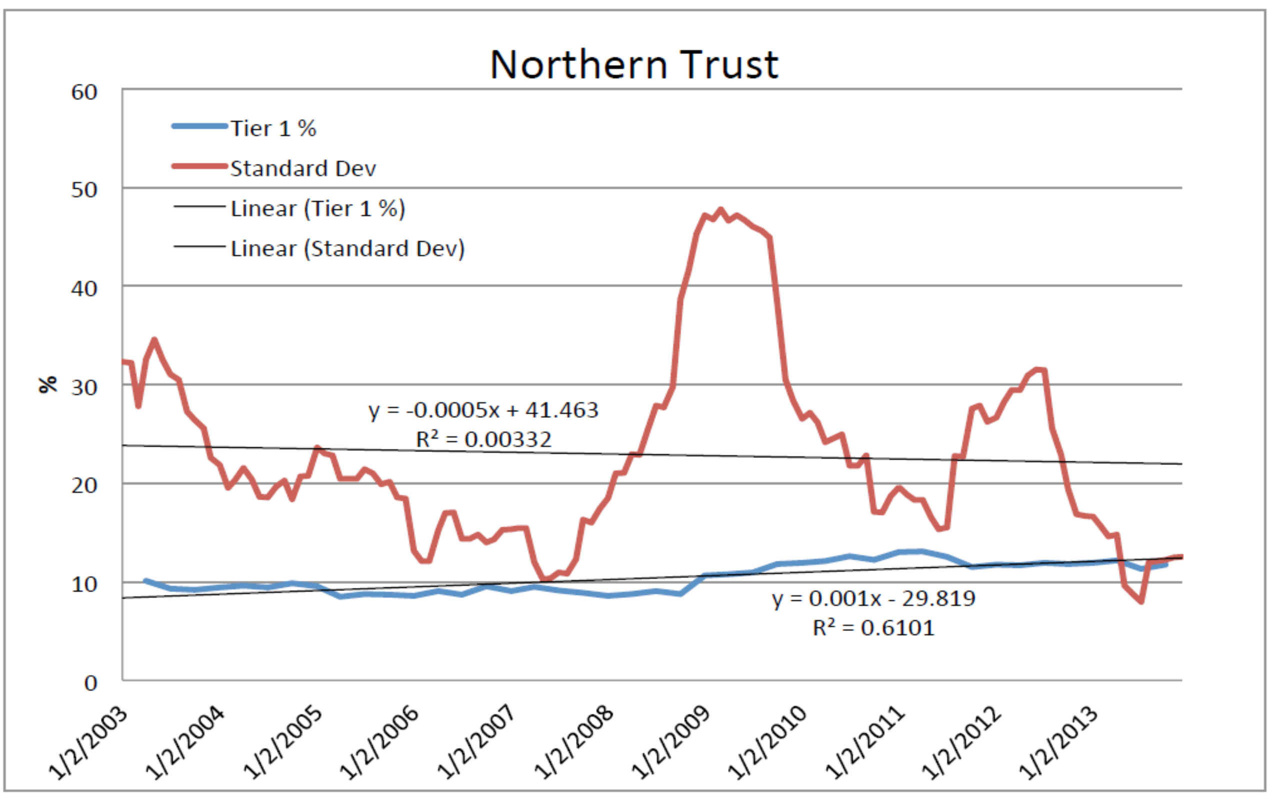

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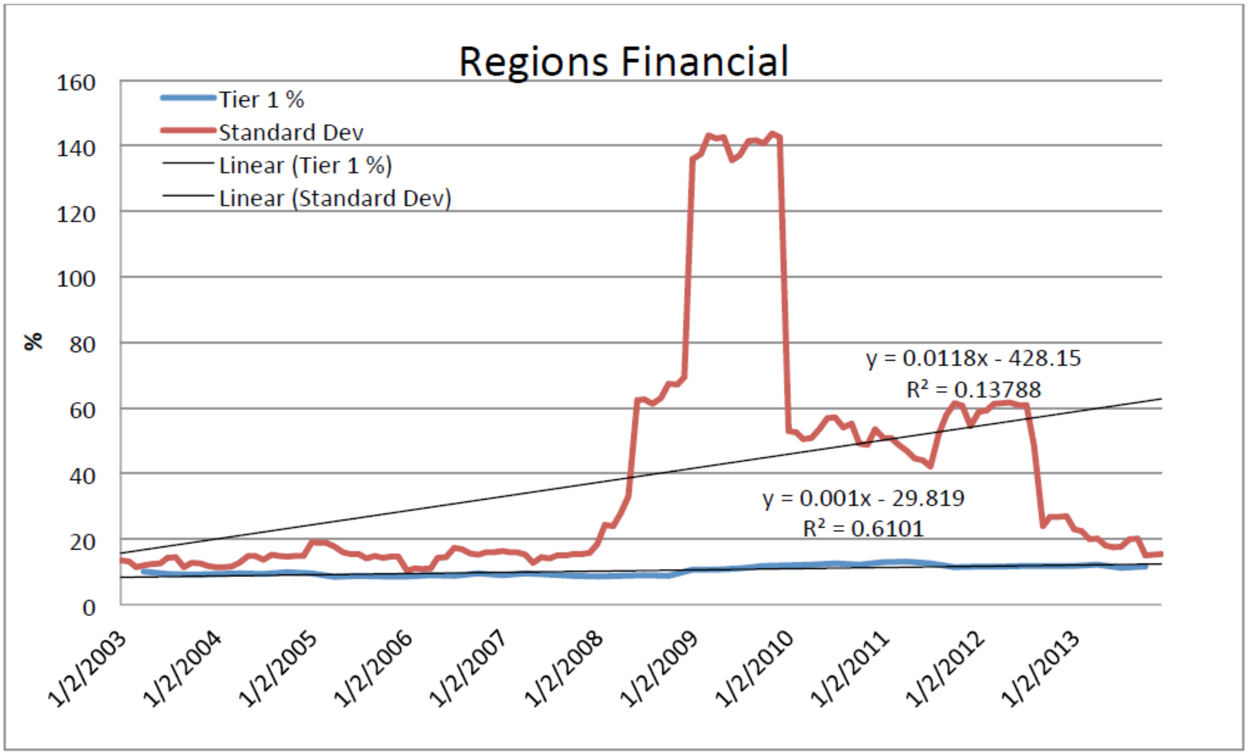

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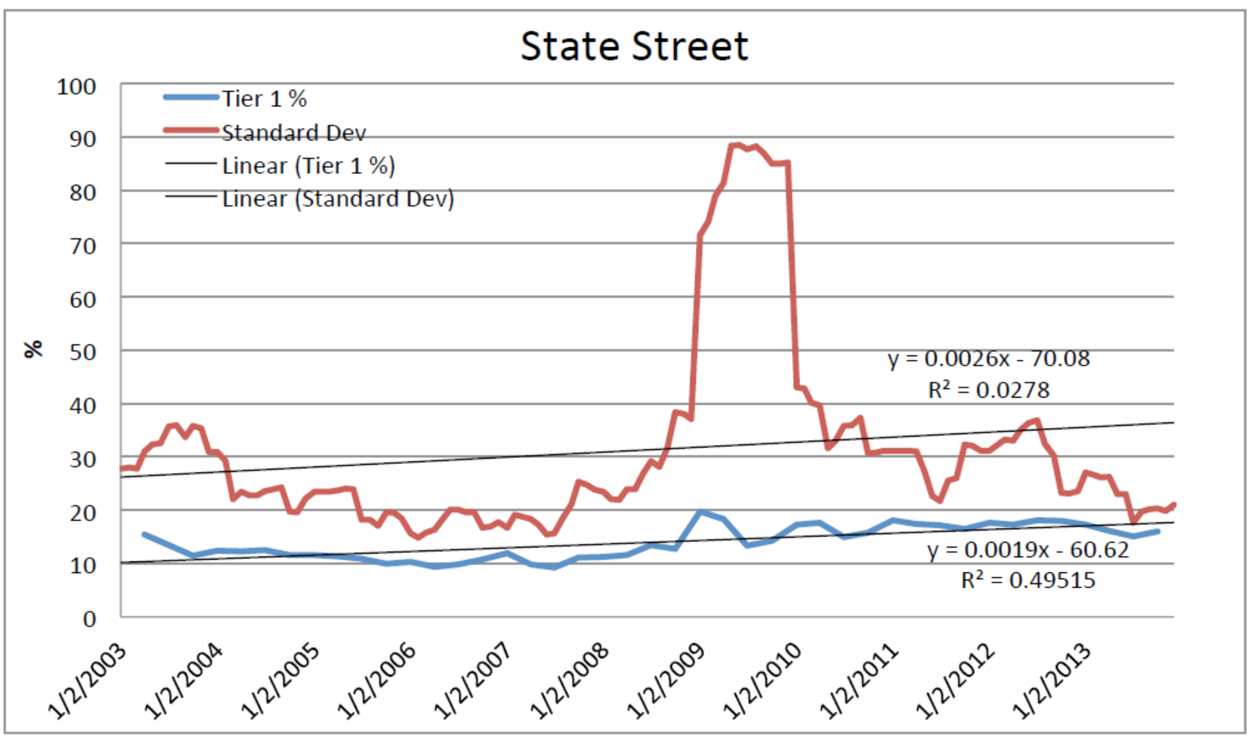

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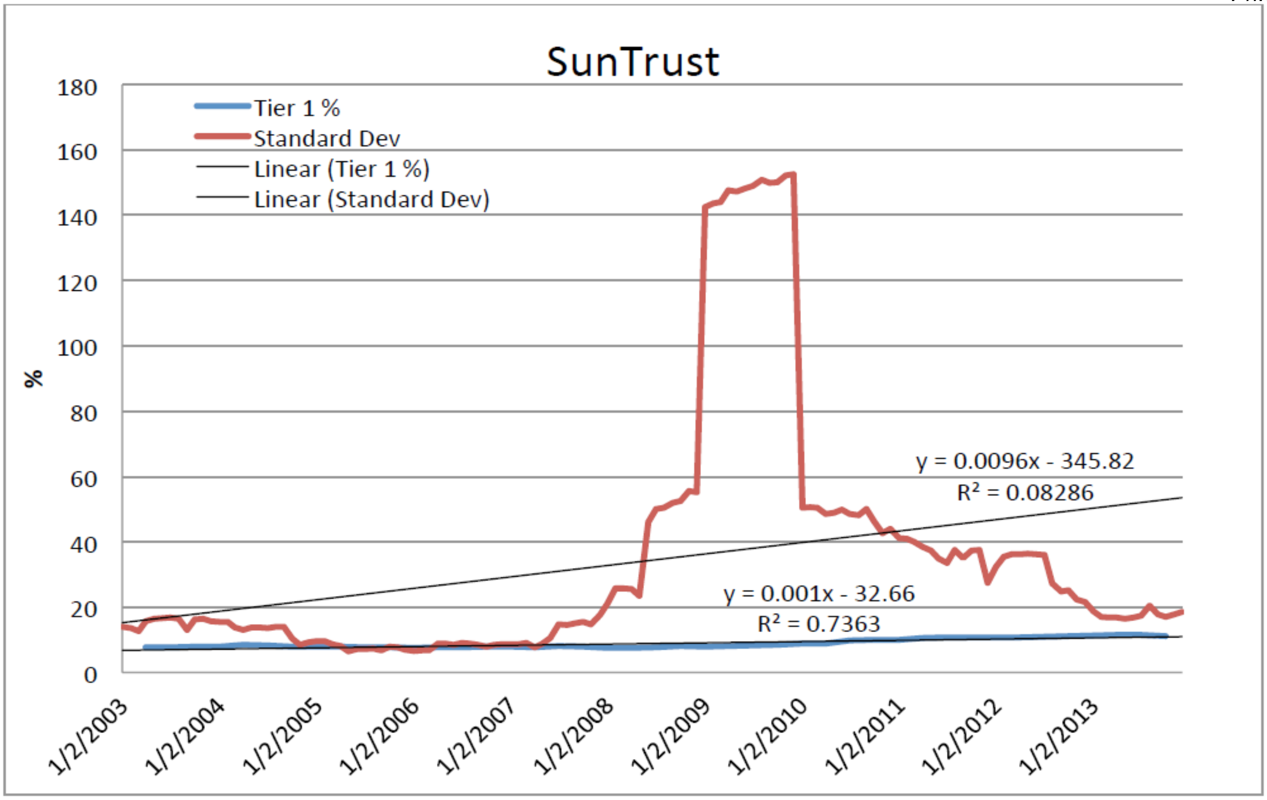

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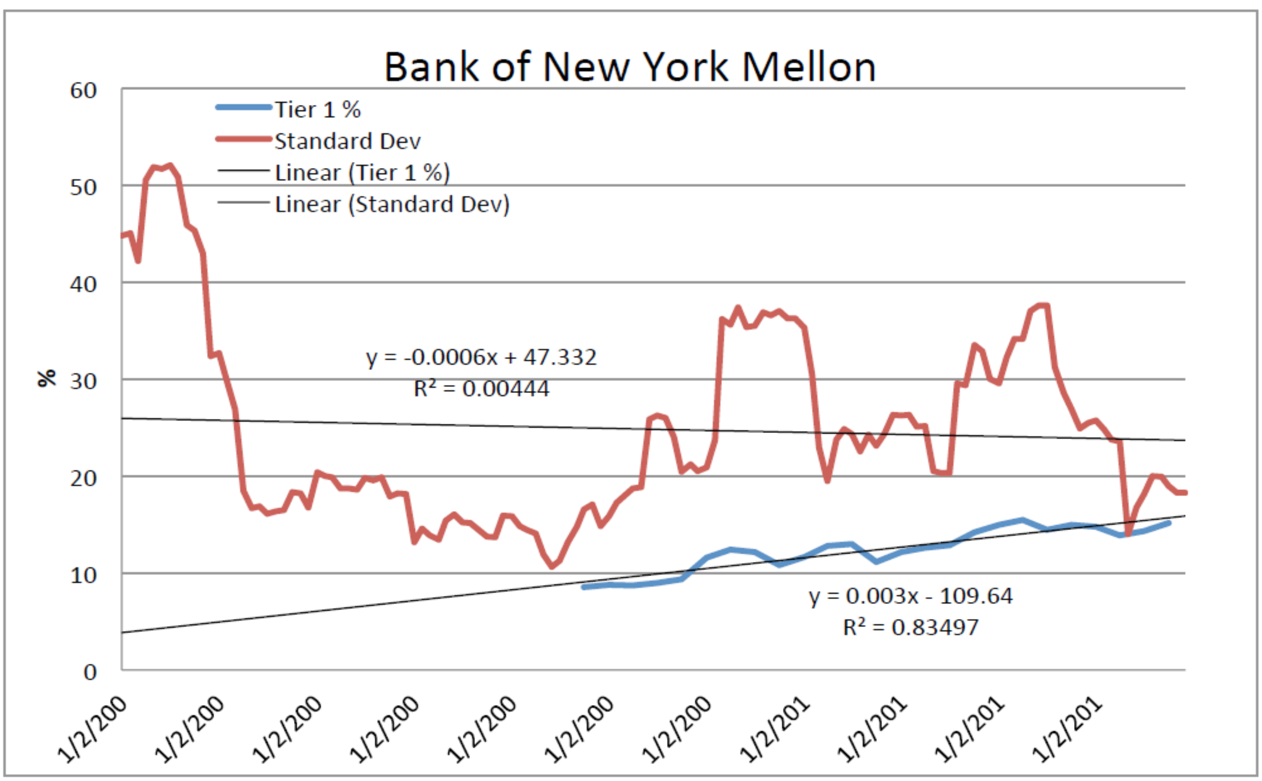

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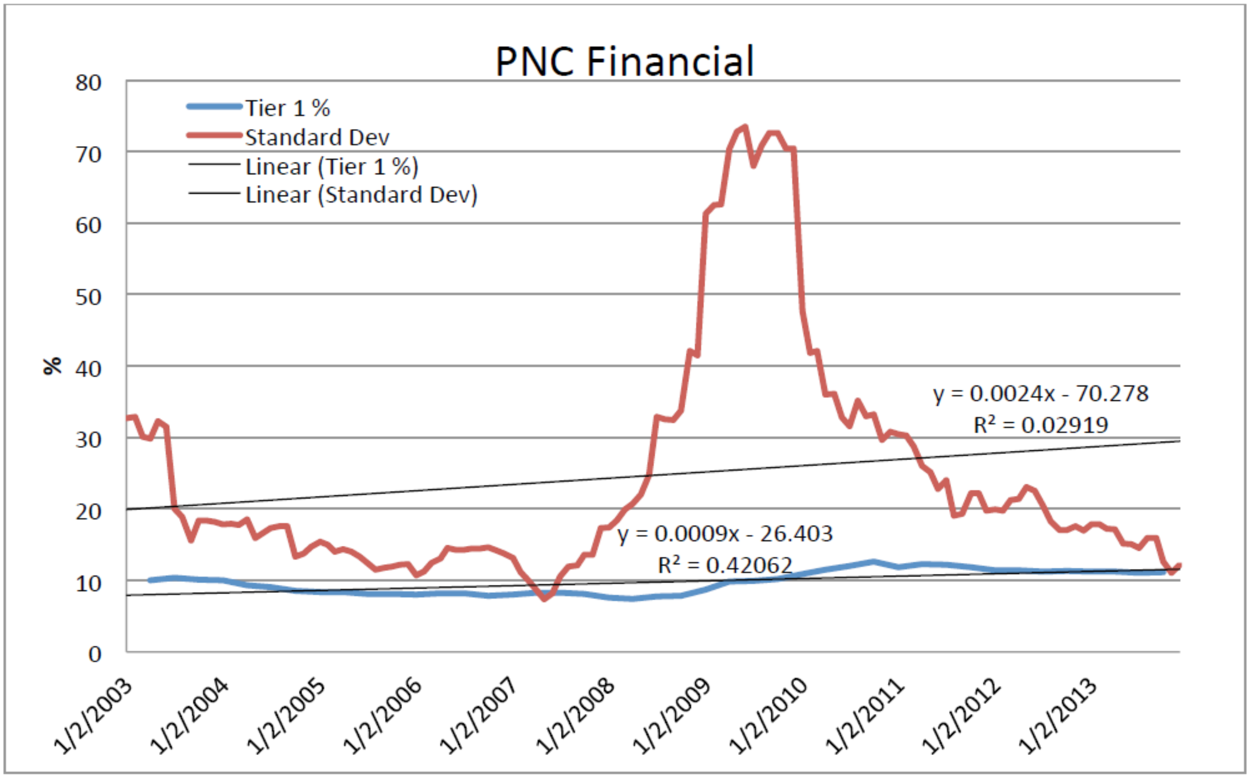

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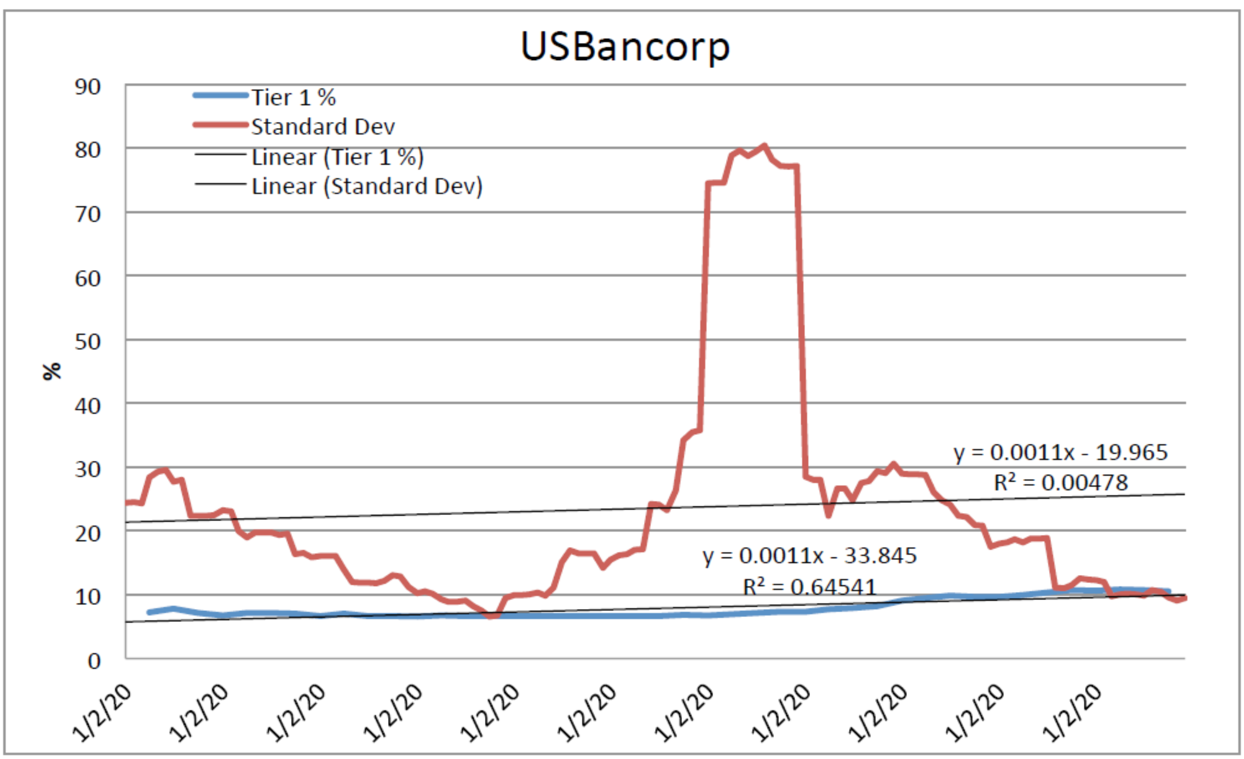

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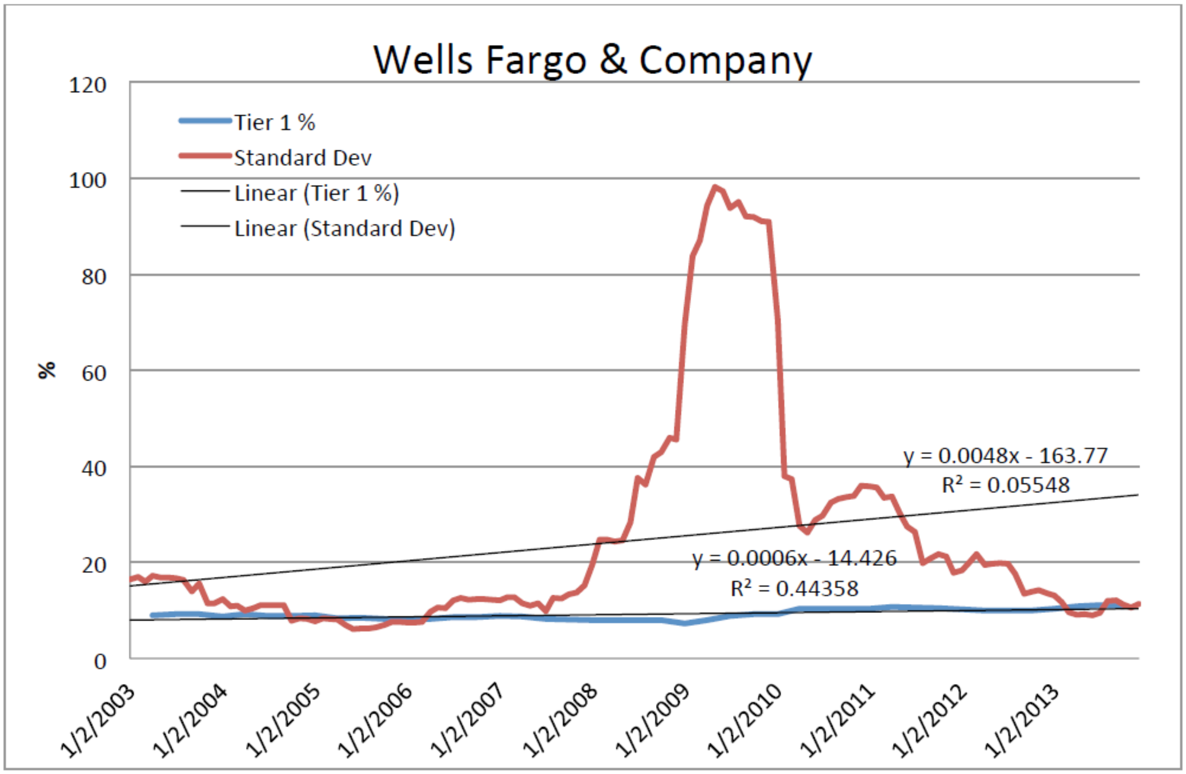

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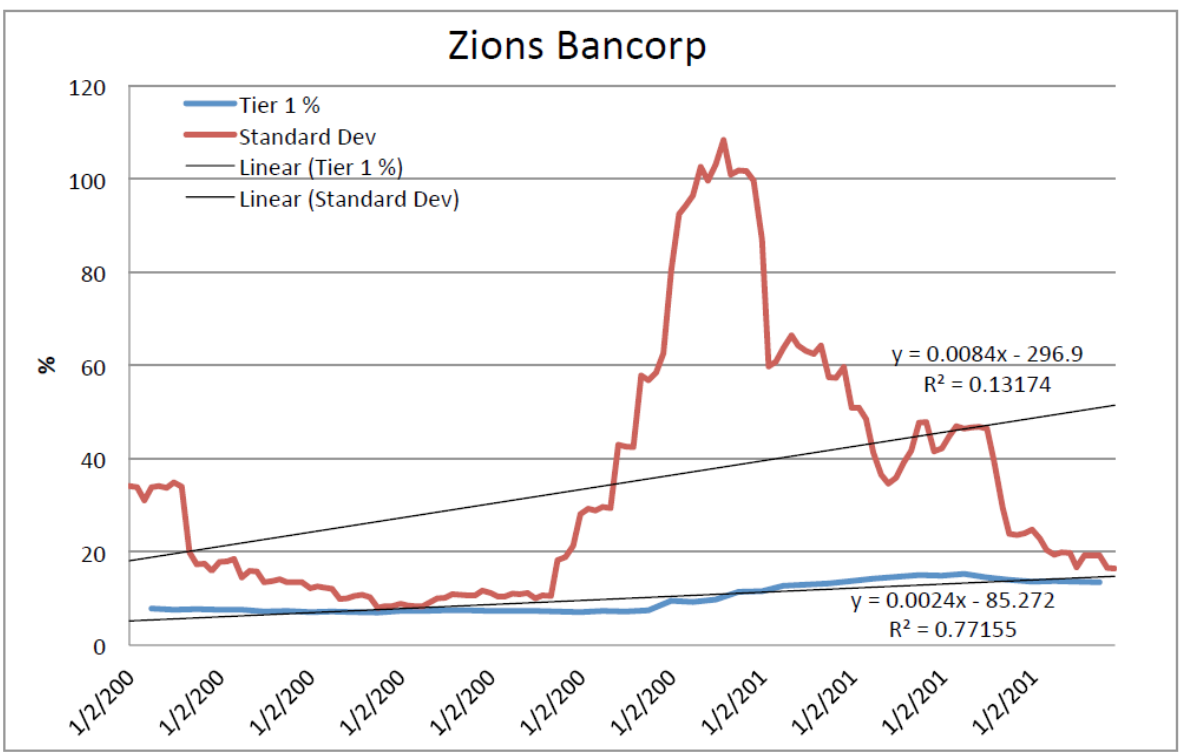

Figure 24

ASSOCIATION BETWEEN PRE IPO EARNINGS MANAGEMENTS AND POST IPO INSTITUTIONAL OWNERSHIP DRIFTS

Kyung Joo Lee, University of Maryland-Eastern Shore
John Jongdae Jin, California State University-San Bernardino
Diane Li, University of Maryland-Eastern Shore

ABSTRACT

The purpose of this study is to investigate how earnings management before IPO affects institutional ownership changes after IPO. It is hypothesized that there is a negative association between the pre IPO earnings managements and post IPO institutional ownership drifts. Using a sample of 302 IPO's, we find that the association between pre IPO earnings managements and post IPO institutional ownerships get weaker over time so that the association becomes statistically insignificant by the end of the first year after IPO's. We also find that the association between pre IPO earnings managements and post IPO institutional ownership changes is a statistically significantly negative over the period between the IPO year and 2 years after that. Both results support the hypothesis. These results hold after controlling for other influencing factors such as market performance, initial offer price, underwriter reputation, and offer fraction. The results are robust across different measures of variables and testing methods.

INTRODUCTION

IPO's may be one of few opportunities where stock issuing firms have significant information asymmetry over general investment public and hence can take advantage of this superior information for their own benefits. Some of those benefits stock issuing firms can entertain through IPO's could be benefits from attracting more institutional owners in the firms because institutional investors usually provide diverse benefits to their investee firms ranging from monitoring/consulting services, better performances, higher spending on R & D, to saving transaction costs. One way for IPO firms to make themselves attractive to institutional investors could be window dressing their financials through aggressive earnings managements, which is working under information asymmetry between IPO firms and general investors including institutional investors. Sun et al. (forthcoming) addressed this issue and found supporting empirical evidence: i.e., IPO firms with more aggressive earnings managements tend to have stronger presence of institutional ownerships than IPO firms without them immediately after IPO's. If this is true, a natural extension of this issue would be how this strong presence of institutional investors inflated by aggressive earnings managements will change after IPO's as the information asymmetry between IPO firms and investors fade away.

The purpose of this study is to investigate this issue of institutional ownership changes after IPO's in conjunction with earnings managements before IPO's. It is hypothesized that there is a negative association between the pre IPO earnings managements and post IPO institutional ownership drifts.

The remainder of this paper is organized as follows. First, a hypothesis is developed through a review of previous literatures and logical reasoning. Then, sample selection and measurement of variables are described. The empirical tests and their results are followed. In the final section, conclusions are addressed.

HYPOTHESIS DEVELOPMENT

It is well documented that institutional investors tend to make diverse value adding contributions to their investee firms in previous studies. For examples, Clyde (1997) finds that institutional ownership is directly related to the benefits of policing firms. Stoughton et al. (1998) & Sun et al. (2008) suggest that institutional investors provide monitoring functions to improve their performances. Field et al. (forthcoming) find that IPO firms with greater institutional ownerships outperform those with smaller institutional ownerships. Baysinger et al. (1991) find that the institutional ownership has a positive impact on corporate R & D spending. Fernando et al. (2004) suggest that IPO firms with greater institutional ownerships have lower mortality rates than others with smaller institutional ownerships. Therefore, there seems to be strong incentives for IPO firms to attract institutional investors at IPO.

Earnings managements can be an effective means of attracting institutional investors at IPO's where there are significant information asymmetries between IPO firms and investors. It is because even intelligent and sophisticate investors like institutional investors could be fooled by artificially inflated earnings through aggressive earnings managements by IPO firms when market-determined price information is not available and most financial information about IPO firms is provided by IPO firms themselves. Previous studies on IPO's show that IPO firms do engage in aggressive earnings managements to take advantage of severe information asymmetries at IPO's for their economic benefits. For examples, Chaney & Lewis (1995) find that earnings managements affect firm values with an information asymmetry. Friedlan (1994) also shows that IPO firms make income increasing discretionary accruals in financial statements released before IPO's to increase offer prices. Since inflated earnings by aggressive earnings managements may increase the initial offer price and be perceived as better performances by investors at IPO's, institutional investors who prefer high price stocks and better performers would buy more of IPO stocks. (See Gompers and Metrick (2001), and Fernando et al. (2004))

However, the increased presence of institutional ownerships by aggressive earnings managements may disappears as the true earnings become available with diminishing information asymmetry after IPO's. Prior studies have shown that pre-IPO aggressive earnings managements increase initial firm value at IPO's but decrease subsequent returns to investors after IPO's. For example, Ducharme et al. (2001) find a positive relation between pre-IPO discretionary accruals (a measure of aggressive earnings management) and initial firm value but a negative relation between initial discretionary accruals and subsequent firm performance. Similarly, Teoh et al. (1998) report a significant negative relation between discretionary accruals in the IPO offer year and stock returns over a three-year post-IPO period. Teoh et al. (1998a) find evidence that IPO firms, on average, have high positive issue-year earnings and discretionary accruals, followed by poor long-run earnings and negative discretionary accruals.

This reversal of institutional ownerships could take long because of transaction costs and various value adding contributions of institutional investors to IPPO firms after IPO's. Therefore, a testable hypothesis derived here from would be

Hypothesis: *There is a negative association between the pre IPO earnings managements and post IPO institutional ownership drifts.*

SAMPLE SELECTION AND DATA

Our initial sample of IPO issuers are obtained from the IPO database of Hoovers Incorporated. The sample period extends from April 1997 to December 2002. Several selection criteria are applied sequentially. First, financial institutions and utility firms are excluded because they are in regulated industries and hence usually have different behaviors than unregulated firms do. Also, the sample excludes ADRs because ADRs are subject not only to US regulations but also to regulations of foreign country where their base stocks are listed and traded. Firms with offer price less than one dollar (penny stocks) and firms with offer size less than one million dollars are excluded. It is because institutional investors, in general, do not invest in penny stocks and small offers. Finally, relevant data availability in COMPUSTAT data files over the period of six years surrounding each IPO (i.e., t= [-2, -1, 0, 1, 2, 3]) is required. These selection criteria yield the initial sample of 302 IPO issuers.

MEASUREMENTS OF VARIABLES

The earnings management is measured by discretionary accruals which are differences between total accruals and the expected benchmark accruals (nondiscretionary accruals). The nondiscretionary accruals are industry wide accruals, varying across firm and industry characteristics, while discretionary accruals are firm specific accruals. Cross-sectional modified Jones model was used to estimate discretionary accruals of each IPO firm (Jones, 1991; Dechow et al., 1995; Teoh et al., 1998a). Cross-sectional method is used because a time series approach is not possible for IPO's. The cross-sectional approach has an additional advantage in that it incorporates changes in accruals resulting from changes in economic conditions for the industry as a whole.

The institutional ownership data are obtained from the 13F filings reported in the database of Thomson One Banker. We measure institutional ownership by 'the percentage of shares owned by all institutional investors' at the end of first quarter after IPO. We also used 'the number of institutional owners' as an additional measure of institutional ownership. The results are basically the same.

Other variables that are proven to affect institutional ownerships are market performance, offer price, offer fraction, and underwriter reputation (see Fernando et. al. (2004), Field & Lowry (forthcoming), and Lee et. al (forthcoming)). These variables are used in sample description and regression analyses as control variables. These variables are measured as follows:

1. *Offer price* (OPRC): initial price at which shares were offered at IPO.
2. *Market Performance* (MPFM): stock returns as measured by the buy-and-hold strategy from IPO date to Year1 or Year2. Abnormal returns adjusted by market returns (equally- or value-weighted) were also used.
3. *Offer fraction* (OFRC): the number of shares offered as a fraction of total number of shares outstanding.
4. *Underwriter Reputation* (UWRP): underwriter reputation based on the rankings of Carter and Manaster (1990), and updated according to the information in Jay Ritter's website.

Descriptive statistics of the above variables are presented in Table 1. On average, the IPO firms in the sample have about $879 million in market value after IPO's. Mean (median) value of offer price is $14.77 ($14.00), while mean (median) value of institutional ownerships after IPO's is 25.60% (21.00%). Mean (median) of offer fraction is 29.82% (median of 24.35%). The sample firms appear to choose highly reputed underwriters with mean (median) rank of 8.15 (9.10) out of 10 point scale.

Table 1
DESCRIPTIVE STATISTICS FOR SELECTED VARIABLES

Variables	Mean	Standard Deviation	Quartiles		
			25%	50%	75%
Discretionary accruals (DAC)	-0.128	0.321	-0.251	-0.057	0.056
Offer price (OPRC): ($)	14.77	7.37	11.00	14.00	17.50
Offer fraction (OFRC): (%)	29.82	20.49	17.62	24.35	33.33
Underwriter Reputation (UWRP)	8.15	1.51	8.10	9.10	9.10
Institutional Ownership (INOS): (%)	25.60	18.50	13.00	21.00	32.00

EMPIRICAL TESTS AND RESULTS

Two testing methods are used to investigate the hypothesis in this study. The first method is testing on changes in the association between earnings managements and institutional ownerships over time. If the association gets weaker over time after IPO's, the effect of earnings managements on institutional ownerships diminish over time, supporting the hypothesis. The second method is testing on associations between earnings managements and changes in institutional ownerships. If the association turns out to be significantly negative after IPO's, earnings managements have negative impacts on institutional ownership changes. It may indicate that aggressive earnings managements before IPO's that increase institutional ownerships at IPO's induce bigger drops in institutional ownerships after IPO's.

Tests on Changes in Association between Earnings Managements and Institutional Ownerships

In order to examine the change in association between institutional ownerships and earnings managements over time, the following simple regression is estimated at four different points in time: i.e., at the end of the first quarter after IPO (Quarter 1), at the end of year of IPO (Year 0), at the end of the first year after IPO (year 1), and at the end of the second year after IPO (Year 2).

$$INOS_i = \beta_0 + \beta_1 EMGT_i + \varepsilon \quad (1)$$

Where: $INOS_i$ = institutional ownership, defined as the percentage of shares owned by all institutions,
$EMGT_i$ = discretionary accruals in year t-1 (one year before IPO).

Table 2 presents the results from regression model (1) for four different points in time. The regression coefficients of EMGT for Quarter 1, Year 0, Year 2, and Year 2 are 0.085, 0.068, 0.070, and 0.020, respectively. The regression coefficient of EMGT for Quarter 1 of 0.085 is statistically significant at 1% significant level, while that for Year 0 of 0.068 is statistically significant at 5% significant level. The other two regression coefficients are not significant at any meaningful level of significance.

Table 2
EFFECT OF PRE-IPO EARNINGS MANAGEMENT ON POST-IPO INSTITUTIONAL OWNERSHIP: SIMPLE REGRESSION ANALYSIS

$$INOS_i = \beta_0 + \beta_1 EMGT_i + \varepsilon$$

Independent Variables	Expected Signs	Quarter 1	Year0	Year1	Year2
		Coefficients (t-value)	Coefficients (t-value)	Coefficients (t-value)	Coefficients (t-value)
Intercepts		0.267 (23.50)***	0.330 (25.64)***	0.395 (24.70)***	0.436 (25.47)***
EMGT	+	0.085 (2.57)**	0.068 (1.84)*	0.070 (1.51)	0.024 (0.49)
Adj. R^2 (%)		1.84	0.78	0.42	0.00
F-value (p-value)		6.63 (0.011)**	3.37 (0.067)*	2.27 (0.133)	0.24 (0.627)

***: Significant at $\alpha<0.01$; **: significant at $\alpha<0.05$; *: significant at $\alpha<0.10$;

These results show that the effect of earnings managements on institutional ownerships diminishes from very significant (Quarter 1), significant (Year 0), to insignificant (after Year 0). In other words, the association between earnings managements and institutional ownerships gets weaker over time, which supports the hypothesis stating a negative association between pre IPO earnings managements and post IPO institutional ownership drifts.

As an attempt to investigate if this result holds after controlling for the other influencing variables mentioned above, the following multiple regression model is estimated:

$$INOS_i = \beta_0 + \beta_1 EMGT_i + \beta_2 OPRC_i + \beta_3 UWRP_i + \beta_4 OFRC_i + \varepsilon \quad (2)$$

Where: $EMGT_i$ = discretionary accruals in year t-1 (one year before IPO),
$OPRC_i$ = initial offer price,
$UWRP_i$ = underwriter reputation for i^{th} firm, measured by the rankings of Carter and Manaster (1990), and updated according to the information in Jay Ritter's website,
$OFRC_i$ = offer fraction, defined as the number of shares offered divided by total number of shares outstanding after IPO.

Results from the regression model (2) are presented in Table 3. Results from the multiple regression model (2) are essentially the same as those from the regression model (1). The regression coefficient of EMGT for Quarter 1 of 0.087 is statistically significant at 1% significant level, while that for Year 0 of 0.068 is statistically significant at 5% significant level. The other two regression coefficients for Year 1 and Year 2 (1.54 and 0.52, respectively) are not significant. Even after controlling for the other influencing variables, we still have weakening associations between pre IPO earnings managements and post IPO institutional ownerships over time, which is consistent with the hypothesis.

Table 3
EFFECT OF PRE-IPO EARNINGS MANAGEMENT ON POST-IPO INSTITUTIONAL OWNERSHIP: MULTIPLE REGRESSION ANALYSIS

$$INOS_i = \beta_0 + \beta_1 EMGT_i + \beta_2 OPRC_i + \beta_3 UWRP_i + \beta_4 OFRC_i + \varepsilon$$

Independent Variables	Expected Signs	Quarter 1	Year0	Year1	Year2
		Coefficients (t-value)	Coefficients (t-value)	Coefficients (t-value)	Coefficients (t-value)
Intercepts	?	-0.089 (1.14)	-0.113 (1.28)	-0.156 (1.43)	-0.198 (1.70)*
EMGT	+	0.087 (2.70)***	0.068 (1.87)*	0.070 (1.54)	0.025 (0.52)
OPRC	+	0.056 (1.91)*	0.089 (2.66)***	0.111 (2.70)***	0.125 (2.85)***
UWRP	+	0.019 (2.49)**	0.021 (2.40)**	0.028 (2.54)**	0.034 (2.94)***
OFRC	+	0.173 (3.44)***	0.134 (2.34)**	0.115 (1.61)	0.101 (1.34)
Adj. R^2 (%)		8.82	8.00	7.61	8.44
F-value (p-value)		8.28 (0.000)***	7.54 (0.000)***	7.20 (0.000)***	7.94 (0.000)***

***: Significant at α<0.01; **: significant at α<0.05; *: significant at α<0.10;

Tests on Association between Earnings Managements and Changes in Institutional Ownerships

As a more direct attempt to examine the hypothetical relationship between pre IPO earnings managements and post IPO institutional ownership drifts, the following simple regression model is estimated.

$$\Delta INOS_i = \beta_0 + \beta_1 EMGT_i + \beta_2 MPFM_i + \varepsilon \qquad (3)$$

Where: $\Delta INOS_i$ = changes in institutional ownerships.
$EMGT_i$ = discretionary accruals in year t-1 (one year before IPO).
$MPFM_i$ = stock returns as measured by the buy-and-hold strategy from IPO dates to Year 1 or Year 2.

MPFM, a market performance measure, is included in the regression model for a control purpose because the market performance of stocks is supposed to be very important determinant of investment decisions. Results from regression model (3) are presented in Table 4.

Table 4
EFFECT OF PRE-IPO EARNINGS MANAGEMENT ON THE *CHANGES* IN POST-IPO INSTITUTIONAL OWNERSHIP: AFTER CONTROLLING FOR MARKET PERFORMANCE

$$\Delta INOS_i = \beta_0 + \beta_1 MPFM_i + \beta_2 EMGT_i + \varepsilon$$

		Number of Institutional Owners		Percentage of Shares Owned by All Institutions	
Independent Variables	Expected Signs	Year1 - Year0	Year2 – Year0	Year1 - Year0	Year2 – Year0
		Coefficients (t-value)	Coefficients (t-value)	Coefficients (t-value)	Coefficients (t-value)
Intercepts	?	0.324 (6.08)***	0.606 (4.39)***	0.062 (6.52)***	0.085 (6.75)***
MPFM	+	0.337 (9.12)***	0.648 (9.68)***	0.024 (3.66)***	0.036 (5.88)***
EMGT	-	0.013 (0.08)	-1.235 (3.10)***	-0.013 (0.47)	-0.096 (2.66)***
Adj. R^2 (%)		21.46	28.06	3.71	12.96
F-value (p-value)		47.71 (0.0001)***	49.17 (0.001)***	6.76 (0.0013)***	19.46 (0.0001)***

***: Significant at α<0.01; **: significant at α<0.05; *: significant at α<0.10;

$\Delta INOS_i$ are measured over two different time periods using two different methods. Changes in institutional ownerships between Year 0 and Year 1and those between Year 0 and Year 2 are used. Over the two time periods mentioned, changes in institutional ownerships are measured by the changes in number of institutional ownerships or by the changes in the percentage of institutional ownerships in total shares outstanding. The regression coefficients of EMGT for the period between Year 0 and Year 1 are statistically insignificant across the different measures of $\Delta INOS_i$, which means no meaningful association between pre IPO earnings managements and institutional ownership changes over one year period between Year 0 and year 1.

On the other hand, the regression coefficients of EMGT for the period between Year 0 an Year 2 are -1.235 and -0.096 for changes in number of institutional owners and changes in percentage of institutional ownerships, respectively. Both regression coefficients are statistically significant at 1% significance level, which means a negative association between pre IPO earnings managements and post IPO institutional ownership changes over the 2 year period between Year 0 and year 2. This is supporting the hypothesis.

In order to investigate if the above results presented in Table 3 hold even after controlling the other influencing variables such as initial offer price, underwriter reputation, offer fraction, the following multiple regression model is estimated, again.

$$\Delta INOS_i = \beta_0 + \beta_1 EMGT_i + \beta_2 OPRC_i + \beta_3 UWRP_i + \beta_4 OFRC_i + \beta_2 MPFM_i + \varepsilon \qquad (4)$$

Where: $EMGT_i$ = discretionary accruals in year t-1 (one year before IPO),
$OPRC_i$ = initial offer price,
$UWRP_i$ = underwriter reputation for i^{th} firm, measured by the rankings of Carter and Manaster (1990), and updated according to the information in Jay Ritter's website,
$OFRC_i$ = offer fraction, defined as the number of shares offered divided by total number of shares outstanding after IPO.

Results from the multiple regression model (4) presented in Table 5 are consistent with those in Table 3. The regression coefficients of EMGT for the period between Year 0 and Year 1 are statistically insignificant for both measures of institutional ownership changes, indicating no meaningful relationship between pre IPO earnings managements and post IPO institutional ownership changes during one year period between Year 0 and year 1.

On the other hand, the regression coefficients of EMGT for the period between Year 0 and year 2 are -1.235 and -0.096 for changes in number of institutional owners and changes in percentage of institutional ownerships, respectively. Both regression coefficients are statistically significant at 1% significance level, which means a negative association between pre IPO earnings managements and post IPO institutional ownership changes over the 2 year period between Year 0 and year 2. This is supporting the hypothesis that there is a negative association between pre IPO earnings managements and post IPO institutional ownership drifts.

Another interesting observation presented in Tables 4 and 5 is the regression coefficient of the market performance measure, MPFM. The regression coefficient of MPFM is statistically significantly positive across all time periods and different institutional ownership change measures, which confirms a common belief that investors in general including institutional investors invest more in the better performing stocks.

In sum, the results from tests on changes in associations between pre IPO earnings managements and post IPO institutional ownership presented in Tables 2 and 3 suggest that the association between pre IPO earnings managements and post IPO institutional ownerships get weaker over time so that the association becomes statistically insignificant by the end of the first year after IPO's. The results from tests on associations between pre IPO earnings managements and changes in post IPO institutional ownerships presented in Tables 4 and 5 suggest that the association is a statistically significantly negative over the 2 year period between the IPO year and 2 year after that. Thus, all empirical results support the hypothesis stating a negative association between pre IPO earnings managements and post IPO institutional ownership drifts.

Table 5
EFFECT OF PRE-IPO EARNINGS MANAGEMENT ON THE *CHANGES* IN POST-IPO INSTITUTIONAL OWNERSHIP: AFTER CONTROLLING FOR MARKET PERFORMANCE AND OTHER IPO-RELATED VARIABLES

$$\Delta INOS_i = \beta_0 + \beta_1 MPFM_i + \beta_2 EMGT_i + \beta_3 OPRC_i + \beta_4 UWRP_i + \beta_5 OFRC_i + \varepsilon$$

		Number of Institutional Owners		Percentage of Shares Owned by All Institutions	
Independent Variables	Expected Signs	Year1 - Year0	Year2 – Year0	Year1 - Year0	Year2 – Year0
		Coefficients (t-value)	Coefficients (t-value)	Coefficients (t-value)	Coefficients (t-value)
Intercepts	?	0.324 (6.08)***	0.606 (4.39)***	0.062 (6.52)***	0.085 (6.75)***
MPFM	+	0.337 (9.12)***	0.648 (9.68)***	0.024 (3.66)***	0.036 (5.88)***
EMGT	-	0.013 (0.08)	-1.235 (3.10)***	-0.013 (0.47)	-0.096 (2.66)***
OPRC	?	-0.007 (1.03)	-0.005 (0.26)	-0.000 (0.07)	0.002 (1.23)
UWRP	?	-0.008 (0.24)	0.025 (0.28)	0.007 (1.18)	0.012 (1.50)
OFRC	?	0.024 (0.10)	-1.093 (1.70)*	-0.015 (0.35)	-0.106 (1.83)*
Adj. R^2 (%)		21.05	28.12	3.32	15.58
F-value (p-value)		16.89 (0.0001)***	20.33 (0.001)***	3.05 (0.0106)**	10.15 (0.0001)***

***: Significant at α<0.01; **: significant at α<0.05; *: significant at α<0.10;

CONCLUSION

The purpose of this study is to investigate how aggressive earnings management before IPO affects institutional ownership changes after IPO. It is hypothesized that there is a negative association between the aggressiveness of earnings management before IPO's and institutional ownership drifts after IPO's.

Using a sample of 302 IPO firms between 1997 and 2002, we find empirical results supporting our hypothesis. The results show that the association between pre IPO earnings managements and post IPO institutional ownerships get weaker over time so that the association becomes statistically insignificant by the end of the first year after IPO's. The results also show that the association between pre IPO earnings managements and post IPO institutional ownership changes is a statistically significantly negative over the 2 year period between the IPO year and 2 years after that. Thus, all empirical results support the hypothesis stating a negative association between pre IPO earnings managements and post IPO institutional ownership drifts. Inflated presence of institutional investors surrounding IPO's due to information asymmetry and aggressive earnings managements gradually fade away after IPO's.

These results hold even after controlling for the other influencing variables on post-IPO institutional ownership changes such as market performance, initial offer price, underwriter reputation, and offer fraction. These results are robust across different measures of variables and testing methods.

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THE ASSOCIATION BETWEEN FINANCIAL LITERACY AND TRUST IN FINANCIAL MARKETS AMONG NOVICE NONPROFESSIONAL INVESTORS

Lee M. Kersting, Northern Kentucky University
Robert N. Marley, University of Tampa
Mark J. Mellon, University of South Florida

ABSTRACT

This study contributes to the capital markets literature by examining the association between novice nonprofessional investors' financial literacy and their trust in financial markets and individuals who operate those markets. We apply psychological contract theory to a financial market setting to predict that financial literacy will be negatively associated with trust in financial markets. In an experimental setting, we provide novice nonprofessional investors with an instrument used to assess financial literacy and their trust in financial markets. Controlling for investing experience, age, gender, and propensity for risk, we find a negative association between novice nonprofessional investors' financial literacy and their trust in financial markets. Our findings should be of interest to policy makers and financial market practitioners, potentially prompting future research to examine the effect of novice nonprofessional investors' financial literacy on their financial market participation.

INTRODUCTION

A growing number of individuals are required to make their own investment decisions as private enterprise shifts from offering employees defined-benefit retirement plans in favor of providing defined-contribution retirement plans (Franklin, 2011). This shift requires individuals to take a more direct role in making long-term investment decisions, forcing many individuals to assume a new and unfamiliar role as a novice nonprofessional investor (Campbell, Jackson, Madrian & Tufano, 2011; Dorfman, 2013). Given that all investment decisions require an act of faith (i.e., trust) on the part of the investor, research that examines the effects of trust on investors' financial decisions is important to academia, policy makers, and financial market practitioners (Guiso, Sapienza & Zingales, 2008). Accordingly, the specific purpose of this study is to apply a theoretical basis to explain how novice nonprofessional investors' financial literacy (an antecedent of trust) affects their trust in the financial markets and in the individuals who operate the financial markets. This study defines financial literacy as the knowledge one has of concepts inherent to investing and to the operation of financial markets in general (Mandell, 2006).[1]

Recognizing the literature is replete with various definitions of trust, this study follows the definition provided by Sapienza and Zingales (2012): "the expectation that another person or institution will perform actions that are beneficial, or at least not detrimental, to us regardless of our capacity to monitor those actions." Accordingly, an individual's decision to commit funds to a market-traded security requires that the individual trust the financial markets and the individuals involved in operating financial markets to function as intended (Changwony, Campbell & Tabner, 2014).

While a robust stream of literature demonstrates that trust affects investors' participation in financial markets (Van Rooij, Lusardi & Alessie, 2011; Mayer, 2008; Guiso et al. 2008; Guiso, 2010; Georgarakos & Pasini, 2011), a paucity of research examines variables that affect trust itself. Given that many individuals are increasingly required to make their own investment decisions, an examination of variables that affect novice nonprofessional investors' trust is needed to establish a greater understanding of how trust can be fostered. Policy makers, in particular, should be especially interested in research that examines variables affecting novice nonprofessional investors' trust because: (1) novice nonprofessional investors' financial market participation rates are low, (2) their participation has declined significantly since the financial crisis, and (3) those novice nonprofessional investors who choose participate in financial markets remain chronically underinvested (Guiso, Haliassos & Jappelli, 2002; Changwony et al. 2014). By more thoroughly understanding the factors affecting trust, policy makers can pursue empirically sound policies to improve novice nonprofessional investors' trust, ultimately encouraging greater participation in financial markets.[2]

Psychological contract theory concerns the mutual expectations regarding inputs and outputs owed to individuals which arise from the relationship existing between an individual and another party (Rousseau, 1989; Morrison & Robinson, 1997). Extending psychological contract theory from a labor market setting to a financial market setting, we predict novice nonprofessional investors' financial literacy will have a negative association with novice nonprofessional investors' trust in financial markets and the individuals who operate them. Research that applies psychological contract theory in labor market contexts demonstrates that as an employee become increasingly mature, that is, as an employee gains greater knowledge, the employee requires more of his expectations to be written into a formal labor contract (Shruthi & Hermanth, 2012). Less knowledgeable employees permit more of their expectations to exist in a non-written "psychological" contract (Shruthi & Hermanth, 2012). Thus, knowledgeable employees are less trusting of their employer than less knowledgeable employees. Extending this research to a financial market setting, we predict that more knowledgeable investors will be less trusting of financial markets and in the individuals who operate the financial markets.

We conducted an experiment in which novice nonprofessional investors completed two questionnaires; one questionnaire assessed investors' financial literacy and their propensity for risk while the other assessed investors' degree of trust in the financial markets. As predicted, we find a negative association between investors' financial literacy and their trust in financial markets and the individuals involved with operating financial markets, thereby suggesting the more knowledgeable investors are, the less trusting they are in the financial markets.

Our findings contribute to the academic literature by providing a theoretical basis to explain empirical evidence that suggests investors' financial literacy negatively affects their trust in financial markets. Consequently, our results should also be of interest to policy makers seeking both to influence the public's trust in the financial markets and to encourage greater financial market participation.

The remainder of the study is organized as follows. The next section provides a review of the trust and financial literacy literature, discusses the main research questions addressed by this literature, and develops our theory-based hypothesis. Then, details of our participants and the method we used to test our hypothesis are discussed. The fourth section presents our empirical results and analysis. Finally, we summarize our results, discuss this study's limitations, and provide suggestions for future research.

LITERATURE REVIEW

Trust

Trust is an important element in free market transactions and is an essential precondition for financial market participation because investing requires individuals to part with their money in exchange for promises of capital appreciation or dividends (Arrow, 1972). Sapienza and Zingales (2012) go so far as to suggest that investments would cease to exist in the absence of trust. Until recently, empirical work largely ignored the role of trust in explaining stock market participation. Although there is scant research assessing the impact of trust on financial market participation, there are a few studies that have analyzed trust and its impact on financial decision-making by focusing broadly on either public trust, generalized trust, or personalized trust.[3] These areas of trust research are described below.

Public trust can be broadly defined as a society's level of trust which arises from environmental, societal, and institutional differences between countries (Zak & Knack, 2001). The extant literature suggests that public trust has a direct effect on decision-making and thus an indirect effect on financial markets. For instance, public trust has been shown to be positively correlated with economic growth (Carlin, Dorobantu & Viswanathan, 2009). In addition, public trust is also positively correlated with prospective investors' participation in the stock market (Carlin et al. 2009). The results support the idea that trust is paramount to investment decisions and that without trust the financial markets may not exist (Arrow, 1972; Sapienza & Zingales, 2012).

Generalized trust refers to whether individuals feel that people are generally trustworthy or whether individuals must be careful when dealing with others (Guiso et al. 2008).[4] Therefore, generalized trust is not directed toward a specific party or entity. The extant literature demonstrates that generalized trust partially explains households' decisions to invest in the stock market (Guiso et al. 2008; Sapienza & Zingales, 2012). Specifically, Guiso et al. (2008) show that individuals who exhibit higher levels of generalized trust are approximately 50 percent more likely to participate in financial markets. Sapienza and Zingales (2012) find that generalized trust affects the level of financial market participation. For example, households that reported the lowest levels of generalized trust stated an intention to divest from the financial market in the future while households that reported the highest level of generalized trust stated an intention to increase stock ownership in the future. Therefore, Guiso et al. (2008) and Sapienza and Zingales (2012) illustrate that generalized trust impacts decisions to participate in financial markets.

In addition to public trust and generalized trust, the trust literature also mentions how personalized trust impacts individuals' decisions to participate in financial markets.[5] Personalized trust assesses an individual's trust in specific individuals or institutions and is typically measured by asking individuals how much they trust the individuals who serve as intermediaries to the financial markets. For example, Monticone (2010) assesses the level of trust that Italian banking customers had in their bank advisor or financial promoter concerning financial investments. Additionally, Sapienza and Zingales (2012) assess the level of trust individuals have in the stock market. They find that individuals' responses were 2.13 on a 5-point scale.[6] This indicates that individuals, in general, exhibit a low level of trust in the stock market.

In addition to illustrating individuals' personalized level of trust, the research has also illustrated how personalized trust can impact financial decisions. For instance, research has shown that personalized trust in a financial intermediary impacts investors' financial decisions.

Specifically, the more trust an individual has in a financial institution or in a financial advisor, the greater the probability that the individual will hold risky assets (Guiso et al. 2008; Monticone, 2010). Additionally, personalized trust, which in this case relates to a household's trust toward the bank as a broker, partially explains households' investments in the stock market (Guiso et al. 2008). Specifically, this measure of personalized trust has a positive and significant effect on stock market participation as well as the decisions on which specific stocks to invest in. We next extend prior theoretical research to predict how financial literacy should affect the level of trust that individuals have in the stock market and in the individuals who operate the stock market.

Psychological Contract Theory and the Effect of Financial Literacy on Trust

Financial literacy has been found to affect an individual's decision to participate in financial markets (Van Rooij et al. 2011). However, the link between financial literacy and the level of trust that an individual has in the financial markets and in those who operate the financial markets has not been examined.

Psychological contract theory concerns the mutual expectations regarding inputs and outputs owed to individuals which arise from the relationship existing between an individual and another party (Rousseau, 1989; Morrison & Robinson, 1997). Primarily examined in labor market settings, the "psychological contract" is frequently applied to explain an employee's expectations with regard to what her employer owes her in return for her continued work performance and loyalty (Rousseau & McLean Parks, 1993). However, contrary to legal connotations which can be associated with the word "contract," the psychological contract is not akin to an explicit contract or express document; rather it represents notions of trust, or at least an implied mutual understanding of expectations which might be different from one individual to another (Rousseau, 1989).

Psychological contracts can emerge from a number of different contexts. For example, when one party believes that a promise of future return has been made (e.g. pay for performance) or when a contribution has been given (e.g. an exchange of some sort) and thus an obligation is owed (Robinson & Rousseau, 1994). While psychological contract research has been primarily conducted in labor market studies examining contracts negotiated between employers and employees, we extend the theory to a financial market context in which investors exchange money expecting future capital returns (Robinson & Rousseau, 1994). Psychological contract theory is contingent upon the party's belief about the contract, thus the investors' belief that their investment will lead to a return forms the basis of a psychological contract.[7]

Within the context of this study, we extend the psychological contract to a financial market setting to refer to the mutual expectations of inputs and outputs due to the relationship arising among investors, financial markets, and the individuals involved with operating the markets. That is, we extend the psychological contract to represent the obligations, rights, and rewards an investor believes he is owed by the financial markets and those who operate the markets in return for the investor's capital. Specifically, we hold that financial markets expect investors to commit capital to risky ventures, while investors expect financial markets to operate in an unbiased (i.e., fair) manner.

Psychological contract research from the labor market domain demonstrates that more "mature" (i.e., more knowledgeable) employees demand greater portions of their expectations to be written into a formal employment contract as compared to less mature employees who permit more of their expectations to exist in a non-written psychological contract (Shruthi & Hermanth, 2012). In other words, more knowledgeable employees are less trusting of their employer compared to less knowledgeable employees. Extending this logic in an analogous manner to a financial market setting, an argument predicting that more knowledgeable investors should be less trusting of financial markets can be advanced. That is, an argument can be made that individuals with higher levels of financial literacy will have lower levels of trust in financial markets. For instance, Guiso (2010) suggests that the financial crisis has had a significantly negative impact on individuals' perceived trustworthiness of financial intermediaries and their managers. An extension to this argument would then suggest that individuals with higher financial literacy are more likely to understand incentive structures applicable to the various market participants and thereby have a better understanding of the potential for those participants' self-interested actions to negatively impact their wealth. It could be argued that individuals with higher financial literacy understand how financial markets are intended to operate and thus are more able to perceive scenarios under which the market would not operate as intended. Those investors with higher financial literacy could perceive the fallibility of gatekeepers (i.e., financial intermediaries, financial advisors) and therefore have lower levels of trust in the financial market and in those individuals associated with the financial market.

On the other hand, it could be argued that individuals with lower levels of financial literacy are less likely to trust that financial markets and the individuals associated with those financial markets will operate as intended. By definition individuals with low financial literacy do not fully understand how financial markets operate and, it could be argued, do not understand what functions individuals involved in the financial markets perform. Therefore, individuals with low financial literacy would be likely to have lower levels of trust in the financial market and the individuals who operate those markets because they lack the general understanding of how the markets operate and what the individuals associated with the financial market are responsible for. The impact on trust would therefore result from a lack of knowledge, whereby individuals do not place trust in environments they do not fully understand.

Extending psychological contract theory research findings to a financial market context involving novice nonprofessional investors, we predict a negative association between nonprofessional investors' financial literacy and their trust such that:

H1 *The financial literacy of novice nonprofessional investors is negatively associated with their trust in the financial markets and those individual who operate those markets.*

Control Variables

Both intuition and prior literature suggest various factors in addition to financial literacy that may cause an investor's trust in the financial markets and those individuals who operate those markets to vary. Intuition suggests that an investor's trust will be affected both positively and negatively by his or her investment experience. Prior literature suggests that one's age, gender and propensity for risk all have the potential to affect one's trust. For example, Castle et al. (2012) identify an age effect such that older individuals are more trusting than younger individuals. Additionally, Jacobsen, Lee, and Marquering (2008) have identified a gender difference such that men are significantly more optimistic than women with respect to economic and financial indicators. Further, trust involves an element of risk (Lewis & Weigert, 1985). Consequently, drawing upon intuition and prior research, we therefore control for the investor's investment experience, age, gender and propensity for risk in robustness tests of the relation between financial literacy and trust.

METHODOLOGY

Experimental Task

Experimental sessions were conducted with 88 undergraduate business students. Each session lasted approximately 20 minutes. During each session, participants completed two questionnaires. The first questionnaire was used to obtain measures of each participant's financial literacy and his or her propensity for risk.[8] After completing the questionnaire participants completed a second questionnaire on which they provided demographic information, such as gender and age, as well as information about their investing experience and answered a question relating to their trust in the financial markets and those who operate the financial markets.

Dependent Variable Measure

The dependent variable was measured as each participant's response to the following question: "I trust the financial markets and those individuals involved with them to operate as intended." The responses were made on a 9-point Likert scale with end-points labeled "Strongly Disagree" (1) and "Strongly Agree" (9).

Independent Variable Measure

The first ten questions on the first questionnaire measured financial literacy. These ten questions had been used previously by Agnew and Szykman (2005) and were similar to those used in other studies to measure financial literacy (Dwyer, Gilkeson & List, 2002; Wilcox, 2003). In accordance with prior literature, each participant's financial literacy was measured as the number of questions answered correctly (Dwyer et al. 2002; Wilcox, 2003; Agnew & Szykman, 2005; Marley & Mellon, 2013).

Control Variables Measures

Each individual's investment experience, age, gender and propensity for risk were measured. Investment experience was measured using the investor's response to the following statement on the second questionnaire: "Please circle your level of investment experience." The responses were made on a 9-point investment experience scale (1 to 9, with endpoints labeled "no investment experience" and "a great deal of investment experience," respectively).

The individual's age and gender were obtained by asking individuals to self-report. The individual's propensity for risk measure was obtained by asking participants to select which of five distinct gambles would be their preference to play. This approach is similar to that used in prior literature to measure individuals' propensity for risk (Eckel & Grossman, 2002). The gambles were constructed such that the number of the gamble was correlated with the level of risk associated with it. Therefore, a risk-averse individual would most likely select Gamble 1 or 2 while a risk-seeking individual would most likely select Gamble 4 or 5. Consistent with prior literature each participant's propensity for risk was scored as the number of the gamble that he or she selected (Eckel & Grossman, 2002).

RESULTS

Descriptive Statistics

The descriptive statistics regarding participants' trust, financial literacy, investing experience, age, gender and propensity for risk are presented in Table 1. The participants' mean trust score was 4.63 (2.19 Std. Dev.) with scores ranging from 1 to 9. Therefore participants exhibited a moderate amount of trust in the financial markets and in those who operate the financial markets. The mean financial literacy of the participants was 4.93 (1.74 Std. Dev.) with a range from 2 to 10. The participants' self-reported investment experience ranged from 1 to 8 on a 9-point investment experience scale (1 to 9, with endpoints labeled "no investment experience" and "a great deal of investment experience", respectively. The average reported investment experience was 2.05 (1.59 Std. Dev). The age of the participants ranged from 20 to 57 years old, with a mean age of 23 years. Forty-nine (55.7%) of the participants were female and thirty-nine (44.3%) were male.[9] Table 1 also illustrates that participants' average propensity for risk was 2.22 (1.28 Std. Dev). The lower propensity for risk score indicates that on average the participants are somewhat risk-averse.

Table 1
DESCRIPTIVE STATISTICS OF NOVICE NONPROFESSIONAL INVESTORS

	Mean	Standard Deviation	Min	Max	25th Percentile	50th Percentile	75th Percentile
Trust[a]	4.63	2.19	1	9	3.00	5.00	6.00
Financial Literacy[b]	4.93	1.74	2	10	4.00	5.00	6.00
Investment Experience[c]	2.05	1.59	1	8	1.00	1.00	3.00
Age[d]	22.99	5.32	20	57	21.00	22.00	22.75
Gender[e]	0.44	0.50	0	1	0.00	0.00	1.00
Propensity for Risk[f]	2.22	1.28	1	5	1.00	2.00	3.00

[a] Trust in the Financial Markets: The response to the following statement in the exit questionnaire "I trust the financial markets and those individuals involved with them to operate as intended." The responses were made on a 9-point scale (1 to 9, with endpoints labeled "strongly disagree" and "strongly agree," respectively).

[b] Financial Literacy: The degree to which an individual is financially literate, measured by the number of questions answered correctly on the financial literacy scale developed by Agnew and Szykman (2005).

[c] Investment Experience: The response to the following statement in the exit questionnaire: "Please circle your level of investment experience." The responses were made on a 9-point investment experience scale (1 to 9, with endpoints labeled "no investment experience" and "a great deal of investment experience," respectively).

[d] Age: The individuals' self-reported age.

[e] Gender: Coded as 1 for males and 0 for females.

[f] Propensity for Risk: The individual's propensity for risk, measured on the financial risk scale developed by Eckel and Grossman (2002).

Correlation Analysis

Table 2 presents bivariate correlations for variables to be used in our regression analysis which is presented in Table 3. We predict that financial literacy is negatively associated with trust in the financial markets. As per Table 2 and consistent with our hypothesis there is a significantly negative correlation between trust and financial literacy (-0.19, p = 0.08). The correlations between trust and investment experience, age, gender and propensity for risk are also presented in Table 2; none of our control variables are significantly correlated with trust. These results, however do not take into account effects present with all the variables in the model.

There are significant correlations between our independent variable and our control variables. For example, investment experience is significantly correlated with financial literacy (0.21, p = 0.06), age (0.20, p = 0.06) and gender (0.24, p = 0.03), while financial literacy is significantly correlated with gender (0.34, p = 0.01). To address concerns that multicollinearity issues may bias our findings, we considered whether any of the variance inflation factors (VIF) for the independent variable and control variables were greater than ten or whether the average VIF was significantly greater than one. Given that the largest VIF was well below ten (1.18) and that the average VIF (1.11) was not significantly greater than one, we have no concerns that multicollinearity influenced our results.

Table 2
BIVARIATE CORRELATIONS FOR VARIABLES TO BE USED IN REGRESSION ANALYSIS

	Trust	Financial Literacy	Investment Experience	Age	Gender	Propensity for Risk
Trust[a]	1	-0.19 (0.08)	0.07 (0.49)	-0.06 (0.55)	-0.09 (0.42)	0.09 (0.40)
Financial Literacy[b]	-0.17 (0.11)	1	0.21 (0.06)	0.15 (0.17)	0.34 (0.01)	0.07 (0.53)
Investment Experience[c]	0.04 (0.70)	0.08 (0.45)	1	0.20 (0.06)	0.24 (0.03)	-0.02 (0.88)
Age[d]	-0.11 (0.32)	-0.05 (0.65)	0.19 (0.07)	1	0.02 (0.89)	-0.07 (0.53)
Gender[e]	-0.08 (0.49)	0.34 (0.01)	0.20 (0.07)	-0.02 (0.85)	1	0.10 (0.35)
Propensity for Risk[f]	0.04 (0.70)	0.08 (0.45)	-0.03 (0.80)	0.19 (0.07)	0.20 (0.07)	1

*Pearson correlation statistics are reported above the diagonal and nonparametric Spearman correlation statistics are reported below the diagonal. Two-tailed p-values are in parentheses.

[a] Trust in the Financial Markets: The response to the following statement in the exit questionnaire: “I trust the financial markets and those individuals involved with them to operate as intended.” The responses were made on a 9-point scale (1 to 9, with endpoints labeled “strongly disagree” and “strongly agree,” respectively).

[b] Financial Literacy: The degree to which an individual is financially literate: measured by the number of questions answered correctly on the financial literacy scale developed by Agnew and Szykman (2005).

[c] Investment Experience: The response to the following statement in the exit questionnaire: "Please circle your level of investment experience." The responses were made on a 9-point investment experience scale (1 to 9, with endpoints labeled "no investment experience" and "a great deal of investment experience," respectively).

[d] Age: The individuals' self-reported age.

[e] Gender: Coded as 1 for males and 0 for females.

[f] Propensity for Risk: The individual's propensity for risk: measured on the financial risk scale developed by Eckel and Grossman (2002).

Regression Analysis

To further investigate the robustness of the negative relation between financial literacy and trust we conducted additional regression analyses. Table 3 allows us to perform a more thorough analysis of our hypothesis which predicts that a novice nonprofessional investor's financial literacy will be negatively associated with his or her trust in the financial markets and in those individuals responsible for operating the financial markets.

Table 3 displays the results of regression analysis performed to examine the relation between an individual's financial literacy and his or her trust in the financial markets. In the first model, investors' trust is regressed onto their financial literacy. In the second model, investors' trust is regressed onto their financial literacy while controlling for their prior investment experience. In the third model, the investors' trust is regressed onto their financial literacy while controlling for their prior investment experience and a number of individual character traits, more specifically the investor's age, gender and propensity for risk.

In regards to the first model, the coefficient on financial literacy is negative and significant (-0.19, $t = -1.80$, $p = 0.038$). This finding is unaffected by the inclusion of the control variables related to the investor's investment experience and/or character traits as the coefficient on financial literacy in the second model (-0.22, $t = -1.99$, $p = 0.025$) and the third model (-0.20, $t = -1.71$, $p = 0.046$) continues to be negative and significant.[10] Consequently, the regression analysis provides additional support for the existence of a negative association between financial literacy and trust in the financial markets. Specifically, regression results support the psychological contract theory argument that more knowledgeable investors have a better idea of how markets operate and what expectations they should have when investing in a market. Therefore, because they have this knowledge, they are less trusting of financial markets and those who operate them because they understand more about the markets themselves. The evidence thereby demonstrates an association between a novice nonprofessional investor's financial literacy and trust, such that the higher the investor's financial literacy, the lower his or her trust in the financial markets and in those individuals responsible for operating the financial markets.

Table 3
REGRESSION MODELS OF AN INDIVIDUAL'S TRUST IN THE FINANCIAL MARKETS[a]

Full Model: Trust in the Financial Markets = α_0 + α_1Financial Literacy + α_2Investment Experience + α_3Age + α_4Gender + α_5Propensity for Risk + ε

Variable	*Model 1*		*Model 2*		*Model 3*	
Intercept	5.81	***	5.63	***	5.69	***
Financial Literacy[b]	-0.19	**	-0.22	**	-0.20	**
Investment Experience[c]			0.12		0.14	
Character Traits						
Age[d]					-0.06	
Gender[e]					-0.07	
Propensity for Risk[f]					0.11	
Adjusted R^2	0.03		0.03		0.01	
Sample Size	88		88		88	

*, **, *** One-tailed significance at the 0.10, 0.05, and 0.01 levels, respectively, for predicted effects.

[a] Trust in the Financial Markets: The response to the following statement in the exit questionnaire: "I trust the financial markets and those individuals involved with them to operate as intended." The responses were made on a 9-point scale (1 to 9, with endpoints labeled "strongly disagree" and "strongly agree," respectively).

[b] Financial Literacy: The degree to which an individual is financially literate, measured by the number of questions answered correctly on the financial literacy scale developed by Agnew and Szykman (2005).

[c] Investment Experience: The response to the following statement in the exit questionnaire: "Please circle your level of investment experience." The responses were made on a 9-point investment experience scale (1 to 9, with endpoints labeled "no investment experience" and "a great deal of investment experience," respectively).

[d] Age: The individuals' self-reported age.

[e] Gender: Coded as 0 for females and 1 for males.

[f] Propensity for Risk: The individual's propensity for risk: measured on the financial risk scale developed by Eckel and Grossman (2002).

CONCLUSIONS AND AREAS FOR FUTURE RESEARCH

Prior research demonstrates that investors' participation in financial markets is positively related to trust. This study extends the capital markets literature by drawing upon psychological contract theory to explain the association between novice nonprofessional investors' financial literacy and their trust in financial markets. Our results indicate that there is a negative association between novice nonprofessional investors' financial literacy and their trust that financial markets and the individuals involved with the markets operate as intended. Further, if broader participation in financial markets is a goal of policy makers, this paper has two additional implications: First, it is important to directly examine how an investor's financial literacy ultimately affects his or her participation in financial markets. Second, our findings highlight the need for researchers to answer the call for research by Guiso et al. (2008) which examines factors affecting investors' perception of market trustworthiness.

Our results stem from a one-item measure of trust and a measure of financial experience that does not capture detailed information related to individuals' returns from prior investments. As a result, future research may find it fruitful to extend this study by examining if our findings are robust to a more comprehensive measure of trust and investment experience. Lastly, we examine the association between financial literacy and trust, thus we cannot infer causality.

ENDNOTES

1 Our definition of financial literacy does not relate to the quality of the actual financial decisions made by investors. Rather, financial literacy serves as a measure of an individual's knowledge of investing concepts and how financial markets operate. Accordingly, this paper does not examine whether financial literacy leads investors to make "better" or more optimal financial decisions.

2 Throughout the remainder of this paper, our use of the word "investor" denotes a novice nonprofessional investor.

3 Another line of research analyzes cross-cultural differences in trust and finds significant differences (e.g., Guiso et al., 2008). This study, however, does not examine cross-cultural differences in trust.

4 For example, Guiso et al. (2008) asked participants in their survey, "Generally speaking, would you say that most people can be trusted or that you have to be very careful in dealing with people?" (p. 2558).

5 Monticone (2010) defines personalized trust as the trust an individual has in his or her own bank or financial advisor.

6 The end points on the 5-point scale were (1) I do not trust at all and (5) I trust completely.

7 Psychological contract theory does not require that both parties have the same understanding of the contract (Robinson & Rousseau, 1994).

8 See the Appendix for the questionnaire.

9 These demographic measures are consistent with our a priori expectations and with demographic measures reported in a number of studies that used undergraduate students as proxies for nonprofessional investors (e.g., Chewning, Coller & Tuttle, 2004; Liyanarachchi & Milne, 2005).

10 Untabulated results show that our findings are unaffected by using the investors' years of investing experience as the measure of their investment experience rather than their self-reported level of investment experience.

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APPENDIX

Pre-Experiment Questionnaire

For each of the following 11 questions please identify the choice that best completes the statement or answers the question.

1. Which of the following types of investments are typically found in a money market fund?

    a. Stocks
    b. Bonds
    c. Short Term Securities

2. When is the best time to transfer money into a long-term bond fund? When interest rates are expected to ________ .

    a. Increase
    b. Remain stable
    c. Decrease
    d. Interest rate doesn't matter
    e. Don't know

3. If you were to invest $1,000 in a STOCK FUND, would it be possible to have less than $1,000 when you decide to withdraw or move it to another fund?
    True False

4. If you were to invest $1,000 in a BOND FUND, would it be possible to have less than $1,000 when you decide to withdraw or move it to another fund?

    True False

5. If you were to invest $1,000 in a MONEY MARKET FUND, would it be possible to have less than $1,000 when you decide to withdraw or move it to another fund?

    True False

6. A stock fund's beta rating can best be described as __________ .
    a. A measure of relative volatility of the fund versus the S&P 500 index
    b. A measure of relative growth versus the S&P 500 index
    c. A measure of the relative capital outflow of the fund versus the S&P 500 index

7. A money market mutual fund is guaranteed by the U.S. government against principal loss.

    True False

8. High yield bond funds are invested in bonds with strong credit ratings.

    True False

9. If you invest in a bond mutual fund with an average maturity of five years, this means that you cannot withdraw your money from the fund within a five-year period without incurring a penalty.

True False

10. A stock market index fund is actively managed by a fund portfolio manager.

    True False

11. We would like you to seriously consider the following hypothetical gambles. Which of the following five gambles would you prefer if you could only choose one? Please indicate your choice __________.

Gamble Choice	Event	Probability (%)	Payoff ($)
1	A	50	16
	B	50	16
2	A	50	24
	B	50	12
3	A	50	32
	B	50	8
4	A	50	40
	B	50	4
5	A	50	48
	B	50	0

THE EFFECTS OF COMPENSATION SCHEME, SOURCE CREDIBILITY, AND RECEIVER INVOLVEMENT ON THE ORGANIZATIONAL BUDGETING PROCESS

Gloria J. McVay, Winona State University

ABSTRACT

The results of this study provide several valuable insights into the budgeting process. The Elaboration Likelihood Model predicts that subjects will elaborate on a message when receiver involvement is high, but could bias the integration of mixed messages to support the initial positions favored by the subjects. Incentive compensation formulas were used to establish initial attitudes toward messages in the high involvement subjects. Pro-attitudinal messages were expected to receive more weight than counter-attitudinal messages. Experimental results revealed parameter estimates that were consistently in the right direction, but statistical tests were not significant. Lack of power may have caused the interaction of initial attitude (manipulated through compensation scheme) and message direction to go undetected.

In contrast, low involvement receivers were predicted to use heuristics, such as relying on peripheral cues, when evaluating messages. In this study, source credibility acted as the peripheral cue. A qualitative analysis of receiver involvement presented evidence of more decision-related thoughts associated with source credibility under conditions of low receiver involvement than under conditions of high receiver involvement. This supports the ELM prediction that low receiver involvement leads to more reliance on peripheral cues such as source credibility.

The ELM predicts that high involvement subjects will use source credibility as evidence to support their initial attitude. Content analysis also supported this prediction. Subjects in the high receiver involvement groups were more likely to present message source arguments when the direction of the message (sales-increasing versus sales-decreasing) favored their initial attitude.

Under conditions of high receiver involvement, source credibility was hypothesized to interact with compensation scheme and message direction. In interpreting the results of this three-way interaction, budget-adjustments were broken down into two categories: the first budget adjustment (the change in the sales forecast after receiving the first message) and the second budget adjustment. The three-way interaction term for source credibility, message direction, and incentive compensation group (high goal versus low goal) was statistically significant when the differences between means were segregated into two groups.

For first budget adjustments, high goal subjects placed more weight on low credibility, increasing messages than did low goal subjects. Weights for high credibility sources and sales-decreasing messages were not significantly different between groups. For second budget adjustments, high goal subjects placed more weight on increasing messages from high credibility sources than did low goal subjects. Weights for sales-decreasing messages were not significantly different between groups. And finally, for all groups and conditions, sales-decreasing messages were weighted more heavily than sales-increasing messages. These findings suggest a pro-attitudinal bias toward message sources that supported the initial attitude of the decision-maker.

In both cases, the direction of credibility's effects was as predicted. The unexpected finding was that the effect only occurred for sales-increasing messages.

A possible interpretation of this finding is that sales-decreasing messages – messages that suggest a downward revision of a sales forecast – are less subject to bias because of an overall conservative bias in the budgeting process. Decision-makers might bring skepticism to the judgment and decision-making process because the initial forecast is the result of an aggregation of sales managers' opinions. The uncertainty concerning the starting point might lead to a greater saliency of decreasing messages. Decreasing messages might seem less refutable. Any biases, therefore, could tend to enter the decision process through sales-increasing messages where the decision-maker is more discriminating about the interpretation of the message content and message source. If this scenario holds in real-world budgeting contexts, a sub-optimal sales forecast could result. This bias and the resulting implications for firm profitability need further investigation

In summary, the predictions of the ELM as tested in this study were generally supported. The consistency of the results with the theory suggests that insignificant test results may be due to lack of power. Differences in parameter estimates among cells consistently had the correct sign. A larger number of subjects might be needed to provide sufficient power to adequately test all the hypotheses under consideration in this study.

INTRODUCTION

The budgeting process is central to the functions of corporate accounting managers. As the guardians of corporate assets, managerial accountants are charged with the responsibility of overseeing the formulation of the annual budget. Ideally, managers strive to make budgets accurate and free from bias, but the assumption that the budgeting process is actually free from bias is unwarranted. Many biases, including the way managers are compensated (rewards based on whether or not expenses come in under budget or sales exceed budgeted goals), the effect of external sources of budget-relevant information, and the credibility of the sources of this information all affect the budget process.

Annual budgets not only summarize expected inflows of resources, how assets will be expended based on those expectations, and the consequent return on investment and financial position, but also provide benchmarks for the evaluation of managerial performance and the resultant rewards and penalties. The optimum allocation of resources implies that the budgeting process is free from bias. Biases in the budget process leading to an under-utilization of firm resources will impair the firm's competitive advantage, stability, and long-term profitability. The success of employees, owners, and managers of an organization, as well as the health of an organization itself are thus affected by these potential biases.

Prior research has focused on antecedents and outcomes of the budgeting process, but this has yielded little information about the types of information that affect budget decisions. This study evaluates potential biases that may enter into a participatory budgeting process and thereby adversely affect budget estimates. The Elaboration Likelihood Model (Petty & Cacioppo 1986a, 1986b, 1990; Petty, Cacioppo, Strathman, & Priester, 2005) provides the basis for identifying potential biasing factors within the communication that occurs during the budgeting process. The importance of the information to the decision-maker (the receiver), the credibility of the information source (the sender), and receiver involvement as manifested in the personal goals of management (how the decision-maker is compensated) are manipulated within an experimental setting. In addition to providing new and important insights into the impact of communication and cognition variables on the organizational process of budgeting, this study represents the only application of the Elaboration Likelihood Model in this field.

The Elaboration Likelihood Model

The key focus of this study is how various factors related to the communication of budget information from one person to another might bias the decision-maker in determining the outcome of the budgeting process. According to Petty and Cacioppo (1986a, 1986b, 1990), a key construct of the Elaboration Likelihood Model (ELM) is the elaboration likelihood continuum, which provides a framework for predicting cognitive effort based on factors related to motivation and ability to evaluate the message. When motivation and ability factors are high, the ELM predicts the "central route" of message processing – more cognitive effort and relatively high elaboration of message content. Conversely, when either motivation or ability is low, the ELM predicts a "peripheral route" of processing, with less elaboration of the message content, less substantive thought, and more reliance on peripheral cues such as source credibility or attractiveness. The "peripheral route" is a heuristic, or cognitive shortcut, to forming an attitude or belief.

The most robust findings of this model have related to two factors. The first factor – receiver involvement – is one of several receiver motivation factors within the ELM framework. When receiver involvement is low due to low personal relevance of the message to the receiver, subjects exhibit a greater reliance on peripheral cues. The second factor is a message source factor – credibility of the sender of the message. According to the ELM, source credibility acts as a peripheral cue when elaboration likelihood is low. However, it can also act as a piece of evidence when elaboration likelihood is relatively high. In the case of high elaboration, the critical factor determining the direction of credibility's effects appears to be the nature of the position advocated by the message – specifically, whether the message advocates a position initially favored or opposed by the receiver. Both of these factors – receiver involvement and source credibility – have consistently shown significance in prior studies (Hornikx & O'Keefe, 2009; McComas, 2008; Hallahan, 2008; MacGeorge, 2008; Noar, Palmgreen, Zimmerman, Lustria, & Lu, 2010).

When budgeting is viewed as a decision process that is dependent upon communication between interactants, the potential biasing effects of both receiver involvement and sender credibility become evident. The budgeting decision-maker typically relies upon information provided by other sources (senders). For example, the sales manager might provide a sales forecast as a starting point in the preparation of the annual budget. Hence, the sales manager (the sender) and the budget decision-maker (the receiver) interact, at least in the initial phase of the budgeting process. Subsequently, the decision-maker might seek out corroborating evidence from parties both within and outside the company to substantiate the sales forecast. Other factors - such as forecasted economic conditions or steps taken by competing companies – can temper the original sales forecast estimate. Normally, the level of budgeted sales is important (has personal relevance) to the receiver because the decision-maker has some accountability for results and may be compensated based upon achieving specific goals.

The ELM, however, is sensitive to degrees of involvement. High (as opposed to moderate or low) levels of involvement lead to a relatively higher likelihood of message elaboration and less attention to peripheral cues such as source credibility (Liu, 2008). When elaboration likelihood is lower, the receiver's perception of the credibility of the sender may be used heuristically in the weighting of information. Source credibility might also interact with receiver involvement in another way; source credibility can be used to support the initial attitude of the message receiver (Petty & Cacioppo 1983a, 1983b, 1990).

According to the ELM model, a person selects either the "central route" or the "peripheral route" as a method to change or form attitudes or beliefs in response to a persuasive message. The central route prevails under conditions leading to high elaboration, while the peripheral route dominates under conditions of low elaboration. According to O'Keefe (2009), when elaboration is relatively high, the directional effects of a message will be influenced by the receiver's initial attitude and the message's advocated position, considered jointly. Conversely, given relatively low elaboration, the persuasive effect will be influenced much more by the use of a simple decision rule, such as the credibility of the source.

Management Compensation and Budgeting Decisions

The potential conflict of goals resulting from the financial incentives imbedded in management compensation schemes is well documented in the literature (Chow, 1983; Frederickson, 1992; Shields & Waller, 1988; Waller & Chow, 1985; Young et al. 1993). Untangling the effects of incentives is relevant to the budgeting process (Libby & Lipe, 1992) because conflicts between the goals of management and investors bias the allocation of resources entrusted to management. As a result, incentive structures are a potentially important dimension in the decision-making environment (Hogarth, 1993) and hence the budgeting process. Linkage between incentive structures and the attainment of targeted sales or profitability goals creates an environment of high receiver involvement within the decision-maker due to the personal relevance attached to the outcomes.

The tenets of the Elaboration Likelihood Model, as applied to the budgeting process, provide several testable hypotheses, given the conditions of both varied compensation schemes and differing levels of source credibility. The following hypotheses are tested within the experimental setting of this study.

H1: High involvement message receivers will bias the weighting of mixed messages to support their initial attitude.

Pro-attitudinal messages will be weighted more heavily than counter-attitudinal messages.

H2: When receiver involvement is low, source credibility will act as a peripheral cue in the budgeting decision process.

Subjects will present evidence of more decision-related thoughts associated with source credibility under conditions of low receiver involvement than under conditions of high receiver involvement.

H3: When receiver involvement is high, the direction of credibility's effects will depend on whether the message advocates the position initially opposed or favored by the receiver.

The receiver's compensation scheme, the source's credibility, and the direction of the message, will jointly influence the weighting of the evidence contained within the message.

This study examines decision-making within the budget process by manipulating compensation scheme and two important communication variables – sender credibility and receiver involvement. The Elaboration Likelihood Model (Petty & Cacioppo, 1986) is used to predict cognitive effort and issue-relevant elaboration of messages. High-involvement message receivers are predicted to exhibit more attention to the message (the central route of cognition) and less attention to the credibility of the receiver (the peripheral route of cognition). Source credibility is also predicted to interact with initial attitude with high credibility sources given relatively more weight in pro-attitudinal arguments and vice versa.

METHODS

Experimental Design

The design for this proposed study is a 3 (compensation scheme) x 2 (high or low level of involvement) x 2 (sales increasing vs. decreasing message) x 2 (high or low credibility source) mixed design. There are three treatment groups in this experiment. Group 1 was a low involvement group where compensation is fixed; Groups 2 and 3 were high involvement groups where compensation consists of both extra credit points and an incentive linked to the final budget forecast respondents provided in the experimental task. Receiver involvement was operationalized in this study in two ways – first, through the language and role assumption embedded within the case materials (both Groups 2 and 3) and second, through the manipulation of compensation schemes (Group 2 was given greater compensation for meeting a high goal, while Group 3 was compensated on the basis of meeting a low goal). In real life, if an executive's pay scheme is tied to actual sales, the tendency would be to set a "high goal" for budgeted sales. A higher sales forecast would result in the availability of more planned production (lowering the possibility of a stock out) and a higher target for sales personnel to meet. On the other hand, if an executive's incentive compensation is tied to attaining the budgeted level of sales, the tendency would be to set a "low goal" to make it easier to achieve. Subjects were randomly assigned to one of the three groups.

Sample

The subjects were 107 MBA students from a large Southern university[1]. MBA students were selected in order to obtain a broader base of business knowledge and experience (report sample characteristics measured: age, gender, years of work experience, budgeting experience, accounting coursework completed, current position level, and undergraduate degree). Statistical tests for differences of mean values among the three experimental groups on these demographic characteristics indicate the successful random assignment of subjects across groups. None of the tests for differences in demographic variables resulted in a test statistic with a significant p-value.

Materials and Measures

The task and case materials were developed on the basis of information widely available in classic cost accounting textbooks dating back to Horngren (1973). Horngren states that "the sales prediction is the foundation for the quantification of the entire business plan . . .the chief sales officer has direct responsibility for the preparation of the sales budget" (p. 186). In discussing sales forecasting procedures, Horngren continues: “If possible, the budget data should flow from individual salesmen or district sales managers upward to the chief sales officer. A valuable benefit from the budgeting process is the holding of discussions, which generally result in adjustments and which tend to broaden participants’ thinking … Previous sales volumes are usually the springboard for sales predictions” (p. 187).

Horngren provides a list of factors that are considered in arriving at the sales forecast. He states that the sales forecast is made after consideration of the following: 1) past sales volume; 2) general economic and industry conditions; 3) the relationship of sales to economic indicators such as gross national product, personal income, employment, prices, and industrial production; 4) relative product profitability; 5) market research studies; 6) pricing policies; 7) advertising and other promotion; 8) quality of sales force; 9) competition; 10) seasonal variation; 11) production capacity; and 12) long-term sales trends for various products.

The case materials in this study focused on the sales forecast as the budget variable under consideration. Previous sales volumes and a sales forecast developed by the fictitious company’s district sales managers provided the starting point for setting the sales forecast for the upcoming year. Subjects were provided with two additional pieces of information (from two different sources) that are relevant to evaluating and adjusting the sales forecast. One message contained information about the potential favorable impact on sales due to a trend in foreign currency rates (the dollar versus the yen) and the other message contained information about a competitor’s acquisition of a downstream supplier common to both companies (leading to a cost advantage for the competitor). The sources of the two messages were varied to provide differences in the level of source credibility (high credibility versus low credibility).

Two additional pieces of information were then provided within messages received from two different sources. The first message respondents received contained information that, if the process is free of bias, should lead to a budget that forecasts increasing sales, while the second message respondents received contained sales-decreasing information. The order of the pieces of information was randomized across subjects and cells. Based upon the compensation scheme for the subjects, the messages are designated as pro- or contra-attitudinal. In the “Low Goal” manipulation, a message that suggested that sales would decrease was considered a pro-attitudinal message. The converse was true for the “High Goal” manipulation. In other words, the initial attitude of the subject, manipulated through compensation scheme, determined whether each message was pro- or contra-attitudinal. Subjects were also asked to document their starting point in the decision process (a manipulation check to verify “district sales managers’ forecast” as the anchor).

Respondents were also asked to complete an 18-item measure of Need for Cognition (Cacioppo, Petty & Kao, 1984). Need for Cognition was used as a covariate in the analyses of the data because we thought that it might be possible that participants’ responses to case materials might vary by the level of this trait.

Procedures

Subjects were provided with case materials, including the district sales managers’ aggregated sales forecast as a starting point in the decision process. Subjects were asked to update their estimate of next year’s sales forecast after receiving each individual piece of information. In all three groups, subjects were asked to provide a sales forecast for the upcoming year based on information provided in the case. When combined with the sales forecast provided by the district sales managers, the messages suggested either an upward or downward revision in the forecast. Participants were also asked to provide a numerical evaluation of the strength of each message.

At the conclusion of the experimental task, subjects were asked to complete a questionnaire that captured demographic information (age, gender, work experience, budgeting experience, accounting coursework, level of current position, undergraduate field of study. Subjects also completed a ten-item semantic differential credibility scale for each of the message sources contained in their case material. This scale was developed by Ohanian (1990) and measures the two components of source credibility – trustworthiness and expertise (a total credibility score was calculated for each message source and serves as a manipulation check). The final step in the experiment was the calculation of subjects' compensation for participation.

ANALYSIS

Adapting the work of Bamber et al. (1997), the regression model used in this study permitted estimation of the two message-sensitivity parameters (α and β) when the anchor, S_{k-1} (given as the district sales managers' sales forecast), amount of budget revision, $S_k - S_{k-1}$ (collected as data from subjects) and subjective evaluation of evidence, $s(x_k)$ (collected as data from subjects) are known. The regression model used to estimate α and β is specified using the following regression equation):

$$
\begin{aligned}
S_k - S_{k-1} = {} & \delta + \Phi\,(COGN) \\
& + \alpha_1 (D)(S_{k-1})\, s(x_k) \quad + \beta_1 (1 - D)(1 - S_{k-1})\, s(x_k) \\
& + \alpha_2 (CRED_j)(D)(S_{k-1})\, s(x_k) \quad + \beta_2 (CRED_j)(1 - D)(1 - S_{k-1})\, s(x_k) \\
& + \alpha_3 (LOW_j)(D)(S_{k-1})\, s(x_k) \quad + \beta_3 (LOW_j)(1 - D)(1 - S_{k-1})\, s(x_k) \\
& + \alpha_4 (HIGH_j)(D)(S_{k-1})\, s(x_k) \quad + \beta_4 (HIGH_j)(1 - D)(1 - S_{k-1})\, s(x_k) \\
& + \alpha_5 (LOW_j)(CRED_j)(D)(S_{k-1})\, s(x_k) \quad + \beta_5 (LOW_j)(CRED_j)(1 - D)(1 - S_{k-1})\, s(x_k) \\
& + \alpha_6 (HIGH_j)(CRED_j)(D)(S_{k-1})\, s(x_k) \quad + \beta_6 (HIGH_j)\, CRED_j)(1 - D)(1 - S_{k-1})\, s(x_k) \\
& + \varepsilon
\end{aligned}
$$

where, S_k: adjusted budget after *k* pieces of evidence,
S_{k-1}: the anchor or prior budget
$s(x_k)$: subjective evaluation of the *k*th piece of evidence
α: sensitivity to sales-decreasing messages, $0 \leq \alpha \leq 1$, and
β: sensitivity to sales-increasing messages, $0 \leq \beta{:}\leq 1$
COGN: Need for Cognition, a covariate
LOW: Low Goal incentive, and HIGH = High Goal incentive
CRED: Source Credibility (Contrast coded 0 (1) for low (high)credibility),
D : Message direction (D=0 for sales-increasing; D=1 for sales-decreasing),
δ, ε are intercept and error terms, respectively.

Regression analysis was used to calculate coefficients for the terms in the regression equation. As noted in Cohen and Cohen (1983), in the presence of significant interaction terms, the main effects should be interpreted with caution and in light of the interaction effects. Prior to determining the significance of the independent variables of interest, the error associated with COGN (if significant) was partialed out from the total model error. Table 1 presents the regression coefficients for α and β that correspond to the cells within the experimental design.

RESULTS

This study used regression analysis to analyze the data and test the hypotheses under consideration. The analysis of data began with tests of the assumptions underlying the regression technique – normality, homoscedasticity (common variance of residuals), and outlier and leverage points. Scatter plots showing the studentized residuals of the predictor variables to predicted values of budget adjustment ($S_k - S_{k-1}$) were developed and reviewed. The scatter plots showed no particular pattern, indicating no violation of homoscedasticity.

Based on a review of the studentized residuals, four data points were identified as potential outliers. Further analysis of these four data points was conducted, resulting in the removal of two points from the data set. The two data points were removed because the subject, when evaluating the first message, adjusted the budget upwards but marked the message on the subjective evaluation scale (s_x) as a sales-decreasing message. Then, when evaluating the second message, the subject adjusted the budget down and rated the message on the sales-increasing scale. The other two outliers were examined for coding problems; the data appeared to be correctly coded and were included in the data set.

The regression model provided estimates for the dependent variable – sensitivity to sales-increasing versus sales-decreasing messages. A significant difference in the weighting of sales-increasing versus sales-decreasing messages provided evidence of bias within the budget task. The alpha (α) terms in the model represent subjects' sensitivity toward sales-decreasing messages; the beta (β) terms in the model represent subjects' sensitivity toward sales-increasing messages.

The regression model designed to test the hypotheses yielded statistically significant results ($F(12,199) = 49.17$, $\underline{p}<0.0001$) with an adjusted R^2 of 0.73. Table 1 summarizes the alpha and beta values by group, source credibility, and message direction. These regression estimates were used to develop statistical tests for the significance of main effects and interaction terms. The actual statistical tests are available upon request from the first author.

Table 1
MESSAGE SENSITIVITY ESTIMATES

Low Involvement	High Involvement			
	Control	High Goal	Low Goal	Message Means
Low Credibility				
Increasing Sales	0.15269	0.19106	0.14534	0.16303
Decreasing Sales	0.23789	0.23009	0.28757	0.25185
High Credibility				
Increasing Sales	0.17159	0.20214	0.15251	0.17541
Decreasing Sales	0.24530	0.2452	0.25622	0.24924
Group Means	0.20187	0.21737	0.21041	

[a] where terms are as previously defined.
[b] t-statistics is significantly different from zero at p<0.05.

The regression model was also run two additional times, segregating the first budget adjustments ($F(12,93) = 40.28$; $\underline{p}<.0001$, adjusted $R^2 = 0.82$) from the second budget adjustments ($F(12,93) = 18.79$; $\underline{p}<.0001$, adjusted $R^2 = 0.67$). Table 2, panel A, presents the alpha and beta values by group, source credibility, and message direction for budget adjustments made after the first message, while Table 2, panel B, presents the results of budget adjustments after the second message. Statistically significant differences in group sensitivities toward messages were obtained when the data was segregated. The lack of significant differences when the data is pooled might point to a lack of independence between the two budget adjustments. This phenomenon was also observed in the test results for hypothesis three, which points to a need to segregate budget-adjustments and conduct independent tests of the data.

Table 2
MEAN SENSITIVITY SCORES (BUDGET ADJUSTMENT) BY GROUP AND MESSAGE TYPE

Panel A: First Belief Adjustment				
	Low Involvement	High Involvement		
	Control	High Goal	Low Goal	Message Means
Low Credibility				
Increasing Sales	0.19502	0.27572	0.11249	0.19441
Decreasing Sales	0.19394	0.23938	0.22122	0.21818
High Credibility				
Increasing Sales	0.18528	0.17702	0.20599	0.18943
Decreasing Sales	0.26327	0.27526	0.26588	0.26814
Group Means	0.20938	0.24185	0.20139	

Panel B: Second Belief Adjustment				
	Low Involvement	High Involvement		
	Control	High Goal	Low Goal	Message Means
Low Credibility				
Increasing Sales	0.07869	-0.02757	0.20778	0.08630
Decreasing Sales	0.25931	0.20154	0.32689	0.26258
High Credibility				
Increasing Sales	0.16808	0.26242	0.11253	0.18101
Decreasing Sales	0.21922	0.22554	0.23914	0.22797
Group Means	0.18133	0.16548	0.22159	

Table 3 presents the results of tests for significance of main effects for message direction, compensation scheme, receiver involvement, and source credibility. Tests for two- and three-way interactions are also presented. Significant interaction terms were further analyzed by testing for significant differences in mean sensitivities for sales-increasing and sales-decreasing messages.

The first hypothesis states that high involvement message receivers will bias the weighting of mixed messages to support their initial attitude. It was expected that pro-attitudinal messages would be weighted more heavily than counter-attitudinal messages. In other words, the receiver's initial attitude and the message's advocated position, considered jointly, were anticipated to influence the direction of elaboration. Experimental results do not support hypothesis one. The interaction of compensation scheme (testing for groups two and three only) and message direction is not significant ($F (1,199) = 0.07$; $\underline{p} =.7881$). The data was also analyzed by segregating reactions to the first message from reactions to the second to determine if combining the data masked a significant interaction between compensation group and message direction. The interaction term remained insignificant.

The second hypothesis states that when receiver involvement is low, source credibility will act as a peripheral cue. It was anticipated that subjects would present evidence of more decision-related thoughts associated with source credibility under conditions of low receiver involvement than under conditions of high receiver involvement. In this study, source credibility acted as the peripheral cue. We expected that when receiver involvement was low, source credibility would act as a peripheral cue. This hypothesis was tested using both qualitative and quantitative methods.

Table 3
TESTS OF MAIN EFFECTS AND INTERACTIONS - F VALUES AND (P-VALUES)

	Groups	Combined	First Adjustment	Second Adjustment
Main – Message Direction	All	6.76 (.0100)***	1.61 (.2073)	5.71 (.0189)**
Main - Compensation	All	0.17 (.8466)	1.01 (.3685)	0.97 (.3841)
Main – Receiver Involvement	All	0.29 (.5936)	0.22 (.6421)	0.11 (.7459)
Main – Source Credibility	All	0.05 (.8189)	0.84 (.3609)	0.67 (.4160)
Credibility*Involvement	1 & 2/3	0.01 (.9159)	0.94 (.3338)	0.28 (.5961)
Direction*Compensation	2 & 3	0.07 (.7881)	1.83 (.1799)	1.58 (.2120)
Direction*Credibility	2 & 3	0.00 (.9770)	0.40 (.5287)	0.51 (.4764)
Direction*Comp*Credibility	2 & 3	0.25 (.6207)	2.83 (.0960)*	7.66 (.0068)***
Direction*Comp*Involvement	1 & 2/3	0.08 (.7827)	0.04 (.8352)	0.01 (.9149)

A content analysis of open-ended questions supports the receiver involvement predictions of hypothesis two. As part of the experimental task, subjects were asked to list their thoughts concerning the evaluation of each message to determine if source credibility was salient to the subjects. An analysis of this thought-listing task was conducted by having two trained, independent raters read the thought-listing text in order to note the presence or absence of statements concerning message content and source credibility. Interrater reliability was assessed by calculating a kappa measure of agreement. A kappa value of .84 was obtained, indicating excellent agreement between raters[2]. Because of the high degree of agreement, the counts for both argument types were averaged between the two raters. Table 4 summarizes the findings of this analysis.

Table 4
SOURCE AND CONTENTS ARGUMENTS

			---------Source Arguments---------		
Group	**Content Arguments**	**Percent Usage**	**Increasing Messages**	**Decreasing Messages**	**Percent Usage**
Low Involvement					
Control group (72)	51	70.8%	22	20	58.3%
High Involvement					
Low goal (70)	52	72.2%	12	16	37.1%
High goal (72)	51.5	73.6%	19	8	37.5%

Under the low receiver involvement condition, message source arguments were more likely to be present in the thought-listing task (58.3% of subjects gave a source argument in the low involvement control group versus 37.1% and 37.5% in the two high involvement groups). This supports the prediction of hypothesis two that low involvement receivers will place more reliance on peripheral cues such as source credibility. Message content arguments appeared to be equally present at both levels of receiver involvement. This could be due to a fairly high amount of involvement for both levels of the involvement variable. However, on a relative basis, the control group showed indications of more reliance on source credibility (58.3% gave source arguments versus 37.1% and 37.5%) – indicative of a relatively lower level of receiver involvement. Because this experiment did not specifically measure cognitive effort, statements concerning receiver involvement, cognitive effort, and reliance on peripheral cues can only be inferred from the results obtained.

A quantitative analysis of receiver involvement was conducted using correlation and regression analysis techniques. Correlation analysis provided some evidence for an association between subjects' ratings of credibility of a source and their subjective evaluation of the message strength. Under conditions of low receiver involvement, a higher correlation between the two scores was anticipated than under conditions of high receiver involvement. A significant correlation was found, but only when the source was highly credible and the message was the first message received ($r = 0.84100$; $p = 0.0045$). However, regression analysis failed to reject the null hypothesis for a receiver involvement main effect ($F(1,199) = 0.29$; $p = 0.5936$) or an interaction between receiver involvement and source credibility ($F(1,199) = 0.01$; $p = .9159$). In summary, hypothesis two is supported by qualitative analysis (content analysis of a thought-listing task), received some support through correlation analysis, but is not supported by regression analysis.

The third hypothesis stated that when receiver involvement was high, the direction of the effects of credibility would depend on whether the message advocated the position initially opposed or favored by the receiver. It was expected that the receiver's compensation scheme, the source's credibility, and the direction of the message would jointly influence the weighting of the evidence contained within the message. As noted in the preceding section, when receiver involvement and elaboration likelihood are expected to be low, source credibility should act as a peripheral cue. This would be evidenced by more decision-related thoughts associated with the credibility of the message source. Source credibility performed the role of a heuristic, or "mental shortcut." Conversely, when receiver involvement and elaboration likelihood are expected to be high, source credibility is anticipated to interact with the subjects' initial attitude and act as a piece of evidence. In the case of high elaboration, the critical factor determining the direction of credibility's effects appears to be the nature of the position advocated by the message - specifically, whether the message advocates a position initially opposed or favored by the receiver (Petty &Wegener, 1998).

Hypothesis three posits a significant three-way interaction of incentive compensation scheme, source credibility, and message direction. The direction of credibility's effects would depend on whether the message advocates the position initially opposed or favored by the receiver. The receiver's compensation scheme, the source's credibility, and the direction of the message, would jointly influence the weighting of the evidence contained within the message. The test for a three-way interaction of compensation scheme, source credibility, and message direction was not significant when first and second budget adjustments were tested as combined data. However, a separation of the two budget adjustments revealed a significant interaction among these variables. The full regression model was run two more times, once using the data from the first budget adjustments and the second time using the data from the second budget adjustments. Both models showed evidence of a three-way interaction of compensation scheme, source credibility, and message direction. The interaction term using the first budget adjustments data resulted in a test result of $F(1,93) = 2.83$, $p = .0960$. The interaction term using the second budget adjustments data resulted in a test result of $F(1,93) = 7.66$, $p = .0068$.

Interestingly, in the high receiver involvement groups, credibility arguments were more prevalent in the "high goal" group when the messages were from high credibility sources and were sales-*increasing* messages. While the count differences are not as large, receivers in the "low goal" groups used low source credibility to support their attitude toward sales-decreasing messages. This is in line with ELM theory which predicts that high involvement receivers will use peripheral cues as evidence to support their initial attitude.

Table 5 summarizes the F-tests for equality of mean alpha and beta terms between groups two and three (the incentive compensation groups). A significant p-value indicates that there was a difference between the mean sensitivities toward sales-*increasing* (beta values) and sales-*decreasing* (alpha values) messages in the groups tested.

Table 5
INTERACTION OF COMPENSATION SCHEME, SOURCE CREDIBILITY, AND MESSAGE DIRECTION

Panel A – First Belief Adjustment	**High Goal**	**Low Goal**	**F**	**p**
Low Credibility				
Increasing Sales	0.27572	0.11249	7.94	0.0059***
Decreasing Sales	0.23938	0.22122	0.04	0.8350
High Credibility				
Increasing Sales	0.17702	0.20599	0.49	0.4859
Decreasing Sales	0.27526	0.26588	0.05	0.8264

Panel B – Second Belief Adjustment	**High Goal**	**Low Goal**	**F**	**p**
Low Credibility				
Increasing Sales	-0.02757	0.20778	3.90	0.0514
Decreasing Sales	0.20154	0.32689	1.36	0.2469
High Credibility				
Increasing Sales	0.26242	0.11253	5.65	0.0195**
Decreasing Sales	0.22554	0.23914	0.08	0.7740

* p<0.10; ** p<0.05; *** p<0.01

Reviewing the results of the first budget adjustments, subjects in the High Goal group placed more weight on low credibility, sales-increasing messages than subjects in the Low Goal group. A comparison of betas showed a significant difference ($p = .0059$) between the two incentive compensation groups (0.27572 for the high goal group versus 0.11249 for the low goal group). Subjects in the Low Goal group showed evidence of using the low credibility cue to lower the weighting of a sales-increasing message. This supports hypothesis three.

After the second message, respondents in the High Goal group placed more weight on high credibility, sales-increasing messages. In this case, a comparison of betas showed a significant difference ($p=0.0195$) between the two incentive compensation groups (0.26242 for the high goal group versus 0.11253 for the low goal group). Across both groups, biases entered the decision process through sales-increasing messages only. Low credibility sources were weighted more heavily by the "Low Goal" group, while high credibility sources were weighted more heavily by the "High Goal" group. Decreasing messages from both low and high credibility sources did not result in different sensitivities between the two groups.

The content analysis presented in Table 4 also supports this phenomenon. Subjects in the high receiver involvement groups were more likely to present message source arguments when the direction of the message (sales-increasing versus sales-decreasing) favored their initial attitude. This was particularly true in the case of high credibility, sales-increasing messages received by the "High Goal" group. Thus, these findings provide support for hypothesis three. Table 6 summarizes the overall findings and implications of this study.

Table 6
RESULTS SUMMARY

Panel A: ELM Predictions	**Findings**	**Implications**
High involvement receivers[a] biased by message direction	Not statistically significant. The integration of mixed evidence did not produce significant directional bias between the two incentive compensation groups, but all α and β values were in the right direction.	While not significant, the direction of the findings are consistent with prior agency-based research that finds compensation-based bias (slack-inducing behavior).
Low involvement receivers use source credibility as peripheral cue	Mixed findings. Content analysis supports the credibility heuristic; quantitative support is weak.	Low involvement receivers may use heuristics that lead to sub-optimal decisions.
High involvement receivers (incentive compensation) use source credibility as pro-attitudinal evidence	Supported. Support is found, but for increasing messages only.	Incentive compensation sets up an initial attitude toward evidence that biases judgment based on source credibility.
Panel B: HE Model Predictions	**Findings**	**Implications**
Recency order effects	Not supported. Weak order effects. Some evidence of primacy for increasing messages; recency for decreasing messages.	Initial attitude may alter the order effects predicted by the HE model. Further research needed.
Contrast effect	Supported. Second message induces more belief change when processed after evidence that is opposite in sign.	Biases may enter the budget decision process through the contrast effect.

[a]Initial attitude toward evidence is manipulated in high involvement receivers through the incentive compensation manipulation.

DISCUSSION

The results of this study provide several valuable insights into the budgeting process. The Elaboration Likelihood Model predicts that subjects will elaborate on a message when receiver involvement is high, but could bias the integration of mixed messages to support the initial positions favored by the subjects. Incentive compensation formulas were used to establish initial attitudes toward messages in the high involvement subjects. Pro-attitudinal messages were expected to receive more weight than counter-attitudinal messages. Experimental results revealed parameter estimates that were consistently in the right direction, but statistical tests were not significant. Lack of power may have caused the interaction of initial attitude (manipulated through compensation scheme) and message direction to go undetected.

In contrast, low involvement receivers were predicted to use heuristics, such as relying on peripheral cues, when evaluating messages. In this study, source credibility acted as the peripheral cue. A qualitative analysis of receiver involvement presented evidence of more decision-related thoughts associated with source credibility under conditions of low receiver involvement than under conditions of high receiver involvement. Subjects provided written comments concerning their thoughts in arriving at budget decisions. Content analysis was used to determine the presence or absence of both message content and message source arguments. Under conditions of low (high) receiver involvement, message source arguments were more (less) likely to be present in the thought-listing task. This supports the ELM prediction that low receiver involvement leads to more reliance on peripheral cues such as source credibility.

The ELM predicts that high involvement subjects will use source credibility as evidence to support their initial attitude. Content analysis also supported this prediction. Subjects in the high receiver involvement groups were more likely to present message source arguments when the direction of the message (sales-increasing versus sales-decreasing) favored their initial attitude. Regression analysis failed to support a statistically significant interaction between receiver involvement and source credibility.

Under conditions of high receiver involvement, source credibility was hypothesized to interact with compensation scheme and message direction. In interpreting the results of this three-way interaction, budget-adjustments were broken down into two categories: the first budget adjustment (the change in the sales forecast after receiving the first message) and the second budget adjustment. The three-way interaction term for source credibility, message direction, and incentive compensation group (high goal versus low goal) was statistically significant when the differences between means were segregated into two groups.

For first budget adjustments, high goal subjects placed more weight on low credibility, increasing messages than did low goal subjects. Weights for high credibility sources and sales-decreasing messages were not significantly different between groups. For second budget adjustments, high goal subjects placed more weight on increasing messages from high credibility sources than did low goal subjects. Weights for sales-decreasing messages were not significantly different between groups. And finally, for all groups and conditions, sales-decreasing messages were weighted more heavily than sales-increasing messages. These findings suggest a pro-attitudinal bias toward message sources that supported the initial attitude of the decision-maker. In both cases, the direction of credibility's effects was as predicted. The unexpected finding was that the effect only occurred for sales-increasing messages.

A possible interpretation of this finding is that sales-decreasing messages – messages that suggest a downward revision of a sales forecast – are less subject to bias because of an overall conservative bias in the budgeting process. Decision-makers might bring skepticism to the judgment and decision-making process because the initial forecast is the result of an aggregation of sales managers' opinions. The uncertainty concerning the starting point might lead to a greater saliency of decreasing messages. Decreasing messages might seem less refutable. Any biases, therefore, could tend to enter the decision process through sales-increasing messages where the decision-maker is more discriminating about the interpretation of the message content and message source. If this scenario holds in real-world budgeting contexts, a sub-optimal sales forecast could result. This bias and the resulting implications for firm profitability need further investigation.

In summary, the predictions of the ELM as tested in this study were generally supported. The consistency of the results with the theory suggests that insignificant test results may be due to lack of power. Differences in parameter estimates among cells consistently had the correct sign. A larger number of subjects might be needed to provide sufficient power to adequately test all the hypotheses under consideration in this study.

Limitations

This study had several limitations related to the nature of the laboratory experiment methodology. The first limitation to generalizability was the use of MBA students as subjects. External validity is weakened to the extent that subjects do not react similarly to a more experienced population of decision-makers. However, past budgeting research (Young, 1985; Chow et al. 1991; Fisher et al. 1996, 2000) has consistently used student subjects to study people's reactions to different contexts. The use of MBA students helped control for individual (i.e., age and gender) and organizational variables (i.e., industry, corporate culture, and organizational structure) that may not be consistent across firms. The use of MBA students might also mitigate some of the problems associated with using undergraduate students, but would not overcome all external validity problems.

A second limitation related to the use of MBA students is that the consequences of biased decision-making are much greater for practitioners. Setting a budget too high or too low results in consequences that are difficult to duplicate in an experimental setting. The subjects in this experiment did not face the magnitude of effects from over- or under-budgeting sales for the upcoming year. Because the sales forecast is used to plan production for the next year, mis-specified sales forecasts can lead to lost sales from under-production or surplus inventory from over-production. Both impact company profits, and can lead to reputation effects for the decision-maker in a multiple-period setting. This experiment was single-period, and did not consider reputation effects.

This study was also limited in its scope because the experiment considered just one budget variable – the sales forecast. The sales forecast is the starting point in developing an annual operating budget, and is therefore a very critical piece to consider. However, it is unclear whether a revenue decision varies from an expense decision. Because this study only tested a revenue decision, the findings might not be relevant in an expense decision context. The biases and cognitive functions associated with an expense versus a revenue context can be different. It is also possible that an overriding profitability (revenues less expenses) parameter might provide additional insights. Finally, validity was also threatened to the extent that the parameters of the subjects' compensation schemes are not reflective of real world conditions.

CONCLUSION

This study remains an important addition to the research in management communication because of its potential to shed light on a key communication function within an organization — managing the budgeting process. This study expands the prior literature in several important ways. First, it proposes the examination of factors affecting the decision-making process of managers within the budgeting context. Previous studies have examined antecedent and consequent factors related to participative budgeting, while ignoring the process (this literature stream is summarized in Kren, 1997). More recent studies have viewed the budgeting process as a negotiation between subordinate and supervisor (Fisher, Frederickson, & Peffer, 2000), but have failed to consider any other communication variables that are inherently part of such a process (as discussed in McVay, Sauers & Clark, 2008). This study incorporates two communication factors that could bias the budget judgment and decision-making process.

In addition, this research extends current research using the Elaboration Likelihood model by 1) focusing on empirical data in 2) an applied context other than advertising or political campaigns. Earlier studies have been much more theoretically-oriented in identifying cognitive processes related to information processing and persuasion (see discussion in Bloemer, Brijs, & Kasper, 2009; also Stephenson, Benoit, & Tschida, 2001). Also, much of the research conducted using the Elaboration Likelihood Model (ELM) of persuasion has focused on a small number of message topics. ELM research has repeatedly employed the topic of senior comprehensive exams (for a review of the studies that have examined this and other issues using the ELM, see O'Keefe, 1998, 2009; Petty & Wegener, 1998, 1999.)

According to O'Keefe, there are approximately twice as many studies on two particular topics (senior comprehensive exams and tuition changes) than on all other topics combined. By examining persuasive arguments in another domain, the generalizability of findings from prior studies is enhanced. As O'Keefe (1990) noted, "there is much to be gained by diversifying the ELM's evidentiary base" (p. 110). To date, there has been little experimental work that utilizes the ELM in a professional decision-making context (Petty & Wegener, 1998); another limitation of previous studies in this area, according to O'Keefe (1998), is a "failure to specify the properties that make specific arguments relatively more or less persuasive" (p. 73)

The results of this study suggest a number of opportunities for future research. The findings related to source credibility explore the impact that message source has on the integration of information and belief updating. Further studies should examine the relative importance of the sub-components of source credibility. The weighting of the various attributes of source credibility might differ, providing insight into those factors that are most influential in biasing the judgment of a decision-maker.

Source credibility factors might also be moderated due to the relationship of the source to the firm – an external versus an internal source of information. The consistency of evidence from different sources within or external to the firm could be examined to determine differences in the persuasiveness of a particular message. The interaction of evidence consistency, initial attitude of the decision maker, and source credibility warrants further exploration of these complex relationships.

END NOTES

[1] A power calculation was performed to determine the number of subjects needed to provide a power level of .80, with alpha set at .05. Because effect size is not known (although a meta-analysis of receiver involvement conducted by Johnson & Eagley [1989] suggests an effect size of approximately .20), number of subjects (n*) was calculated at three different effect (f^2) sizes. When $f^2 = .10$, n* = 192; when $f^2 = .15$, n* = 133; when $f^2 = .20$, n* = 103. (Cohen & Cohen, 1983).
[2] A kappa exceeding 0.75 represents excellent agreement (Fleiss 1981; Fleiss and Cohen 1973).

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OWNERSHIP STRUCTURE AND INFORMATION DISCLOSURE: AN APPROACH AT FIRM LEVEL IN VIETNAM

Pham T. B. Ngoc, Hoa Sen University
Quach M. Hung, University of Economics HCMC

ABSTRACT

This paper aims at investigating the impact of firm ownership concentration on firm-specific information disclosure for the case of an emerging country. By analyzing an unbalanced panel data including 195 Vietnamese firms on the Hochiminh stock market from 2006 to 2011 since Vietnam strongly opened its economy by completing the ASEAN free trade area in 2006 and joining the WTO in 2007, we find that the largest owner tends to disclose more information to the market if his asset, tied with the stock price, is large, fearing the market could punish his bad behavior by discounting the stock price. Moreover, as the Vietnamese stock market operates in a market oriented economy originating from a central planned economy, we further investigate origins of the largest owners, private vs. state ownership. Accordingly, the impact of ownership structure on information disclosure is only engaged with wholly private firms but not significant when the largest owner is related to the state.

Keywords: ownership concentration, state joint stock firms, information disclosure.

JEL Classification: G14, G32, G34

INTRODUCTION

The Hochiminh stock exchange (HOSE), which occupies 85% of the Vietnamese stock market capitalization, has developed to have 302 listed stocks, 2 funds and 28 bonds until 2013 since the first trading day at 28/07/2000 with only two listed stocks. This fresh market accounts 27% of the GDP with the capitalizing value about USD40 billion for the year 2013. After a period of fast development, the VN Index as denoted the HOSE market index has confronted a decreasing trend from the range 950-1000 in the years 2007-2008 to be sustainably above 500 in recent years, vis-à-vis the world crisis. This fact possibly reflects a stagnancy in the Vietnamese economy since the stock market is always considered as one of the best ways to forecast the economic performance as it shows much economic information through its stock pricing system according to Roll (1988). A research question is posed that how to improve the informativeness environment focusing on corporate information disclosure practices in order to promote the investment climate attractive enough to both foreign and domestic investors.

Corporate disclosure is considered as the communication between the firm managers, controlling owners and the outside investors about firms' performance, financial situation, potential development or even risks such as cost of capital, stock performance and bid-ask spreads via regulated financial, annual reports, press release or firm online news (Healy and of those kinds of information into the stock price variation is not always good because of the corporate disclosure problem. A bad disclosure can block the information to be captured in the stock price and create the asymmetric information between the insiders and uninformed investors. Due to this market failure, the cost for acquiring information becomes higher for the outside investors (Jiang, et al. 2011). The more severe the situation, the less attractive an investment environment. Thus, a fund attraction progress for the capital market in order to lower the domestic cost of capital could be in vain if the corporate disclosure problem is not resolved (Jiang, et al. 2011; Lawrence, 2013).

In this study, the impact of the ownership structure on disclosure activities is the main research objective. The first argument behind this suggestion is based on the agency problem mentioned by Jensen and Meckling (1976) that controlling shareholders would hide corporate information from outside investors for their private benefits, such as covering their corruption, private contracts or inside trading. Perhaps, ownership concentration especially that associated with state ownership in Vietnam doesn't favor the information disclosure system. Hence, the ownership level would have a negative relationship with the corporate disclosure level. However, there could be another argument developed by Healy and Palepu (2001) that a high holding rate of a firm stock is a strong commitment for the owner's honesty. Investors could easily punish his bad behavior by discounting his asset easily and directly on the stock market. Thus, the effect of ownership concentration on the corporate disclosure is important but with mixed results.

To the best of our knowledge, this paper is the first one to shed a light on the transparency of Vietnam stock market by analyzing the firm-specific return variation and its relationship with ownership concentration. By using the OLS, fixed effects, and random effects estimations together with robustness checks for a panel data including 195 listed firms on the Hochiminh Stock Exchange from 2006 to 2011, we find a robustly positive impact of ownership concentration on information disclosure in the context that firms try their effort to send transparent signals to investors. Interestingly, this affect is only significant for wholly private firms, but not for the state-related firms. There could be the fact that state-related firms want to protect information as state ownership plays a major role in transition economies, from former central planned economy, for the case of Vietnam.

The following section is literature review. The third and fourth sections present research methodology and estimation strategy, and data description. Next, the fifth section provides the empirical results and analysis. Finally, we come up some conclusions and policy implications in the final section.

LITERATURE REVIEW

According to Morck, Yeung, and Yu (2000), low level of informativeness is a common phenomenon in emerging financial markets resulting from many serious corporate and institution structure problems. According to Ball (2001) and Chan and Hameed (2006), the bad enforcement of disclosure regulations in emerging markets makes the insiders and managers have less incentive to release more information for the outside investors. In addition, corporate structure, for instance ownership concentration is considered as a main cause for the problem in emerging economies. Ownership concentration is the situation when one or a few shareholders hold a large percentage of stock of a firm. When the stock holding is equivalent to the voting right, the result is the power concentration (Thomsen and Pedersen, 2000). In developing countries, the ownership usually concentrates in hands of the entrepreneurs and their relatives. Meanwhile, in the case of transition economies, the largest shareholders are related to the state. A high ownership concentration rate certainly has a large influence on firms' disclosure policy.

There could be a controversial impact of ownership structure on the disclosure activities. On the one hand, Jensen and Meckling (1976) state that the controlling shareholders could access to the inside information sooner than the outside investors. Moreover, Fan and Wong (2005), Kim and Yi (2006) and Gul, Kim and Qiu (2010) argue that the controlling owners, by exploiting their concentrated power, have incentives to hide those information or disclose them in a selective way in order to benefit their self-serving activities, such as hiding the private contracts, corruption or inside trading. Hence, in this case, the ownership concentration would have a negative relationship with the corporate disclosure level.

On the other hand, Healy and Palepu (2001) argue that the high holding rate of a firm is a strong commitment for the owner honesty. As a result, investors could easily punish his bad behavior by discounting his asset easily and directly on the stock market. That certainly could encourage the owners to release firm information. Jalila and Devi (2012) argue that strict and close supervision of large owners forces the manager working for the common good of the shareholders. They also note that large investors such as institutions, international investors and professional funds tend to make the manager to disclose the information better.

Jalila and Devi (2012) summarize these two opposite impacts through channels of the entrenchment effect and the alignment effect. The former effect derives from the conflict between larger owners who could be founders or managers at the same time and minority outside investors. The owners with the inside information behave like a predators to minority shareholders. Meanwhile, the latter shows the conflict between owners and corporate managers that the effect can rise when the manager acts for his own benefit but not for the owners. In this case, the large owner will behave in the common interest with the shareholders by supervising closely the moral hazard activities of the managers.

Previous empirical studies provide ambiguous results. In Jiang, et al. (2011), the stock price reflects the asymmetric information, which comes from the signal of the bid-ask spread, depending on ownership concentration for the case of New Zealand. This study is applied for 103 firms with 390 firm-year observations in order to show that the ownership concentration rises the asymmetric information. Moreover, Chau and Gray (2010), by using a voluntary disclosure index, find a positive relationship between the family ownership and voluntary disclosure in Hong Kong. However, Gul, Kim and Qiu (2010) show the negative impact of ownership on corporate disclosure for the China with 1,142 firms from 1996 to 2003. Their results support the entrenchment effect with which the largest shareholders has incentive to hide the information from outside investors. Meanwhile, Jung & Kwon (2002) analyzes the return of the informativeness earning per share with the ownership concentration, institution and block holding in Korea. Their study provides evidence that ownership concentration, institution and blockholdings supply more information to the stock return but not for the case of the cheabol group. Due to its complicated ownership and activities, cheabol managers and owners don't want to disclose their secret. The same situation happens to the state joint stock firms that the government ownership does not favor the information disclosure according to Gul, Kim and Qiu (2010).

RESEARCH MODEL AND METHODOLOGY

In this research, we apply the approach of Fernandes and Ferreira (2008) and Gul, Kim and Qiu (2010) which were developed from the foundation of Roll (1988). Accordingly, two main steps will be conducted as follows:

Step 1: Measuring corporate disclosure

According to Roll (1988), the stock price fluctuation of a firm is composed by 3 components: systematic economic influences, industrial factors and firm specific information. An investor's paying decision, which is revealed in stock variation, will be based on the macro information and industrial factors and firm specific information. Thus, after regressing stock variation to market and industry returns, which represent the public information, the unexplained part of the stock price variation is identified as the firm specific information. Then we can use it as a proxy to capture the contribution level of disclosing information.

$$RET_{it} = \alpha + \beta_1 MKTRET_t + \beta_2 MKTRET_{t-1} + \beta_3 INDRET_{it} + \beta_4 INDRET_{i,t-1} + \varepsilon_{it} \quad (1)$$

Where:

$\mathbf{RET_{it}}$: daily return of stock i at the end of day t in a trading year. Being different from Gul, Kim and Qiu (2010), Fernandes and Ferreira (2008) and Morck, Yeung and Yu (2000) which use the trading year from 1st January to 31st December, we apply a trading year from 1st April to 31st March for the reason to avoid the overlap counting problem of the new Board of Directors (BoD) and Board of Management (BoM), who are elected in the shareholders annual meeting at the end of the first year quarter, and the old BoD and BoM.

$\mathbf{MKTRET_t}$: market return variation (VNIndex) at the end of day t in a trading year.

$\mathbf{INDRET_{it}}$: industry return variation at the end of day t in a trading year. This indicator is constructed by making a stock index of all the firms in the same industry, excluding the estimated firm. The industrial classification is taken from the HOSE website (hsx.vn) and a chosen industry is required to have at least 4 firms and in a trading year. The index formula is as follow:

$$INDRET_{it} = \frac{\sum_{k=1}^{n}(SIZE_{kt} * RET_{kt}) - SIZE_{it} * RET_{it}}{\sum_{k=1}^{n}(SIZE_{kt}) - SIZE_{it}}$$

where **n** is the number of firm in the industry. The **SIZE** is identified as the total share listed of each firm at the beginning of the year.

The lagged components of **MKRET** and **INDRET** are included in the equation **(1)** for capturing the impact of the information from the last trading day on the actual stock trading variation.

After running the regression for every firm, we got the value R_{iy}^2 for each firm-year regression which captures the percentage of market and industry return variation over the total return variation (where **i**: identifies firm **i**, and **y**: represents the estimated year **y**). The value of specific firm information captured in the stock price of firm **i** in year **y** is: $\mathbf{1 - R_{iy}^{2}}$

Because the $\mathbf{1 - R_{iy}^{2}}$ value only varies between [0,1], a transformation is required in order to convert it to a real number. Hence, we acquire the measurement variable for the corporate disclosure or the informativeness of the firm **i** in year **y**:

$$\boldsymbol{INFO_{iy} = \log(\frac{1 - R_{iy}^2}{R_{iy}^2})}$$

Step 2: Measuring the impact of ownership concentration on corporate disclosure

$$\boldsymbol{INFO_{iy} = \gamma_0 + \gamma_1 TOPHOLD_{iy} + \sum_k \gamma_k CONTROL_{iy}^k + \varepsilon_{iy}} \quad \textbf{(2)}$$

where:

$\mathbf{TOPHOLD_{iy}}$: is the percentage of share of the largest holder of firm **i** at the beginning of the trading year **y**. In addition, the share of the largest holder is the ownership combination of family members, related people or company. Whereas, if the shareholder is government related, even if the ownership is discarded into several persons, institutions or public firms, the ownership will be also combined and counted for the state. The data is collected manually from the annual report of each firm which is released at the first quarter of the year.

CONTROL variables

$\mathbf{VOL_{iy}}$: daily average trading volume of firm **i** at year **y**. Chan and Hameed (2006) suggest that a high trading volume could mean the high speed of price adjustment which helps it keeping up with the market movement. Hence, it is believed that the more highly traded stock, the more its price is synchronized with the market return. Thus, it is expected to have a negative relationship with the corporate disclosure. However, Gul, Kim and Qiu (2010) found an opposite effect as high trading volume could be an effective signal for liquidity when the firm specific information capitalized in the stock price. The difference in their results could be the consequence of using different proxy for measuring the trading volume.

$\mathbf{SIZE_{iy}}$: denoted by the total shares of firm **i** at the beginning of the year. According to Chan and Hameed (2006), Gul, Kim and Qiu (2010) the **SIZE** control variable is used in order to capture the influence of the large firms on the market and industrial index which is formed by weighting each stock variation by its size. Hence, the **SIZE** is expected to have a negative relation with the dependent variable due to its positive theoretical correlation with the market and industrial index.

$\mathbf{INDSIZE_{iy}}$: the total **SIZE** of all firms in the same industry of firm **i**. When the industry is too large or too small, the interaction of the firm stock variation with the market index or the industry index also varies. Hence, this industry variable is included in the model to control the industrial level variations.

An extension

The equation (2) will be applied for wholly private joint stock firms and state- related joint stock firms separately in order to estimate the role of private vs. state ownership structure on the information disclosure. Gul, Kim and Qiu (2010) use only a dummy variable to capture the impact of government ownership on the corporate disclosure level. We consider this method is not sophisticated enough for emphasizing that effect. Hence, in this paper we divide the sample in two groups: the state-related joint stock firms, which the largest shareholder is related to the state, and the private joint stock firms.

Robustness check

We are checking if the impact of ownership concentration on information disclosure is still consistent when applying different measurements for this regressor.

Firstly, a simpler additional ownership index **HSUM** is suggested. **HSUM** is only the sum of top 3 largest shareholders' ownership.

$$\boldsymbol{HSUM_{iy} = \sum_{k=1}^{3} TOPHOLD_{kiy}}$$

TOPHOLD$_{\mathbf{kiy}}$ is the percentage of share which is hold by the top three shareholders of firm **i** at the beginning of the year **y** respectively.

Next, according to Jiang, et al (2011), a different proxy for measuring the ownership concentration is applied in order to put more weight on the larger shareholding:

$$\boldsymbol{H_{iy} = \sum_{k=1}^{3} TOPHOLD_{kiy}^{2}}$$

where:

H$_{\mathbf{iy}}$ is the ownership concentration index of firm ***i*** at the begining of year ***y***.

Estimation methods

Fernandes and Ferreira (2008) and Gul, Kim and Qiu (2010) employ the OLS estimation and follow the Petersen (2009) by using robust standard errors corrected for analyzing financial panel firm-level data. This method is crucial for correcting the potential serial dependency problems. However, Petersen (2009) also suggests that while analyzing panel data with potential fixed effects, the fixed effects (FE) or the random effects (RE) estimations will be more efficient.

F-test and LM-test will be applied to examine the appropriateness of the FE and RE model correspondingly. If both models are qualified, they will be tested by the Hausman test for choosing the most appropriated model. In addition, time dummies will be included to control the potential time effects. Industry dummies are employed in the OLS and RE model for controlling the industrial effect. Moreover, the clustered standard errors are used for correcting the heteroskedasticity and within panel serial correlation problem. VIF test for multicollinearity is also applied for finding the correlation level among independent variables.

DATA DESCRIPTION

Data sample

The data covers 729 firm-year observations of 195 listed firms on the Hochiminh Stock Exchange from 2006 to 2011. The stock market return with the trading volume is collected from cophieu68.com website. Meanwhile, the data about the ownership, firm size is gathered manually from annual and financial report taken from the firm website and the official website of Hochiminh Stock Exchange (hsx.vn). Every firm is classified following the industry category of HOSE and must have at least 200 trading days per year. Financial firms and outliers including firms with more than 100 million stocks or firms with only one year data are excluded.

Summary Statistics

As can be seen from **Table 1**, the value **R2**, which represents the level of the capitalization of market and industrial information in the stock price variation, has the mean 0.3045, which is much lower than the mean 0.454 for the case of China in Gul, Kim and Qiu (2010), but much higher than the value 0.193 for the US in Piotroski and Roulstone (2004).

The amount **1 – R2** indicating firm specific information level captured in the stock price is 0.6955. As compared with the result in Fernandes and Ferreira (2008), Vietnamese corporate disclosure level belong to the bottom third of 24 emerging markets. However, among the developed markets, Vietnamese disclosure level can only outperform slightly the case of Greece. After transforming it by taking log, we get the corporate disclosure measurement **INFO**.

Table 1
SUMMARY STATISTICS

Variables	Number of observation	Mean	Standard Deviation	Min	Max
Dependent variable					
1 - R2	729	0.6967	0.1699	0.0257	0.7349
INFO	729	1.0283	1.0032	-1.0196	3.6352
Independent variables					
Ownership concentration					
TOPHOLD	723	0.3681	0.1918	0.0500	0.8370
Control variables					
VOL	729	91,376	142,699	478	1,174,396
SIZE	729	21,000,000	16,900,000	1,138,501	82,700,000
INDSIZE	729	808,000,000	639,000,000	3,000,000	1,970,000,000

Also from **Table 1**, the first main independent variable **TOPHOLD** which denotes ownership concentration presents that the largest shareholder holds 36.81% of the stock on the average. However, this value varies a lot from 5% to 83.7%. Although the mean value is lower than that of 42.8% for the case of China (Gul, Kim and Qiu, 2010), it is very high compared to the case of the US. Jiang et al (2011) report that 20 top shareholders in US hold only 37.66% of the total amount of shares.

Meanwhile, **Figure 1** shows that the disclosure situation of Vietnamese listed firms is positively and significantly enhancing through time. A simple explanation for this phenomenon could be that the Vietnamese policy makers and regulators have success in making a good environment for better disclosure activities. It could be the result of strict law enforcement or more experienced market supervisors and investors. However, it is only the first intuitive observation. The detailed results will only be acquired after finishing the regressing phase.

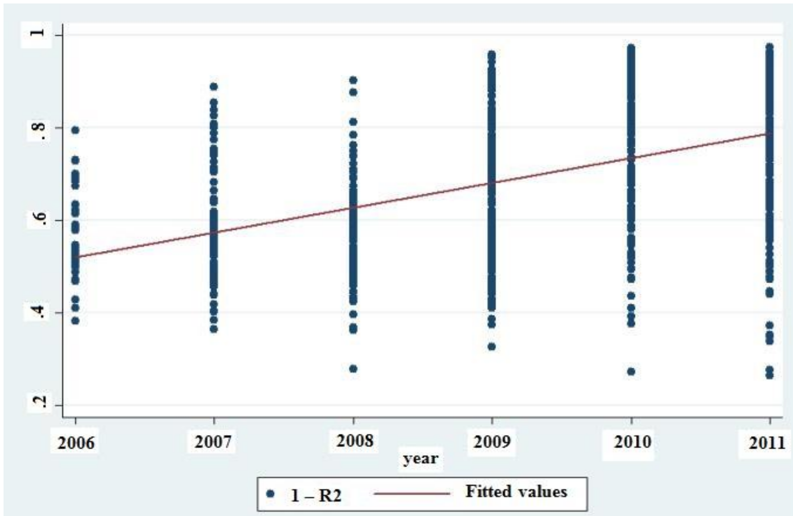

Figure 1: Informativeness level by year

A positive relationship between corporate disclosure and ownership concentration could be seen in **Figure 2**. Although many previous researches only concentrate on the linear trend, Gul, Kim and Qiu (2010) suggest a concave relation. In our study, we do not analyze the quadratic relationship.

When taking ownership structure into account, the number of state-related firms is 114 among 195 firms as a whole. The state controls on average 39.47% of the shares of these firms. However, there is a strong firm concentration around the level 50% as many Vietnamese state-related firms protect the state's power by keeping the voting share more or less than 51% in the privatization progress.

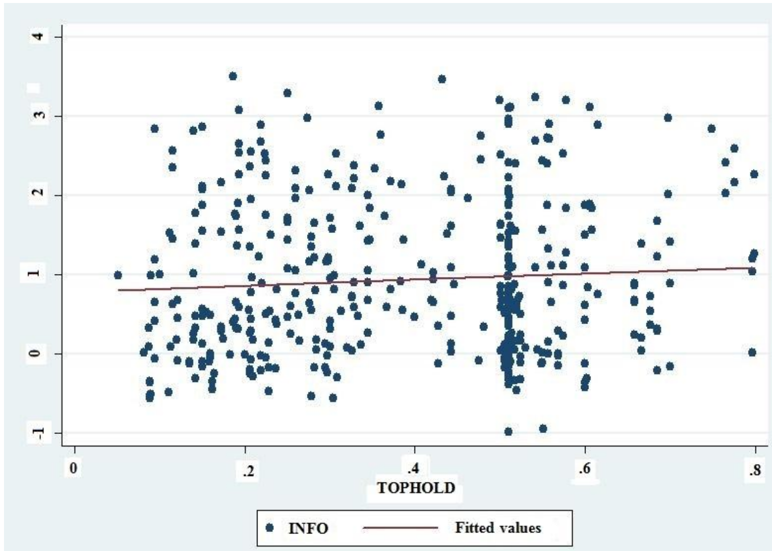

Figure 2: The relationship between corporate disclosure and ownership concentration of state joint stock firms

EMPIRICAL RESULTS AND ANALYSIS

The relationship between ownership concentration and corporate disclosure

The OLS, FE, and RE methods are applied for the equation (2). Accordingly, the estimation results for all firms, state-related and wholly private firms are introduced in **Table 2**. The F-test, LM test and Hausman test have been performed for each group. All groups had passed the F-test and LM test with the significance level at 1%. Therefore, the OLS model is proven to be less appropriated than the FE and RE model and would not be applied. Moreover, the Hausman test indicated that the FE method is more appropriate for the group of all firms and state- firms at 5% significance level. Meanwhile, the RE method is suitable for the group of private joint stock. The selected results will be displayed in bold.

Column 1 provides the positive coefficient 1.06 which is significant at 5% significance level. As predicted in the descriptive statistic section, the slope is pretty small. We find the results that the more ownership is concentrated, the better corporate disclosure is in the Vietnam's stock market. In other words, the more stock the largest shareholder holds, the more he discloses firm specific information to the public. Then, the information could be well capitalized in the stock price variation. However, the result is opposite with the negative result in Gul, Kim and Qiu (2010) so we need a further robustness check.

Column 3 shows insignificant coefficients for the state-related firms which is in line with the finding of Jung and Kwon (2002) about Korean cheabol firms. Their explanation is that the positive effect of the ownership concentration is offset by the entrenchment effect in the cheabol firms. Their largest shareholders, with the complicated system of possession, have large incentive to hide their activities or to exploit the minor investors. However, the state joint stock firms in Vietnam may have not incentive to exploit the minor shareholders. Their low level of disclosure could be explained by inefficient governance which reveals their passive role in the disclosure activities. The finding is also consistent with Gul, Kim and Qiu (2010). In their research, the included dummy variable for the state related top shareholder is negatively correlated with the corporate disclosure.

Table 2
THE IMPACT OF OWNERSHIP CONCENTRATION ON CORPORATE DISCLOSURE

Dependent variable: INFO						
Column	1	2	3	4	5	6
	All firms		State JS firms		Private JS firms	
GROUP	FE	RE	FE	RE	FE	RE
TOPHOLD	1.0570 (2.28)**	0.4312 (2.02)**	1.5935 (0.94)	0.2171 (0.67)	1.4114 (2.65)***	0.9005 (3.17)***
Control variables						
SIZE	-1.39E-08 (-2.25)**	-1.11E-08 (-3.88)***	-1.33E-08 (-1.48)	-9.22E-09 (-2.26)**	-7.66E-09 (-0.98)	-1.33E-08 (-3.64)***
INDSIZE	-4.64E-11 (-0.25)	2.12E-11 (0.12)	5.11E-11 (0.21)	1.40E-10 (0.63)	-3.65E-10 (-0.99)	-2.77E-10 (-0.89)
VOL	-1.46E-06 (-4.40)***	-2.02E-06 (-6.83)***	-1.41E-06 (-3.08)***	-2.21E-06 (-4.15)***	-1.46E-06 (-3.75)***	-1.91E-06 (-6.28)***
Year dummies						
2007	0.0648 (0.59)	0.0432 (-0.42)	-0.0610 (-0.46)	-0.0415 (-0.32)	0.4867 (2.19)**	0.3565 (2.00)**
2008	0.2104 (1.51)	0.2324 (-1.79)*	0.0613 (0.35)	0.1147 (0.71)	0.7042 (2.52)**	0.6469 (2.86)***
2009	0.6357 (3.25)***	0.6258 (3.47)***	0.5262 (2.22)**	0.5097 (2.03)***	1.1856 (2.82)***	1.1058 (3.28)***
2010	1.3711 (5.60)***	1.3202 (6.01)***	1.1140 (3.85)***	1.0419 (3.89)***	2.1360 (3.94)***	2.0562 (4.83)***
2011	1.4176 (5.27)***	1.3766 (5.69)***	1.2941 (4.12)***	1.2288 (4.18)***	2.0230 (3.32)***	1.9826 (4.14)***
constant	0.2366 (1.12)	0.3947 (1.92)*	-0.0115 (-0.02)	0.2619 (-1.07)	-0.1681 (-0.56)	-0.0369 (-0.11)
Dummies		Industry		Industry		Industry
F-test	(3.58)***		(3.33)***		(3.19)***	
LM test		(98.5)***		(23.22)***		(41.69)***
Hausman test	(12.65)**		(14.37)**	(14.37)**	(7.96)	(7.96)
Obs	723	723	417	417	306	306

Note: The robust results are with bold columns 1,3 and 6. Industry dummies are used in the RE regressions. Standard errors are in parentheses. Statistics significance at: 10% level (*), 5% level (**), 1 % level (***).

In contrast, the wholly private joint stock group has significant results in columns 5-6. The magnitude of the coefficient in the FE model is also higher than the overall group (1.4114 > 1.057) and its level of significance rises as well (2.65 > 2.28). The answer for this finding is the credit of a firm is tied closely to the credit of its founders, owners or managers. In addition, social capital plays important role in Vietnamese economy. A good credit, commitment of the firm or the owner could be a collateral for borrowing or issuing new stock. This is also a vital purpose of each firm for being listed. Hence, maintaining a good reputation is crucial for not only a firm but also the owner especially in the period of the financial crisis.

Besides, when holding a large share ratio, a bad behavior once discovered could be catastrophic for the owner. Fan and Wong (2005) mentions that, the outside investors will defend themselves from the information disadvantage by adjusting the stock price. The more asymmetric information is, the larger the discount ratio is. Thus, the largest shareholder, while caring for their asset, will choose to behave properly. This also explains the insignificant result for state-related firms. Since the managers only own a little amount of share, they don't have incentive to disclose much information about the firm activities. The agency problem between the owners and the managers is more severe in the public firm where the ownership belongs to the state and the risk of corruption is commonly high.

The year dummies included in every model has shown significant positive increase in corporate disclosure each year. Furthermore, the significance level also rises year by year. In short, the corporate disclosure of Vietnamese firms becomes better over time. This is a good signal for the progress of privatization and transparency of Vietnam.

Robustness check

Robustness check is applied in order to gain more confidence in the main relationship between the ownership concentration and the corporate disclosure (**Table 3**). The regression progress for the equation (2) will be replicated with 2 different new independent variables **HSUM** and **H** with 3 data samples: all firms, state-related and wholly private joint stock firms. The private group is expected to gain a positive relationship between ownership concentration and information disclosure and the state-related group should have a neutral impact. FE and RE methods are used with the F-test's and LM test's significance level at 1%. Therefore, the OLS model is proven to be less appropriated than the FE and RE model and would not be applied. The Hausman tests show suitable results in *Column 2* (state-related firms/FE) and *Columns 4* and *6* (all firms and wholly private firms/RE).

As predicted, the relationship of ownership concentration and corporate disclosure is significantly positive in both case **HSUM** and **H**. The results are consistent with all the previous findings. Ownership concentration contributes significantly and positively to corporate disclosure in every models and independent variables. Moreover, this effect happens stronger in the private sector than in the public sector. In the case of state related firms, the effect is offset by the negative entrenchment incentive and become insignificant.

More specifically, in the case of **HSUM** independent variable, the coefficient of the private group is also significantly positive (0.8663). Meanwhile, the coefficients of state joint stock group are not significant in both models despite its positive values.

In addition, the results from the **H** proxy test (**Table 4**) prove that the coefficient of the private group is much greater than the state group in both fixed effects and random effects models (see the results in columns *3* and *6* as compared to those in 2 and 5). Furthermore, the coefficients of the state group are not significant in both models, confirming again that the state ownership has no influence on corporate disclosure.

Table 3
THE IMPACT OF OWNERSHIP CONCENTRATION ON CORPORATE DISCLOSURE – THE CASE OF HSUM

	FIXED EFFECT			RANDOM EFFECT		
Column	**1**	**2**	**3**	**4**	**5**	**6**
GROUP	***Total***	***State***	***Private***	***Total***	***State***	***Private***
HSUM	0.6580 *(2.07)***	**1.1071** ***(1.10)***	0.8987 *(1.99)***	**0.4972** ***(2.44)*****	0.2432 *(0.77)*	**0.8663** ***(2.89)******
Control variables						
SIZE	-1.4E-08 *(-2.30)***	**-1.4E-08** ***(-1.53)***	-8.7E-09 *(-1.08)*	**-1.1E-08** ***(-3.97)******	-9.3E-09 *(-2.27)*	**-1.3E-08** ***(-3.53)******
INDSIZE	-4.0E-11 *(-0.21)*	**5.6E-11** ***(0.23)***	-3.4E-10 *(-0.90)*	**1.3E-11** ***(0.08)***	1.4E-10 *(0.63)*	**-2.7E-10** ***(-0.85)***
VOL	-1.5E-06 *(-4.40)****	**-1.4E-06** ***(-3.09)******	-1.4E-06 *(-3.64)****	**-2.0E-06** ***(-6.75)******	-2.2E-06 *(-4.15)****	**-1.9E-06** ***(-5.85)******
Year dummies						
2007	0.065 *-0.580*	**-0.076** ***(-0.57)***	0.456 *(1.85)**	**0.053** ***(0.51)***	-0.041 *(-0.32)*	**0.390** ***(1.98)*****
2008	0.209 *-1.510*	**0.045** ***-0.260***	0.686 *(2.21)***	**0.238** ***(1.83)****	0.115 *(0.71)*	**0.671** ***(2.74)******
2009	0.632 *(3.21)****	**0.509** ***(2.17)*****	1.161 *(2.56)***	**0.632** ***(3.5)******	0.511 *(2.3)***	**1.120** ***(3.16)******
2010	1.368 *(5.55)****	**1.096** ***(3.8)******	2.115 *(3.65)****	**1.334** ***(6.07)******	1.044 *(3.9)****	**2.080** ***(4.7)******
2011	1.408 *(5.20)****	**1.277** ***(4.07)******	1.998 *(3.09)****	**1.385** ***(5.71)******	1.230 *(4.19)****	**1.991** ***(4.02)******
Constant	0.359 *(2.01)***	**0.196** ***(0.44)***	-0.070 *(-0.20)*	**0.343** ***(1.65)****	0.255 *(1.05)*	**-0.144** ***(-0.37)***
Dummies				***Industry***	*Industry*	***Industry***
F-test	*(3.54)****	***(3.32)******	*(3.08)****			
LM-test				***(97.76)******	*(40.88)****	***(38.47)******
Hausman test	*(10.37)*	***(11.88)****	*(5.89)*	***(10.37)***	*(11.88)**	***(5.89)***
Obs	723	**417**	306	**723**	417	**306**

Note: The robust results are with bold columns 2, 4 and 6. Standard errors are in parentheses. Statistics significance at: 10% level (*), 5% level (**), 1 % level (***).

Table 4
THE IMPACT OF OWNERSHIP CONCENTERATION ON CORPORATE DISCLOSURE – THE CASE OF H

Column	1	2	3	4	5	6
GROUP	*Total*	*Public*	*Private*	*Total*	*Public*	*Private*
H	**1.1145** **(2.57)****	**1.0926** **(0.58)**	1.2645 *(2.81)****	0.5590 *(2.15)***	0.2425 *(0.62)*	**1.0589** **(3.08)*****
Control variables						
SIZE	**-1.4E-08** **(-2.26) ****	**-1.4E-08** **(-1.53)**	-8.1E-09 *(-1.04)*	-1.1E-08 *(-3.89)****	-9.2E-09 *(-2.25)***	**-1.3E-08** **(-3.55)*****
INDSIZE	**-3.7E-11** **(-0.20)**	**5.7E-11** **(0.24)**	-3.4E-10 *(-0.91)*	2.3E-11 *(0.14)*	1.4E-10 *(0.64)*	**-2.5E-10** **(-0.82)**
VOL	**-1.5E-06** **(-4.40)*****	**-1.4E-06** **(-3.12)*****	-1.5E-06 *(-3.71)****	-2.0E-06 *(-6.81)****	-2.2E-06 *(-4.15)****	**-1.9E-06** **(-6.29)*****
Year dummies						
2007	**0.064** **(0.59)**	**-0.077** **(-0.59)**	0.444 *(2.03)***	0.045 *(0.44)*	-0.042 *(-0.32)*	**0.352** **(2.00)****
2008	**0.210** **(1.52)**	**0.044** **(0.26)**	0.668 *(2.38)***	0.234 *(1.81)**	0.115 *(0.72)*	**0.640** **(2.85)*****
2009	**0.627** **(3.32)*****	**0.501** **(2.14)****	1.133 *(2.70)****	0.624 *(3.46)****	0.509 *(2.3)***	**1.081** **(3.25)*****
2010	**1.362** **(5.61)*****	**1.087** **(3.77)*****	2.081 *(3.86)****	1.319 *(6.02)****	1.041 *(3.88)****	**2.030** **(4.84)*****
2011	**1.407** **(5.27)*****	**1.268** **(4.05)*****	1.968 *(3.24)****	1.375 *(5.69)****	1.228 *(4.18)****	**1.953** **(4.13)*****
Constant	**0.427** **(3.11)*****	**0.436** **(1.07)**	0.122 *(0.55)*	0.450 *(2.31)***	0.294 *(1.23)*	**0.097** **(0.3)**
Dummies				*Industry*	*Industry*	***Industry***
F-test	**(3.57)*****	**(3.31)*****	*(3.15)****			
LM-test				*(98.79)****	*(40.67)****	**(41.37)*****
Hausman test	**(12.00)***	**(11.59)***	*(6.95)*	*(12.00)**	*(11.59)**	**(6.95)**
Obs	**723**	**417**	306	723	417	**306**

Note: The robust results are with bold columns 1,2 and 6. Standard errors are in parentheses. Statistics significance at: 10% level (*), 5% level (**), 1 % level (***).

CONCLUSION

In this study, we aim to shed a light into the relationship between the ownership concentration and corporate disclosure for the whole, and separated private vs. state joint stock firms by applying a data set of 195 firms listed on the Hochiminh stock exchange from 2006-2011.

Firstly, the corporate disclosure issue of Vietnamese firms has been carefully analyzed. In an emerging country like Vietnam, the level of corporate disclosure of Vietnamese firms is pretty low. According to our calculation, Vietnamese corporate disclosure level belong to the bottom third of 24 emerging markets of the Fernandes and Ferreira (2008) study.

Secondly, we find evidence that ownership concentration favors corporate disclosure in support for the alignment effect as being mentioned in Jalila and Devi (2012). When investigating further types of ownership, the positive relationship between ownership concentration and corporate disclosure is associated with the private sector but not for the private sector.

Many previous studies suggested that the high ownership concentration in emerging countries could be related to the bad disclosure performance. For the case of Vietnam which is originating from a central planned economy to a market oriented economy, ownership structure of state joint stock firms can be a major obstacle for the disclosure process. This may result from the fact that state ownership representatives have less incentive to disclose information possibly due to agency problem. On the contrary, the owner of the private firm care more about disclosure activities. The explications could be that: (1) the owner fears the lack of disclosure could cause rumors or doubt among outside investors which could harm their credits; (2) not only the reputation could be harm, but also the stock price into which the owner asset is tied; (3) more disclosure will send a signal of a good credit for both the firm and its owner which could be a great help in gaining for capital or loan.

In sum, it is noticed that a strong trend of enhancing disclosure situation over time is crucial to express a good signal from the market to call for more investors. Acknowledging the importance of disclosing information on the financial market and the economy, policy makers should improve the law enforcement on the listed and even non listed firms to enhance the information transparency. Better information disclosure regulations can protect the minor investors. So privatization could be the most effective way to set the situation go straight. However, the effort could be still in vain if most of firms' shares remain in hands of ineffective state agents.

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APPENDIX

Table 5
SAMPLE DISTRIBUITION BY INDUSTRY

No	Industry	Number of firms	Number of observations
1	Agriculture and forestry	7	28
2	Construction	24	76
3	Information and technology	4	12
4	Manufacturing	80	323
5	Mining	8	28
6	Power and gas	9	34
7	Real estates	20	62
8	Trade	28	111
9	Transporting	15	55
	Total	**195**	**729**

Table 6
EMPIRICAL RESEARCHES ABOUT OWNERSHIP CONCENTRATION AND CORPORATE DISCLOSURE

Authors	Period & Sample	Methodology	Disclosure measurement	Ownership concentration measurement	Results
Gul, Kim and Qiu (2010)	1996 - 2003 1142 firms 6129 obs from China	Multivariate regression	Stock Synchronization	Percentage of topshareholder	Negative relationship with concave function
Chau & Gray (2010)	2002 273 firms Hong Kong	OLS	Voluntary disclosure index	Percentage of family member	Family ownership disclose more information
Jung and Kwon (2002)	Korea	OLS	Return informativeness	Dummy variable Equal 1 if ownership above mean value.	Positive relationship between ownership concentration and return informativeness
Jiang et al (2011)	103 firms 390 firm-year obs New Zealand	Panel corrected standard error (PCSE)	Bid - Ask spread	Ownership index	Ownership concentration blocks the information

Table 7
THE IMPACT OF OWNERSHIP CONCENTRATION ON CORPORATE DISCLOSURE – OLS RESULTS

Column	*1*	*2*	*3*	*4*	*5*	*6*
	INFO			*wINFO*		
GROUP	*Total*	*State*	*Private*	*Total*	*State*	*Private*
TOPHOLD	0.2511 *(1.21)*	-0.0055 *(-0.02)*	0.7634 *(2.55)***			
wTOPHOLD				0.3279875 *(1.3)*	0.0904937 *(0.31)*	0.886635 *(2.42)***
Control variables						
SIZE	-7.19E-09 *(-2.88)****	-3.05E-09 *(-0.87)*	-1.06E-08 *(-2.98)****	4.8E-05 *(2.21)***	7.2E-05 *(2.74)****	1.8E-05 *(0.58)*
INDSIZE	3.71E-11 *(0.22)*	1.66E-10 *(0.72)*	-1.85E-10 *(-0.65)*	-7.0E-08 *(-0.09)*	1.7E-07 *(0.16)*	-1.0E-06 *(-0.76)*
VOL	-2.56E-06 *(-7.11)****	-3.05E-06 *(-3.90)****	-2.28E-06 *(-6.6)****	-1.4E-02 *(-7.57)****	-1.7E-02 *(-4.67)****	-1.2E-02 *(-6.18)****
Year dummies						
2007	0.0300 *(0.32)*	0.0308 *(0.24)*	0.1726 *(1.05)*	-36.15 *(-0.1)*	206.77 *(0.45)*	74.18 *(0.11)*
2008	0.2583 *(2.6)****	0.2470 *(1.5)*	0.4989 *(2.41)***	946.97 *(1.84)**	1211.73 *(1.88)**	1547.25 *(1.83)**
2009	0.6116 *(6.04)****	0.6015 *(2.78)****	0.9524 *(3.23)****	2407.94 *(3.35)****	2258.69 *(2.54)***	3545.82 *(2.79)****
2010	1.2247 *(10.45)****	1.0818 *(4.12)****	1.8908 *(5.17)****	5342.47 *(5.77)****	4203.58 *(3.67)****	7819.51 *(4.55)****
2011	1.2699 *(10.18)****	1.2784 *(4.4)****	1.8139 *(4.38)****	5597.67 *(5.44)****	5038.63 *(4.01)****	7443.76 *(3.91)****
Constant	0.3851 *(3.8)****	0.1952 *(0.87)*	0.0616 *(0.20)*	188.43 *(0.22)*	-622.02 *(0.59)*	-662.71 *(-0.52)*
Dummies	Industry	Industry	Industry	*Industry*	*Industry*	*Industry*
Obs	723	417	306	723	417	306

Note: Standard errors are in parentheses. Statistics significance at: 10% level (*), 5% level (**), 1 % level (***).

Table 8
THE CORRELATION MATRIX AND TEST FOR MULTICOLLINEARITY

	INFO	TOPHOLD	SIZE	INDSIZE	VOL		Variable	VIF	1/VIF
INFO	1.0000						**SIZE**	3.13	0.319983
TOPHOLD	0.0888	1.0000					**TOPHOLD**	2.97	0.336889
SIZE	-0.0769	0.2396	1.0000				**INDSIZE**	2.08	0.481463
INDSIZE	0.3363	0.0263	0.0508	1.0000			**VOL**	1.58	0.632529
VOL	-0.4339	-0.1216	0.3458	-0.0584	1.0000		**Mean VIF**	2.44	

DAILY PRICE CHANGES IN THE REAL ESTATE MARKET

David Rodriguez, Henderson State University

ABSTRACT

Daily price changes are generally missing from data used to investigate the real estate market, leading to an incomplete examination of the market. Given that some properties undergo numerous changes before reaching a sale, this paper makes an effort to include all available data. This paper studies the daily price changes of over 11,000 properties from 2004 to 2011, providing nearly 13,000 price changes. The average price change is a downward movement ranging from 6% to 8%. The results suggest a marginal benefit in timing a price change as gauged by time on market and discount from the last list price. While observational analyses have frequently made a case for Friday being a superior day to list, the current findings indicate that Wednesday may be the optimal day to initiate a change. Wednesday price changes reduce the discount by approximately 1.9%, allowing sales marginally closer to the asking price, and reduce time on market by approximately 5 days. Both reductions are significant at the 10% level.

INTRODUCTION

A quick search on any search engine will return a wealth of media coverage and research on housing price trends, the average time on market, and even how particular factors are expected to be reflected in single-family housing prices. Similarly, real estate investment trusts (REITs) have received a fair amount of attention possibly due not only to the size of the market but also to how easily data can be retrieved. However, the real estate market is more than just single-family houses and REITs. Real estate, as an asset class for the active investor, has been all but ignored by both the media and the academia. In fact, the United States Census Bureau has published results in 2013 showing that equity in a primary home, rental property, or other real estate makes up the majority of the net worth of Americans across all demographics (e.g., race, age, and education). The primary goal of the current research is to increase the attention given to this seemingly significant asset class by examining a more complete data sample—that is, one that incorporates daily price changes. Real estate as an investment class is worthy of attention, and discovering how to more accurately price a parcel will improve the efficiency of this market.

Active investors in the real estate market are accustomed to its lack of efficiency. Unlike investing in stocks or REITs, investing directly in real estate forces participants to trade in a fragmented, non-centralized, non-standardized market. This simple fact alone forces participants to specialize in a particular area to leverage their individual experiences and local knowledge. Unfortunately, since parcels are unique and are rarely traded, determining a market price for them can be difficult for even seasoned investors or brokers. To determine the value of a property, participants often rely on rule-of-thumb valuations or simple comparative market analyses. These methods are anything but precise, as exemplified by the frequent price changes in the market and the lack of uniformity in estimating list prices. In fact, even though multiple listing services (MLSs) provide daily data on real estate, this data is not examined. This is not to say that multiple-listing data is unavailable or has not been used. However, attention has been drawn only to the original list price, final list price, sales price, and time on market. The simple reason is that these price points are the most easily collected. In view of this, this paper utilizes a complete proprietary MLS dataset and examines whether day-of-the-week advantages exist in the real estate market. Specifically, this research investigates the day-of-the-week differences of listings as well as all price changes undertaken within the small investment property space.

This study focuses on small multi-unit properties to examine a more investor-oriented class of buyers, sellers, and brokers. While there is no guarantee that every broker working with investment properties is knowledgeable or that every buyer and seller in this market is concerned only with the investment potential, this segment provides a theoretically “clean” sample to work with since participants in the single-family home market can become emotionally involved with the purchase or sale of a home. This emotional involvement alone can reduce the efficiency of a market. In contrast, an investor may be less inclined to bring emotion into a transaction and more concerned with the investment potential of a parcel. This makes the market more structured and ultimately more efficient.

This study adds to the discussion on whether it truly matters when a parcel is listed, and introduces an examination of daily price changes. Determining the best day or month to list one’s property has been a topic of discussion in several white papers developed by market participants, but the analysis has been limited. For example, Redfin has published several white papers examining the real estate market. In 2013, after surveying 17 markets, the company created a top-five list of home-selling tips (Ellis, 2013). Ellis reported that Friday is the best day to list a home since doing so results in a faster sale and a sale price closer to the asking price. Another finding is that April is the best month to list a home, but any month prior to June is ideal. While these are interesting findings, the study focused only on single-family houses and looked at only the original list date and price rather than including the sale date and final price. This fact ignores all of the time and potential changes during the listing period. Follow-up examinations, such as those discussed by Fischler (2012), have observed other markets and found that Wednesdays are optimal, using the same methods of observational analysis. However, in those instances, empirical analysis was lacking, and while the day of the week a parcel is listed may be considered significant, the attention it has received seems to dwarf the focus on price changes. This distinction is noteworthy since both the original listing and each price change lead to a top listing position in MLSs, which position a listing on top when it is new or when a price change is made. This positioning brings a listing in front of investors’ eyes and presumably increases attention to it in a similar way to that of a new listing. The MLS from which the data was gathered treats a “new” listing similar to a “PCHG.” In both cases, the listing is top-listed for 5 days. The argument presented here is that since the goal is to draw attention to a parcel, practitioners should have a firm understanding of both the optimal day to list and the optimal day to initiate price changes to garner the most attention from prospects.

The proprietary data utilized in this study to examine daily price changes has allowed the examination of several key questions relevant to active market participants.

1. Of those parcels that did not undergo a price change, what quarter of the year and day of the week were they sold in the shortest amount of time and closest to the list price?
2. Does the time of the year matter? Does listing in the summer direct more attention to a parcel? Or does listing in the winter solicit attention from more serious buyers?
3. Of those parcels that changed prices, what was the average number of price changes, and what were the sizes of these price changes?
4. Does the day of the week a price change occurs impact the speed of a sale or the sale price as it relates to the final market price?

The following literature review focuses on only the first two research questions since the third and fourth relate to individual price changes, which have not been examined in literature. While examining price changes is common in stock market studies, data on real estate pricing must be hand-collected by a licensed broker from each MLS, of which there are hundreds. For this reason, work in this area is limited.

LITERATURE REVIEW

Previous research has studied the relationships between list prices, sale prices, and time on market (Horowitz, 1992; Yavas & Yang, 1995). For example, Yavas and Yang (1995) examined the relationship between optimal list prices and time on market. The study focused on the original list price, and the data examined was on single-family home sales. The authors found that listing price has no impact on the listing duration of low- and high-priced houses. Kaplanski and Levy (2012) examined real estate prices to determine if the time of the year is relevant. The study focused on several countries and found a persistent seasonality. However, it analyzed only broad indices (such as the Case–Shiller index), which examine only single-family home sales based on a repeat sales approach, greatly limiting its value among practitioners. The current paper determines whether these findings on seasonality and list prices hold in a sample of multi-family parcels while extending the examination to individual price changes.

Price changes were not examined before 2002, and when they were, the focus was on the reason for their occurrence instead of on the changes themselves. Knight (2002) studied single-family houses and considered the causes and effects of changes in list price in relation to the time-on-market measure. The author found that the homes most likely to undergo changes are those with high initial markups, and vacant homes. The data in that study included only one change in listing price, the final price change. If more than one change occurred, only the most recent list price and date were used. Given that properties are not constrained to only one price change, the dataset was possibly significantly reduced by this restriction. In fact, some parcels in this dataset underwent nearly three dozen price changes. As stated in the introduction, this focus on single-family homes also leads to more emotionally driven or at least more irregular participants. The current paper extends the focus of price changes into the investor arena, where participants are presumably less driven by emotion and more actively engaged in the market. Given that listing prices begin as opinions supported by a general comparison analysis or broker/seller sentiment, it is not appropriate to ignore the price changes that were necessary to sell a parcel. Properties can undergo dozens of price changes to identify the market price, and this study is the first to examine the daily price changes that lead to a sale.

DATA AND METHODOLOGY

This paper seeks to go beyond the public data points that are available (the original list price, sale price, time on market, and last price), and instead include all available data. The Chicago market is chosen for this initial examination because it is one of the largest metropolitan areas in the United States and is included in the Case–Shiller index, a prime metric in the real estate industry. Another reason is that every area in this market operates on an independent MLS. For example, Illinois alone has dozens of MLSs, each requiring a separate membership. In fact, Chicagoland utilizes at least six MLSs. The data from the choice MLS examined here singles out Chicago proper. The data is hand-collected from all available "closed" properties with two to four units in Chicago. "Closed" is an MLS term for a property that has been sold. The complete dataset is gathered from the MLS serving Chicago, Multiple Listing Service of Northern Illinois, and spans approximately 7 years, starting from August 2004. The Financial Crisis officially began in 2007 when Freddie Mac announced it would no longer buy the most risky subprime (Center for Responsible Lending, 2007). This provides approximately 30 months' worth of data prior to the crisis. Some may argue that it actually began in September 2008, when the government allowed Lehman to collapse, signifying they would not be an unlimited backstop. If this is the case, the data precedes this by 49 months. The National Bureau of Economic Research (2010) concluded that the recession ended in June 2009. The data collected for the current study runs through December 2011, therefore providing approximately 30 months of data after that publicized end. This creates three distinct windows to examine: pre-crisis, crisis, and post-crisis. The focus here is buildings with two to four units (i.e., multi-unit buildings) and a closing (i.e., selling) price of \$50,000 to \$500,000. This expansive closing price range is chosen after the average closing price of all of Chicago's 77 neighborhoods over the time period has been examined. Only five neighborhoods have average selling prices that approach the upper limit of \$500,000: Kenwood and Lake View, \$365,500; Fuller Park, \$379,000; Lincoln Park, \$417,750; and North Center, \$476,000. A greater number of such neighborhoods would have created upward bias.

The total number of properties in the sample, after the omission of several parcels because of a lack of information, is 11,159. Of these, 4,748 have undergone price changes to arrive at a sale. Complete descriptive statistics on the retrieved data can be found in Exhibit 1 in Appendix A.

Using each of the final price changes available, we calculate the percentage changes as follows:

$$PC_F = \frac{V_t - V_{t-1}}{V_{t-1}} \tag{1}$$

Where PC_F is the percentage price change, V_{t-1} is the previous asking price, and V_t is the final price presented on the MLS before a sale occurs. Given that this final price change results in a sale, this is one of the data points examined in this study.

To assess whether the day of the week increases the percentage change, the following base regression equation is used:

$$PC_F = \beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3 + \beta_4 D_4 + \beta_5 D_5 + \beta_6 D_6 + \beta_7 D_7 \tag{2}$$

Where PC_F is the percentage change of the listing price and β_1 through β_7 represent the average percentage price change on each day of the week beginning with Saturday. The dummy variables indicate the day of the week on which return is observed: D_1 = Saturday, D_2 = Sunday, D_3 = Monday, etc. With the omission of the intercept, this equation identifies any daily effect that may exist. Specifically, any effect on a given day is indicated by a statistically significant *t* value on the dummy coefficient. Since Redfin (Ellis, 2013) and Fischler (2012) have shown that Friday and Wednesday are the best days to list properties, we assume that this logic extends to price changes too. Further, since a price change results in a top listing on the choice MLS for 5 days, Wednesday would be ideal since this listing holds that top position during the entire weekend. This expectation will change depending on the MLS since every system sets the rules for the amount of time a listing is top-listed. For example, an MLS that allows a top listing position for 7 days is unlikely to produce an optimal day to change a price since a broker can alter a price on any given day and that listing remains top-listed every day of the following week.

To assess whether time on market is impacted by the day of the change, the following base regression equation is used:

$$TOM = \beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3 + \beta_4 D_4 + \beta_5 D_5 + \beta_6 D_6 + \beta_7 D_7 \quad (3)$$

Where *TOM* represents the time on market between the final price change and the sale and β_1 through β_7 represent the average percentage price change on each day of the week beginning with Saturday. The dummy variables indicate the day of the week on which return is observed: D_1 = Saturday, D_2 = Sunday, D_3 = Monday, etc. Similar to the previous equation, this equation, with the intercept omitted, identifies any daily effect that may exist. Specifically, any effect on a given day is indicated by a statistically significant t value on the dummy coefficient. As above, both Wednesday and Friday are expected to produce significant variables.

Given that previous studies (Ellis, 2013; Fischler, 2012) have found that Friday is the optimal day to list a parcel, the two regressions are also examined with Friday omitted. Additionally, since research (e.g., French, 1980) examining the day-of-the-week effect in the stock market has shown that Monday provides significantly low return, the two regressions are also examined with Monday omitted. These six regressions, of which the results are reviewed in Table 9, allow us to examine the differential intercepts. Since this study focuses on price changes themselves and how they impact time on market and the ultimate discount, no effort is made to control for factors such as the seller's motivation, opportunities for owner financing, or the distinction between partial and full vacancy. However, because the examined time frame encompasses the real estate crisis, care is taken in identifying and controlling for properties that are the result of a court sale, foreclosure, or short sale. Admittedly, this does not ensure that these factors have been adequately controlled for since the listing parties may not have taken the time to code these scenarios into the MLS. Additionally, the data is stratified based on three periods—pre-crisis, crisis, and post-crisis—and on the price points identified in Panel C of the appendix to ensure asking price is not a determining factor. Finally, in examining the price changes, we include in the original regressions both the quantity of the change and the time to the last price change as controls to gauge whether these factors contribute to time on market following the last price change and final discount. The results obtained are not significant, so only the complete sample is presented here.

RESULTS

Sample 1: Price change not undertaken

In this section, no empirical work is made. Instead, the intent is to provide insight into the data being examined. When a parcel does not undergo a price change (because it does not need to) to make a sale, we can assume that the initial price is appropriate, as determined by the market. In practice, one may assume that the price is set too low, but if this were the case, we would expect no discounts from the asking price and frequent overbidding. However, neither of these events occurs with any regularity. Therefore, reducing the sample to those parcels that do not undergo a price change leaves a total of 6,410 properties to examine. Table 1 shows that over the period examined, the differences in inventory segmented by the quarter listed and sold are negligible.

Table 1 This table shows the 6,410 parcels sold without requiring a price change. The parcels are segmented by quarter to gauge activity over the year. The list date is the date on which the parcel enters the market, and the sell date is the date on which a purchase contract is accepted by both parties.		
	List Date	Sell Date
Quarter 1	1,706	1,661
Quarter 2	1,716	1,715
Quarter 3	1,565	1,585
Quarter 4	1,423	1,449

We can identify some broad trends in the aggregated data in Table 1, such as the majority of listings and sales during the first and second quarters. If a practitioner is trying to garner maximum attention, the first half of the year is probably ideal. However, since the third and fourth quarters have more sales than listings, sellers may hold a stronger bargaining position in the second half of the year. From the information above, buyers may reason that the fourth quarter is optimal since few properties have high demand (i.e., are sold) and they will be taken most seriously then. Another finding regarding this subset of parcels that may act as further evidence of an accurate price is the average day-to-sale of 34.06 days, in contrast to the average for the complete sample, which is 80.6 days. This difference is significant and speaks of the benefits of an initial price that requires no adjustments.

While the differences across quarters differ only slightly, it is worth identifying how distressed sales may have impacted the numbers. The quantity of short sales and foreclosures is shown in Table 2. In both cases, the majority of distressed sales occurred in 2009 and 2011. With the data as large as it is, the omission of these years did not alter the quarterly dispersion identified above.

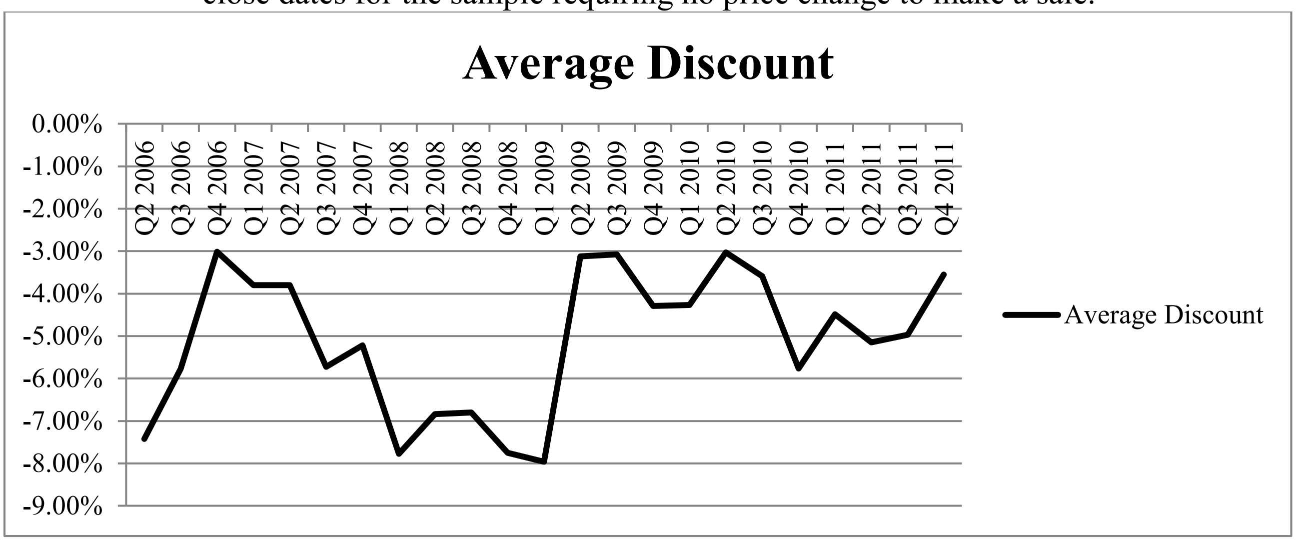
Table 2 This table examines the 6,410 parcels sold without requiring a price change. The parcels are segmented by both the quarter and the distress code.				
Properties noted as short sales				
Quarter 1	Quarter 2	Quarter 3	Quarter 4	SUM
140	153	151	145	589
Properties noted as foreclosures				
Quarter 1	Quarter 2	Quarter 3	Quarter 4	SUM
252	338	309	400	1,299

Having looked at the timing of these listings and the speed at which they have moved, we can now determine how a potentially accurate price translates to the sales price. It is worth knowing not only when a parcel should be listed or purchased but also what discount from the original list price can be expected. Table 3 shows that the average discount for those properties that require no change in price is approximately 5%, regardless of the quarter. To ensure that this simple average is not overly weighted by extremes, the upper and lower deciles are omitted, but the result does not change substantially. Additionally, the median for the average discount based on the list date is −4.97%, and that based on the sell date is −4.88%. This shows that the original asking prices are not overly discounted, resulting in bidding wars, but that even when a parcel is priced right, we can still expect an approximate discount of 5%.

Table 3 This table shows the average difference between the list price and closing price for the parcels that do not undergo a price change to make a sale. Both columns examine the same dataset with the time classification based on either the original list date or the sell date.		
	List Date	Sell Date
Quarter 1	−5.66%	−5.26%
Quarter 2	−4.89%	−5.69%
Quarter 3	−4.99%	−5.56%
Quarter 4	−4.93%	−5.26%

As shown above, a buyer seems to have a marginal benefit in negotiating a purchase in the second quarter. Similarly, a seller has a marginal benefit in listing in this quarter. Examining these price changes over time (Figure 1), we can see that, as expected, discounts are greatest around the real estate collapse. However, even when the years of the collapse are omitted, the average still hovers at 5%.

Figure 1
This figure shows the average discount (percentage discount from the asking price) based on the close dates for the sample requiring no price change to make a sale.



Sample 2: Price change undertaken

Similar to the previous section, this discussion provides details on the underlying data. The remainder of the sample, 4,748 parcels, underwent at least one price change before arriving at a sale. These parcels had 12,806 price changes in total. This should imply a simple average of 2.7 price changes per listing, but that is misleading. In reality, the majority of the parcels underwent only one price change, while others underwent nearly three dozen. Table 4 shows that nearly 77% of the total price changes were undergone by parcels that required three price changes or fewer. The table does not show all parcels but accounts for approximately 98% of the total sample.

Table 4 This table summarizes the information on the final price changes prior to the sale.			
Number of Changes	Average Discount to Sale	% Change	Number of Parcels
1	$(14,640.98)	−5.69%	1983
2	$(16,896.62)	−6.93%	1036
3	$(16,796.02)	−7.68%	629
4	$(16,623.92)	−7.20%	357
5	$(17,856.24)	−8.21%	264
6	$(12,896.19)	−6.48%	145
7	$(12,892.92)	−6.82%	97
8	$(13,191.48)	−8.00%	62
9	$(11,102.34)	−6.09%	53
10	$(16,615.76)	−7.32%	38

Table 5 shows the quarterly breakdown of this subset. The time on market is not significantly different from one quarter to the next. However, the properties listed in the fourth quarter sell at less of a discount, supporting the anecdotal evidence purported by practitioners that only serious buyers engage in real estate in the winter and around holidays. Examining this further, we see the greatest number of sales during the first half of the year and the greatest discount given by those selling in the first quarter. While this is commonly the level studied by researchers, it is clear that we lose a significant amount of information when we are concerned only with the listing price, selling price, and time on market. In this study alone, such an omission would have discarded nearly 8,000 data points.

Table 5 This table shows the averages of the parcels requiring a price change prior to being sold, segmented by both the quarter the parcels are listed and the quarter they are sold. The total discount is the discount from the original list to the sale price, and the time on market (TOM) reflects the total time from the original list to the sale date.				
	Quarter 1	Quarter 2	Quarter 3	Quarter 4
TOM based on quarter listed	**167.37**	**160.07**	**173.82**	**161.52**
Total discount based on quarter listed	−20.95%	−22.56%	−24.04%	−16.06%
TOM based on quarter sold	**149.35**	**150.06**	**128.59**	**138.15**
Total discount based on quarter sold	−24.98%	−21.44%	−20.37%	−22.34%

Table 6 also shows the properties partitioned by year. As expected, discounts escalated during the real estate collapse. However, discounts remained relatively high even after the collapse.

Table 6 This table shows the averages of the parcels requiring a price change prior to being sold, segmented by both the year the parcels are listed and the year they are sold. The total discount is the discount from the original list to the sale price, and the time on market (TOM) reflects the total time from the original list to the sale date.							
	2005	2006	2007	2008	2009	2010	2011
TOM based on year listed	**414.5**	**214.96**	**128.75**	**160.70**	**151.28**	**137.79**	**77.28**
Total discount based on year listed	−18.01%	−12.18%	−21.13%	−30.49%	−25.30%	−22.82%	−14.51%
TOM based on year sold	—	**109.44**	**115.88**	**129.16**	**147.32**	**154.80**	**169.56**
Total discount based on year sold	—	−9.00%	−14.00%	−27.61%	−28.38%	−24.12%	−24.40%

Day-of-the-week examination

While the observations presented thus far are of interest to market participants, the primary contribution of this article extends beyond these. The remainder of the results section examines the daily changes and the day-of-the-week effect. The first examination of daily price changes is completed to determine any significant differences from the last price change, based on the day. Table 7 shows the descriptive statistics of the last price change for each parcel divided by the day of the week. In other words, the table examines the price change that leads to the final list price. This is significant since it is this price that leads to the sale.

Table 7
Descriptive statistics for the final price change as measured by the percentage change from the previous price. The day of the week is the day when the last price change is initiated.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Mean	−9.21%	−8.66%	−7.36%	−8.03%	−9.31%	−7.35%	−8.49%
Min	−74.35%	−67.69%	−77.78%	−68.33%	−73.33%	−73.37%	−53.13%
Max	50.91%	111.76%	108.51%	50.04%	175.00%	43.53%	14.90%
St Dev	11.10%	12.63%	32.65%	31.93%	14.46%	11.79%	8.65%
Count	902	941	882	830	841	220	132

While this data omits a significant amount of the price changes, it is worth focusing on since it is these price changes that ultimately result in the market price that makes the sale. The frequency of changes on Monday and Tuesday is logical because most parcels are shown on the weekend and if the parcels do not receive adequate attention in these showings, participants are likely to request a price change to garner more attention. For the same reason, the most sizeable price changes occur on Friday since these may result in more attention over the weekend. These changes may be an attempt to get the parcel on top of the list and create interest in weekend viewings. The initial test that extends this discussion is the testing of the null hypothesis: that the price changes across days are not significantly different from one day to the next. Comparison of the averages shows that only Monday, compared to Saturday, results in a noteworthy difference at a 5% level of significance. The remaining days are not significantly different from one another.

When comparing the discounted final sale price to the last list price, we arrive at the descriptive statistics in Table 8, which essentially examines the difference between the last list price and the final agreed-upon price at which the sale culminates.

Table 8
Descriptive statistics for the final sale price versus the most recent list price. The days of the week are the days when the last price change is initiated.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Mean	−6.12%	−5.92%	−6.69%	−6.81%	−7.28%	−8.20%	−7.44%
Min	−63.03%	−70.00%	−71.43%	−65.60%	−66.80%	−76.78%	−50.00%
Max	100.80%	103.95%	90.64%	125.56%	107.96%	53.26%	55.52%
St Dev	11.87%	11.73%	13.07%	12.53%	12.74%	11.58%	11.32%
Count	902	941	882	830	841	220	132

Table 8 shows that while Monday and Tuesday seem to be the most popular days to initiate a price change, the most significant average discounts (as related to the final sale) are offered on the weekend, Friday through Sunday. Practitioners may consider that not only are price changes on the weekend less common, but they also result in the most significant average discounts on the sale price. The average discount across all properties is 6.65%, in contrast to the 5% among parcels requiring no price change. This implies that after undertaking price changes and ultimately arriving at an appropriate reserve price, sellers become more willing to take a lower offer. These findings may lead sellers to avoid price changes on the weekends and buyers to offer less for properties that have undergone price changes.

Table 9 shows how the day of the week a price change occurs can impact both the time on market and the final list price as compared to the market price. Sellers would like to sell at a price close to the list price and would prefer shorter time on market. The table shows which day a price change should occur to minimize the difference between the marketed price and the sale price and which day will reduce the time on market. The results of the six regressions are provided in this table.

Table 9

The results of the regression analyses, where a dummy variable is created for each day of the week, are shown. To address the dummy variable trap, Regressions 1 and 4 omit the intercept, Regressions 2 and 5 omit Monday, and Regressions 3 and 6 omit Friday in order to examine the differential intercepts.

Model	1	2	3	4	5	6
Dependent	Final Price Change (%)			TOM from Change to Sale		
Intercept	NO INT	−0.092*	−0.093*	NO INT	38.181*	35.905*
Saturday	−0.073*	0.019	0.02	37.332*	−0.849	1.428
Sunday	−0.085*	0.007	0.008	36.038*	−2.143	0.133
Monday	−0.092*	—	0.001	38.181*	—	2.277
Tuesday	−0.087*	0.006	0.006	37.917*	−0.264	2.012
Wednesday	−0.074*	0.019**	0.019**	32.99*	−5.191*	−2.915
Thursday	−0.080*	0.012	0.013	35.688*	−2.494	−0.217
Friday	−0.093*	−0.001	—	35.905*	−2.277	—
R-Square	0.132	0.001	0.001	0.411	0.008	0.002
F-Value	102.57*	0.92	0.92	473.23*	1.41	1.41

* = significant at the 5% level; ** = significant at the 10% level

Table 9 shows that both Model 1 and Model 4 produce significant coefficients, which can be interpreted as significant daily effects. Model 2 omits Monday and Model 3 omits Friday to examine the final price change. These omissions are made to examine the differential coefficients with respect to the omitted day. In both models, only Wednesday is significantly different, at the 10% level. Given the conclusion of previous work that Friday is optimal, we expected to see significant differences between other days. However, this does suggest that changing prices on a Wednesday reduces the discount by approximately 1.9%. This finding is expected since the MLS examined creates a top listing for 5 days. As previously stated, this result is likely to change if the MLS adheres to different listing rules.

Models 5 and 6 use time on market as the dependent variable and omit Monday and Friday, respectively. However, only Model 5 shows a significant difference, at the 10% level, between Monday and Wednesday. This can be interpreted as the time on market's reduction by approximately 5 days when the final price change occurs on a Wednesday, as compared to that on a Monday. This supports the observation that Wednesday is the optimal day to change a list price.

CONCLUSION

What conclusions can be drawn from this initial study on price changes? First and foremost, when a parcel is priced "right," an approximate discount of 5% can still be expected. Additionally, when priced right, a parcel should sell in approximately 30 days regardless of the quarter it is listed. When a parcel requires a price change, the discount from the last list price to the sale price increases to 6.65%, implying that buyers may offer less for properties that have undergone price changes.

When price changes become necessary, 77% of all parcels that undergo price changes require three or fewer changes, and the average price change is a reduction in the list price of 6–8%. Additionally, while the daily effects in Models 1 and 4 show that all days are significant, the remaining regressions showing the differential coefficients do not support significant differences between days. Even though previous research maintains that Friday is the optimal day to list single-family homes, this cannot be defended by the statistical differences between the days. In fact, the marginal benefits to a seller seem to come from price changes that occur on a Wednesday since these changes reduce the discount by approximately 1.9%, selling marginally closer to the asking price, and reduce the time on market to approximately 5 days—both reductions significant at the 10% level. However, this result may be a function of the fact that the MLS for Chicago provides a top listing of 5 days for price changes and conclusions are likely to differ under different rules. For example, if the MLS permitted top listing for only 4 days as a result of a price change, Thursday would be ideal since this would permit a listing to carry a top position over the weekend. However, testing how the rules of the MLS may be dictating the optimal day is an issue because the data is not readily available and must be hand-collected by a licensed agent with access to each MLS.

This introduction to price changes delivers some actionable points for practitioners. For example, Monday and Tuesday are the most popular days to initiate price changes. However, the discounts are not significantly different from those on other days. From a practical point of view, this may encourage practitioners not to change prices on these days since they are likely to face more competition for attention then. From a buyer's perspective, the story changes slightly. When price changes occur on a Friday, the greatest resulting average discount is 9.31%. Similarly, discounts from the market price are greatest when a price change is submitted between Friday and Sunday. This means that buyers may be inclined to look for properties that change prices on the weekend if they want to secure the largest discount. While this is by no means the summation of findings, it does help to outline the significance of such research for participants. Information such as this is imperative to improving not only the way in which practitioners engage in the market but also their understanding of this asset class and the efficiency of the market.

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APPENDIX A

Exhibit 1

Select Descriptive Statistics on Properties with Price Changes

These panels provide select descriptive statistics on properties that initiated price changes.

Panel A

This table shows the total number of unique properties included and separates them into those that initiated a price change and those that did not. The table also shows how each property is classified when listed. The listing classification of foreclosure (F), short sale (S), and court-approved sale (C) is the responsibility of the broker.

	Closed with No Price Change	Closed with Price Change
Foreclosed (F)	1,809	1,009
Short Sale (S)	791	1,093
Court-Approved (C)	31	23
No Specification Noted (NA)	3,779	2,623
Total Closed	6,410	4,748*

*Two properties are omitted due to an apparent abuse of the top-listing function. These two properties alone count for nearly 100 price changes over a 2-year period.

Panel B

This table displays the total number of properties that initiated a price change (4,748) from the above panel. Each daily directional change is shown as a unique observation. A small number of owners have changed prices twice within a day with no net change, implying merely a goal to top the list. These events are ignored in this analysis since the goal is only to receive a status change.

	Unique Price Changes
Negative Movements	12,183
Positive Movements	624
Total Changes	12,807

Panel C This table shows additional descriptive details about the 4,748 properties with regard to their list and final prices. The first table partitions the properties in $50,000 increments for both the final selling price and the original list price. The second table displays the total discount from the original list price and the market time for each property in the sample. The table continues to divide the properties by their classification type (NA, F, S, and C).			
Final Price ($)	**N**	**List Price ($)**	**N**
50,000–100,000	**1,280**	**<50,000**	**10**
100,000–150,000	**854**	**50,000–100,000**	**554**
150,000–200,000	**716**	**100,000–150,000**	**709**
200,000–250,000	**552**	**150,000–200,000**	**837**
250,000–300,000	**464**	**200,000–250,000**	**585**
300,000–350,000	**318**	**250,000–300,000**	**584**
350,000–400,000	**245**	**300,000–350,000**	**419**
400,000–450,000	**177**	**350,000–400,000**	**349**
450,000–500,000	**142**	**400,000–450,000**	**229**
		450,000–500,000	**206**
		500,000–550,000	**157**
		550,000–700,000	**102**
		700,000–900,000	**7**
Sum	**4,748**	**Sum**	**4,748**
	Sum	**Average**	**St Dev**
Discount in Price (NA)	$144,712,766	$30,479	$48,112
Discount in Price (F)	$43,964,451	$9,260	$27,401
Discount in Price (S)	$96,893,564	$20,413	$51,387
Discount in Price (C)	$1,839,671	$387	$7,919
Market Time (NA)	524,634 days	110 days	162 days
Market Time (F)	204,319 days	43 days	120 days
Market Time (S)	274,466 days	58 days	141 days
Market Time (C)	4,448 days	1 days	17 days

THE EFFECTS OF VOLATILITY AND LEVERAGE ON THE EARNINGS-GDP RELATION

Jagjit S. Saini, Western Michigan University
Todd P. White, University of New Mexico

ABSTRACT

We find the ability of aggregate accounting earnings to predict future GDP growth is influenced significantly by changes in 1) market volatility and 2) average firm leverage. More specifically, we find increasing levels of market volatility are associated with earnings being more predictive of future GDP growth. We attribute this finding to the constraining influence of volatility on the discount rate signaling effect of earnings. Next, we find aggregate earnings predict GDP growth less when debt-to-equity levels have peaked and we attribute this result to the inability of earnings to predict GDP growth when capital is constrained. Results demonstrate the importance of controlling for macroeconomic factors such as the level of market volatility and firm leverage when assessing the ability of aggregate earnings to forecast growth in GDP.

Keywords: aggregate earnings, GDP forecasting, market volatility, debt-to-equity

JEL Classification: D82, D84, G20

INTRODUCTION

Research has demonstrated the value of accounting earnings in predicting corporate stock returns. This research depicts accounting earnings as a leading indicator of the economic performance of a company. It seems intuitive then that aggregate accounting earnings for the market as a whole would be indicative of future economic growth. However, this conclusion is not easily deduced from prior research. Cready & Gurun (2010), for example, show that aggregate accounting earnings is actually negatively related to returns in the stock market. Despite this surprising relationship between aggregate earnings and returns, Konchitchki & Patatoukas (2014), (hereafter KP (2014)), document that aggregate accounting earnings are indeed predictive of future economic growth. Their study makes an important contribution by providing robust evidence that aggregate corporate earnings are a leading indicator of economic development. However, the study of KP (2014) does little to identify the types of macroeconomic conditions that are more (or less) conducive to earnings predicting future GDP growth. An analysis of the effects of macroeconomic conditions on the earnings-GDP relationship would serve to further knowledge regarding exactly how aggregate earnings predict future GDP growth. That is the aim of the current study. This study seeks to examine the effects of macroeconomic conditions of (i) market volatility and (ii) firm leverage on the relationship between aggregate earnings and GDP growth.

The theoretical framework utilized in this paper hypothesizes that both volatility and leverage could impact the earnings-GDP relation through one of two mechanisms. These two mechanisms are 1) discount rate signaling effects, and 2) forecasting future investment. Discount rate signaling effects refers to the fact that aggregate accounting earnings contain not only news about cash flows but also discount rate news. Cready & Gurun (2010) show aggregate accounting earnings are negatively related to returns and hypothesize the reason for this is aggregate earnings forecast increases in the discount rate. Additionally, market volatility and firm leverage may impact future investment. Research has shown investment in equipment, R&D, and infrastructure forecasts future growth in GDP (Long & Summers, 1990; Lichtenberg, 1992; Herrerias & Orts, 2008). Aggregate earnings forecast GDP due to positive signals about investment. If volatility and leverage constrain investment then earnings would be less predictive of GDP.

The results of this study demonstrate that both (1) changing levels of market volatility and, (2) changing levels of average leverage affect the predictability of earnings on GDP. This is consistent with the hypothesis that macroeconomic conditions have a significant impact on the degree to which aggregate earnings predict future GDP growth. Further analysis demonstrates that increasing levels of volatility are actually associated with earnings being more predictive of future GDP growth. This result is consistent with the hypothesis that increasing levels of volatility actually constrain the discount rate signaling effect in earnings, leading to a higher correlation between earnings and GDP growth.

With respect to average firm leverage, it is shown that earnings are less predictive of GDP growth when the level of debt-to-equity is high but on the downward slope. This result follows the theoretical foundation of Mendoza (2010) showing that over-borrowing triggers constraints in lending which reduce asset prices and capital availability. Aggregate earnings are less likely to translate into growth in GDP in this type of capital-constrained environment.

This paper represents an important contribution to the extant literature by documenting that macroeconomic conditions play a significant role in the ability of earnings to forecast GDP growth. The analysis provides an indication that the predictability of earnings on GDP is constrained by the discount rate news in earnings. When market uncertainty is higher, the discount rate news in earnings is constrained and earnings are more predictive of GDP. Additionally, the study shows that restrictions on the availability of capital negatively affect the degree to which earnings signal GDP growth. Overall, the study provides further insight into the mechanism with which earnings predict GDP by identifying the effects of discount rate signaling and investment forecasting components of earnings.

The next section of the paper presents the background and hypothesis development. This is followed by the section describing the methodology utilized. Subsequently, the sample is presented and this is succeeded by the results of the analysis. The final section concludes the study.

BACKGROUND AND HYPOTHESIS DEVELOPMENT

It is well known that corporate earnings are an important component of national GDP. However, there exists debate about the degree to which positive future economic output can be predicted via positive corporate earnings. KP (2014) make an important contribution to this debate. In their study, they show aggregate accounting earnings in the market are a leading indicator of growth in GDP. The authors explain the theoretical foundation for this finding in that 1) corporate profits are correlated with other components of GDP and 2) accounting earnings proxy for corporate profits. The empirical results of KP (2014) support the above assertions and demonstrate the importance of aggregate accounting earnings in forecasting economic growth. The current study extends the research of KP (2014) by analyzing macro-economic conditions that cause earnings to be more (or less) predictive of future GDP. This will enable us to more closely examine the factors involved in the predictability of earnings on GDP.

To understand the effects of macroeconomic conditions on the predictability of earnings on GDP growth, it is important to understand the relation between earnings and other components of the economy. One important relationship to analyze is that of earnings and stock returns. Extant research has demonstrated that aggregate earnings are negatively related to market returns (Cready & Gurun 2010). The reason for this negative relation concerns the fact that earnings contain information about discount rates. Stock market returns can be decomposed into three components: 1) cash flow news, 2) discount rate news, and 3) previous returns. Aggregate accounting earnings contain both cash flow news and discount rate news (Gkougkousi 2013; Kothari et al. 2013; Penman 2015). It is the discount rate signal in positive aggregate earnings that causes market returns to react negatively (Cready & Gurun 2010). Forecasts of higher borrowing news are impounded negatively by market participants. This finding is corroborated by additional studies demonstrating a negative market reaction to the potential increases in borrowing rates forecasted in economic news. Patatoukas (2014) demonstrate empirically that increases in GDP are surprisingly not associated with positive market returns. This lack of association is attributed to the higher borrowing rates signaled by GDP growth.

If accounting earnings signal increases in the discount rate which cause stock prices to react negatively and affect other components of the economy, it is probable that the discount rate signaling effect weakens the predictability of earnings on GDP growth. KP (2014) show accounting earnings to be a leading indicator of economic news. It is possible, however, that the earnings-GDP relationship is attenuated by the discount rate signaling effect of earnings which negatively affects stock prices. Therefore, when analyzing how macro-economic conditions affect the ability of aggregate earnings to predict GDP growth, it is important to identify how those conditions will affect the degree to which earnings signal changes in borrowing rates. The discount rate signaling effect of accounting earnings could counteract the cash flow news in earnings. Therefore, macro-economic conditions which constrain (or enhance) the discount rate signaling effect in earnings could alter the predictability of earnings on GDP.

The first macro-economic scenario considered is that of a volatile market. It is hypothesized that volatile market conditions could actually decrease the propensity of positive earnings to signal future discount rate increases. When market volatility is high, monetary policy is more likely to pursue actions to lower borrowing rates (Mishkin, 2010; Perrera, 2010). Therefore, when positive earnings are announced, the market and other components of GDP are less likely to react negatively in expectation of higher borrowing rates. Since earnings contain both cash flow news as well as discount rate news, market conditions which constrain the effects of the discount rate news should increase the predictability of earnings on GDP. Patatoukas (2014) shows GDP growth forecast errors are correlated with both cash flow news and discount rate news but these two sources have offsetting impacts on stock prices over the sample period. If volatile markets mitigate the discount rate signaling effect then the ability of earnings to forecast GDP growth should be strengthened.

While volatile markets could constrain the discount rate signaling effect of earnings, it is important to consider the negative effects that volatile market conditions could have on investment. Prior studies have demonstrated that investment in equipment, R&D, and infrastructure are important predictors of future growth in GDP (Long & Summers, 1990; Lichtenberg, 1992; Herrerias & Orts, 2008). If volatile market conditions negatively impact investment through a higher cost of capital, this could cause earnings to be less predictive of GDP growth.

In volatile markets, the cost of equity capital may increase as investors expect larger rewards to compensate for risk. Guo (2002) shows that higher market volatility results in lower economic output. He conjectures a reduction in economic output arises from a higher cost of capital. This is supported by Ramey and Ramey (1995) who show countries with greater volatility demonstrate less economic growth. The higher cost of capital in volatile markets could constrain positive corporate profits and this would attenuate the earnings-GDP relation. Therefore, the direction of the effect of market volatility on the earnings-GDP relation is uncertain. The constraining effect of volatility on the discount rate and the potential increase in the cost of capital lead to conflicting hypotheses. Therefore, the first hypothesis is non-directional. It is stated in the null form as follows:

H1: Market volatility will have no effect on the ability of earnings to predict GDP growth.

The second macroeconomic scenario considered is that of the changing levels of average debt-to-equity. Returning to the discount rate signaling effect of earnings, it is conjectured that any scenario that alters this effect could change the ability of earnings to forecast future GDP growth. If companies have greater debt, this should magnify the discount rate signaling effect of earnings. If firms are taking on more debt, the amplification of the discount rate signaling effect would cause an even more negative effect of aggregate earnings on market returns. If the market reacts negatively to earnings due to greater firm leverage, this could weaken the relation between earnings and future GDP growth. This would cause greater levels of firm debt to negatively affect the predictability of earnings on GDP.

An additional reason why greater firm leverage could negatively affect the ability of earnings to predict future GDP growth is that taking on too much debt may signal poor economic growth. Bianchi & Mendoza (2011) argue that over-borrowing occurs in competitive equilibriums because agents fail to internalize the amplification effects. This eventually triggers a decline in asset prices and decreases lending available. Mendoza (2010) argues that debt financing rises during expansions, and when it has reached the peak, it triggers the constraints that tighten debt financing and reduce credit, which result in a decline of investment and GDP. Additionally, Metiu et al. (2014) conjecture that credit constraints in the U.S. have a spillover effect which negatively affects global economic conditions. Earnings will be less likely to forecast higher GDP growth when debt financing is tighter and credit is less available. Therefore, in addition to a magnification of the discount rate signaling effect of earnings, an additional reason why greater leverage may negatively affect the ability of earnings to predict GDP is that over-borrowing may signal poor economic growth.

Alternatively, increasing leverage may provide a positive signal that investment opportunities are more attractive. In this case, future economic output would be expected to rise. An increase in leverage may be indicative of an increasing set of investment opportunities. KP (2014) maintain that one reason earnings is predictive of GDP is that earnings are correlated with other components of GDP. If investment opportunities are increasing, positive earnings are more likely to be correlated with other components of GDP. Since there are reasons to hypothesize increasing leverage will have a negative effect on the earnings-GDP relation as well as reasons to believe the effect will be positive, it is unclear which effect will dominate. Therefore, the second hypothesis is stated in the null form as follows:

H2: The change in average firm leverage will have no effect on the ability of earnings to predict GDP growth.

METHODOLOGY

To investigate the effects of market volatility and leverage on the predictability of earnings on GDP, we employ the methodology of KP (2014). This requires running time-series regressions of GDP growth on the change in aggregate earnings. To examine the effects of volatility and debt-to-equity, we include additional regressors as explained below.

The first hypothesis of this study states changes in the level of market volatility will have no effect on the predictability of earnings on GDP. To test this hypothesis, we use a regression of GDP on aggregate earnings similar to KP (2014). Since our hypothesis looks at the effect of volatility on the earnings-GDP relation, we include the change in volatility as a regressor. We use both GDP at time t+1 and GDP at time t+2 as dependent variables in the regression. Our models are as follows:

$$GDP_{t+1} = \alpha_1 + \beta_1 \Delta Earnings_t + \beta_2 \Delta VIX_t + \beta_3(\Delta Earnings_t * \Delta VIX_t) + \varepsilon \quad (1a)$$

$$GDP_{t+2} = \alpha_1 + \beta_1 \Delta Earnings_t + \beta_2 \Delta VIX_t + \beta_3(\Delta Earnings_t * \Delta VIX_t) + \varepsilon \quad (1b)$$

Similar to KP (2014), *GDP* is equal to nominal GDP growth (at time t+1 for 1a and t+2 for 1b). Δ*Earnings* is equal to aggregate earnings growth for quarter *q*. Finally, Δ*VIX* is equal to the one-year change in market volatility as measured by the CBOE index. Our first hypothesis stated in the null form was that volatility would not affect the earnings-GDP relation. This hypothesis is rejected if the coefficient on β_3 is significant. This would indicate that a change in the level of volatility affects the degree to which aggregate earnings predict future GDP growth.

The second hypothesis of this study states changes in the average level of firm debt-to-equity will have no effect on the predictability of earnings on GDP. To test this hypothesis we run the KP (2014) time-series regression of GDP growth on earnings and include debt-to-equity as an additional regressor. The model is as follows:

$$GDP_{t+1} = \alpha_1 + \beta_1 \Delta Earnings_t + \beta_2 \Delta DTE_t + \beta_3 (\Delta Earnings_t * \Delta DTE_t) + \varepsilon \quad (2a)$$

$$GDP_{t+2} = \alpha_1 + \beta_1 \Delta Earnings_t + \beta_2 \Delta DTE_t + \beta_3 (\Delta Earnings_t * \Delta DTE_t) + \varepsilon \quad (2b)$$

GDP and Δ*Earnings* are as described previously. Δ*DTE* is equal to the change in the aggregate debt-to-equity ratio and is included as a measure of leverage. Following KP (2014), all regressions use Newey-West heteroskedasticity- and autocorrelation-consistent standard errors. The second hypothesis is rejected if the coefficient on β_3 is significant. This would indicate that a change in the average level of debt-to-equity impacts the predictability of earning on returns.

While the above tests will allow us to infer whether volatility and debt-to-equity have an effect on the earnings-GDP relation, it may be difficult to infer the direction of the effect on the basis of those tests. For this reason, we include an additional test for each hypothesis. To perform this test, we include four wave indicator variables. The four indicator variables take a value of 1 depending on whether the level of the variable is above the median and whether the variable is increasing or decreasing. The variables are as follows: *Wave_AI*, *Wave_AD*, *Wave_BI*, and *Wave_BD*. *Wave_AI* is equal to 1 if the amount is above the median and the change is positive. *Wave_AD* is equal to 1 if the amount is above the median and the change is negative. *Wave_BI* is equal to 1 if the amount is below the median and the change is positive. *Wave_BD* is equal to 1 if the amount is below the median and the change is negative. The bottom wave dummy (*Wave_BD*) is excluded to avoid multicollinearity issues.

The first set of tests seeks to determine which period or wave of volatility causes earnings to be more (or less) predictive of GDP growth. The specification with the three wave dummy variables representing volatility and the interactions is shown below:

$$GDP_{t+1} = \alpha_1 + \beta_1 \Delta Earnings_t + \beta_2 VIX\_AI_t + \beta_3\ VIX\_AD_t + \beta_4\ VIX\_BI_t + \beta_5(\Delta Earnings_t * VIX\_AI_t) + \beta_6(\Delta Earnings_t * VIX\_AD_t) + \beta_7(\Delta Earnings_t * VIX\_BI_t) + \varepsilon \text{ (3a)}$$

$$GDP_{t+2} = \alpha_1 + \beta_1 \Delta Earnings_t + \beta_2 VIX\_AI_t + \beta_3 VIX\_AD_t + \beta_4 VIX\_BI_t + \beta_5(\Delta Earnings_t * VIX\_AI_t) + \beta_6(\Delta Earnings_t * VIX\_AD_t) + \beta_7(\Delta Earnings_t * VIX\_BI_t) + \varepsilon \text{ (3b)}$$

The second set of tests seeks to determine which period or wave of changes in average debt-to-equity causes earnings to be more (or less) predictive of GDP growth. The specification with three wave dummy variables represent debt-to-equity changes and the interactions is shown below:

$$GDP_{t+1} = \alpha_1 + \beta_1 \Delta Earnings_t + \beta_2 DTE\_AI_t + \beta_3 DTE\_AD_t + \beta_4 DTE\_BI_t + \beta_5(\Delta Earnings_t * DTE\_AI_t) + \beta_6(\Delta Earnings_t * DTE\_AD_t) + \beta_7(\Delta Earnings_t * DTE\_BI_t) + \varepsilon \text{ (4a)}$$

$$GDP_{t+2} = \alpha_1 + \beta_1 \Delta Earnings_t + \beta_2 DTE\_AI_t + \beta_3 DTE\_AD_t + \beta_4 DTE\_BIt + \beta_5(\Delta Earnings_t * DTE\_AI_t) + \beta_6(\Delta Earnings_t * DTE\_AD_t) + \beta_7(\Delta Earnings_t * DTE\_BI_t) + \varepsilon \text{ (4b)}$$

No prediction is made with respect to these indicator variables or the interaction variables. The aim of these tests is to isolate the type of macro-economic environments that most greatly affect the ability of earnings to predict GDP growth. Significance on the interaction variables should yield greater insight toward this end.

SAMPLE

Our sample contains 94 quarterly observations spanning from Q1:1988 to Q2:2011. We obtain data from the Compustat Quarterly US dataset. Earnings growth ($\Delta Earnings$) is measured as the year-to-year change in scaled quarterly income. Following KP (2014), earnings are scaled by sales. An aggregate quarterly time series of earnings is constructed using value-weighted cross-sectional averages with weights based on market capitalization as of the beginning of the quarter. Furthermore, following KP (2014), for a firm to be included in our sample, it must have non-missing data for market value of equity, earnings, and the quarterly earnings announcement date. The sample is restricted to firms with December fiscal year-ends. Finally, we delete firm-quarter observations that fall in the top and bottom one percentile of each quarterly cross-section of *Earnings* and $\Delta Earnings$.

GDP is equal to the "final" estimate of realized GDP growth in nominal terms. This number comes from the Real-Time Data Set for Macroeconomics of the Federal Reserve Bank of Philadelphia. ΔVIX is equal to the yearly change in volatility as proxied by the Chicago Board of Options Exchange Index, commonly known as the "fear index". *DTE* is equal to the year-over-year change in the debt-to-equity ratio measured as long-term debt over the market value of equity. Data to create the *DTE* variable was obtained from both CRSP and Compustat.

RESULTS

Descriptive statistics are presented in Table 1. These statistics match KP (2014) with minor discrepancies. The median level of volatility (*VIX*) in our study is 19.23 and the median level of average *DTE* is 0.379. The median for Δ*VIX* is 0.200 while the median for Δ*DTE* is -0.026.

Table 1
DESCRIPTIVE STATISTICS

Variable	N	Mean	Median	Std. Dev.	1rst Quartile	3rd Quartile
GDP	94	4.931	5.091	2.445	3.822	6.557
Earnings	94	0.090	0.092	0.036	0.077	0.116
ΔEarnings	94	0.001	0.002	0.030	-0.009	0.013
VIX	93	20.929	19.230	7.986	14.410	24.590
ΔVIX	93	-0.266	0.200	9.139	-3.320	4.700
DTE	94	0.380	0.379	0.090	0.306	0.441
ΔDTE	94	-0.038	-0.026	0.198	-0.069	0.032

Table 2
PEARSON CORRELATION MATRIX

Variable	GDP	Earnings	ΔEarnings	VIX	ΔVIX	DTE	ΔDTE
GDP	1	0.035	0.327	-0.384	-0.323	-0.316	-0.189
		(0.737)	(0.001)	(0.001)	(0.002)	(0.002)	(0.069)
Earnings	0.035	1	0.614	-0.232	-0.075	0.032	-0.171
	(0.737)		(<.0001)	(0.025)	(0.474)	(0.759)	(0.099)
ΔEarnings	0.327	0.614	1	-0.270	-0.276	0.004	-0.178
	(0.001)	(<.0001)		(0.009)	(0.007)	(0.968)	(0.085)
VIX	-0.384	-0.232	-0.270	1	0.563	0.245	0.270
	(0.000)	(0.025)	(0.009)		(<.0001)	(0.018)	(0.009)
ΔVIX	-0.323	-0.075	-0.276	0.563	1	-0.044	0.397
	(0.002)	(0.474)	(0.007)	(<.0001)		(0.677)	(<.0001)
DTE	-0.316	0.032	0.004	0.245	-0.044	1	0.104
	(0.002)	(0.759)	(0.968)	(0.018)	(0.677)		(0.320)
ΔDTE	-0.189	-0.171	-0.178	0.270	0.397	0.104	1
	(0.069)	(0.099)	(0.085)	(0.009)	(<.0001)	(0.320)	

GDP is nominal GDP growth for the quarter as reported by the Bureau of Economic Analysis.
Earnings is the amount of quarterly earnings.
ΔEarnings is the year-to-year change in aggregate quarterly earnings.
VIX is the level of market volatility as measured using the VIX or "fear index".
ΔVIX is the year-to-year change in market volatility measured using the VIX or "fear index".
DTE is quarterly debt-to-equity ratio.
ΔDTE is the year-to-year change in the quarterly debt-to-equity ratio.

Table 2 presents Pearson correlation statistics for the variables used in the study. As expected, a positive change in earnings (Δ*Earnings)* is positively related to GDP growth (coeff.= 0.327; p=0.001). Higher degrees of market volatility and debt-to-equity, however, appear negatively related to GDP growth. Both the level of volatility (*VIX)* and increases in volatility *(ΔVIX)* are negatively related to GDP growth. The correlation coefficient on *VIX* is -0.384 (p<.001) while that on Δ*VIX* is -0.323 (p=0.002). The level of debt-to-equity (*DTE)* is negatively and significantly related to GDP growth while changes in the level of debt-to-equity (Δ*DTE)* are only marginally negatively related to GDP growth. The correlation coefficient on *DTE* is -0.316 (p=0.002) while that on Δ*DTE* is -0.189 (p=0.069). The relation between both market volatility and debt-to-equity with earnings appears to be negative. Both the level of volatility (coeff.= -0.27; p=0.009) and the change in volatility (coeff.= -0.276; p=0.007) are negatively related to the change in earnings (Δ*Earnings*). With respect to debt-to-equity, however, only the change in debt-to-equity (Δ*DTE)* is marginally related to the change in earnings (coeff.=-0.178; p=0.0855). With respect to volatility and leverage, there is a strong correlation between the level of debt-to-equity and the level of volatility (coeff.=0.245; p=0.018). Finally, the change in debt-to-equity is positively correlated with both the level of volatility (coeff.=0.270; p=0.009) and the change in volatility (coeff.= 0.397; p<.0001).

Our first hypothesis stated in the null form is that the change in volatility has no effect on the predictive ability of earnings on future GDP. This hypothesis is tested by regressing GDP growth on earnings, volatility, and the interaction between these two variables as presented in equation 1a. The results of this regression are presented in Table 3.

Panel A of Table 3 examines the effect of the change in volatility *(*Δ*VIX*) on the earnings-GDP relationship when the dependent variable is the next quarter's GDP (GDP_{t+1}). First, it is interesting that when Δ*VIX* is included in the regression, Δ*Earnings* is now insignificant (p=0.187). This contrasts with the results of KP (2014) where earnings was significant at the 1% level. This indicates a significant portion of the effect of earnings in predicting GDP is subsumed by market volatility. As expected, the coefficient on Δ*VIX* is negative (-0.11) and significant (p=0.008) indicating that generally, higher volatility is associated with lower GDP growth. The variable of interest, the interaction between Δ*Earnings* and Δ*VIX*, is highly significant (p=0.001). This demonstrates the significant impact of changing volatility levels on the predictive effect of earnings on GDP growth. While the coefficient on this interaction variable is positive (2.68), it is difficult to draw conclusions regarding the direction of the relationship due to the fact the two variables being interacted are both change variables. Further tests will attempt to more accurately isolate the direction of the effect of volatility on the earnings-GDP relation. However, using this initial test, it appears the null hypothesis that volatility does not affect the predictability of earnings on GDP can be rejected.

Panel B of Table 3 examines the effect of the change in volatility *(*Δ*VIX*) on the earnings-GDP relationship when the dependent variable is GDP growth two quarters ahead (GDP_{t+2}). The first point of note when looking at this table is that Δ*Earnings* is now more significant than in Panel A (p=0.002). This is probably due to the fact Δ*VIX* measures the change in volatility over the prior year. Therefore, the farther out you forecast GDP, the less relevant the prior year's change in volatility becomes. This is supported by the fact that the coefficient on Δ*VIX* is now only significant at the 5% level (p=0.03). The coefficient on Δ*Earnings**Δ*VIX* remains positive and significant (coeff.= 1.89; p=0.001). Again, this means the null hypothesis which states volatility has no effect on the ability of earnings to predict GDP can be rejected. Further tests will seek to demonstrate the direction of this effect.

Table 3
EFFECT OF MARKET VOLATILITY ON THE EARNINGS-GDP RELATION
$GDP=\alpha_1 + \beta_1\Delta Earnings_t + \beta_2\Delta VIX_t + \beta_3(\Delta Earnings_t{*}\Delta VIX_t) + \varepsilon$ **(1a and 1b)**

Panel A: Dependent Variable = GDP_{t+1}

Variable	+/-	Est. Coeff.	T-Stat	p
Intercept		5.07	23.66	<.0001
ΔEarnings	+	14.34	1.33	0.187
ΔVIX	-	-0.11	-2.71	0.008
ΔEarnings*ΔVIX	?	2.68	3.33	0.001
N	94			
Adj. R-Squared	29.46%			

Panel B: Dependent Variable = GDP_{t+2}

Variable	+/-	Est. Coeff.	T-Stat	p
Intercept		4.93	20.89	<.0001
ΔEarnings	+	22.57	3.12	0.002
ΔVIX	-	-0.07	-2.22	0.029
ΔEarnings*ΔVIX	?	1.89	3.50	0.001
N	94			
Adj. R-Squared	20.21%			

GDP is nominal GDP growth for the quarter as reported by the Bureau of Economic Analysis.
ΔEarnings is the year-to-year change in aggregate quarterly earnings.
ΔVIX is the year-to-year change in market volatility measured using the VIX or "fear index".

Our second hypothesis stated in the null form is that changes in the average level of firms' debt-to-equity do not affect the predictive ability of earnings on GDP growth. To test this hypothesis, we regress GDP growth on the change in aggregate earnings (Δ*Earnings*), the change in average DTE (Δ*DTE*), and the interaction of those two variables (Δ*Earnings**Δ*DTE*) as depicted in equations 2a and 2b. The results are exhibited in Table 4.

Panel A of Table 4 shows the results of the regression using GDP growth at time t+1 (GDP_{t+1}). Unlike in Panel A of Table 3, the coefficient on Δ*Earnings* in this model is highly significant (p=0.015). This means that unlike volatility, growth in leverage does not subsume the predictive effect of earnings on GDP growth. The coefficient on Δ*DTE* is negative and significant (coeff.= -3.06; p=0.018). This means, generally, greater aggregate leverage is associated with a decrease in GDP growth. Finally, the coefficient on Δ*Earnings**Δ*DTE* is positive and significant at the 10% level (coeff.= 175.07; p=0.052). Therefore, the null hypothesis that the aggregate DTE level does not affect how earnings predict GDP growth can be rejected at the 10% level of significance. Further tests, however, are needed to determine the direction of this relationship.

Panel B of Table 4 shows the results of the regression using GDP growth at time t+2 (GDP_{t+2}). The coefficient on Δ*Earnings* remains positive and significant. The coefficient on Δ*DTE*, however, is no longer significant (p=0.247). Finally, the interaction between Δ*Earnings* and Δ*DTE* is again positive and significant (coeff.= 116.42 and p=0.007). This means a change in the prior year's aggregate level of debt-to-equity has an impact on how earnings predict future GDP.

Table 4
EFFECT OF LEVERAGE ON THE EARNINGS-GDP RELATION
$GDP=\alpha_1 + \beta_1\Delta Earnings_{t} + \beta_2\Delta DTE_{t} + \beta_3(\Delta Earnings_t * \Delta DTE_t) + \varepsilon$ **(2a and 2b)**

Panel A: Dependent Variable = GDP_{t+1}

Variable	+/-	Est. Coeff.	T-Stat	p
Intercept		4.98	16.45	<.0001
ΔEarnings	+	19.08	2.47	0.015
ΔDTE	-	-3.06	-2.41	0.018
ΔEarnings*ΔDTE	?	175.07	1.97	0.052
N	94			
Adj. R-Squared	14.51%			

Panel B: Dependent Variable = GDP_{t+2}

Variable	+/-	Est. Coeff.	T-Stat	p
Intercept		4.94	15.53	<.0001
ΔEarnings	+	21.68	2.66	0.009
ΔDTE	-	-0.96	-1.17	0.247
ΔEarnings*ΔDTE	?	116.42	2.78	0.007
N	94			
Adj. R-Squared	9.24%			

GDP is nominal GDP growth for the quarter as reported by the Bureau of Economic Analysis.
ΔEarnings is the year-to-year change in aggregate quarterly earnings.
ΔDTE is the year-to-year change in the quarterly debt-to-equity ratio.

The next set of tests attempts to more accurately identify the direction of the effect that volatility and leverage have on the earnings-GDP relation. As discussed in the methodology section, these tests implement four indicator variables to separate the directional changes or "waves" of volatility and debt-to-equity. Two of the indicator variables represent periods when the level of volatility (or DTE) is above the median with one of those indicators representing an increasing level and the other representing a decreasing level. Additionally, two indicator variables represent periods when the level of volatility (or DTE) is below the median with one of those indicators representing an increasing level and the other representing a decreasing level. By breaking out the changes or waves in the volatility, it is easier to identify the conditions under which the earnings-GDP relationship is most affected.

Table 5 presents the results using the volatility wave indicator variables. For Panel A, the dependent variable is GDP at time t+1 (GDP_{t+1}). The variables of interest in this panel are the interaction variables between earnings and the volatility indicators. The only significant interaction among these variables occurs between earnings (Δ*Earnings*) and the wave indicator variable representing a level of volatility that is below the median and increasing (*VIX_BI*). The interaction is positive (coeff.= 29.70) so this indicates that when volatility is low and increasing, earnings is more predictive of GDP. Panel B of Table 5 examines the effect of volatility on GDP at time t+2 (GDP_{t+2}). In this panel, it is evident that the only significant interaction with earnings occurs when volatility is above the median and increasing (*VIX_AI*). The coefficient on this variable is again positive and significant (coeff.= 27.59; p=0.02). This means a level of volatility that is high and increasing is associated with a stronger earnings-GDP relation.

Table 5
EFFECT OF MARKET VOLATILITY ON THE EARNINGS-GDP RELATION

$$GDP=\alpha_1 + \beta_1\Delta Earnings_t + \beta_2 VIX\_AI_t + \beta_3 VIX\_AD_t + \beta_4 VIX\_BI_t + \beta_5(\Delta Earnings_t * VIX\_AI_t) + \beta_6(\Delta Earnings_t * VIX\_AD_t) + \beta_7(\Delta Earnings_t * VIX\_BI_t) + \varepsilon \quad \text{(3a and 3b)}$$

Panel A: Dependent Variable = GDP_{t+1}

Variable	+/-	Est. Coeff.	T-Stat	p
Intercept		5.49	15.28	<.0001
ΔEarnings	+	9.91	0.89	0.377
VIX_AI	-	-1.13	-1.59	0.115
VIX_AD	+	-0.24	-0.32	0.748
VIX_BI	-	-0.69	-1.54	0.127
ΔEarnings*VIX_AI	?	27.28	1.12	0.266
ΔEarnings*VIX_AD	?	-10.92	-0.45	0.652
ΔEarnings*VIX_BI	?	29.70	1.84	0.069
N	93			
Adj. R-Squared	8.73%			

Panel B: Dependent Variable = GDP_{t+2}

Variable	+/-	Est. Coeff.	T-Stat	p
Intercept		5.63	21.44	<.0001
ΔEarnings	+	11.59	1.98	0.051
VIX_AI	-	-1.33	-2.15	0.035
VIX_AD	+	-0.93	-1.54	0.128
VIX_BI	-	-1.05	-1.40	0.164
ΔEarnings*VIX_AI	?	27.59	2.32	0.022
ΔEarnings*VIX_AD	?	5.34	0.22	0.823
ΔEarnings*VIX_BI	?	17.31	0.49	0.624
N	93			
Adj. R-Squared	12.16%			

GDP is nominal GDP growth for the quarter as reported by the Bureau of Economic Analysis.
ΔEarnings is the year-to-year change in aggregate quarterly earnings.
VIX_AI is a wave indicator variable that equals 1 if the level of volatility is above the median and the change in volatility is positive (increasing).
VIX_AD is a wave indicator variable that equals 1 if the level of volatility is above the median and the change in volatility is negative (decreasing).
VIX_BI is a wave indicator variable that equals 1 if the level of volatility is below the median and the change in volatility is positive (increasing).

Therefore, for both GDP growth at time t+1 and GDP growth at time t+2, the implication seems to be that an increasing level of volatility is associated with a stronger earnings-GDP relation. This follows the theory that higher volatility mitigates the discount rate signaling effect. In other words, higher volatility decreases the probability that positive earnings forecast increases in borrowing rates. Therefore, in volatile markets, the "cash-flow news" in earnings is not so strongly offset by the "discount-rate news". This causes the correlation between earnings and corporate profits to be stronger and earnings to be more predictive of GDP growth.

Table 6 presents the results using *DTE* wave indicator variables. For Panel A, the dependent variable is GDP at time t+1 (GDP_{t+1}). Panel A shows the only significant interaction between earnings and *DTE* occurs when *DTE* is above the median and decreasing (*DTE_AD*). The sign on this interaction variable (Δ*Earnings**DTE_AD*) is negative (coeff.= -37.85; p=0.024). This means that when the *DTE* ratio has peaked and begins to decrease, the predictive ability of earnings on GDP is smaller. Panel B shows a similar result when the dependent variable is GDP_{t+2}. The coefficient on the interaction variable (Δ*Earnings**DTE_AD*) is again negative and significant (coeff.= -45.79; p=0.007). Thus, in both model specifications, earnings predict GDP less when DTE is above the median and decreasing. The most likely explanation for this is that over-borrowing has occurred and is causing negative economic effects. This scenario is explained in Mendoza (2010), Bianchi and Mendoza (2011), and Akinci and Queralto (2014).

Table 6

EFFECT OF LEVERAGE ON THE EARNINGS-GDP RELATION

$$GDP=\alpha_1 + \beta_1\Delta Earnings_t + \beta_2 DTE\_AI_t + \beta_3 DTE\_AD_t + \beta_4 DTE\_BI_t + \beta_5(\Delta Earnings_t{*}DTE\_AI_t) + \beta_6(\Delta Earnings_t{*}DTE\_AD_t) + \beta_7(\Delta Earnings_t{*}DTE\_BI_t) + \varepsilon \quad \textbf{(4a and 4b)}$$

Panel A: Dependent Variable = GDP_{t+1}

Variable	+/-	Est. Coeff.	T-Stat	p
Intercept		5.33	21.42	<.0001
ΔEarnings	+	25.39	3.07	0.003
DTE_AI	-	-0.60	-0.99	0.323
DTE_AD	+	-0.26	-0.52	0.601
DTE_BI	-	-1.33	-1.12	0.265
ΔEarnings*DTE_AI	?	5.83	0.32	0.751
ΔEarnings*DTE_AD	?	-37.85	-2.31	0.024
ΔEarnings*DTE_BI	?	44.45	0.73	0.468
N	94			
Adj. R-Squared	9.74%			

Panel B: Dependent Variable = GDP_{t+2}

Variable	+/-	Est. Coeff.	T-Stat	p
Intercept		5.03	12.27	<.0001
ΔEarnings	+	33.855	3.43	0.001
DTE_AI	-	-0.12	-0.19	0.851
DTE_AD	+	0.19	0.37	0.715
DTE_BI	-	-1.43	-1.95	0.054
ΔEarnings*DTE_AI	?	-7.73	-0.42	0.677
ΔEarnings*DTE_AD	?	-45.79	-2.75	0.007
ΔEarnings*DTE_BI	?	39.12	0.79	0.430
N	94			
Adj. R-Squared	9.63%			

GDP is nominal GDP growth for the quarter as reported by the Bureau of Economic Analysis.
ΔEarnings is the year-to-year change in aggregate quarterly earnings.
DTE_AI is a wave indicator variable that equals 1 if the level of debt-to-equity is above the median and the change in debt-to-equity is positive (increasing).
DTE_AD is a wave indicator variable that equals 1 if the level of debt-to-equity is above the median and the change in debt-to-equity is negative (decreasing).
DTE_BI is a wave indicator variable that equals 1 if the level of debt-to-equity is below the median and the change in debt-to-equity is positive (increasing).

Due to over-borrowing, a collateral constraint is triggered which causes agents to liquidate capital thereby reducing the prices of assets and the availability of credit. These conditions are more likely to lead to a financial crisis. Therefore, when over-borrowing has occurred and negative economic consequences ensue, corporate profitability is less likely to forecast positive GDP growth.

ROBUSTNESS TESTS

Following KP (2014), we introduce familiar leading indicators of GDP to determine whether volatility and leverage are incremental predictors of GDP. The three variables used are as follows: *Yield,* which is the yield on one-year constant maturity Treasury bill (T-bill), measured one month after quarter *q* ends; *Spread*, the yield on the ten-year constant maturity Treasury bond minus the yield on the one-year constant maturity T-bill measured one month after quarter *q* ends; and *Return*, the quarterly buy-and-hold stock market return over the three months leading to one month after quarter *q* ends. We obtain the data on treasury yields from the Federal Reserve Board's H15 Report and stock market returns data from the CRSP Monthly Index file of value weighted returns. The results of the robustness tests are presented in Table 7.

Panel A of Table 7 shows the results of robustness tests utilizing market volatility (*VIX*). When the appropriate control variables are included, volatility continues to significantly affect the predictability of earnings on GDP growth. Under all specifications, the coefficient on volatility is negative and significant. When all three control variables are included, the coefficient on *ΔVIX* is -0.10 (p=.003). In addition, earnings continue to be more predictive of GDP growth when volatility is increasing. This is demonstrated by the coefficient on *ΔEarnings*ΔVIX* which is significant for all specifications and is equal to 1.85 (p=.003) when all control variables are included in the regression. When the dependent variable is GDP_{t+2}, results on *ΔVIX* and *ΔEarnings*ΔVIX* are similar. The coefficients on both variables are significant under all specifications, however, the magnitudes are marginally smaller. In summary, the results analyzing the effect of changing volatility on the earnings-GDP relation are consistent when additional predictors of GDP are included in the model. Increasing levels of volatility actually increase the predictability of earnings on GDP. The hypothesized reason for this concerns the constraining effect of increasing volatility on discount rates.

Panel B of Table 7 presents the results of robustness tests analyzing debt-to-equity. With GDP_{t+1} as the dependent variable, *ΔDTE* continues to be negatively related to future GDP for all specifications. Furthermore, the interaction variable of interest, *ΔDTE*ΔEarnings*, continues to be significant at the 10% level in specifications including *Spread* and *Return*. However, the coefficient on *ΔDTE*ΔEarnings* is insignificant when *Yield* is included in the regression. This is likely the result of the manner with which the level of aggregate debt co-varies with the T-bill yield. When ΔGDP_{t+2} is assessed as the dependent variable, *ΔDTE* continues to significantly impact the earnings-GDP relation. In specifications using *Spread* and *Returns*, the coefficient on *ΔDTE*ΔEarnings* remains significant at the 5% level. Overall, results including control variables known to predict GDP are consistent with previous results. Changing levels of debt-to-equity have a significant impact on the degree to which earnings predict GDP.

Table 7

ROBUSTNESS TESTS

Panel A: $GDP = \alpha_1 + \beta_1\Delta Earnings_t + \beta_2\Delta VIX_t + \beta_3\Delta Earnings_t{*}\Delta VIX_t + \beta_4 Yield_t + \beta_5 Spread_t + \beta_6 Returns_t + \varepsilon$

	Dependent Variable = GDP_{t+1}				Dependent Variable = GDP_{t+2}			
Variable	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**
Intercept	4.01***	5.65***	4.91***	4.37***	4.18***	5.25***	4.80***	4.02***
ΔEarnings	17.27*	15.39*	12.59	15.31*	24.64***	23.15***	21.14***	23.27***
ΔVIX	-0.11***	-0.12***	-0.09***	-0.10***	-0.07**	-0.08**	-0.06**	-0.06**
ΔEarnings*ΔVIX	2.00***	2.32***	2.42***	1.85***	1.41***	1.69***	1.68***	1.25**
Yield	0.24***	-	-	0.17	0.17	-	-	0.17
Spread	-	-0.43**	-	-0.15	-	-0.24	-	0.03
Return	-	-	5.60*	4.78	-	-	4.56	4.1
N	93	93	93	93	93	93	93	93
Adj. R-Squared	33.40%	32.47%	31.10%	33.98%	21.69%	20.48%	20.95%	21.21%

Panel B: $GDP = \alpha_1 + \beta_1\Delta Earnings_t + \beta_2\Delta DTE_t + \beta_3\Delta Earnings_t{*}\Delta DTE_t + \beta_4 Yield_t + \beta_5 Spread_t + \beta_6 Returns_t + \varepsilon$

	Dependent Variable = GDP_{t+1}				Dependent Variable = GDP_{t+2}			
Variable	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**
Intercept	3.73***	5.42***	4.69***	3.40***	4.20***	5.08***	4.73***	3.46***
ΔEarnings	21.70***	19.73***	13.25*	16.10***	23.24**	21.88**	17.28**	19.20**
ΔDTE	-2.90**	-3.11**	-2.93**	-2.78**	-0.87	-0.97	-0.86	-0.72
ΔEarnings*ΔDTE	103.39	147.19*	152.8*	90.67	73.86	107.81**	99.63**	63.06
Yield	0.28**	-	-	0.27	0.17	-	-	0.22
Spread	-	-0.33*	-	0.07	-	-0.1	-	0.22
Return	-	-	10.27**	9.49**	-	-	7.74	7.23
N	94	94	94	94	94	94	94	94
Adj. R-Squared	19.88%	15.84%	23.19%	26.84%	10.51%	8.45%	13.84%	14.08%

*, **, and *** indicate p-values less than 0.10, 0.05, and 0.01, respectively.

GDP, ΔEarnings, ΔVIX, and ΔDTE are as defined previously.

Yield is equal to the one-year constant maturity treasury bill measured one month after the quarter ends.

Spread is equal to the yield on the ten-year treasury bond minus the yield on the one-year treasury bill.

Returns is equal to the quarterly buy-and-hold stock market return.

In untabulated results, the "waves" of *ΔVIX* and *ΔDTE* are analyzed along with the appropriate control variables. While the significance of the wave indicators is diminished by the presence of the control variables, results are consistent with those reported previously. In the full specification, with all three control variables included, the interaction between earnings and the "wave" of volatility below the median and increasing (*VIX_BI*) is positive and significant (coeff.=40.70; p=0.054). When GDP_{t+2} is used as the dependent variable, *VIX_AI* continues to be negatively related to GDP but the interaction variable (*ΔEarnings*ΔVIX_AI*) is insignificant. Similarly, when "waves" of *DTE* are analyzed after controls for *Yield*, *Spread*, and *Return* are included, results are consistent with previous results but the significance is diminished. When

GDP_{t+1} is used as the dependent variable *ΔEarnings*ΔDTE_AD* is no longer significant. However, when GDP_{t+2} is used as the dependent variable, the coefficient on *ΔEarnings*ΔDTE* is negative and significant (-33.77; p-value=0.034). This is consistent with previous tests. Therefore, while the inclusion of additional predictors of GDP mitigates the strength of our results when breaking volatility into "waves", the inferences drawn are consistent with previous tests.

CONCLUSION

The current analysis answers the call of studies such as Ball and Sadka (2015) to further our understanding of aggregate earnings. The findings demonstrate the importance of considering macroeconomic conditions when analyzing the ability of aggregate corporate earnings to predict future GDP growth. The study demonstrates that both 1) market volatility and 2) average firm leverage as measured by the debt-to-equity ratio significantly impact the ability of earnings to predict GDP. The study extends research seeking to understand exactly how growth in earnings transfers into growth in GDP. More specifically, the analysis shows the degree to which aggregate earnings forecast GDP growth is mitigated by the discount rate signaling effects of earnings as well as the degree of average firm leverage. The results of the study should serve as a catalyst for further research into the manner with which changing interest rates and constraints in capital impact the economic information content of corporate earnings.

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CAPITAL BUDGETING PRINCIPLES: BRIDGING THEORY AND PRACTICE

Atul K. Saxena, Georgia Gwinnett College

ABSTRACT

One of the important qualities that accrediting bodies, e.g., the AACSB are looking for in business schools is learning outcomes that relate theory with practice. In fact, they encourage business schools to include pedagogical tools in the curriculum that foster practical applications of complex theoretical concepts, thereby making them intuitive and somewhat easier to grasp by students. Additionally, prospective employers, college professors, and students themselves are interested in learning valuable skills such as conducting research, team building, leadership, and interdependence that they can take with them to their job. This paper describes a capital budgeting project that is a real world simulation of a new business startup. It allows students to acquire the valuable skills mentioned above. The proposed project is suitable for graduate (MBA) and upper-level undergraduate courses. The project has been assigned in an MBA program with great success in the core corporate finance. But it can also be amended and utilized in the capstone strategic management course. For undergraduate finance students, this project can be assigned in the second (intermediate) finance course. The project is particularly appealing to non-traditional business students, who often desire to establish their own firms. The project directs their focus on the achievement and profitability of their future dreams while applying in practice what they learn in theory.

INTRODUCTION

Social scientists and academicians have stressed offering students multiple techniques of pedagogy for better learning outcomes. These techniques include one-minute papers, more detailed research papers, simulations, power point presentations, and real-world projects among others. Research has shown that generation-X actually prefers experiential learning to the more traditional lecture-based pedagogy (Bale and Dudney, 2000). Frequently professors spend a lot of time and effort searching for projects to supplement their lectures to enrich their coursework. The accrediting bodies encourage schools to include such pedagogical tools that bridge theory with practice. While instructors have always desired such tools, lately there is an increased demand from employers and student graduates to obtain these valuable hands-on experiences by simulating the real world before entering it.

While useful to both graduate and undergraduate students, practical learning experience is more important for the former group. This paper describes a project that can be used in upper level undergraduate finance (and strategic management) courses, but is particularly geared towards graduate students. The project requires students to apply financial analysis to the startup of a small company. This project has already been assigned successfully in MBA (and undergraduate) courses at a business school for a number of years with good results. Since most of the students enrolled in the core MBA corporate finance course are classified as nontraditional, they frequently have a dream of establishing their own company, of being entrepreneurs. This project provides them the opportunity to apply theoretical concepts and focus on the costs and benefits of their future plans.

Viewing various business functions on a small scale provides insight in understanding the interactions among functions in larger, established firms. While this paper involves the application of financial analysis, the project can be modified for any other business discipline, such as management or marketing. Over the course of study in an MBA program, it can also be used as a continuing project, adding facets to the study in each discipline. It may be modifi67ed to provide an examination of the practicalities in setting up businesses for other professionals, such as medical offices, engineering firms, etc. Its main benefit for the student is to encourage the disciplined thought and planning required in establishing a successful business.

The rest of the paper is organized as follows. Section II reviews the relevant literature. Section III discusses some desirable attributes of a class project assignment. Section IV explains the project in detail. Based upon procedural logic, Section IV is further divided into four sequential sub-sections. Section V summarizes the paper and provides some concluding remarks.

LITERATURE REVIEW

In a classic study on how to frame classroom learning experiences that model necessary attributes for the foundations of success, Bruner et al. (1999) found the following as important:

1. Select cases that employ, exercise or explore a tool or concept
2. Highlight the dilemmas of the decision maker
3. Set the numbers and critique them
4. Embrace uncertainty
5. Demand the action recommendations arising from analysis
6. Look for unintended consequences
7. Explore opportunities for further work

If a project possesses several of the above attributes, it is considered good. Remarkably, the project explained in this paper meets most of the above criteria.

Bale and Dudney (2000) surveyed students to research their preferred mode of learning. They find from their survey results that for Generation X students (born between 1961 and 1981) “hybrid” teaching models incorporating both andragogy (self-directed, self-motivated) and pedagogy methods are most effective. Making reference to another related study they go on to conclude that Generation X wants to see value and relevance in education, otherwise they are not motivated to learn new skills. They prefer experiential learning using as many of the five senses as possible (Caudron 1997). The startup project explained here is an example of hybrid teaching model that incorporates both andragogy and pedagogy.

Deeter-Schmelz, Kennedy, and Ramsey (2002) conclude that team projects play a vital role in modern pedagogy. Moreover, as team projects become even more common in business courses, an increased understanding of factors contributing to team effectiveness is necessary for instructors to assist students in realizing the potential benefits of this pedagogical tool. Their results support the positive and direct role of cohesion as an input variable on teamwork. Ashraf (2004) finds that in business schools across the United States, one of the most common pedagogical tools is the use of group projects. "Passive" instruction (i.e., lecture only) is considered to be an inferior mode of teaching. He highly recommends the use of group-based projects as pedagogical tools. Since we suggest that our project be preferably given as a team assignment, recommendations of both Deeter-Schmelz *et al* (2002) and Ashraf (2004) are met.

A simulation, like any pedagogical tool, must be evaluated in terms of its effectiveness in achieving course objectives. In a study, Chapman and Sorge (1999) investigate how well a particular simulation does in achieving course objectives and compare its performance to the textbook and papers used in the course. They find that compared to the textbook and research papers, students consistently gave simulation the highest ratings. In another study, Olson *et al* (2006) discuss and encourage the use of simulation as a pedagogical tool. While their simulation is developed for Eastern European transition economies, it is applicable to any pedagogical learning situation, specifically to the general operations of the firm at the microeconomic level of decision-making. Our project conforms to both studies, Chapman and Sorge and Olson *et al*.

While most of the above studies pertain to general education and business courses, there is some literature that is specifically relevant to finance courses. For example, Gurnani (1984) extensively reviews and compares capital budgeting concepts as advocated in theory with the methods employed by industry. Capital budgeting is an interdisciplinary function, involving diverse areas such as engineering, finance, and management. The ability of a firm to make sound decisions in this area rests not only on the theoretical techniques employed but also on the judgment, intuition, and creativity of the analysts and decision makers. He claims that the academic literature has concentrated heavily on developing and refining quantitative evaluation criteria, methods of measuring return, risk analysis techniques, and procedural aspects of capital investment decision making. However, academic research has been criticized because it tends to be essentially concerned with accuracy of analysis, sophistication of methodology, and improving conditions in a laboratory setting without regard to the realities of corporate decision making. One reason for the gap is a lack of bridging theory with practice at the school level. We feel that this project is the perfect bridge.

Benton Gup (1994) surveys academics and practitioners and ranks those finance concepts considered most important for students to acquire. The academics rank time value of money capital budgeting, CAPM, capital structure, and valuation as the top five financial concepts for this purpose. It is striking that all five are included to some degree in the project discussed in this paper. The practitioners ranking excluded CAPM and valuation but included accounting and cost of capital. This project requires a critical understanding of the cost of capital concept.

In what has to be one of the most comprehensive and impressive studies in corporate finance, Harvey and Graham (2001) sampled 4440 firms receiving responses from 392 chief financial officers (CFO's) to examine the proverbial *bridge* between theory and practice. Their findings are both reassuring and surprising. It is reassuring to them that NPV is dramatically more important now as a project evaluation method than it was 10 or 20 years ago. The CAPM is also widely used in the real corporate world. However, they find it surprising that more than half of the respondents would use their firm's overall discount rate to evaluate an investment in an overseas market, even though the investment likely has different risk attributes than the overall firm. This indicates that practitioners might not apply the CAPM or NPV rule correctly, perhaps indicating a need for a better bridge between theory and practice. A class assignment such as proposed in this paper would be useful to reinforce this bridge.

Weaver and Michelson (2004) suggest a project that could accompany a corporate finance course to enhance the learning of theoretical concepts. It is a simple Excel model that provides measures of the standard deviation of forecasted internal rate of return (IRR) given traditional data inputs such as annual cash flows, terminal values and equity. The model first calculates IRR using traditional discounted cash flow methods and then provides heuristic estimates of variability measured in terms of "high," "low" and "most likely" values. It also provides an actual measurement of risk in terms of mean and standard deviation and upper and lower quartiles, along with a graphical presentation of various risk parameters. While the Excel model just described is a good class project, our startup project is more comprehensive in nature covering a wider variety of financial concepts.

DESIRABLE ATTRIBUTES OF A CLASS PROJECT

Project assignments vary widely in their complexity and the amount of time needed for completion. For example, an economic ordering quantity (EOQ) model with imperfect quality items can be rather challenging for a typical corporate finance course, it may be well suited for a decision science course (Wang, Tang, and Zhao, 2007). Most finance class projects do not necessarily have to be as complex as EOQ models. The project outlined in this paper is rigorous yet relatively simple. It is a real world simulation of a firm and the decision making that goes on within it by its financial managers. As discussed above, Chapman and Sorge (1999) recommend the prudent use of such pedagogical tools. However, designing an appropriate project can be tricky and time consuming. From our own experiences in the classroom, we have found that certain key factors must be considered when designing a project assignment.

First, a well-designed class project must logically follow the concepts learned in class and/or the text. There ought to be opportunities for students to clearly and easily relate to certain key theoretical concepts and apply them in practice through the project. Second, it must be doable within the term of the course, which is the case of the proposed assignment. Another issue is whether a project can be done individually or in a group setting. Most instructors encourage projects to be done in small groups of 3 or 4, depending on the class size. Despite the potential for the classic free-rider problem (Ashraf 2004), group projects support the important goals of team building, leadership, responsibility and mutual trust. Business program accrediting bodies, e.g., AACSB, put enormous weight on these values. Moreover, there are alternative means of mitigating free ridership, e.g., peer evaluation by team members. However, a situation may arise that is not suitable for teams and group assignment. For instance, if the class size is very small or students are extremely busy (executives, etc.) who do not have enough flexible time to meet in teams. A desirable project can be done individually, as is ours.

THE PROJECT

There are several steps involved in this project assignment. The first step involves selecting the type of business to be established. Step two entails setting the assumptions under which the financial analysis will be performed. The third step involves calculating a financing rate (the cost of capital), estimating the revenues and expenses over an extended period of time (say a 5-year period). The fourth step consists of applying various capital budgeting techniques to reach an accept/reject decision. The final step consists of evaluating and assessing the risk involved in the cash flows and profitability. Each step is explained in detail in the following subsections.

A: Selection of the Business Type

It is helpful to select a business that does not depend on results of research and development activities, exploration, etc. These unknown or future factors add considerable complexity to the project and undermine the task of estimating probable cash flows from the business by making the whole project seem unreal. Business types such as retail, most manufacturing, consulting, construction, or service make the project more manageable for the student. For those students who do not have a specific type of business they would like to establish, a business run by a family member or friend can be a good choice since discussions with these owners can provide a solid base for estimating the startup requirements, revenues, costs and growth potential.

Occasionally, students run into problems with certain business selections. For instance, franchises can be problematic if estimates of revenues, costs, franchise fees, and other data are not provided by the franchiser. Buying an existing business for project analysis moves the student outside the procedures provided in classroom discussion in the MBA's core corporate finance course and therefore makes the project more difficult for them. This activity is best analyzed with acquisition procedures rather than capital budgeting used in this project. Indeed, this variation of the project can be used for a finance course on Mergers and Acquisitions.

Not-for-profit businesses are frequently avoided by students because they assume that they are not suitable for a profit analysis. However, since these businesses must take in at least as much money as they spend to stay in existence, they are as appropriate for this project as a for-profit business. Businesses that require very large capital outlays at startup for assets with lives longer than the project horizon (say 5 years) will generally not be profitable within the analysis period. This problem can be overcome and is discussed in Section IV-C.

B: Statement of Assumptions

A statement of assumptions used to estimate cash flows is an important habit for students to build. While in the project its function is strictly to build the initial cash flow estimates and provide a base for risk analysis, in an actual establishment of a firm it allows periodic reassessment of the progress expected. Should what initially appeared to be a profitable venture fail to meet projections or economic conditions worsen beyond expectations, the owner may need to either take alternative measures or shut down before losses become excessive. For a project manager in an established firm, changing assumptions may invalidate prior capital budgeting cash flow estimates. It is the responsibility of the project manager to keep upper management informed of these changing circumstances and to re-estimate the probable profit of the project. Failure to do so can significantly impact the profitability of the firm and in turn have a devastating effect on the career of the project manager. Finally, assumptions are also required for the instructor to evaluate the student's ability to apply the concepts. Assumptions generally include such things as the economic conditions, growth in revenues/costs, hiring of employees, increases in fixed assets, cost of capital, termination revenues and expenses, initial inventories and fixed assets, etc. Table 1 contains an example of the set of assumptions to be used for this case.

As suggested in the simplified example in Table 1, the best estimate for sales growth is projected to be 10% annually. Students might more reasonably predict sales growth of 25% in year 2, 15% in year 3 followed by 5% growth in the last two years. As examples, assumptions might also include a significant increase in payroll in year 3 as a planned administrative staff addition occurs. At the same time one might see increased office expenses and depreciation. Students need to be encouraged to be creative, imaginative, yet realistic when making these assumptions.

Table 1
AN EXAMPLE OF A SET OF ASSUMPTIONS

Business Type: Retail Outlet

Expected Case Assumptions*:

1. Sales Growth	10% of Sales per year
2. Cost of Goods Sold	60% of Sales per year
3. Utilities	$5,000 per year
4. Advertising	$10,000 per year
5. Miscellaneous Expenses	$9,000 per year

*Note that this is only a partial set of assumptions for illustration purpose.

C: Cost of Capital and Cash Flow Estimates

Since the project involves a startup company, a basic assumption is that at least initially, it is a sole proprietorship and the cost of capital is composed of the student's own required rate of return plus the cost of borrowing money. Students are asked to call a financial institution to determine what lending rate would be required for a business of the type chosen. The weighted average of these two rates is used as the discount rate for capital budgeting purposes. Students may wish to assume additional investors and incorporate their required rates as well when computing the overall cost of capital.

Students are also asked to estimate cash flows for the initial startup costs and revenue/expenses for five years at which time the business is shut down or sold. The five year life span may appear somewhat arbitrary at first. However from experience, this is a long enough horizon to include most of the changes a new company may encounter so students have the opportunity to manage the growth. At the same time, a 5-year life span of the project is not so long as to make long-term estimates of cash flows too unrealistic and far-fetched. The process and organization of cash flows in this paper follow that presented by Titman, Martin, and Keown (2014).

To demonstrate knowledge of technology (a desirable tool by AACSB), spreadsheets are required for the organization and estimation of cash flows. The initial outlay includes all cash flows that occur at the beginning. Table 2 provides a complete output of the capital budgeting analysis. It shows that our sample project requires modifications to the proposed property as well as furniture and fixtures to open. It also has deposits and opening expenses. These could be utility and phone deposits, operating licenses, and the initial advertising campaign. Working capital requirements might include cash.

The next cash flow category includes revenues and expenses occurring throughout the five-year life of the project on an annual basis. Generally called after-tax cash flows, these include annual revenues, annual expenses, depreciation, and taxes. The format of these cash flows follows the general format of an income statement except that interest expense is not included. All after-tax financing expenses are recovered by the level of the interest rate used to discount the cash flows. The final cash flow category is the terminating cash flows. These include all one-time cash flows occurring at shut down and could include after-tax salvage value, disposal/restoration expenses, sale of business revenue, etc. Since these cash flows occur in year 5, they should be netted with the year five after-tax cash flows. At this point students should have six cash flows: total initial outlay and cash flows for years 1-5 (year 5 includes the terminal cash flow). Additional instructions given to students in this phase can include:

- After-tax cash flows in years 1-5 must vary. Texts frequently repeat the use of year 1 cash flows in all succeeding years of the project life for ease of classroom instruction. Requiring variability forces a more realistic picture of a firm.
- Record cash flows as they occur. While the after-tax cash flows format resembles an accounting income statement, it does not follow accounting practices. Cash flows should coincide with cash going into and out of a bank account.
- At termination students can assume a complete shutdown with or without salvage value or the sale of the company. For firms that had costly and long-lived fixed assets, realistic profitability will require the sale of the assets or the company in year 5.
- Categories estimated in the after-tax cash flows should be moderate in breadth. For instance, estimates for total revenue and total cost are too broad. For a retail outlet, estimating revenue and costs for every item sold is too detailed.
- Straight line depreciation or MACRS can be used.

Students who are seriously considering starting the business analyzed in the project are permitted and encouraged to be as detailed as they feel necessary.

Table 2 AN EXAMPLE OF A COMPLETE CAPITAL BUDGETING SPREADSHEET						
Initial Expenses ($)	**Year 0**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Fixed Assets	$100,000					
Renovations	$20,000					
Working Capital	$10,000					
Bank Balance	$25,000					
Inventory	$30,000					
Miscellaneous	$9,000					
Initial Cash Outlay	**$194,000**					
Revenues		$500,000	$550,000	$605,000	$665,500	$732,050
Cost of Goods Sold		$300,000	$330,000	$363,000	$399,300	$439,230
Payroll		$50,000	$52,500	$55,125	$57,881	$60,775
Utilities		$5,000	$5,000	$5,000	$5,000	$5,000
Lease/Rent		$10,000	$10,000	$10,000	$10,000	$10,000
Advertising		$10,000	$10,000	$10,000	$10,000	$10,000
Maintenance		$1,000	$1,000	$1,000	$1,000	$1,000
Insurance		$500	$500	$500	$500	$500
Other Overheads		$500	$500	$500	$500	$500
Depreciation		$2,000	$2,200	$2,420	$2,662	$2,928
Earnings before Tax		**$121,000**	**$138,300**	**$157,455**	**$178,657**	**$202,116**
Less Taxes @ 40%		$48,400	$55,320	$62,982	$71,463	$80,847
Earnings after Tax		**$72,600**	**$82,980**	**$94,473**	**$107,194**	**$121,270**
Add Depreciation		$900	$900	$900	$900	$900
Salvage Value						$51,000
Net Cash Flow	($194,000)	$73,500	$83,880	$95,373	$108,094	$173,170
Cumulative NPV*	**($194,000)**	**($127,182)**	**($57,860)**	**$13,796**	**$87,625**	**$195,150**
*Assuming a 10% discount rate						

D: Capital Budgeting Techniques and Acceptability Analysis

Once the net cash flows are obtained, the acceptability of the business is evaluated. Students are required to use several decision criteria methods: payback period, discounted payback period, net present value (NPV), profitability index, internal rate of return (IRR), and modified internal rate of return.

- Payback period provides the number of years required for the initial outlay to be recovered from the after-tax cash flows. Since this is strictly an accumulation of the cash flows in years 1-5, it fails to account for the *time value of money* and is considered to be a less than accurate method and, financially speaking, a naïve way of evaluating the acceptability of the project. Acceptability of the business depends on owner-set criteria. For example, the initial outlay must be recovered within 3 years. If the pay back is equal to or less than this hurdle, the business is acceptable. Despite its limitations, the payback period method remains a popular capital budgeting technique (Harvey and Graham, 2001). It is frequently used as a *preliminary* screening measure in large firms and as the sole requirement in cash poor firms.

- Discounted pay back corrects for the lack of use of the time value of money in the pay back method by discounting each year's cash flow to year zero using the cost of capital as the discount rate. Therefore, this technique is regarded as an improvement on its predecessor and not as naïve. It is interpreted in the same manner as pay back but will obviously take longer to recover the initial outlay since the cash flows are in present value terms. Once again, the owner must set the acceptability criterion.
- Net present value (NPV) is the present value of the cash *inflows* minus the present value of the cash *outflows* and provides the dollar estimate of the change in the value of the firm. The business is acceptable if the NPV is positive.
- Profitability index is the present value of the cash *inflows* divided by the present value of the cash *outflows* and provides the dollar return for each dollar invested. The business is acceptable if the profitability index is greater than one.
- The internal rate of return (IRR) is the discount rate that equates the present value of the future cash flows to the initial outlay. It provides the percent return on funds invested *assuming* that the cash flows are reinvested at the internal rate of return as they flow into the firm. This is known as the reinvestment rate assumption. If these funds cannot be reinvested at that rate, the return will not be achieved. For this reason, sometimes the IRR rule is regarded as too optimistic, and the *modified* IRR is computed as discussed in the next paragraph. The internal rate of return must be greater than the firm's cost of capital for the business to be profitable.
- When the reinvestment rate assumption cannot be met, or when a relatively more conservative technique is desired, the *modified* internal rate of return is calculated. All the cash flows are compounded to the final year (year 5 for the project) using a reasonable rate for reinvestment, generally the cost of capital, and totaled to arrive at the future value of all cash flows. The modified-IRR is the implied rate that equates the initial outlay with the future value just calculated. This modified-IRR must be greater than the cost of funds.

If the business is unprofitable, students are asked to discuss some methods that might make it profitable. For example, operating from a home office or obtaining lower cost facilities might delay costs, or slowing/increasing the growth rate might provide a greater spread between revenues and costs. Students are not required to apply these suggestions.

E Risk Assessment

Students are also asked to analyze business risk using one of four risk analysis techniques and to discuss their findings. The methods suggested are sensitivity analysis, scenario analysis, decision tree analysis, and simulation. In all cases, the student can also determine the probability of the net present value falling below zero since this requires the average of several estimates of the net present value and its standard deviation. Although these techniques carry different nomenclature depending on the source, their definitions below should be familiar to faculty.

- In sensitivity analysis, the assumptions used in the analysis are changed one at a time to determine those with high impact on the net present value. These are called driver variables and generally require a high degree of confidence in the estimate or the ability to be well managed for an overall assessment of low business risk.
- Scenario analysis involves modifying the expected scenario already presented with the worst case and best case estimates of the assumptions used to create the model. This has the advantage of incorporating the interactions of all the variables into the analysis.

- Decision tree analysis provides re-evaluation points as the establishment of the business progresses. Owners can incorporate their experience at these points to re-estimate profitability. They may decide to expand/contract the business, modify facilities, shut down, etc. The decision tree provides "legs" to determine the net present values for each of the possible paths that the firm might take. The expected net present value and its standard deviation can assist in the risk assessment.
- Simulation provides estimates of the net present value by randomly selecting a value from each variable's probability distribution and combining them for the trial NPV calculation. Computer simulation software is generally instructed to make 1,000 to 10,000 trail runs, creating a net present value probability distribution. The area under the curve below a net present value of zero provides an assessment of the risk of the business.

Summarization of the acceptability of the business including both the decision criteria and the risk analysis concludes the project. Since risk analysis provides no definitive answer for how much risk is acceptable, students must apply their own risk preferences to this decision. Depending upon the preparedness of students, this section can be excluded from undergraduate finance courses if it becomes too overwhelming for them.

SUMMARY

This paper describes a capital budgeting project for the startup of a new business (e.g., a sole proprietorship). It is a real-world project that is do-able in a semester. It is preferably assigned as a group project, but can be adapted for individual student assignment. The company/business type is chosen by the student(s). Based on the types of assets and services required, students estimate the initial startup cost, the recurring revenues and expenses over the life of the business and any terminating cash flows. Once the cash flows are estimated, the business is evaluated for profitability and risk using the capital budgeting techniques of the *net present value* (NPV) and the *internal rate of return* (IRR). Students then must decide if they would proceed with that "dream" business.

The project can be assigned to MBA students in their core corporate finance course or with slight modifications it can also be included in courses such as management, marketing or entrepreneurship. A remarkable characteristic is that the project can be used as a thread connecting much of the MBA curriculum, creating a management business plan, a marketing plan, a cash budget, etc. in different classes. The described project has also been used in undergraduate finance classes by eliminating the risk analysis. Certain non-business professional programs, such as health care or engineering, where students frequently plan to open their own business, may also find it beneficial to include it in their curriculum.

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AN EXPERIMENT TO ASSESS THE EFFECT ON INVESTING OF SWITCHING AUDITORS FROM BIG 4 FIRMS TO REGIONAL FIRMS

Arnold Schneider, Scheller College of Business

ABSTRACT

This study examines whether knowledge about companies switching auditors from Big 4 firms to regional firms affects decisions to invest in those companies. Participants were given a scenario involving an investing decision and were first asked to assess the level of risk associated with investing in the company. Next, they were asked to allocate $10,000 between investing in the company versus a money market account. Four different questionnaires were created by varying information about auditor switches. Results indicated that neither risk assessments nor investment amounts differed for companies that switch auditors from Big 4 firms to regional firms as compared to companies that did not switch auditors. For companies that did switch auditors, providing a reason for the switch did not impact investing decisions. Finally, when a reason was provided for the switch, participants perceived a lower risk associated with switching auditors to acquire more expertise as opposed to switching to obtain lower audit fees, but this perception did not lead to increased amounts of investment.

INTRODUCTION

In recent years, many companies have switched their audit firms from Big 4 to smaller ones (Cullinan, Du, and Zheng, 2012). A study conducted by the United States Government Accountability Office (2008) reports that, from 2002 to 2006, there was a material increase in the market share of publicly-traded client firms with $500 million or less in revenue by non-Big 4 audit firms, and a corresponding increase in the market share during that period by Big 4 audit firms. Ettredge, Li, and Scholz (2007) report that from their sample, the majority of Big 4 clients who dismissed their auditors subsequently hired non-Big 4 audit firms. Among the many reasons cited for this phenomenon are client-auditor disagreements, lower audit fees, and a desire to obtain better services (Fontaine, Ben Letaifa, and Herda, 2013; Stefaniak, Robertson, and Houston, 2009).

The main purpose of this research is to ascertain whether knowledge about companies switching auditors from Big 4 firms to regional firms affects decisions to invest in those companies. Often, Big 4 firms are perceived as performing higher quality audits than regional firms (Nichols and Smith, 1983). Thus, a switch may be perceived as a negative signal coming from the company that switches auditors in this manner, as suggested by prior studies of stock market reactions to these types of auditor switches (e.g., Knechel, Naiker, and Pacheco, 2007). In addition, "the selection of a non-Big 4 auditor could signal that the company is not an attractive client for a Big 4 firm, which may be more selective in their choice of clients. In this case, moving from a Big 4 to non-Big 4 may be an unfavorable signal to the marketplace about the client's future prospects" (Cullinan, Du, and Zheng, 2012, 7). In recent years, however, these perceptions may be changing due to events such as Arthur Andersen's failure, the passage of the Sarbanes-Oxley Act of 2002, and the creation of the Public Company Accounting Oversight

Board (PCAOB). The PCAOB has encouraged the use of second-tier audit firms as alternates to Big 4 firms, suggesting that there is no difference in audit quality between Big 4 and second-tier firms (Jenkins and Velury, 2011). Cassell et al. (2013) find that, post-Andersen, perceived financial reporting credibility of second-tier audit firm clients is indistinguishable from that of Big 4 clients. Moreover, some studies (e.g., Ettredge, Li, and Scholz, 2007) indicate that companies sometimes change audit firms to obtain audit fee savings or better services. “Under such circumstances, a nonnegative or even a positive market reaction could be expected for a switch from a Big 4 to a non-Big 4 auditor” (Chang, Cheng, and Reichelt, 2010, 84).

When a company switches auditors, it need not disclose the reason for the auditor change, so companies often do not make these disclosures. The current study also examines whether disclosing a reason for the switch impacts investors’ judgments and whether investors perceive a reason relating to lower audit fees differently from a reason pertaining to a desire to obtain better audit services.

The issues examined in this study are important to companies considering switching auditors from Big 4 to smaller audit firms, and if they do decide to switch in this manner, the results of this study can provide guidance on whether it is worthwhile to disclose the reason for the switch. Findings from this study indicate that neither risk assessments nor investment amounts differed for companies that switched auditors from Big 4 firms to regional firms as compared to companies that did not switch auditors. For companies that switched auditors, the results show no differential impact on investing decisions between the disclosure of a reason for an auditor switch versus no disclosure of the reason for the switch. Furthemore, for companies that provided a reason for an auditor switch, respondents perceived a lower risk associated with switching auditors to acquire more expertise as opposed to switching auditors to obtain lower audit fees. This perception, however, did not lead respondents to increase the amount they would invest in the company.

The remainder of this paper is organized as follows. The next section reviews previous literature dealing with the effects of auditor switches in general and then the effects of auditor switches from from Big 4 firms to smaller firms. The following section develops three hypotheses relating to the effects of auditor switches from from Big 4 firms to smaller firms. Afterwards, the selection and demographic information about participants are provided. Then, the experimental task undertaken by the participants is discussed. Next, the paper presents the results of manipulation checks, hypothesis tests, and resposes to post-experimental questions. Finally, the paper concludes with a summary of results, limitations, and directions for future research.

PRIOR STUDIES

A long line of literature has investigated auditor switching in general (i.e., not necessarily from Big 4 to other firms or visa versa). A number of studies have shown negative reactions to auditor switching. Fried and Schiff (1981) find a negative market reaction to auditor switches, but do not find a difference in market reactions to auditor switches accompanied by disagreement disclosures versus those without such disclosures. Smith and Nichols (1982) report that the market reacts more negatively to firms that change auditors and disclose disagreements with its auditor than for firms that change auditors but do not disclose such disagreements. DeFond, Ettredge, and Smith (1997) report negative returns for the period between auditors’ resignations and the SEC’s receipt of the related Form 8-K filing and for the five day period beginning on the SEC receipt date. Wells and Louder (1997) obtain negative stock price reactions for companies associated with auditor resignations and find that reasons provided for resignations or other information related to resignations provide no additional information to the market. The authors conclude that it is the resignation disclosure itself, not any other related information, that causes the negative reaction. Shu (2000) reports that investors react negatively to auditor resignations and that the magnitude of these negative reactions increase with higher client litigation risk. Whisenant, Sankaraguruswamy, and Raghunandan (2003) show that disclosure of auditor resignations together with reportable events dealing with financial statement reliability issues are associated with negative returns above and beyond the effect of the resignation disclosure itself. Disclosure of auditor dismissals together with those reportable events are associated with negative returns above and beyond the effect of the dismissal disclosure itself for a seven-day trading period, but not for a three-day trading period surrounding the disclosure date. Beneish et al. (2005) demonstrate that when resignations are accompanied by disclosures about auditor-client disagreements over accounting treatment or over the adequacy of internal controls, the resignations are associated with negative abnormal returns for the former client. Griffin and Lont (2010) also find that investors react negatively to auditor resignation announcements. The negative reaction increases for companies with prior securities litigation and higher bankruptcy risk. Also, the negative reaction is explained mostly by two reportable event disclosures – auditor client-disagreements and nonreliance on management. Results in Schneider (2015) reveal that auditor switches produce higer investment risk assessments and marginally lower amounts invested than no auditor switches, but the effects of auditor resignations were not significantly different from the effects of dismissals.

On the other hand, several studies have found no reactions or positive reactions to auditor switching. Johnson and Lys (1990) find no contemporaneous abnormal stock price reaction to auditor switching announcements. Klock (1994) also finds no significant stock price effect associated with the switching of auditors. Asthana, Balsam, and Krishnan (2010) show that clients switching from Arthur Andersen just prior to its demise experienced positive abnormal returns during the three day window surrounding the announcement of the switch. The authors attribute this positive response to the reduction in uncertainty associated with the cost of finding a new auditor. Mande and Son (2013) provide evidence that stock markets have a positive view of auditor switches for companies that have experienced financial statement restatements. Taken as a whole, the evidence is very mixed as to whether auditor switches in general adversely impact investing decisions.

Some researchers have addressed the effects of switches from Big 4 firms to smaller firms. Eichenseher, Hagigi, and Shields (1989) show that market reactions surrounding auditor switches to Big N firms are slightly positive, while auditor switches away from Big N firms yield negative market reactions. Dunn, Hillier, and Marshall (1999) find a negative market reaction to auditor resignations on the date of the resignation letter and that the loss of a Big N auditor is associated with a greater negative reaction. Knechel, Naiker, and Pacheco (2007) provide evidence that companies changing from specialist Big 4 auditors to non-big 4 auditors have the largest adverse capital market reactions, while the market reacts most favorably when companies change from non-Big 4 auditors to Big 4 audit firms that are not specialists. Boone, Khurana, and Raman (2010) find that client-specific ex ante risk premium is lower for Big 4 clients than for second-tier audit firm clients. This result is consistent with the notion that investors perceive Big 4 audit quality to be higher. Blau et al. (2013) show that short sellers increase activity following changes from Big 4 to non-Big 4 auditors and that short selling during the post-announcement period leads to higher short-selling revenues. This indicates that short sellers view these auditor changes as negative events.

While these studies demonstrate that switching away from Big 4 audit firms have negative consequences for investors, other studies provide different results. Chang, Cheng, and Reichelt (2010) find that between 2004 and 2006 the market responded non-negatively to auditor switches from Big 4 to third-tier accounting firms, as well as to switches from Big 4 to Medium 2 firms and from Big 4 to other Big 4 firms. However, the market reacted negatively to other switches. Cullinan, Du, and Zheng (2012) find negative market reactions for auditor switches, but note that the market does not react more negatively when companies switch from a Big 4 firm to a second tier firm than when companies switch from a Big 4 firm to another Big 4 firm.

These prior studies on auditor switches all use archival data and focus on stock market reactions. The current study involves investing decisions by individuals rather than a market-based approach. Individual investors merit study because they represent a significant portion of the investment community and potentially impact stock prices (DeLong et al., 1991), their welfare is of concern to the SEC, and knowledge about individual investor decision-making is useful for developing theoretical models relating to stock markets (Daniel, Hirshleifer, and Subrahmanyam, 1998).

The current study uses an experimental approach to examine the effects of Big 4 to regional firm auditor switches on individuals' investing decisons. An experimental approach enables one to completely control the information available to investor participants. One can control for factors that might create confounding effects in archival studies, such as concurrent information disclosure, firm-specific characteristics, and self selection.

HYPOTHESES

Lu (2006) analytically shows that auditor switching sends a negative signal to capital markets that can result in stock price declines for switching companies. Reasons for the negative signal may include that the new auditor selected would be perceived as less critical of the company management, managers might be looking after their own interests rather than shareholder wealth maximization, and corporate governance could be weak. In line with this notion that auditor switches convey negative signals, an auditor switch is a factor considered by the Public Company Accounting Oversight Board when selecting specific audits for inspection (Stefaniak, Robertson, and Houston, 2009). As discussed earlier, results from some prior studies on auditor switches are consistent with this negative signal view (i.e., adverse stock price reactions occur for companies switching auditors), but other studies have shown no adverse impact or sometimes a positive impact when switching audit firms.

Switching from a Big 4 firm to a regional firm could signal that the company is not an attractive client for a Big 4 firm, which may be more selective in its choice of clients (Cullinan, Du, and Zheng, 2012). On the other hand, the perception may be that the switch is a positive development. For instance, Louis (2005) provides evidence that non-Big 4 firms have a comparative advantage over Big 4 firms in assisting clients with merger transactions. As noted earlier, most prior studies have found more negative market reactions for companies switching away from Big 4 firms than for other auditor switches. Some studies, however, have shown neutral or even positive reactions for companies switching away from Big 4 firms. Therefore, non-directional hypotheses are offered. Two components of investing judgments will be examined, the risk associated with the investment and the amount to invest in the company, as follows:

H1A: Risk assessments will be differentially impacted for companies that switch auditors from Big 4 firms to regional firms as compared to companies that do not switch auditors.

H1B: Amounts invested will be differentially impacted for companies that switch auditors from Big 4 firms to regional firms as compared to companies that do not switch auditors.

The Securities and Exchange Commission (SEC) requires registrants to report in its Form 8-K filing any change in auditor (SEC, 2014), as well as whether the change was client-initiated or auditor-initiated, but the registrant need not disclose the reason for an auditor change. Indeed, reasons for auditor switches are often not provided. Sankaraguruswamy and Whisenant (2004) show that reasons for auditor switches were provided in only 26 percent of Form 8-K filings containing auditor switches. Grothe and Weirich (2007) find that of 1,011 auditor switches reported to the SEC in 2006, 72.5 percent disclosed no information about the reason for the switches.

Since providing a reason for changing an auditor promotes transparency, one might expect that investors should view these disclosures favorably. However, prior research has produced mixed results. Sankaraguruswamy and Whisenant (2004) examine auditor switches where companies voluntarily reported their reasons for switching. They classified reasons as verifiable and non-verifiable and found that the latter were positively associated with abnormal returns while the former were unrelated. Hackenbrack and Hogan (2002) report that earnings response coefficients do not differ pre- to post-switch for companies that provide uninformative or no reasons for the switch, while earnings response coefficients are lower after switches for some types of reasons and higher for other types of reasons. Consistent with these findings, Hossain, Mitra, and Rezaee (2014) provide evidence that when auditor switches are accompanied by preexisting red-flag situations, capital market effects are negative, implying that disclosure of reasons for switching auditors would be informative to investors. Based on the mixed findings of prior research, non-directional hypotheses are offered. As before, investment risk and amounts invested are examined separately, as follows:

H2A: For companies switching auditors from Big 4 firms to regional firms, risk assessments will be differentially impacted for companies that provide a reason for the switch than for companies that do not provide a reason.

H2B: For companies switching auditors from Big 4 firms to regional firms, amounts invested will be differentially impacted for companies that provide a reason for the switch than for companies that do not provide a reason.

The next hypothesis examines two commonly cited reasons for why companies switch from Big 4 to smaller audit firms -- to obtain better service in the form of more industry expertise and to reduce their audit fees (Chang, Cheng, and Reichelt, 2010; Stefaniak, Robertson, and Houston, 2009; Ettredge, Li, and Scholz, 2007). These two reasons may evoke very different perceptions by investors, although each may be viewed both positively and negatively. More industry expertise may be viewed as enhancing audit quality, but investors may question whether it involves spending extra money to do so. On the other hand, investors may percieve lower audit fees as desirable from the standpoint of maximizing the company's profits, but they could also be concerned about an associated decline in audit quality since lower fees could result from auditors spending less time conducting the audit.

Few studies have investigated the impact of auditor switches on investing by examining reasons such as more expertise or lower audit fees. Hackenbrack and Hogan (2002) find that earnings response coefficients are lower subsequent to the auditor change for companies that switched for fee-related reasons, but higher for those that switched for service-related reasons. Knechel, Naiker, and Pacheco (2007) show that companies switching auditors experience positive abnormal returns when the successor auditor is an industry specialist, but when the successor audit firm is not a specialist, negative abnormal returns are experienced. Chang, Cheng, and Reichelt (2010) find that a relatively more positive stock market reaction to clients switching from Big 4 to smaller firms reflects companies seeking better services rather than lower audit fees. Because no other study has produced evidence on the comparative effects of these two reasons for switching auditors, and since each reason can be viewed as both positive and negative by investors, non-directional hypotheses are offered. Again, investment risk and amounts invested are examined separately, as follows:

H3A: For companies that provide a reason for switching auditors from Big 4 firms to regional firms, risk assessments will be differentially impacted for reasons relating to obtaining lower audit fees than for reasons relating to the desire to obtain better service in the form of more industry expertise.

H3B: For companies that provide a reason for switching auditors from Big 4 firms to regional firms, amounts invested will be differentially impacted for reasons relating to obtaining lower audit fees than for reasons relating to the desire to obtain better service in the form of more industry expertise.

PARTICIPANTS

Particpants were obtained from websites of Institute of Management Accountants (IMA) chapters located throughout the United States. Members of the IMA represent individuals who are generally knowledgeable about audited financial statements and who would also have some awareness about issues involving auditor changes. IMA members were contacted by email and asked whether they were willing to participate in a study dealing with the effects of financial information on investing decisions, and if so, whether they would also be willing to distribute some questionnaires to accounting/finance colleagues at their place of work. Based on their responses (i.e., willingness to participate, willingness to distribute questionnaires), 338 questionnaires were sent to 106 IMA members. Completed questionnaires were later returned by 101 people from at least 38 different organizations (some respondents did not reveal their organizational affiliations). If all of the questionnaires were distributed, the response rate would be 30 percent (101/338).

The average age of the participants is 46 years, 68 percent are male, 41 percent have masters degrees, they average 23 years of full-time work experience, and 88 percent indicate accounting/finance as the job category for their most recent full-time position. Most are experienced investors -- 82 percent state that they have previously purchased or sold stock relating to a personal investment. These participants would seem to have characteristics and backgrounds that are appropriate for the current study. Statistical tests were conducted to determine whether the demographic data across all four groups are similar. Because some groups did differ with respect to age and experience, supplemental analyses were conducted with these two variables as covariates (the results of these supplemental analyses are reported later in this paper).

TASK

The participants were given a case scenario involving an investing decision pertaining to a hypothetical company that designs, develops, manufactures, and markets power protection for computer communications and electronic applications worldwide. The case provided background information about the company, financial information (revenues, assets, cash flow from operations, and earnings per share), a consensus analyst forecast of earnings per share for the coming year together with the consensus analyst recommendation, and stock price data for the company covering the past twelve months. The case also stated that the company's financial statements were audited and that a clean (i.e., unqualified) opinion audit report had been issued on its most recent year financial statements.

Participants first assessed the level of risk associated with investing in the common stock of the company. This assessment was done on a 10-point scale ranging from no risk at all to very high risk. Next, assuming an investment horizon of one to two years, the participants allocated $10,000 between investing in the common stock of the company versus investing in a relatively risk-free money market account.

Four different questionnaire versions were created by varying the information about an auditor switch and the reason for the switch. The questionnaires were pre-tested with nine business school faculty members, resulting in some minor changes. For one version of the questionnaire (NO SWITCH), there was no auditor switch at all. A second version (SWITCH/NO-REASON) had an auditor switch with no reason given for the switch. A third version (SWITCH/LOWER-FEES) involved an auditor switch due to the company obtaining a lower audit fee. A fourth version (SWITCH/MORE-EXPERTISE) contained an auditor switch because of a desire to obtain auditors with more industry expertise. This results in a 1 x 3 research design with a control condition (NO SWITCH) and three treatment conditions involving auditor switches. Each participant received only one of these four questionnaire versions. As shown in Table 1, the numbers of participants responding for each questionnaire version are as follows: 30 respondents in the NO SWITCH group, 20 respondents in the SWITCH/NO-REASON group, 23 respondents in the SWITCH/LOWER-FEES group, and 28 respondents in the SWITCH/MORE-EXPERTISE group.

RESULTS

As a manipulation check, participants were asked at the end of the experiment to recall the case scenario information about any auditor change. Of the 101 participants, eight did not correctly recall the auditor change information. When these participants are excluded from the data anlaysis, the results remain essentially unchanged. Data analysis was also performed on a data set that excluded participants who had no previous investing experience. Results were similar to those of the full data set. Therefore, the following data analysis includes all participants. Since each of the three hypotheses are non-directional, all statistical tests reported in this section are two-tailed.

Table 1
DEPENDENT VARIABLE MEANS

Group (and sample size)	Mean Risk Assessment*	Mean Investment Amount*
NO-SWITCH (n=30)	5.77 (1.98)	$4,233 ($3,048)
SWITCH/NO-REASON (n=20)	6.19 (1.95)	$3,975 ($3,354)
SWITCH/LOWER-FEES (n=23)	6.23 (1.51)	$4,978 ($2,140)
SWITCH/MORE-EXPERTISE (n=28)	5.32 (1.72)	$4,759 ($2,887)

*Standard deviations are reported in parentheses below the means.

Note: For Risk Assessment, the rating scale ranged from 1 = "not risky at all" to 10 = "very risky."

The average responses to the two dependent variables for each questionnaire group appears in Table 1. Overall, the average risk assessment (1=not risky at all; 10=very risky) was 5.80, with a range of 5.32 for the SWITCH/MORE-EXPERTISE group to 6.23 for the SWITCH/LOWER-FEES group. The average amount allocated to investing in the common stock of the company was $4,495, ranging from $3,975 for the SWITCH/NO-REASON group to $4,978 for the SWITCH/LOWER-FEES group. A MANOVA revealed no significant differences across the four groups (Wilks' Lambda = .443). Likewise, ANOVAs indicated no significant differences across the four groups for the risk assessment variable (p = .262) and for the amount allocated to investing (p = .624). These analyses were also performed with age and work experience as covariates and the results from ANCOVAs showed no significance for either of the two dependent variables.

To test the first set of hypotheses, H1A and H1B, which address the impact on investing resulting from knowledge of auditor switches from Big 4 to regional firms, the responses to the NO-SWITCH (i.e., conrol) group were compared to those of the combined three treatment groups, all of which involved auditor switches. The risk assessment for the control group averaged 5.77, while that of the combined treatment groups averaged 5.85. The amount invested for the control group averaged $4,233, while the average for the combined treatment groups was $4,607. The direction of these differences would suggest a negative signal regarding the auditor switch for the risk assessment variable, but a positive signal regarding the auditor switch for the amount invested. However, neither of these two differences is statistically significant (p = .844 for the risk assessment; p = .553 for the amount invested). Therefore, neither H1A nor H1B is supported. Hence, there is no evidence that risk assessments or investment amounts differ for companies that switch auditors from Big 4 firms to regional firms as compared to companies that do not switch audit firms.

The second set of hypotheses, H2A and H2B, examine whether investing judgments will be differentially impacted for companies that provide a reason for an auditor switch versus companies that do not provide a reason for the switch. To test H2A and H2B, the responses to the SWITCH/NO-REASON group were compared to those of the combined SWITCH/MORE-EXPERTISE and SWITCH/LOWER-FEES groups. The risk assessment for the SWITCH/NO-REASON group averaged 6.19, while that of the combined two groups that provided reasons for the switches averaged 5.70. The amount invested for the SWITCH/NO-REASON group averaged \$3,975, while the average for the combined two groups that provided reasons for the switches was \$4,860. For both of these response variables, the direction of the differences would suggest a negative signal sent by not providing a reason for a switch from a Big 4 audit firm to a regional audit firm. However, neither of these two differences is statistically significant ($p = .328$ for the risk assessment; $p = .236$ for the amount invested). Therefore, for both risk assessments and amounts invested, there was no differential impact on investing between the disclosure of a reason for an auditor switch versus no disclosure of the reason for the switch. Hence, neither H2A nor H2B is supported.

To examine the possibility that the two reasons (i.e., lower audit fees and more industry expertise) could have opposite effects and thereby cancel each other out, two supplementary tests were conducted. First, the responses to the SWITCH/NO-REASON group were compared to those of the SWITCH/MORE-EXPERTISE group. The risk assessment for the SWITCH/NO-REASON group averaged 6.19, while that of SWITCH/MORE-EXPERTISE group averaged 5.32. The amount invested for the SWITCH/NO-REASON group averaged \$3,975, while the average for the SWITCH/MORE-EXPERTISE group was \$4,759. Neither of these differences is statistically significant ($p = .118$ for the risk assessment; $p = .395$ for the amount invested). Second, the responses to the SWITCH/NO-REASON group were compared to those of the SWITCH/LOWER-FEES group. The risk assessment for the SWITCH/NO-REASON group averaged 6.19, while that of SWITCH/LOWER-FEES group averaged 6.23. The amount invested for the SWITCH/NO-REASON group averaged \$3,975, while the average for the SWITCH/LOWER-FEES group was \$4,978. Neither of these differences is statistically significant ($p = .952$ for the risk assessment; $p = .243$ for the amount invested). Therefore, the finding that disclosing a reason for an auditor switch has no impact on investing judgments does not appear to be attributable to offsetting effects of the two different types of reasons for switching.

The third set of hypotheses, H3A and H3B, focus on companies that provide a reason for an auditor switch by examining whether investing judgments are differentially impacted for reasons relating to obtaining lower audit fees versus reasons relating to the desire to obtain better service in the form of more industry expertise. To test H3A and H3B, the responses to the SWITCH/MORE-EXPERTISE group were compared to those of the SWITCH/LOWER-FEES group. The risk assessment for the SWITCH/MORE-EXPERTISE group averaged 5.32, while that of the SWITCH/LOWER-FEES group averaged 6.23. This difference is marginally significant ($p = .057$). Hence, H3A is weakly supported. This suggests that disclosing a reason for an auditor switch dealing with seeking more expertise may send a more positive signal to investors than disclosing a reason for an auditor switch dealing with seeking lower audit fees. The amount invested for the SWITCH/MORE-EXPERTISE group averaged \$4,759, while the average for the SWITCH/LOWER-FEES group was \$4,978. This difference is not statistically significant ($p = .765$). Hence, H3B is not supported. So, while it appears that participants perceive a lower risk associated with switching auditors to acquire more expertise as opposed to switching auditors to obtain lower audit fees, this perception did not lead them to increase the amount they would invest in the company.

After the experiment was concluded, respondents rated the importance of eight different factors in making their investing decisions (1 = no importance; 10 = very important), as shown in Table 2. All of the factors except “Stability/instability of company’s relationship with its auditor” are significantly different from the scale midpoint of 5.5 at the .05 level of significance. This suggests that a company changing auditors is considered neither important nor unimportant in participants’ judgments about investing. The most important one of these factors was “financial data”. “Having a Big 4 firm vs. a regional firm conduct the audit” was ranked last (tied with “standard industrial classification”). This ranking appears to be consistent with the current study’s main findings that investors do not strongly consider factors relating to switches from Big 4 audit firms to regional firms when making judgments about investing.

Table 2
FACTOR RATINGS

Factor	Avg. Rating	Standard Deviation
Firm description	6.7	2.1
Standard industrial classification	4.0	2.5
Stability/instability of company’s relationship with its auditor	5.3	2.4
Auditor’s opinion on financial statements	7.8	2.1
Financial data	8.9	1.2
Analyst recommendation	6.2	2.1
Historical stock prices	7.4	1.8
Having a Big 4 firm vs. a regional firm conduct the audit	4.0	2.1

Rating scale: 1 = no importance; 10 = very important

CONCLUSION

The current study examines whether knowledge about auditor switches from Big 4 to regional firms affects judgments about investing in those companies that switch auditors. Results indicate that neither risk assessments nor investment amounts differed for companies that switched auditors from Big 4 firms to regional firms as compared to companies that did not switch auditors at all. This finding is consistent with Chang, Cheng, and Reichelt (2010), whose archival study found that the stock market responded non-negatively to auditor switches from Big 4 to third-tier accounting firms. For companies that switched auditors, the current study shows that there was no differential impact on investing judgments between the disclosure of a reason for an auditor switch versus no disclosure of the reason for the auditor switch. Finally, for companies that provided a reason for an auditor switch, participants perceive a lower risk associated with switching auditors to acquire more expertise as opposed to switching auditors to obtain lower audit fees, but this perception did not lead particpants to increase the amount they would invest in the company.

One implication of these findings is that companies need not be wary of switching auditors from Big 4 to regional firms. An implication for companies that switch from Big 4 firms to regional firms is that they need not be concerned about whether or not to provide a reason for the audit firm switch. Different reasons that are disclosed, though, may convey different messages about the riskiness of the company. Specifically, an auditor switch to obtain more expertise may be viewed more favorably (in terms of risk) by investors than an auditor switch to obtain lower audit fees. Despite that, amounts that would be invested in a company switching from a Big 4 firm to a regional firm are not likely to be affected.

The usual limitations of experimental approaches apply to the current study as well. One limitation is that this research was conducted in the context of one company scenario only and therefore is not necessarily generalizable to other types of company scenarios. Therefore, future studies should investigate the impact of auditor switches with company settings having different characteristics regarding industry, competitive environment, risk, financial performance, analyst forecasts and recommendations, and historical stock prices. Another limitation is that investors can usually obtain more information about a company than was provided in the current study's questionnaire. A third limitation is that economic incentives such as incurring a financial loss from poor investing decisions were not present in this experiment. Participants did not have any actual funds at risk in the current study. Future studies can go beyond investigating participants' intentions by examining investing decisions using an experimental economics approach where the amount of compensation to participants would depend on the outcomes of their investing decisions. A fourth limitation is that IMA members may not be representative of the typical individual investor, so care must be taken in generalizing this study's results to other types of respondents. Finally, the total sample size of 101 participants, divided into four cells ranging from 20 to 30, may not have been adequate.

Future research should also investigate effects of disclosing reasons for auditor switches from Big 4 firms to regional firms other than to oabtain lower audit fees or to acquire auditors with more industry expertise. Other reasons include disagreements between the client and its auditor, the client's business strategy, going concern issues, management's reputation, reputation/experience of the auditor, scope limitations, and independence impairment (Turner, Williams and Weirich, 2005; Calderon and Ofobike, 2008; Chang, Cheng, and Reichelt, 2010). The current study's setting involved switching from Big 4 audit firms to regional audit firms, so future research could also examine scenarios involving switches from regional audit firms to Big 4 firms. Another avenue for future research would be to investigate the effects of switching from Big 4 audit firms to regional audit firms on other types of judgments such as commercial lending decisions.

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BANK SIZE EFFECT IN THE DEPOSIT MARKET: EVIDENCE FROM BANK BRANCH OWNERSHIP CHANGES

Huabing (Barbara) Wang, West Texas A&M University

ABSTRACT

This paper examines the effect of bank size in the deposit market by utilizing a sample of branch offices that have changed ownership. We find that branches with larger new owners are associated with deposit decrease in the branch, while branches with smaller new owners are associated with deposit increase in the branch. This is consistent with the competitiveness of smaller banks in the deposit market. However, we also find that if the branches have changed ownership to the four largest banks, deposits increase too at the branch level, suggesting unique niches of these largest banks.

INTRODUCTION

The most recent financial crisis has put large banks under the spotlight for the systematic risks they bring to the economy. The massive bailout of these banks has been troubling for regulators. During a senate hearing on establishing a framework for systemic risk regulation in 2009, Sheila Bair, then Chairman of the U.S. Federal Deposit Insurance Corporation (FDIC), states that "the notion of too big to fail creates a vicious circle that needs to be broken." She further states in her testimony the need to "develop a resolution regime that provides for the orderly wind-down of large, systemically important financial firms, without imposing large costs to the taxpayer." While debatable, many even have advocated the breaking-up of large banks to avoid the "too-big-to-fail" problem and future financial catastrophe. The Progressive Change Institute, who recently released a poll result showing bipartisan backing for breaking up big banks, is an example of such advocate groups (Schroeder, 2015). The *Economist* magazine held a debate on whether big banks should be broken up on May 14, 2013, and the post-debate poll indicated favorable public sentiment with 83% yes vote.

However, technology advances and heightened regulation have favored large banks as never before. For example, Wheelock and Wilson (2010) suggest that information technology has tended to favor larger institutions for two reasons. First, larger institutions can more easily bear the relatively high fixed cost of information processing equipment and software. Secondly, the new technologies have eroded the value of close proximity and personal relationships in gaining soft information, which has been an advantage of small institutions. Regarding regulation, Peirce et al (2014) conduct a small bank survey covering 200 banks across 41 states, and report substantially increased compliance costs in the wake of new regulations such as Dodd-Frank for participating banks. Indeed, according to FDIC data, U.S. banking assets and deposits have continued to consolidate since the financial crisis of 2008. Tracy (2013) reports in a *Wall Street Journal* article that the number of federally insured institutions has shrank to 6,891 in the third quarter of 2013, and community banks might be "too small to survive".

While technology and regulation both put small banks at a disadvantage, community banks have many advantages compared with large banks in the deposit market. The ability to source low-cost stable core deposits can significantly lower bank funding cost, contributing to the bank's financial well-being. Small banks are known for their more personalized services, lower checking fees, and more lending flexibility (Kadlec, 2014). According to the 2013 Banking satisfaction study by J. D. Powers, smaller banks have higher scores regarding fees and problem resolution. At the same time, the ability of banks to attract transaction and savings deposits from businesses and consumers is an important measure of a bank's acceptance by the public (Rose and Hudgins, 2012, P. 397). Community banks are viewed as part of the local economy, and indeed, they tend to keep their sourced deposits in the local community. In the wake of the recent global financial crisis, the resentment towards the largest banks of the country has grown, and as mentioned earlier, the idea of breaking up large banks has gained support and advocated by many advocate groups. Therefore, the depositor sentiment may also play in the smaller banks' favor. Of course, large banks do offer more convenience thanks to their larger branch and ATM network. The scale of economy allows them to provide more cutting-edge technology and security features appreciated by customers (Kadlec, 2014). On balance, it is an empirical question whether larger or smaller banks have an upper hand in the competition for deposits.

This paper attempts to shed light on this question. Specifically, we examine the effect of bank size on deposit market competition, by utilizing a natural laboratory setting where branch offices experience ownership change among banks of different sizes. We find that branches with larger new owners are associated with deposit decrease in the branch, while branches with smaller new owners are associated with deposit increase in the branch. This is consistent with the competitiveness of smaller banks in the deposit market. However, we also find that if the branches have changed ownership to the Top 4 banks, deposits increase too at the branch level, suggesting unique niches of these Top 4 banks. This is consistent with Hirtle (2007)'s finding that mid-sized branch networks may be at a competitive disadvantage in branching activities.

LITERATURE REVIEW

Our paper is related to several streams of literature in the banking field. First of all, it is a critical question whether smaller community banks can survive the competition with larger banks. As shown in prior literature, community banks play a vital role in local economic growth, especially in the rural areas. For example, Hakenes, Hasan, Molyneux, and Xie (2014) theoretically show that small regional banks are more effective in promoting local economic growth. Their empirical evidence based on a sample of German banks lends support to their model. Burgess, Robin and Pande (2005) also document that branch expansion into rural unbanked locations in India significantly reduces rural poverty. This is consistent with the observation of Brooks (2014) in the U.S. banks, which reports that small businesses in the rural areas of the U.S. hurt by the decline of local community banks.

However, despite their contribution to local economic growth, smaller community banks may be at a competitive disadvantage due to the economy of scale. For example, in terms of the adoption of new information technology, Wheelock and Wilson (2010) suggest that larger institutions have advantages in two regards. First, they can more easily bear the high fixed cost of information infrastructure and software. Secondly, the new technologies have eroded the value of close proximity and personal relationships, which has been an advantage of small institutions. In the wake of the most recent financial crisis and the passage of Dodd Frank, community banks may face even harsher competition. Marsh and Norman (2013) suggest that Dodd-Frank will lead to greater asset concentration in a small number of financial institutions, furthering the trend of "too big to fail." Peirce et al (2014) conduct a small bank survey covering 200 banks across 41 states, and report substantially increased compliance costs in the wake of new regulation such as Dodd-Frank for participating banks.

Prior research on the interaction of small versus large banks offers mixed evidence on the competition dynamics between large and small banks. Pilloff (1999) documents reduced competition in the rural markets where big banks operate, allowing all banks in those markets to earn greater returns. Filbeck et al (2010) find that community banks have gained market share at the expense of larger, regional banks in small metropolitan Statatistical areas (MSAs). Pilloff (1999), however, does not find clear and consistent patterns of variations in the relationship between the profitability of small banks and the presence of big banks. Filbeck, Preece, and Zhao (2012) also document fewer advantages to large banks making market share gains in terms of subsequent performance. Hirtle (2007) reports that mid-sized branch networks may be at a competitive disadvantage in branching activities relative to larger or smaller branch networks. On the other hand, Hannan and Prager (2009) document that when large primarily-out-of-market banks increase their presence in the rural market, the profits of small single-market banks are significantly affected. Overall, while some studies suggest that community banks may still be viable in the competition with larger banks, prior literature does show concern especially in the rural areas.

While the prior studies approach the issue at the bank level, focusing on bank profitability and market share, we take a micro view in our study by focusing on branch deposit of banks of various sizes. Specifically, we examine branch deposit changes after bank ownership change between large and small banks. While larger banks have many advantages, smaller banks also have their strong suit, especially in customer service. For example, Eastman et al (2010) find that consumers are significantly more comfortable with community banks than the other forms of banking, including national banks, regional banks, investment houses, and brokerage firms. In our study, we examine whether the new ownership change will affect branch deposit level and share. For example, when a branch changes hand from a small community bank to a large national bank, will the branch deposit level/share be negatively or positively affected? The answer to such questions will shed light on the dynamics of competition between community and large banking institutions in the deposit market.

Finally, our research is also embedded in the literature on the determinants of the market share of deposit, a vital source of funding for banking institutions. Berger and Dick (2007) document the early-mover advantage in the banking market. Specifically, they find that the earlier a bank enters a market, the larger its market share relative to other banks. It is worth noting that Berger and Dick (2007) also examine bank entry by merger, and find that entering a market through a merger gives the bank a higher market share because the bank is buying up another bank's existing branch network in the market. Furthermore, our study is related to the literature on bank switching behavior. Kiser (2002) documents based on survey data that the average household uses the same bank for 10 years, and household relocation is the main cited reason of switching banks. Lees, Garland, and Wright (2007) examine bank customer loyalty and switching behavior, and report utility maximization ('a better deal') and expectation disconfirmation (usually service failure) as the main switching reasons.

DATA AND METHODOLOGY

Data, Sample, and Sample Characteristics

We start by obtaining the branch office deposit data[1] over the period 2000-2013 from the Federal Deposit Insurance Corp (FDIC). We then focus on branch acquisitions through either asset acquisition or bank merger and acquisition (M&A) over the eleven-year period of 2002-2012 period so that we have one year of branch deposit data available post-acquisition and two years pre-acquisition[2]. We delete observations representing branch offices that have changed hands more than once during the sample period. We also require the branch to have non-zero reported branch deposit over the sample period. Our final sample includes 11,118 branch ownership changes.

Table 1
SAMPLE CHARACTERISTICS
(*n*=11,118; All numbers are in thousands except the Metro Area Dummy and branch market share)

	Mean	*Median*	*Min*	*Max*
Branch deposit at the acquisition year	67,013	36,439	4	17,890,014
Total assets of selling bank	150,871,106	18,545,750	4,858	1,132,840,000
Total assets of acquiring bank	432,800,384	104,413,336	26,914	1,450,829,889
Metro area Dummy	1	.86	0	1
Branch deposit:				
Branch deposit after the acquisition year	65,135	36,312	3	16,730,800
Branch deposit before the acquisition year	69,199	38,210	1	16,889,232
Change in branch deposit	-4,063	-1,211	-9,015,802	7,711,817
Market share:				
Market share after the acquisition year	16.18%	5.25%	0.00%	100%
Market share before the acquisition year	17.56%	5.96%	0.00%	100%
Change in market share	-1.38%	-0.15%	-99.99%	99.98%

Table 1 contains the major characteristics of the sample. The average bank branch in the sample has approximately $67 million in total deposits the year of the branch acquisition. Half of the branches have deposits less than $36 million. On average, the selling bank has the average total asset of $151 billion, while the acquiring bank has the average total asset of $433 billion, almost three times the size of the selling bank. In terms of the median asset size, the difference is even more prominent with $18.5 billion for the seller and $103 billion for the acquirer. Regarding geographic location, the Metro area[3] has been more active in branch acquisitions or bank M&A, accounting for 86% of the sample.

Table 1 also illustrates the change in branch deposit and market share around the acquisition year. We first aggregate the reported deposits from the FDIC Summary of Deposit database by county for each year to obtain the total market volume. Then we divide the branch deposit by the total market to obtain the branch's market share. On average, both branch deposit volume and branch market share have dropped the year after the change of ownership in the branch.

Table 2 demonstrates the transition matrix of bank branches in the sample. Following FDIC convention, we define institutions with more than $10 billion in assets as large banks, and institutions with less than $1 billion as community banks. The remainder of the institutions are mid-size banks. Large banks as a buyer accounts for 73.60% of the observations. Large banks are also the most likely seller, accounting for 55.97% of the sample. It is rare that the branches go from a large bank to a community bank, and there are only 20 such cases in the sample.

Table 2
TRANSITION MATRIX OF BRANCHES (2002-2012)

Seller	**Community**	**Mid-size**	**Large**	**Total**
Buyer				
Community	734	61	20	580 *(7.33%)*
Mid-size	1,264	767	89	2,120 *(19.07%)*
Large	386	1,683	6,114	8,183 *(73.60%)*
Total	2,384 *(21.44%)*	2,511 (22.59%)	6,223 *(55.97%)*	11,118 *(100%)*

Methodology and Hypothesis Development

We estimate the following model to test the relationship between bank size and post-acquisition branch deposit change:

$$Chg\_Deposit_i=\alpha+\beta_1*Dif\_Size_i+\beta_2*Top4\_buyer_i+\beta_3*Metro_i+\beta_4*Chg\_area\_deposit_i+\beta_5*Prior\_growth_i+\varepsilon_i \quad (1)$$

$$Chg\_MKTShare_i=\alpha+\beta_1*Dif\_Size_i+\beta_2*Top4\_buyer_i+\beta_3*Metro_i+\beta_4*Chg\_area\_deposit_i+\beta_5*Prior\_growth_i+\varepsilon_i \quad (2)$$

In Model (1), *Chg_Deposit* is our dependent variable measured as the volume of branch deposit the year after the ownership change minus the volume of branch deposit the year before the ownership change. Therefore, higher deposits after the branch ownership transfer will result in a positive *Chg_Deposit,* suggesting that the branch attracts more deposits under the new ownership.

In Model (2), our dependent variable is *Chg_MKTShare* , which is measured as the market share of the branch at the county level after the ownership change minus that before the ownership change. Similar to the case of *Chg_Deposit,* higher branch market share after the ownership change will result in a positive *Chg_MKTShare,* indicating better performance of the branch in the deposit collecting market under new ownership.

We introduce five explanatory variables in the models as follows that explain the deposit level (share) changes.

First, *Dif_Size* equals the asset size of the acquiring bank minus the asset size of the selling bank. This variable will be positive when the ownership of a branch changes from a larger bank to a smaller bank, and negative is the ownership changes from a smaller bank to a larger bank. The sign of the coefficient indicates the effect of bank size in the deposit market. Community banks have many advantages over larger banks in their more personalized services, lower checking fees, and more lending flexibility (Kadlec, 2014). However, large banks do have larger branch and ATM network and often offer more cutting-edge technology and security features. Ultimately, it is an empirical question whether larger or smaller banks are more competitive in the deposit market.

Secondly, we define the following banks as the Top 4 banks: Wells Fargo (CERT=3511), JPMorgan Chase (CERT=628), Citigroup (CERT=7213), Bank of America (CERT=3510). These banks constantly top of the list of large banks. They are among the first groups of banks receiving bailout funds and have received the most[4]. Combined, these banks have received the bailout funding of more than $100 billion (including the funds initially allocated to Merrill Lynch and later absorbed by Bank of America) out of the $200 billion total bailout fund allocated. *Top4_buyer* is a dummy variable that takes the value one if the buying bank is among the Top 4 banks, and zero otherwise. Approximately 41.73% of the branches in the sample were acquired by the Top 4 banks. As industry leaders, the Top 4 banks offer comprehensive services and products, and feature the most cutting-edge technology. However, they are also more likely to draw resentment in the wake of the most recent financial crisis.

Our third independent variable is *Metro*, which is a dummy variable that takes the value one if the branch is in a metro area and zero otherwise. Branches in metro areas might face more intense competition, and we expect a deeper loss of deposits after ownership changes in these areas. For example, Berger and Dick (2007) note the difference between metropolitan markets and rural markets and only focus on the metropolitan markets in their study of bank entry and early-mover advantage. Superficially, they argue that metropolitan markets are generally considered more competitive with eaiser entry/exit and acquisition of local market share.

Finally, we control for the area deposit growth and the branch's own deposit trend prior to the change in ownership. *Chg_area_deposit* equals the total volume of county deposits the year after the ownership change minus that before. We expect that the coefficient of *Chg_area_deposit* is positive as branch deposit positively correlates with the area deposit trend. *Prior_growth* is measured as the growth rate of branch deposit from year -2 to year -1, which captures the branch's deposit trend prior to the ownership change. We expect the coefficient of *Prior_growth* to be positive since the historical trend might continue into the future, positively affecting the dependent variables.

It is worth noting that because we examine a specific branch with location unchanged, we can ignore the location effect, although it can be a significant driver for deposit level (share). In addition, deposit rates might have direct bearing on branch deposit volume. However, we view deposit rates as endogenous in our analysis because banks have the discretion to raise or lower the deposit rate after branch acquisition. Prior literature also indicates that deposit rates and bank funding costs correlates with bank size. For example, Jacewitz and Pogach (2013) document significant and persistent pricing advantages at the largest banks for comparable deposit products and deposit risk premiums.

EMPIRICAL RESULTS

We run the regression following Model (1) as described in Section III, and report our result in Table 3 Panel A. For the combined sample, the difference in size is negatively associated with an increase in deposit volume at the branch, after accounting for the area deposit change and the branch's previous deposit trend. We rerun the regression on the two sub-samples of "large banks as buyers" and "small banks as buyers" to further test the issue. We find that the coefficient of *Dif_size* is significantly negative for branches bought by large banks. However, the coefficient of *Dif_size* is significantly positive for branches bought by small banks. Combined, the negative association between bank size and branch deposit indicates that smaller banks might have an advantage in attracting deposits. In Panel B, we report our results from Model (2) with the change in branch market share as the dependent variable. Overall, our results are similar with the coefficient of size differences negative and significant.

It is interesting to note that the coefficient of *Top4_buyer* is significantly positive for both models. This suggests that a top 4 bank as the buyer actually enhances the deposit flow into the branch following the ownership change. While smaller banks generally have an advantage in the deposit market, the Top 4 Bank status also has a positive impact on the deposit flow.

Finally, a note of caution is in order. There are numerous factors affecting the deposit flow at the branch level, such as deposit rate, service quality at the branch, and the bank's ability to provide credit to deposit customers at the branch. However, due to limitation of data, we do not have measurement or proxy for these variables. Therefore, we can only include the limited explanatory variables available to us, and this may attribute to the low explanatory power of our models, as suggested by the low R-square values.

Table 3
MULTIVARIATE REGRESSIONS: RESULTS

	Combined sample		Large banks as buyers		Small banks as buyers	
	Coefficient	*T*	*Coefficient*	*t*	*Coefficient*	*t*
Panel A: y= *Chg_Deposit*						
Constant	**-13559**	**-2.98*****	**-13777**	**-1.97****	-21052	-1.32
Dif_Size	**0.00**	**-2.2****	**0.00**	**-2.30****	**0.00**	**1.69***
Top4_buyer	**17259**	**2.49****	**17481**	**2.46****		
Chg_area_ deposit	**0.00**	**4.91*****	**0.00**	**4.91*****	**0.00**	**1.84***
Prior_growth	0.84	0.08	0.68	0.07	20.24	0.06
Metro	**9112**	**1.85***	10259	1.45	18648	0.84
N	11,118		8,183		815	
Adjusted R^2	0.027		0.034		0.038	

Panel B: y= *Chg_Mktshare*						
Constant	**-0.06**	**-6.79*****	**-0.02**	**-4.32*****	**-0.01**	**-2.15****
Dif_Size	**-0.00**	**-5.21*****	**-0.00**	**-5.22*****	-0.00	-0.94
Top4_buyer	**0.02**	**4.75*****	**0.02**	**4.47*****		
Chg_area_ deposit	**-0.00**	**-3.81*****	**-0.00**	**-3.74*****	**-0.00**	**-2.61*****
Prior_growth	0.00	0.32	0.00	0.27	0.00	0.50
Metro	0.00	1.19	0.00	1.23	-0.01	-1.04
N	11,118		8,183		815	
Adjusted R^2	0.033		0.043		0.064	

Note: Top_4 buyer is not included for the subsample of "Small banks as buyers" for lack of variation. *** indicates significance at the 99 percent level; ** indicates significance at the 95 percent level; * indicates significance at the 90 percent level

CONCLUSION

This paper examines how bank size affects deposit flow at the branch level by utilizing a natural experimental setting of branch ownership change. We find that bank size difference of the acquiring and selling banks is significantly negatively associated with the branch deposit change after the ownership, after accounting for the area deposit change and the branch's previous deposit trend. In other words, branches with larger new owners are associated with deposit decrease in the branch, while branches with smaller new owners are associated with deposit increase in the branch. Despite the concern that small banks might be too small to survive, their smaller size appear to be advantageous in the deposit market. However, we also find that if the branches have changed ownership to the four largest banks, the deposits increase too at the branch level.

Our paper sheds light on the competitiveness of small banks in the deposit market. While small community banks play positive roles in local economic growth, they may be at a disadvantage due to the economy of scale, and therefore their survival is of concern to regulators and the public. The findings from our paper may partly ease this concern as small community banks seem to have an edge in the game of sourcing core funding sources, a key factor of bank success.

ENDNOTES

1 All FDIC-insured institutions have been required to fill out an annual summary of deposit (SOD) survey since 1934 to report branch office deposits as of June 30 every year.

2 In later analysis, we control for the deposit trend prior to the ownership change and therefore need at least two years of deposit data prior.

3 A metro area is an area that is centered on a single large city (or sometimes two large cities) with substantial economic influence over the surrounding areas.

4 For more details, please see the Treasury's bank bailout list from http://money.cnn.com/news/specials/storysupplement/bankbailout/

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EFFICIENCY AND CORPORATE BANKRUPTCY PREDICTION

Domenico Piatti, University of Bergamo
Peter Cincinelli, University of Bergamo
Davide Castellani, University of Bergamo

ABSTRACT

This study investigates the role of technical efficiency in predicting the probability of default of a sample of Italian SMEs in the period 2007-2009. This specific period is of particular interest because it is centered on the beginning of the Global Financial Crisis. We argue that technical efficiency allows for a forward-looking perspective and can contribute to shed more light on the reasons behind the default of many Italian SMEs in the particular period considered. The technical efficiency is estimated with a stochastic frontier approach and the efficiency ratio is used as independent variable, along with several financial ratios. Consistently with the literature, the results suggest that efficiency is a good predictor when the financial ratios are also considered. Several robustness checks support the preliminary findings.

INTRODUCTION

Although there are numerous empirical studies on business failure prediction in the literature, only few of them purposely employ technical efficiency ratios to predict financial distress (Becchetti & Sierra, 2003, Pusnik & Tajnikar, 2008; Iazzolino, Bruni & Beraldi, 2013; Li & Wang, 2014). Most models, in fact, rely on hard information embedded in the balance sheet in terms of financial ratios. Conversely, information provided by the level of technical efficiency can improve understanding of the role played by qualitative or soft variables in corporate default prediction (Becchetti & Sierra, 2003).

Based on a sample of Italian SMEs in the period 2007-2009, this study therefore aims to assess whether a firm's technical efficiency can lead to a significant improvement in the performance of business failure prediction models.

Efficiency is measured as the distance from the industry's best efficient frontier. The least efficient firms are expected to have a greater probability of default because inefficiency can compromise their ability to generate profits and cash flows to meet their financial exposure.

This study contributes to the extant literature in the following respects. Firstly, the purpose of adopting soft information, as a measure to detect early business failure, is to overcome a merely backward-looking perspective based only on financial ratios, in favour of a forward-looking perspective. A further reason concerns the Italian SMEs sample used in our empirical analyses. Particularly, besides a "*polycentric model*" (Censis, 2008) expressed by Italian SMEs, a remarkable aspect concerns the time period considered, i.e. 2007-2009, which includes the onset of the financial crisis. As in many other developed countries, the crisis increased the strain on the already stressed Italian economic environment.

The study is organized as follows. Section 2 provides a literature review. Section 3 presents the sample and methodology. Section 4 shows the efficiency ratio. Sections 5 and 6 give, respectively, the empirical results and robustness checks, and section 7 sets out the main conclusions.

LITERATURE REVIEW

Over the 1930-1965 time period, a few early studies attempted to use financial ratios for bankruptcy prediction (Smith, 1930; FitzPatrick, 1932; Smith & Winakor, 1935; Merwin, 1942; Chudson, 1945; Hickman, 1957; Jackendoff, 1962). In these studies, bankruptcy prediction was conducted by means of statistical univariate approaches focused on comparison between the financial ratios of failed companies with those of sound firms. However, although the univariate approaches were unable to control for the interrelationships among several indicators (Beaver, 1966), they laid the bases for multivariate bankruptcy prediction models. The first multivariate study was published by Altman (1968). In Altman's seminal paper, the financial ratios of healthy companies are different from those of insolvent ones. Moreover, this difference becomes progressively stronger as the date of bankruptcy approaches. Several bankruptcy prediction models are present in the literature. More than 165 bankruptcy prediction studies were published from 1966 (Beaver, 1966) to 2007 (Bellovary, Giacomino & Akers, 2007). However, all these models differ in terms of input variables, prediction timeframe, statistical methodology and definition of default. Specifically, these studies, as regard the input variables, sought to test the effectiveness of financial ratios in forecasting insolvencies. Various financial ratios were used to forecast insolvencies (Ezzamel, Brodie & Mar-Molinero, 1987). The lack of an economic theory of firm crisis has induced several authors to test the effectiveness of financial ratios from balance sheet data in predicting insolvencies through empirical analysis (Skogsvik, 1990) and on the basis of specific research objectives (Edmister, 1972; Keasey & Watson, 1987). However, despite the numerous and different financial ratios used in the literature, there is an unexpressed but evident agreement on the best, and therefore most widely adopted, ratios. Out of the overall 752 different financial ratios used in the literature (Bellovary, Giacomino & Akers, 2007), the return on assets (ROA), that is, the ratio of net income to total assets, and the current ratio, that is, the ratio of current assets to current liabilities, are commonly adopted. As suggested by Tamari (1966), companies that show current ratios less than one are closer to bankruptcy. Moreover, the ratio between cash flow and total debt is the best ratio with the greatest failure predictive capacity (Beaver, 1966). As Tamari suggests, this ratio is characterised by a margin of error, in terms of bankruptcy prediction, ranging from 13% in the first year to 24% in the fifth year. Regardless of the specific financial ratios, a model that predicts insolvencies as early as possible is more appropriate and valuable. For instance, Deakin (1972) and Dwyear (1992) provide a model in which bankruptcy can be predicted two years prior the failure with an accuracy of 96% and 97% respectively. El Hennawy & Morris (1983) show a prediction ability of five years earlier with 100% accuracy. Several contributions provide diverse prediction timeframes: 6 years (Martin, 1977; Skogsvick, 1990; Gilson & Vetsuypens, 1993), 5 years (Deakin, 1972; Wilcox, 1973; Altman, Haldeman & Narayanan, 1977; Frydman, Altman & Kao, 1985), 4 years (Sinkey, 1975; Kahya & Theodossiou, 1999) and 3 years (Appetiti, 1984; Izan, 1984; Levitan & Knoblett, 1985; Lo, 1986). However, the predictive ability of the model is strongly affected by both the financial ratios and the extent of the time period considered. The predictive ability of the model can decline as the number of years prior to the failure increases (Deakin, 1972), or it can be affected by biases due to positive serial correlation (Kahya & Theodossiou, 1999).

With reference to methodology, most of the techniques adopted to date in the literature converge into two specific categories (Kumar & Ravi, 2007). The first category, i.e. statistical techniques, includes linear discriminant analysis, multivariate discriminant analysis, quadratic discriminant analysis, logistic and probit regression and factor analysis. The second category encompasses intelligent techniques, such as neural network architectures (e.g. multi-layer perception, probabilistic neural networks, auto-associative neural networks, self-organizing maps, learning vector quantization), decision trees, case-based reasoning, evolutionary approaches, soft computing (hybrid intelligent systems), operational research techniques (e.g. linear programming, data envelopment analysis, quadratic programming) and other intelligent techniques (e.g. support vector machine, fuzzy logic techniques). Other techniques, rough set theory (Slowinski & Zopounidis, 1995), hazard models (Shumway, 2001), Bayesian network models (Sarkar & Sriram, 2001) and genetic programming (McKee & Lensberg, 2002) have been also used in the bankruptcy field.

Regarding the definition of default, it is widely known that a generally-accepted definition does not exist in the literature (Sharma & Mahajan, 1980; Koenig, 1985; Guilhot, 2000; Crutzen, 2010). Some studies consider default to be either a simply bankruptcy (Fernández-Castro, 1988; Laitinen, 1991; Everett & Watson, 1998), or a Chapter XI bankruptcy petition (Altman, 1981) linked with the going concern perspective (Taffler & Tishaw, 1977), or the occurrence of certain events, such as bankruptcy, bond default, overdrawn bank account and non payment of a preferred stock dividend (Beaver, 1966). From a regulatory perspective, instead, situations such as the obligor's unlikelihood of paying its credit obligations and when the obligor is past due more than 90 days are warnings of potential default (Basel Committee on Banking Supervision, 2006). Moreover, lower profitability levels, in comparison with the risk free rate or a substantial amount of loans past due, represent a different default perspective (Unal, 1988).

Within this framework, the Italian environment has been characterised by a considerable number of studies on failure prediction. On comparing statistical methodologies for prediction with neural networks, Altman, Marco & Varetto (1994) find a balanced degree and beneficial characteristics. Amendola, Bisogno, Restaiano & Sensini (2011), investigate the main aspects related to the bankruptcy model of 63 failed industrial firms in the Campania region of Italy. Bisogno (2012) analyses Italian bankruptcy procedures from an ex post and an ex ante perspective. The latter, as suggested by the author, benefits from prediction models for default risks. Gentry, Newbold & Whitford (1985), Raja, Nosworthy & Goureia (1980) Gombola, Haskins, Ketz & Williams (1987), Gilbert (1990), Charitou (2004) and Piatti (2014b) investigate the role of cash flow ratios in order to improve firm assessments in business failure prediction models.

A key aspect, which emerges from the literature outlined above, concerns the kind of information adopted. The several dimensions on which information is recorded, collected, compared, coded and catalogued allow a twofold classification to be made between hard and soft information (Petersen, 2004). Financial ratios, contained in balance sheets and income statements, are characterised by hardness, precision, verifiability and manipulability (Godbillon-Camus & Godlewski, 2005). On the other hand, soft information is considered to be a stock of information that embraces economic, social, financial, political and personal aspects (Cosma, 2002). Soft information provides more advantages in decentralised organizational structures than in larger hierarchies, where higher levels of bureaucracy, such as division managers, have been characterised by several and well documented reports, which, however, are "not terribly informative" (Stein, 2002). The harmonization between hard and soft information allows to have a forward-looking perspective (qualitative components), as opposed to the backward-looking one (quantitative elements), in order to obtain richer and more sustainable predictions of business failures and, indeed, to avoid an "excess of automatisms" (Draghi, 2010). Over the years, only a few bankruptcy prediction studies have considered both quantitative and qualitative factors. Some authors have analysed qualitative credit risk regarding German banks (Weber, Krahnen & Vossmann, 1999; Brunner, Krahnen & Weber, 2000; Günther & Grüning's, 2000) and German companies (Hesselmann, 1995; Blochwitz & Eigermann, 2000; Lehmann, 2003; Grunert, Norden & Weber, 2005). Altman, Sabato & Wilson (2008), on a sample of 5.8 million sets of accounts of unlisted UK SMEs along the 2000-2007 time period, investigate the role played by qualitative information as predictive variables of company distress. The authors argue that qualitative information, such as legal action by creditors to recover unpaid debts, company filing histories, comprehensive audit report data and firm-specific characteristics, can significantly improve the accuracy of the distress assessment by up to 13%. Combining hard and soft information on a sample of Italian North-Eastern SMEs, Gibilaro & Piatti (2012) argue that both the company's confidence and relationship banking (as qualitative variables) improve its position in a prediction failure perspective. On a sample of 1,446 private firms obtained from a Taiwanese finance company in September 2000 and October 2005, Chen, Huang & Tsai (2013) show that soft information, such as employee loyalty, the degree of the borrowing firm's sales to long-term customers, and the sum of the adjustments made by loan officers on the scores for financial ratios regarding both leverage and profitability, have a crucial capacity to predict defaults of small business borrowers. Using a sample of 389 small loans granted by a French credit cooperative bank, Cornée (2013) emphasises that management quality and project quality, together with hard information variables, improve credit default prediction.

The benefit from the early detection of corporate failure signals has highlighted, over the years, the crucial concept of efficiency relative to its origin and operational variations. In the past twenty years, efficiency analysis has become an "appealing theme" for academic research (Resti, 1997). In the rich and heterogeneous literature, Data Envelopment Analysis (DEA) and the Stochastic Frontier Approach (SFA) are the most widely adopted approaches. The advantages of these non-parametric and parametric tools derive from the possibility to improve on methodologies such as discriminant analysis (Retzlaff-Roberts & Puelz, 1996) in order to investigate a firm's inefficiency (through distance from the "best practice") as an ex-ante indicator of business failure and, moreover, to strengthen the role of qualitative variables in predicting business failure (Becchetti & Sierra, 2003).

In parallel with DEA methodology, several authors have adopted a parametric technique, i.e. the stochastic frontier approach (SFA), developed by Aigner, Lovell & Schmidt (1977), to assess the efficiency of companies in the financial environment (Aly, Grabowski, Pasurka & Rangan, 1990; Kaparakis, Miller & Noulas, 1994; Allen & Rai, 1996; Berger & Mester, 1997) and as a tool with which to detect inefficiency measures (Jondrow, Knox Lovell, Materov & Schmidt, 1982; Ferrier & Lovell, 1990; Hunt-McCool, Koh & Francis, 1996; Kwan & Eisenbeis, 1996). Becchetti & Sierra (2003) adopted the SFA to test whether productive efficiency could predict bankruptcy. Using data from Mediocredito Centrale surveys (from 1989 to 1997), they concluded that firm efficiency, measured as the distance from the efficient frontier, can have explanatory power in predicting bankruptcy, and that the predictive capacity can be further improved with both balance sheet and qualitative variables. Hwang, Siao, Chung & Chu (2011) have obtained similar results. Comparing the probability of bankruptcy on the Merton model and on a discrete-time hazard model, both of them used in the SFA framework, they found that as the time of bankruptcy draws near, the technical efficiency derived from SF decreases. Styrin (2005) applied the SFA to obtain X-efficiency for all Russian banks during the period between 1999(Q1) and 2002(Q4). Their X-efficiency scores were positively correlated with the share of big risks in a bank's loan portfolio and negatively correlated with the share of related borrowers. Recently, some authors have tried to associate the Mixture Hazard Model (Almanidis & Sickles, 2012) and the distance to default (Merton's model) (Saeed & Izzeldin, 2014) with the SFA.

In the above studies, the combination of hard information, soft information, and estimates of technical efficiency proxies has further enriched and broadened out the discussion on bankruptcy prediction. Nonetheless, the adoption of soft information, rather than financial ratios, both to detect bankruptcy and to conduct efficiency estimation (through non-parametric and parametric techniques) is still rare. *Ceteris paribus*, methods that take account only of hard information to predict corporate bankruptcy are strongly oriented to a backward-looking perspective. Recently, although within limits, the academic literature has paid attention to soft information and its ability to predict early bankruptcy. This study aims to fill this gap by gaining better understanding of a forward-looking perspective based on the role of soft information captured by a stochastic frontier approach.

SAMPLE AND METODOLOGY

The data used in the empirical analysis were entirely drawn from AIDA, a financial database maintained by Bureau Van Dijk which consists of the balance sheet data of all the Italian firms. To be pointed out is that, while banks usually generate their statistical models on the basis of private data, this study considers only available public data. Two issues were considered when building the sample. The first was the size of firms, and the second was the default definition. As regards the former issue, given the objective of this study, we focused only on SMEs. To this end, according to Basel 2 and European Union definition rules, we consider firms with a turnover of less than 50 million euros and/or with fewer than 250 employees. The latter issue is more challenging because there are several definitions of default in the literature

(Everett & Watson, 1998; Daubie & Meskens, 2001), including bankruptcy (Altman, 1968), crisis (Gilbert, Menon & Schwartz, 1990; Chowdhury & Lang, 1993) organisational exit (Swaminathan, 1996), collapse (Argenti, 1986), temporary and slight financial distress that does not necessarily result in failure (Gentry, 1985; Johnsen & Melicher, 1994; Piatti, 2012; Piatti, 2014a). In this study, however, following Pederzoli & Torricelli (2010), default occurs when a firm is insolvent and itself, one or more creditors, the Public Prosecutor or the Law Court can request the beginning of bankruptcy proceedings.

According to the definitions of SMEs and of default, a sample for the period 2007-2009 was extracted by focusing on two groups: firms that did not go bankrupt in year 2009 and firms that went bankrupt in year 2009. In this way it was possible to analyse the characteristics of firms that influenced the probability of failure two years and one year prior to the default.

From the perspective of economic activity, the sample was built so that financial and construction firms were excluded. Moreover, the sample did not include firms less than five years of age. After dealing with missing values, a sample of 8,145 firms was selected from AIDA. 253 firms in the sample, i.e. 3% of the firms selected, went bankrupt in 2009. Table 1 shows the distribution of firms by class of turnover, economic sector and location.

Table 1
FIRM DISTRIBUTION BY TURNOVER CLASS, ECONOMIC SECTORS AND MACRO-AREA LOCATION

Turnover class (EUR thousands)	Firm distribution based on turnover class (%)	Economic sector	Firm distribution based on productive sectors (%)	Macro-area location	Firm distribution based on macro-area location
<5,000	0.73	Service	16.17	NW	41.5%
5,000-10,000	42.60	Commerce	37.24	NE	18.55%
10,000-15,000	23.13	Industry	46.59	M	28.48%
15,000-20,000	12.3			S	11.47%
20,000-30,000	13.40				
30,000-40,000	5.47				
40,000-50,000	2.36				
Total	100		100		100%

Notes: NW = North-West; NE = North-East; M = Middle; S = South including Islands.

The dependent variable is dichotomous and takes the value of zero if the firm is sound and the value of one if the firm is failed. With regard to the independent variables, given the absence of a commonly accepted financial ratio framework, 25 financial ratios were selected from among those most frequently used in the literature (Bellovary, Giacomino & Akers 2007; Lin & Chen, 2011; Serrano-Cinca & Gutierrez-Nieto, 2013). They represent the following profiles (Beaver, 1966; Ohlson, 1980; Levitan & Knoblett, 1985; Gentry, Newbold & Whitford, 1987; Charitou, Neophytou & Charalambous, 2004; Altman & Sabato, 2007;): 1) liquidity, which provides the defensive cash resources for firms to meet claims for payment (Keasey &

Watson, 1987); 2) activity, which proxies for the sale generating ability of the company's assets; 3) profitability, which is an important indicator of a firm's health (Zavgren, 1985); 4) capitalization, which provides a cushion to absorb fluctuations in the borrower's earnings and asset values; 5) interest coverage, which determines how easily a company can pay interest on outstanding debt. Besides the financial ratios, and given the aim of the analysis, an efficiency ratio was introduced. It is discussed in detail in the next section. Financial and efficiency ratios were calculated based on accounting data related to the period 2007-2008.

Owing to potential extreme value problems in the variables of financial ratios (excluding efficiency ratio) that could alter the results of the analysis, we followed Tinoco & Wilson (2013) by using the hyperbolic tangent transformation (tanh transformation) to provide a satisfactory solution to the outliers issue instead of the traditional "windsorising" technique. The hyperbolic function tanh(x) was used and tested in robust signalling processing as well as in statistical estimation, and it was shown to be very useful in decreasing the effect of extreme values of a specific variable (Godfrey, 2009).

A principal component analysis (Lattin, Carroll & Green, 2003) was applied to the set of financial ratios with the purpose of identifying a latent structure characterized by components able to reduce the complexity, to synthesise the information, and to tackle multicollinearity of the independent variables. Components and efficiency ratios were merged in order to obtain a final complete model characterised by the presence of both efficiency and financial ratios. In addition, as an alternative to a static analysis we computed the averages of the efficiency and financial ratios, as in Edminster (1972) and Appetiti (1984), over two years (2007 and 2008), and we used the averages as independent variables in the model. For year 2008, the trend of the independent variables computed over two years (from 2007 to 2008) was added as a regressor to the independent variables of the final model. The trend included upward and downward financial and efficiency ratio movements obtained by comparing values at the end of 2008 with those at the end of 2007. Depending on this movement, a dichotomous variable was introduced for each covariate. The variable takes the value of 1 for upward movement and 0 for downward movement. Unlike the methodology of Edmister (1972), in our analysis the dichotomous variable synthesising the trend did not replace the other independent variables but instead added to them. In this way, the model simultaneously presents the static information of the year immediately preceding the classification of firms (the year 2008) and the dynamic information synthesised from the trend, which represent an implicit correction of any accounting manipulations. Finally, several control variables were added to the regressors: 1) a dummy variable for each economic sector (commerce and industry; service as baseline category); 2) a dummy variable for each location in Italy (North-East, Middle, and South including Islands; North-West as baseline category); 3) a dummy variable for each category of the sales size (between 5 and 10 million, between 10 and 15 million, between 15-20 million, between 20-30 million, between 30-40 million and between 40-50 million; less than 5 million as a baseline category); the age of the firm represented by its logarithm.

A logistic regression model including the financial components, the efficiency ratio and the controls was estimated to determine the probability of a firm entering the zero class (sound) or class one (failed). In particular, the model consists of a set of independent variables that explain a dependent dichotomous variable. The logit binary model (Wooldridge, 2009; Cameron & Trivedi, 2010) assumes that the stochastic error follows a logistic distribution.

A critical value of 3% was used to discriminate firms between the two classes. Following Tinoco & Wilson (2013) this value was the ratio between the number of failed firms and the total number of sample firms. This threshold took into account that the number of sound and failed firms was not balanced.

EFFICIENCY RATIO

In the economic literature, the idea of efficiency has taken deep root, giving rise to a unanimous and a well-established accommodation (Resti, 1997). Within this framework, Varian (1990) provides a production efficient plan definition: "a production plan y in Y is called efficient, if there is no y' in Y such that $y' \geq y$; i.e., a production plan is efficient if there is no way to produce more output with the same inputs or to produce the same output with less inputs". In addition, production efficiency leads to at least three efficiency definitions: technical, allocative, and revenue efficiency (Fanti, 1997).

Focusing on technical efficiency, i.e. maximum output from a given combination of factors, the efficiency ratio was determined by a cross-section analysis using a stochastic frontier production function, which took into account a sample of 8,145 firms over the 2007-2008 time period. The model that fits the production function is of the form

$$Y_{i,t}=exp\left(x_{i,t}\beta+v_{i,t}-\upsilon_{i,t}\right)$$
$$i=1,\ldots,8145; \qquad t=2007,\ 2008$$

The technical inefficiency effects, in accordance with Battese & Coelli (1995), are:

$$\upsilon_{i,t}=z_{i,t}\delta+W_{i,t}$$

The function, estimated through the stochastic frontier approach, is a *Cobb-Douglas* production function with two input factors, specified as follows:

$$ln\left({}^{Y}/_{Empl}\right)_{i,t}=\alpha_i+\beta_1 ln\left({}^{Crmcm}/_{Empl}\right)_{i,t}+\beta_2 ln\left({}^{FixAss}/_{Empl}\right)_{i,t}+\left(v_{i,t}-\upsilon_{i,t}\right)$$

where:

$\left({}^{\mathrm{Y}}/_{\mathrm{Empl}}\right)_{\mathrm{i,t}}$: is the natural log of the production value per worker for the *i*th firm at time *t* of observation;

$\left({}^{\mathrm{Crmcm}}/_{\mathrm{Empl}}\right)_{\mathrm{i,t}}$: is a vector of the first factor input *Crmcm*, i.e. the natural log of cost of raw material, consumables and merchandise per worker for the *i*th firm at time *t*;

$\left({}^{\mathrm{FixAss}}/_{\mathrm{Empl}}\right)_{\mathrm{i,t}}$: is a vector of the second factor input *FixAss*, i.e. the natural log of fixed assets per worker for the *i*th firm at time *t*;

$\mathrm{v}_{\mathrm{i,t}}$: is assumed to be independent and identically distributed (i.i.d.) $N(0,\sigma_v^2)$ random errors;

$\upsilon_{i,t}$: is assumed to be independent and identically distributed (i.i.d.) non-negative truncations of the $N(\mu,\sigma_\upsilon^2)$ distribution that accounts for technical inefficiency in production. Note that $\upsilon_{i,t}$ is obtained by truncation at zero of the normal distribution with mean $z_{i,t}\delta$ and variance σ^2;
$z_{i,t}$: is a vector of explanatory variables associated with the technical inefficiency of production of each firm over the time period considered, and δ is a vector of unknown coefficients. The technical inefficiency effect $\upsilon_{i,t}$, in the stochastic frontier model outlined above, is regressed on the following variables assumed to influence efficiency:

$$\upsilon_{i,t}=\delta_1+\delta_2(Size)_{i,t}+\delta_3(Age)_{i,t}+\delta_4(Geog)_i+\delta_5(Sector)_i+W_{i,t}$$

where:
$Size_{i,t}$: is the natural log of the total employees for the ith firm at time t;
$Age_{i,t}$: is the natural log of the total years in activity for the ith firm at time t;
$Geog_i$: are dummy variables that refer to the geographic location (North-East, Middle, and South including Islands; North-West as baseline category);
$Sector_i$: are dummy variables that refer to the economic sector (commerce and industry; service as baseline category).

As the technical inefficiency component υ_i is estimated, the measure of technical efficiency is defined as follows:

$$TE_{i,t}=exp\left(-\upsilon_{i,t}\right)=exp\left(-z_{i,t}\delta-W_{i,t}\right)$$

As suggested by Battese & Coelli (1988), the technical efficiency value is determined as

$$TE_i=\frac{E\left(Y_{i,t}^*|\upsilon_i,x_{i,t}\right)}{E\left(Y_{i,t}^*|\upsilon_i=0,x_{i,t}\right)}$$

where:
$Y_{i,t}^*$: is the production for the ith firm at time t.[1]
The technical efficiency measure takes a value between 0 and 1. For example, if a firm's technical efficiency is 0.78, this means that, on average, it uses 78% of its potential production capacity, compared with a fully efficient firm with the same mix and size of inputs.
The adoption of a parametric approach requires selection of a specific functional form of the error distribution and of the inefficiency component. If we assume orthogonality between inefficiency components, random errors, input and output factors, three kinds of inefficiency components distribution are offered by the literature: half-normal, normal-truncated and normal-exponential.
We adopt the parameterization provided by Frontier[2] where σ_v^2 and σ_υ^2 are replaced with $\sigma^2=\sigma_\upsilon^2+\sigma_v^2$ and $\gamma=(\sigma_\upsilon^2/\sigma_\upsilon^2+\sigma_v^2)$ respectively, and where γ takes a value between 0 and 1. In

particular, when γ takes values close to 1, we assume that the deviations from the frontier are only due to technical inefficiency. On the contrary, when γ takes values close to 0, we assume that the deviations are related only to random error.

The *Cobb-Douglas* production function consists of two inputs: cost of raw material, consumables and merchandise per worker; and fixed assets per worker. All the coefficients of the input factor variables are statistically significant at 1% level. These coefficients, interpretable as partial elasticity, show a greater reaction of the production value per worker to the cost of raw materials (0.32), for both 2007 and 2008, than to the fixed assets (0.11 and 0.08) in 2007 and 2008 respectively. A higher value for the cost of raw materials highlights the important role played by the input variable factors used in the production process (Trestini, 2006). The decrease in the marginal productivity of fixed assets is supported by the engineering industry downturn that occurred in the last quarter of 2008. Overall, the deterioration of the marginal productivity of the Italian industrial sector is due in particular to the shrinkage of productive capacity and the credit crunch (Banca d'Italia, 2008). A more exhaustive analysis concerns the assessment of some production sets' properties, such as constant, and non-increasing/decreasing returns to scale. The production technology Y exhibits constant returns to scale if, on using the double amount of each input the quantity produced is also double. However, the Wald χ^2test rejects the null hypothesis at 1% statistical level and hence suggests that the production function does not exhibit constant returns to scale.[3] Moreover, in order to verify the existence of non-increasing or non-decreasing returns to scale, a point estimate for linear combination test was conducted. The sum of the coefficients estimated is significantly less than one (0.43 in 2007 and 0.41 in 2008).[4]

Therefore, the production function exhibits non-increasing returns to scale, i.e. if the cost of raw materials, consumables and merchandise together with fixed assets are doubled, the output is less than double and any feasible input-output vector can be scaled down (Mas-Colell, Whinston & Green, 1995).[5]

Table 2 shows the empirical results.

Table 2
EMPIRICAL RESULTS STOCHASTIC FRONTIER APPROACH

Frontier Production	**2007**	**2008**
Crmcm/Empl	0.3256***	0.3229***
	(0.005)	(0.005)
FixAss/Empl	0.1106***	0.0875***
	(0.006)	(0.005)
Constant	8.1675***	8.4170***
	(0.081)	(0.080)
Inefficiency Components		
Size	1.5845***	1.5962***
	(0.056)	(0.057)
Age	0.0471	0.0647
	(0.041)	(0.041)
North-East	0.2316*	0.2119*
	(0.101)	(0.101)
Middle	0.0221	0.0032
	(0.096)	(0.096)
South	0.5425***	0.4484***
	(0.125)	(0.127)
Commerce Sector	1.1023***	1.1885***
	(0.152)	(0.155)
Industry Sector	1.4056***	1.4764***
	(0.138)	(0.143)

N. Observations	8,129	8,136
$\bar{\sigma}_\upsilon$	0.403	0.403
σ_v	0.585	0.588
σ^2	0.504	0.5095
γ	0.321	0.319
Log-Likelihood	-7,492.41	-7,554.22

Stochastic Frontier Estimations (SFA). This table presents the production function efficiency regression equations using the stochastic frontier method for cross-section. The entire sample is composed of 8,145 Italian firms (firm-year data from balance sheets and income statements) over the period 2007-2008, split up by geographical area for all sectors. The industry sectors, where each firm belongs to, are: Commerce, Industry and Service. The ***dependent variables*** is: PRODUCTION VALUE= natural log of production value per worker for the ith firm at time t of observation; ***independent variables-input factors*** (CRMCM/EMPL) COST RAW MATERIAL CONSUMBABLE & MERCHANDISE= natural log of cost raw material consumables and merchandise per worker for the ith firm at time t of observation; (FIXASS/EMPL) FIXED ASSETS= natural log of fixed assets per worker for the ith firm at time t of observation; ***inefficiency components*** are: SIZE= natural log of the total employees for the ith firm at time t of observation; AGE= the natural log of the total years of life for the ith firm at time t of observation; NORTH-EAST= dummy variable equals to one if the firm is located in western-northern Italy, zero otherwise; CENTRE= dummy variables equals to one if the firm is located in centre Italy; SOUTH & ISLANDS= dummy variable equals to one if the firm is located in southern Italy and in its islands, zero otherwise; COMMERCE SECTOR= dummy variable equals one if the firm belongs to the commerce sector, zero otherwise; INDUSTRY SECTOR= dummy variable equals to one if the firm belongs to industry sector, zero otherwise. The standard errors are on brackets. $v_{i,t}$= represents the identically and distributed random error; σ_υ= is the standard deviation of technical inefficiency; σ_v= is the standard deviation of random error; σ^2= is the sum between σ_υ^2 and σ_v^2; γ= $(\sigma_\upsilon^2/\sigma_\upsilon^2+\sigma_v^2)$. The levels of significance are the following: *,**,*** which denote respectively, 10%,5% and 1% significance level.

The coefficients of the variables affecting the inefficiency measure were estimated simultaneously with the frontier. If the coefficient is positive, it increases the inefficient term υ_i, and therefore decreases the efficiency technical value. *Vice versa*, if the coefficient is negative, it reduces the inefficiency and positively affects the efficiency value on the whole. According to the results, larger firm size has a negative impact on production efficiency. Furthermore, firms located in North-Eastern and Southern Italy are significantly less efficient than North-Western Italy (Becchetti & Sierra, 2003). These findings point to other explanatory factors such as weaknesses in the civic community, civic engagement, solidarity, honesty, trust, law-abidingness, stronger crime control, and social capital (Putnam, 1993). With regard to the economic sector, the results hint that both the commerce and industry sectors show a lower production efficiency than the service sector.

EMPIRICAL RESULTS

An exploratory analysis was carried out, and the results are shown in Table 3. Mean, standard deviation and median of the financial ratios are presented on the basis of two groups: sound firms and failed firms. The t-test on the mean and the Wilcoxon-Mann-Whitney test on the median were performed to evaluate the univariate discriminatory power of each ratio. The statistics of the financial ratios highlight, with a few exceptions, that the means and medians are significantly different between the two subsets.

Table 3
DESCRIPTIVE STATISTICS FOR RATIOS SPLIT IN SOUND FIRMS AND FIRM WITH FINANCIAL DISTRESS

Ratio	2008						2007						2008	
	Sound firms			Failed firms			Sound firms			Failed firms			T-test	Median Test
	Mean	Median	Std	Mean	Median	Std	Mean	Median	Std	Mean	Median	Std		
CA/CL	0.826	0.834	0.122	0.769	0.785	0.114	0.828	0.835	0.127	0.748	0.768	0.131	0.00	0.00
QUICK	0.692	0.716	0.193	0.568	0.575	0.175	0.690	0.715	0.202	0.548	0.542	0.185	0.00	0.00
CASH/TA	0.070	0.030	0.097	0.027	0.008	0.048	0.064	0.024	0.094	0.020	0.005	0.045	0.00	0.00
Working capital/total asset	0.273	0.291	0.207	0.305	0.317	0.168	0.275	0.288	0.202	0.295	0.291	0.178	0.09	0.33
Operating cash flow/financial debt	0.095	0.058	0.123	0.043	0.032	0.079	0.094	0.053	0.137	-0.003	0.014	0.119	0.00	0.00
Inventories/average daily sales	0.902	1.000	0.284	0.942	1.000	0.219	0.900	1.000	0.287	0.937	1.000	0.234	0.04	0.00
Net working capital flow/debt	0.107	0.078	0.115	0.071	0.066	0.081	0.106	0.076	0.126	0.031	0.044	0.112	0.00	0.00
Net working capital/sales	0.213	0.202	0.183	0.327	0.318	0.219	0.224	0.207	0.188	0.359	0.342	0.247	0.00	0.00
Sales/total asset	0.853	0.896	0.152	0.725	0.740	0.193	0.830	0.880	0.169	0.665	0.657	0.212	0.00	0.00
Ebitda/totale asset	0.099	0.083	0.079	0.067	0.064	0.059	0.086	0.073	0.077	0.028	0.045	0.093	0.00	0.00
Depreciation/fixed asset	0.198	0.152	0.162	0.126	0.088	0.116	0.181	0.127	0.168	0.139	0.087	0.155	0.00	0.00
Return on asset (ROA)	0.065	0.050	0.075	0.037	0.038	0.056	0.053	0.043	0.074	-0.008	0.021	0.108	0.00	0.00
Return on debt	0.023	0.021	0.021	0.038	0.038	0.019	0.025	0.024	0.019	0.035	0.035	0.015	0.00	0.00
Return on equity	0.085	0.074	0.223	-0.013	0.011	0.218	0.044	0.043	0.231	-0.224	-0.035	0.384	0.00	0.00
Return on sales	0.045	0.035	0.068	0.037	0.038	0.080	0.038	0.031	0.071	-0.021	0.022	0.159	0.00	0.00
Net income/total asset	0.025	0.012	0.055	0.000	0.001	0.041	0.020	0.008	0.060	-0.046	-0.005	0.106	0.00	0.00
Net income/sales	0.018	0.008	0.058	-0.005	0.001	0.068	0.013	0.005	0.068	-0.072	-0.006	0.160	0.00	0.00
Earning before taxes/total asset	0.053	0.032	0.078	0.012	0.010	0.051	0.040	0.022	0.078	-0.038	0.000	0.111	0.00	0.00
Equity/total asset	0.228	0.191	0.159	0.180	0.156	0.119	0.265	0.239	0.168	0.176	0.155	0.124	0.00	0.00
Equity/debt	0.803	0.992	0.470	0.621	0.858	0.544	0.704	0.968	0.572	0.241	0.696	0.793	0.00	0.00
Sales/debt	0.325	0.234	0.270	0.240	0.184	0.196	0.387	0.312	0.288	0.236	0.183	0.203	0.00	0.00
Ebit/interest expenses	0.018	0.016	0.014	0.031	0.031	0.015	0.019	0.017	0.014	0.029	0.029	0.014	0.00	0.00
Interest expenses/ebitda	0.016	0.010	0.031	0.040	0.032	0.047	0.018	0.012	0.033	0.042	0.035	0.039	0.00	0.00
Interest expenses /total assets	0.918	0.964	0.121	0.799	0.826	0.171	0.914	0.963	0.129	0.738	0.746	0.198	0.00	0.00
Interest expenses /sales	0.016	0.010	0.031	0.040	0.032	0.047	0.018	0.012	0.033	0.042	0.035	0.039	0.00	0.00

All financial ratios were transformed through hyperbolic tangent transformation whose range was from -1 to 1. The F-test was used in the context of variance analysis (ANOVA). The T-Test was replaced by Welch statistics if the hypothesis of variance homogeneity between groups (Leven's test) was rejected. The Welch test provided robust results even in the presence of the heterogeneity of variance between the two groups. A non parametric test, the Wilcoxon-Mann-Whitney test, was conducted for the median.

Through principal component analysis, the 25 financial ratios described above were reduced to their main components. Table 4 shows the components, and the names allocated to them.

Table 4
PATTERN MATRIX WITH THE COMPONENTS

Financial ratios	Profitability and debt service capacity	Capitalization and liquidity	Asset turnover	Working capital	Debt cost
Operating cash flow/financial debt	0.73				
Net working capital flow/debt	0.77				
Ebitda/totale assets	0.89				
Return on assets (ROA)	0.92				
Return on equity	0.75				
Return on sales	0.83				
Net income/total assets	0.89				
Net income/sales	0.73				
Earning before taxes/total assets	0.89				
Ebit/interest expenses	0.68				
Interest expenses/ebitda	-0.64				
Current asset/current liabilities		0.62			
(Current asset-inventories)/current liabilities		0.63			
Liquidity/total assets					
Equity/total assets		0.89			
Equity/debt		0.90			
Sales/total assets			0.89		
Depreciation/fixed assets			0.49		
Sales/debt			0.86		
Working capital/total assets				0.87	
Net working capital/sales				0.90	
Inventories/average daily sales				0.58	
Return on debt					0.90
Interest expenses /total assets					0.86
Interest expenses /sales					0.66

Extraction method: principal component analysis. Bartlett's test of sphericity was conducted with rejection of the null hypothesis. KMO test results were 0.79, higher than 0.7. The factors loading matrix was orthogonally rotated with the Varimax method. The component number was not defined on the basis of eigenvalues with a value greater than 1 but by the parallel analysis (Zwick & Velicer, 1986). The components explained 73.88% of the variance for the financial ratios. Low commonality, less than 0.4 (Haslam et al. 1992) is not reported.

Note that the 25 financial ratios initially considered are reduced to 5 components, with great interpretative advantage. The components are named by considering the values assumed by factor loadings in the rotated matrices. In particular, the first component, which explains 29.05% of the variance, is named "Profitability and debt service capacity" because it includes profitability and cash flow ratios that reflect the ability of the firm to generate profits and funds from its operations to meet its financial obligations. The second component, named "Capitalization and liquidity" includes ratios related to the financial structure and short-term liquidity. Higher loadings of equity and liquidity positively affect the component. The third component, named "Asset turnover", consists of ratios that measure how effectively the firm deploys its resources. The fourth component, named "Working capital", contains three indicators, which proxy for the relationship between sales or assets and the need to finance working capital. The last component, named "Debt cost", approximates the economic impact of debt and the cost of borrowings. Means, standard deviations and medians of the financial components in year 2008 are presented in Table 5 on the basis of two groups: sound firms and failed firms.

Table 5
PATTERN MATRIX WITH THE COMPONENTS: YEARS 2008

Components	Sound firms			Failed firms			T-test	Median Test
	Mean	Median	Std	Mean	Median	Std		
Profitability and debt service capacity	-0.072	-0.075	1.009	-1.003	-0.289	1.7842	0.00	0.00
Capitalization and liquidity	0.131	-0.069	1.016	-0.196	-0.212	0.792	0.00	0.00
Asset turnover	-0.026	0.173	1.008	-1.054	-1.013	1.483	0.00	0.00
Working capital	-0.019	-0.009	0.989	0.411	0.387	1.453	0.09	0.33
Debt cost	0.057	-0.014	0.982	0.367	0.382	1.004	0.00	0.00

T-test on the mean and Wilcoxon-Mann-Whitney test on the median are performed to evaluate the univariate discriminatory power of each component.

The statistics of the components differ markedly between the two subsets.

The present study reports ex-ante models developed for the estimation of default likelihood. Accordingly, estimation was made of the probability of failure in the year prior to the observation of default (t-1; 2008) as well as two years prior to the financial distress event (t-2; 2007). Consequently, first the models provided evidence about the predictors that best discriminated between failed and healthy enterprises; second, they tested their predictive power.

Table 6 reports the results of the logit model with regard to three different specifications. In the first specification, we used only variables related to the efficiency ratios. In the second specification, only the components of the financial ratios were used, and in the third specification, we estimated the model with both the efficiency ratios and the components of the financial ratios. To interpret the results, negative coefficients indicate that the variable has a positive influence on the probability of a firm being assigned to the class of sound firms (the class with the value of zero).

Table 6
LOGISTIC REGRESSION RESULTS. THE DEPENDENT VARIABLE HAS A VALUE OF 0 FOR SOUND FIRMS AND A VALUE OF 1 FOR FIRMS IN FINANCIAL DISTRESS

Default	2008			2007		
	1° spec	2° spec	3° spec	1° spec	2° spec	3° spec
Efficiency	-3.571***		-3.721***	-4.009***		-3.912***
	(0.341)		(0.381)	(0.365)		(0.392)
Commercial sector	-0.582**	-0.199	-0.185	-0.596**	-0.284	-0.256
	(0.263)	(0.327)	(0.325)	(0.261)	(0.325)	(0.328)
Industrial sector	1.001***	1.266***	1.283***	0.987***	1.256***	1.289***
	(0.214)	(0.288)	(0.287)	(0.212)	(0.277)	(0.28)
North-East	-0.16	-0.2	-0.166	-0.135	-0.177	-0.163
	(0.192)	(0.199)	(0.202)	(0.19)	(0.195)	(0.199)
Middle	0.121	-0.0481	-0.00535	0.157	0.0217	0.0415
	(0.156)	(0.167)	(0.169)	(0.156)	(0.164)	(0.167)
South	0.268	-0.0194	0.0384	0.311	0.0209	0.0274
	(0.218)	(0.243)	(0.246)	(0.221)	(0.232)	(0.233)
Sales 5-10	-2.218***	-1.189**	-1.420***	-0.751**	-0.886**	-0.969***
	(0.39)	(0.511)	(0.519)	(0.335)	(0.361)	(0.361)
Sale 10-15	-2.525***	-1.383***	-1.666***	-0.580*	-0.642*	-0.660*
	(0.406)	(0.524)	(0.531)	(0.344)	(0.369)	(0.368)
Sales 15-20	-2.172***	-0.967*	-1.242**	-0.483	-0.51	-0.567
	(0.418)	(0.538)	(0.547)	(0.364)	(0.388)	(0.389)
Sales 20-30	-2.195***	-0.884*	-1.155**	-0.158	-0.303	-0.358
	(0.413)	(0.531)	(0.54)	(0.348)	(0.38)	(0.381)
Sales 30-40	-2.040***	-0.841	-1.228**	-0.118	-0.0525	-0.141
	(0.451)	(0.562)	(0.578)	(0.387)	(0.404)	(0.412)
Sales 40-50	-2.732***	-1.422**	-1.664**			
	(0.592)	(0.695)	(0.717)			
Age	-0.108	-0.143*	-0.147**	-0.136*	-0.139*	-0.182**
	(0.071)	(0.074)	(0.075)	(0.07)	(0.073)	(0.074)
Profitability & debt serv capacity		-0.778***	-0.787***		-0.530***	-0.548***
		(0.068)	(0.069)		(0.077)	(0.079)
Capitalization and liquidity		-0.821***	-0.828***		-0.642***	-0.609***
		(0.115)	(0.118)		(0.106)	(0.105)
Asset turnover		-0.484***	-0.488***		-0.534***	-0.535***
		(0.05)	(0.051)		(0.052)	(0.055)
Working capital		0.308***	0.305***		0.332***	0.305***
		(0.060)	(0.06)		(0.063)	(0.06)
Debt cost		0.369***	0.363***		0.486***	0.477***
		(0.057)	(0.061)		(0.069)	(0.065)
Constant	1.278**	-3.278***	-0.324	-0.0616	-3.557***	-0.524
	(0.559)	(0.658)	(0.725)	(0.513)	(0.524)	(0.589)
N. Observations	8,145	8,145	8,145	8,145	8,145	8,145
Pseudo R^2	0.09	0.228	0.257	0.096	0.182	0.218
Log-Likelihood ratio test	204.06***	513.9***	580.32***	215.37	410.16***	491.44
1° type error cut-off 0.03	0.257	0.205	0.182	0.257	0.205	0.202
Accuracy ratio cut-off 0.03	0.648	0.757	0.773	0.659	0.732	0.758
Sensitivity	0.743	0.794	0.818	0.743	0.794	0.798
Specificity	0.645	0.755	0.771	0.657	0.729	0.754
Area under ROC curve	0.751	0.856	0.871	0.758	0.838	0.857
BIC	-86.99	-360.81	-418.22	-107.32	-266.09	-338.37
Hosmer-Lemeshow χ^2	17.67*	11.7	8.64	12.6	14.49*	7.13

The results in the table were obtained with logit regression. All z statistics have been corrected to take into account the heteroscedasticity and the autocorrelation of the errors. The standard errors are reported in parentheses. *, ** and *** indicate levels of significance of 10 %, 5% and 1 %, respectively. The first specification of the model included only the variables determined by the presence of efficiency ratio. The second specification represented the base model obtained using only the components of financial ratios, and the third specification considered the basic model in addition to the variables determined by the efficiency ratio. The log-likelihood ratio test was obtained from the following difference: (-2 log-likelihood of the base model) - (-2 log-likelihood of the full model). The first type error represents the percentage of failed firms evaluated as sound firms from the model. The accuracy ratio was determined by the ratio between the firms properly classified and the total of firms in the sample. The sensitivity measures the ability of the model to predict failure events correctly, while the specificity defines the ability of the model to predict non-financial distress events correctly. The area under the ROC curve is a measure of the predictive accuracy of the model, with a value of 1 representing a perfect model. The cut-off of 0.03 was determined by the ratio between the number of bankrupted enterprises in the sample and the total number of sampled enterprises.

If only the efficiency ratio is considered (first specification of the model), the results are not encouraging. The coefficients of the efficiency ratio are negative and statistically significant for both one year (2008) and two years (2007) prior to the default, as expected, but all the statistical diagnostics are indicative of poor performance. In particular, the significance of the Hosmer-Lemeshow χ^2 test does not reveal a goodness of fit of the model, and the high percentage of failed firms evaluated as sound firms by the model (first type error: 22.92%) confirms that efficiency, although very important, in isolation is not a good predictor of default.

In the second specification of the model, only the predictive ability of financial ratios was considered, without the contribution of efficiency. All the components that synthesize the financial ratios show high statistical significance levels for both years, 2008 and 2007. In particular, the negative signs of the coefficients associated with the components "Profitability and debt service capacity", "Capitalization and liquidity" and "Asset turnover" indicate that the greater these ratios, the more likely a firm's classification as sound. By contrast, the positive signs of the coefficients of the "Working capital" and "Debt cost" components increase the likelihood of a firm being classified as failed.

The behaviour of the above variables appears economically justifiable and correct. To be noted is that the level of working capital and its management play a crucial role in generating financial needs. Moreover, in SMEs like those analysed in this study fixed and large investment in plants and equipment are less important than the day-by-day management of working capital. The cost of debt is also very important, and it depends both on the leverage and on the cost of debt itself. In fact, all financial ratios represented by their components maintain, in line with the literature (Unal, 1988), high predictive power for 1 or 2 years prior to firm classification.

Regarding the control variables, such as the economic sector, geographic area and size, the coefficients exhibit an interesting behaviour. The coefficient of the industrial sector variable, in particular, has a high statistical significance level in all the specifications and for both years, while the commercial sector variable is statically significant only in the first specification. Where the firm is located in Italy seems not at all to affect the probability of default. Firms with a turnover less than or equal to 15 million euros have a higher probability of being assigned to the sound class, and applies for all specifications and years. Nevertheless, firms with a turnover higher than 15 million euros also show a negative statistically significance coefficient, but only for years 2008, that is, one year prior to default. This behaviour may be attributed to the lack of financial planning often linked to growth that is typical of medium-sized firms. This may explain the counterintuitive signs assumed by the coefficients linked to the size variable (Williamson, 1967). The age of the firm is also important, and the negative coefficient indicates that the longer the firm's life, the lower its probability of default.

After separately analysing the roles of efficiency and financial ratios, the third specification of the model shows the combination of both of them. As Table 6 evidences, adding efficiency ratios to financial ratios increases the predictive capacity of the final model compared to the second specification, for years, 2007 and 2008. All the coefficients related to the efficiency ratios and the financial components are statistically significant. The log-likelihood ratio test (Cameron & Trivedi, 2010) is significant for both years, 2008 and 2007, and the BIC level provides strong support for the third specification with respect to the first and second specifications.

In addition, going from the first to the third specification, there is an improvement in the accuracy ratio, the first type error, the sensitivity, and the specificity for both years. However, it seems that the model of the year before failure performs better in predicting whether a firm is classified as defaulted. Therefore, the use of efficiency ratios can furnish more information than the use of only financial ratios, and this implies a better prediction ability in terms of firm creditworthiness, which is in line with the findings of Becchetti & Sierra (2003) and Psikillaki, Tsolas & Margaritis (2010).

The results are further verified when a more dynamic model is considered. Tables 7 and 8 report the estimates obtained by using respectively the two-year simple arithmetic mean of components and the trend ratios over the two years added to the basic model for the year. Each trend variable is proxied by a dummy that takes the value of 1 in the case of an upward trend over the two years and of 0 in the case of a downward trend.

Table 7
LOGISTIC REGRESSION RESULTS. THE DEPENDENT VARIABLE TAKES THE VALUE OF 0 FOR SOUND FIRMS AND 1 FOR FIRMS WITH FINANCIAL DISTRESS MEAN

Mean	1° spec	2° spec	3° spec
Efficiency	-7.421***		-7.559***
	(0.508)		(0.556)
Commercial sector	-0.551**	-0.296	-0.263
	(0.263)	(0.318)	(0.32)
Industrial sector	1.033***	1.225***	1.265***
	(0.215)	(0.276)	(0.276)
North-East	-0.127	-0.202	-0.172
	(0.193)	(0.198)	(0.201)
Middle	0.146	-0.026	0.021
	(0.158)	(0.165)	(0.171)
South	0.292	-0.027	0.034
	(0.223)	(0.238)	(0.245)
Sales 5-10	-2.326***	-1.423***	-1.713***
	-0.407	-0.453	-0.421
Sales 10-15	-2.603***	-1.648***	-1.931***
	(0.422)	(0.467)	(0.436)
Sales 15-20	-2.287***	-1.239**	-1.544***
	(0.436)	(0.482)	(0.455)
Sales 20-30	-2.268***	-1.171**	-1.419***
	(0.431)	(0.477)	(0.445)
Sales 30-40	-2.097***	-1.158**	-1.502***
	(0.469)	(0.514)	(0.495)
Sales 40-50	-2.847***	-1.780**	-2.131**
	(0.608)	(0.675)	(0.697)
Age	-0.124*	-0.151**	-0.201***
	(0.072)	(0.074)	(0.076)

Profitability & debt service capacity		-0.808***	-0.832***
		(0.079)	(0.082)
Capitalization and liquidity		-0.778***	-0.753***
		(0.122)	(0.128)
Asset turnover		-0.524***	-0.536***
		(0.051)	(0.055)
Working capital		0.341***	0.299***
		(0.061)	(0.062)
Debt cost		0.520***	0.497***
		(0.059)	(0.062)
Constant	4.191***	-2.901***	3.018***
	(0.62)	(0.61)	(0.705)
N. Observations	8,145	8,145	8,145
Pseudo R^2	0.13	0.216	0.279
Log-Likelihood ratio test	292.79	487.64***	629.87***
1° type error cut-off 0.03	0.205	0.213	0.186
Accuracy ratio cut-off 0.03	0.701	0.75	0.789
Sensitivity	0.794	0.786	0.814
Specificity	0.697	0.749	0.788
Area under ROC curve	0.792	0.835	0.882
BIC	-175.72	-334.55	-467.77
Hosmer-Lemeshow χ^2	18*	21.67*	8.43

The table shows the results obtained using as input of the regression the simple arithmetic mean of the covariates computed on 2 years. The results of the table were obtained with logit regression. All z statistics are corrected to take into account the heteroscedasticity and the autocorrelation of the errors. The standard errors are reported in parentheses. *, ** and *** indicate levels of significance of 10 %, 5% and 1 %, respectively. The first specification of the model includes only the variables determined by the presence of efficient ratio. The second specification represents the base model obtained using only the components of financial ratios, and the third specification considers the basic model in addition to the variables determined by the efficiency ratio. The log-likelihood ratio test is obtained from the following difference: (-2 log-likelihood of the base model) - (-2 log-likelihood of the full model). The first type error represents the percentage of failed firms evaluated as sound firms from the model. The accuracy ratio is determined by the ratio between the firms properly classified and the total firms in the sample. The sensitivity measures the ability of the model to predict failure event correctly while the specificity defines the ability of the model to predict non-financial distress event correctly. The area under ROC curve is a measure of the predictive accuracy of the model, with a value of 1 representing a perfect model. The cut-off of 0.03 is determined by the ratio between the number of companies bankrupted of the sample and the total number of companies observed.

On considering the mean values over the two years, the efficiency ratios and financial components show high statistically significance levels in all the specifications, which further supports the use of a model that includes both efficiency and financial ratios.

Table 8
LOGISTIC REGRESSION RESULTS. THE DEPENDENT VARIABLE TAKES THE VALUE OF 0 FOR SOUND FIRMS AND 1 FOR FIRMS WITH FINANCIAL DISTRESS TREND

Trend	1° spec	2° spec	3° spec
Efficiency	-5.368***		-5.389***
	(0.454)		(0.497)
Trend efficiency	1.039***		0.950***
	(0.174)		(0.187)
Commercial sector	-0.564**	-0.228	-0.224
	(0.263)	(0.327)	(0.327)
Industrial sector	1.025***	1.237***	1.236***
	(0.215)	(0.288)	(0.288)
North-East	-0.155	-0.228	-0.201
	(0.194)	(0.203)	(0.207)
Middle	0.128	-0.07	-0.042
	(0.157)	(0.168)	(0.171)
South	0.249	-0.002	0.025
	(0.218)	(0.239)	(0.244)
Sales 5-10	-2.249***	-1.051*	-1.422***
	(0.416)	(0.543)	(0.511)
Sales 10-15	-2.531***	-1.200**	-1.576***
	(0.431)	(0.555)	(0.522)
Sales 15-20	-2.199***	-0.807	-1.202**
	(0.443)	(0.567)	(0.538)
Sales 20-30	-2.199***	-0.693	-1.062**
	(0.439)	(0.561)	(0.531)
Sales 30-40	-2.039***	-0.649	-1.129**
	(0.476)	(0.589)	(0.569)
Sales 40-50	-2.773***	-1.217**	-1.588**
	(0.607)	(0.716)	(0.7)
Age	-0.114	-0.155**	-0.184**
	(0.071)	(0.075)	(0.076)
Profitability and debt service capacity		-0.795***	-0.798***
		(0.067)	(0.069)
Capitalization and liquidity		-0.860***	-0.827***
		(0.118)	(0.121)
Asset turnover		-0.469***	-0.480***
		(0.052)	(0.055)
Working capital		0.277***	0.262***
		(0.059)	(0.06)
Debt cost		0.451***	0.435***
		(0.053)	(0.055)
Trend profitability & debt service capacity		-0.103	-0.073
		(0.174)	(0.179)
Trend capitalization and liquidity		0.144	0.137
		(0.177)	(0.184)
Trend asset turnover		-0.059	-0.045
		(0.165)	(0.17)
Trend working capital		0.337**	0.329**
		(0.152)	(0.154)
Trend debt cost		-0.770***	-0.724***
		(0.147)	(0.15)
Constant	2.092***	-3.179***	0.727
	(0.574)	(0.705)	(0.758)
N. Observations	8,145	8,145	8,145
Pseudo R^2	0.109	0.244	0.286
Log-Likelihood ratio test	246.51***	549.65***	644.57***
1° type error cut-off 0.03	0.237	0.202	0.182
Accuracy ratio cut-off 0.03	0.676	0.771	0.790
Sensitivity	0.763	0.798	0.818
Specificity	0.673	0.770	0.798
Area under ROC curve	0.771	0.858	0.879

BIC	-120.44	-351.54	-428.45
Hosmer-Lemeshow χ^2	15.84*	20.76*	10.3

The table shows the results obtained using as input to the regression the covariates specified in Table 5 and in addition for each covariate, its trend. The trend is represented by dummy variables that take the value of 1 in the case of a growing trend and 0 in the case of a decreasing trend in the ratios. The results of the table were obtained with logit regression. All z statistics were corrected to take into account the heteroscedasticity and the autocorrelation of the errors. The standard errors are reported in parentheses. *, ** and *** indicate levels of significance of 10 %, 5% and 1 %, respectively. The first specification of the model included only the variables determined by the presence of efficient ratio. The second specification represented the base model obtained using only the components of financial ratios, and the third specification considered the basic model in addition to the variables determined by the efficiency ratio. The log-likelihood ratio test was obtained from the following difference: (-2 log-likelihood of the base model) - (-2 log-likelihood of the full model). The first type error represents the percentage of failed firms evaluated as sound firms from the model. The accuracy ratio is determined by the ratio between the firms properly classified and the total of firms in the sample. The sensitivity measures the ability of the model to predict failure events correctly while the specificity defines the ability of the model to predict non-financial distress events correctly. The area under the ROC curve is a measure of the predictive accuracy of the model, with a value of 1 representing a perfect model. The cut-off of 0.03 was determined by the ratio between the number of companies bankrupted of the sample and the total number of companies observed.

On adding the variables that proxy for the trend of the financial components and efficiency ratios to the model (Table 8), all the estimates remain statistically significant, but the coefficients of the trends are statistically significant only for the efficiency ratio, the working capital component and the debt cost component, which suggests that not only the levels but also the dynamics of these variables affect the likelihood of a firm being classified as sound.

To sum up, all the estimated coefficients of the efficiency ratios and the financial components are statistically significant at 1% in both 2008 and 2007. This suggests that both types of variables have a high discriminating and predicting power.

Finally, for the Roc Curve point of view, the model that considers the mean of ratios seems to perform better: indeed, the area under the Roc Curve is 88.19% for the mean model in comparison to 87.05% and 87.88% respectively for the model of Table 6 and the model with trends (Table 8).

ROBUSTNESS CHECK: BOOTSTRAPPING PROCEDURE

In order to support the estimates obtained with logistic regressions, we conducted a comparative analysis of robustness by applying a bootstrapping procedure (Efron, 1979). The bootstrap method allows the application of a general resampling technique that helps to assess whether sample statistics or estimated regression parameters are biased. The underlying motivation is the concern that previous logistic estimates may have be biased because the distributional assumptions were violated or the regressors and the error terms were correlated. In particular, the empirical estimations of the sample distribution concern the first (only efficiency ratios considered) and third (both efficiency and financial ratios) specification of each logistic regression conducted (technical efficiency component for 2007 and 2008 respectively, average technical efficiency and both average and trend technical efficiency component from 2007 to 2008).[6]

The bootstrapping procedure is carried out in three steps: 1) identify the proper number of replications for the estimation of the standard errors by comparing the results with the robust standard errors and with a few number of replications, i.e. 1,000 replications; 2) compare the bootstrapped confidence intervals, the normal confidence intervals (N), the percentile confidence interval (P) and the bias-corrected confidence intervals (BC); 3) investigate the relationship between the bootstrapped standard errors and the observed coefficients of each standard error of each independent variable, in order to detect possible noise in standard error estimates of each variable considered.

In order to show the effects of the number of replications on standard error estimations, Tables 9 and 10 report the comparisons between the results obtained with the robust standard error procedure and the bootstrapping procedure (with 1,000 replications). The delta percentage, on the right side, indicates the change in the standard errors.

Table 9
BOOTSTRAPPED STANDARD ERRORS:
1° MODEL 2007-2008 TECHNICAL EFFICIENCY RATIOS

Variable	R.S.E.	B=1,000	R.S.E.	B=1,000	Δ% Std Error	
	2007	2007	2008	2008	2007	2008
Efficiency	-4.009	-4.009	-3.571	-3.571		
	(0.365)	***(0.384)***	***(0.341)***	***(0.349)***	**5.26%**	**2.35%**
Constant	-0.062	-0.062	1.278	1.278		
	(0.513)	***(0.568)***	***(0.559)***	***(0.592)***	**10.80%**	**5.76%**

Notes: R.S.E.:Robust Standard Error; B= 1,000: bootstrapping procedure with 1,000 replications.

Table 10
BOOTSTRAPPED STANDARD ERRORS:
3° MODEL 2007-2008 TECHNICAL EFFICIENCY COMPONENT

Variable	R.S.E.	B=1,000	R.S.E.	B=1,000	Δ% Std Error	
	2007	2007	2008	2008	2007	2008
Efficiency	-3.9123	-3.9123	-3.7209	-3.7209		
	(0.392)	***(0.39)***	***(0.381)***	***(0.385)***	**-0.41%**	**1.02%**
Constant	-0.5245	-0.5245	-0.3239	-0.3239		
	(0.589)	***(0.609)***	***(0.725)***	***(0.763)***	**3.41%**	**5.17%**

Notes: R.S.E.:Robust Standard Error; B= 1,000: bootstrapping procedure with 1,000 replications.

Table 11 reports the post-estimation results obtained by running the logistic regressions with the bootstrapping procedure. The results, with regard to only the first and third specifications, are equivalent to those provided by Table 10.

Table 11
POST ESTIMATION RESULTS - BOOTSTRAP PROCEDURE - EFFICIENCY COMPONENT

Description	1° Spec.	3° Spec.	1° Spec.	3° Spec.
	2007	2007	2008	2008
1° type error cut-off 0.03	25.69%	20.16%	25.69%	18.18%
Accuracy Ratio cut-off 0.03	66.03%	75.61%	64.85%	77.29%
Sensitivity	74.31%	79.84%	74.31%	81.82%
Specificity	65.77%	75.47%	64.55%	77.14%
Area under ROC Curve	0.758	0.857	0.751	0.87

Like Table 10 and Table 11, Table 12 presents the results of the bootstrapped standard errors with reference to the technical efficiency ratios and the financial components (both mean and trend). Moreover, Table 13 provides the results of the post-estimation coefficients that, compared with those obtained from logistic regression without bootstrapping, have similar values.

Table 12
BOOTSTRAPPED STANDARD ERRORS:
1°&3° MODEL 2007-2008 TECHNICAL EFFICIENCY COMPONENT MEAN&TREND

Variable	R.S.E.	B=1,000	R.S.E.	B=1,000	Δ% Std Error	
	1° Spec.	1° Spec.	3° Spec.	3° Spec.	1° Spec.	3° Spec.
Efficiency (Mean)	-7.4213	-7.4213				
	(0.508)	***(0.504)***			**-0.88%**	
Efficiency			-5.3894	-5.3894		
			(0.492)	***(0.497)***		**0.95%**
Efficiency (Trend)			0.9502	0.9502		
			(0.189)	***(0.187)***		**-0.85%**
Constant	4.1913	4.1913	0.7268	0.7268		
	(0.619)	***(0.656)***	***(0.788)***	***(0.757)***	**5.82%**	**-3.93%**

Notes: R.S.E.:Robust Standard Error; B= 1,000: bootstrapping procedure with 1,000 replications.

Table 13
POST ESTIMATION RESULTS - BOOTSTRAP PROCEDURE - EFFICIENCY COMPONENT (MEAN&TREND)

Description	Efficiency (Mean)		Efficiency Component & Efficiency (Trend)	
	1° Spec.	3° Spec.	1° Spec.	3° Spec.
	2007-2008	2007-2008	2007-2008	2007-2008
1° type error cut-off 0.03	20.55%	18.58%	23.72%	18.18%
Accuracy Ratio cut-off 0.03	70.06%	78.87%	67.59%	79.03%
Sensitivity	79.45%	81.42%	76.28%	81.82%
Specificity	69.75%	78.79%	67.31%	78.94%
Area under ROC Curve	0.792	0.882	0.77	0.878

Table 14 and Table 15 show the results of the estimation of the different confidence intervals. The confidence intervals estimated are: normal (N), percentile (P) and bias corrected (BC). The confidence intervals for the technical efficient variable are similar in all the specifications analysed. In particular, percentile and bias corrected methods provide similar results. This confirms that the statistics are unbiased. Moreover, with unbiased statistics, the bootstrap distribution becomes approximately normal. Table 14 (bis) and Table 15 (bis) report the ratios of the estimated bias to standard error. In accordance with the finding of Efron and Tibshirani (1993), when this ratio is small – that is, less than 0.25 – the bias is suitable.

Table 14
BOOTSTRAPPED CONFIDENCE INTERVALS EFFICIENCY RATIOS 3rd SPECIFICATION 2007-2008

Model	Variable	Observed Coefficient	Bias	Bootstrap Std Error	[95% Conf. Interval]		Interval Type
3rd Spec. 2007	Efficiency	-3.912	-0.033	(0.400)	-4.697	-3.126	(N)
					-4.715	-3.154	(P)
					-4.657	-3.124	(BC)
3rd Spec. 2008	Efficiency	-3.721	-0.025	(0.389)	-4.484	-2.957	(N)
					-4.514	-2.978	(P)
					-4.444	-2.907	(BC)

Notes: Confidence Intervals: N= Normal; P= Percentile; BC= Bias Corrected.

Table 14 (bis)
BOOTSTRAPPED CONFIDENCE INTERVALS EFFICIENCY COMPONENTS 3rd SPECIFICATION 2007-2008

Model	Variable	Observed Coefficient	Bias	Bootstrap Std. Error	Bias/Std Err.	[95% Conf. Int.]	Interval Type
3rd Spec. 2007	Efficiency	-3.912	-0.033	0.400	-0.08	-4.697 -3.126 -4.715 -3.154 -4.657 -3.124	(N) (P) (BC)
3rd Spec. 2008	Efficiency	-3.721	-0.025	0.389	-0.06	-4.484 -2.957 -4.514 -2.978 -4.444 -2.907	(N) (P) (BC)

Notes: Confidence Intervals: N= Normal; P= Percentile; BC= Bias Corrected.

Table 15
BOOTSTRAP CONFIDENCE INTERVALS EFFICIENCY COMPONENTS (MEAN & TREND) 3rd SPECIFICATION 2007-2008

Model	Variable	Observed Coefficient	Bias	Bootstrap Stand. Error	[95% Conf. Interval]	Interval Type
3rd Spec. 2007-2008	Efficiency (Mean)	-7.559	-0.057	0.567	-8.671 -6.445 -8.740 -6.539 -8.626 -6.452	(N) (P) (BC)
3rd Spec. 2007-2008	Efficiency	-5.389	-0.062	0.492	-6.354 -4.423 -6.438 -4.561 -6.334 -4.377	(N) (P) (BC)
3rd Spec. 2007-2008	Efficiency (Trend)	0.950	0.010	0.190	0.577 1.323 0.587 1.348 0.578 1.328	(N) (P) (BC)

Notes: Confidence Intervals: N= Normal; P= Percentile; BC= Bias Corrected.

Table 15 (bis)
BOOTSTRAP CONFIDENCE INTERVALS EFFICIENCY COMPONENTS (MEAN & TREND) 3rd SPECIFICATION 2007-2008

Model	Variable	Observed Coefficient	Bias	Bootstrap Stand. Error	Bias/Std.Err	[95% Conf. Int.]	Interval Type
3rd Spec. 2007-2008	Efficiency (Mean)	-7.559	-0.057	0.567	-0.10	-8.671 -6.445 -8.740 -6.539 -8.626 -6.452	(N) (P) (BC)
3rd Spec. 2007-2008	Efficiency	-5.389	-0.062	0.492	-0.13	-6.354 -4.423 -6.438 -4.561 -6.334 -4.377	(N) (P) (BC)
3rd Spec. 2007-2008	Efficiency (Trend)	0.95	0.010	0.190	0.06	0.577 1.323 0.587 1.348 0.578 1.328	(N) (P) (BC)

Notes: Confidence Intervals: N= Normal; P= Percentile; BC= Bias Corrected.

Furthermore, Table 16 and Table 17 show the results of the estimations with reference not only to the beta efficiency components, but also to the beta standard error of efficiency components. In so doing, the bootstrapped results make it possible to detect any noise in the estimated standard errors of the efficiency ratios (Cameron & Trivedi, 2010). The results show that, because the bootstrapped standard errors of beta technical efficiency are close to the mean of the bootstrapped standard errors, the noise in all beta technical efficiency standard errors is sufficiently small. Moreover, this slight difference corroborates the estimates of the default logistic regressions with robust standard errors.

Table 16 BOOTSTRAP EFFICIENCY COMPONENTS B EFFICIENCY COMPONENTS B STD. ERR. 1st AND 3rd SPECIFICATION 2007-2008				
Model	**Variable**	**Observed Coefficient**	**Bootstrap Std. Error**	**Δ β-β Std. Error**
1st Spec. 2007	Efficiency Efficiency Std. Error	-4.0094*** ***0.4054****	***(0.382)*** (0.012)	**0.02**
3rd Spec. 2007	Efficiency Efficiency Std. Error	-3.9123*** ***0.4327****	***(0.405)*** (0.014)	**0.03**
1st Spec. 2008	Efficiency Efficiency Std. Error	-3.5712*** ***0.4138****	***(0.353)*** (0.013)	**0.06**
3rd Spec. 2008	Efficiency Efficiency Std. Error	-3.7209*** ***0.4543****	***(0.396)*** (0.015)	**0.06**

Table 17 BOOTSTRAP EFFICIENCY COMPONENTS B EFFICIENCY COMPONENTS B STD. ERR. 3rd SPECIFICATION 2007-2008 (MEAN & TREND)				
Model	**Variable**	**Observed Coefficient**	**Bootstrap Stand. Error**	**Δ β-β Std. Error**
3rd Spec. 2007-2008	Efficiency (Mean) Efficiency Std. Error	-7.5587*** ***0.6499****	***(0.549)*** (0.023)	**0.10**
3rd Spec. 2007-2008	Efficiency Efficiency Std. Error	-5.3894*** ***0.5571****	***(0.515)*** (0.020)	**0.04**
	Efficiency (Trend) Efficiency Std. Error	0.9502*** ***0.1764****	***(0.196)*** (0.006)	**0.02**

SUMMARY AND CONCLUSIONS

An increase in a firm's technical efficiency in the use of inputs can result in either a decrease in the overall costs or an increase in production. The level of technical efficiency is therefore an important determinant of the firm's financial sustainability. In particular, we argue that the qualitative or soft information conveyed by the level of technical efficiency can improve the capacity to predict the firm's probability of default. Measuring the level of technical efficiency is however tricky since it can be affected by several unobserved factors and the real production function is unknown. The most advanced methodologies are data envelopment analysis, which is a non parametric approach, and the stochastic frontier analysis, which is a parametric approach. In this study, we have estimated technical efficiency with the latter methodology as implemented in Battese & Coelli (1995). We have then used the estimates of the technical efficiency along with the more traditional financial ratios to predict a firm's default in the frame of a logit model. Hence this study furnishes a comparison of the classification accuracy and predictive power of two types of variables, efficiency and financial ratios. The sample employed consisted of 8,145 Italian SMEs in the period 2007-2009. The results suggest that efficiency is a good predictor of the probability of default only when the financial ratios are also included in the model. This is consistent with the findings of Becchetti & Sierra (2003) and Psikillaki, Tsolas & Margaritis (2010). In particular, the model that consists of the average values over the period considered seems partially to outperform the other models in its ability to classify a firm as unsound.

The policy implications are several and can be drawn from the interpretation of the results. We can assume that when a firm employs the factors of production efficiently, that is, maximizing the potential output, it also means that the owned and, especially, borrowed funds are allocated efficiently and used to properly generate value. The greater the production value the greater the ability to repay the borrowed funds. In this study we inferred our technical efficiency ratios from only two subsequent fiscal years but in terms of default prediction, the performance of the efficiency in the medium-long run can be more important. We believe that the information of whether a firm has been efficient over time is mostly embedded in the income statement and balance sheet. This somehow explains why including the financial ratios dramatically improve the prediction capacity. Besides, the financial ratios proxy for the firm's ability to generate cash flow and meet its obligations. We indeed found further that the financial ratios that fall within the "Profitability and debt service" component, the "Capitalization and liquidity" component, and the "Asset turnover" component appear to decrease the probability of default. On the other hand, the ratios in the "Working capital" component and "Debt cost" component increase the probability of default. We point out that good management of working capital is extremely important given the small size of the Italian firms analysed. Moreover, commercial enterprises and enterprises with a turnover of between 5 and € 15 Mln also show a lower probability of default compared to firms with a turnover of less than € 5 Mln. Where the enterprise is located is instead irrelevant. So, to sum up, current and potential financiers of Italian SMEs have to be concerned by the firm's technical efficiency level. The technical efficiency is though unobserved. This also limits its inclusion in credit scoring models unless some proxies are identified. However, traditional financial ratios seem to still provide the most comprehensive information.

Finally, this study has contributed to the default prediction literature in several ways. First, by allowing for the estimated efficiency ratios in the empirical model, it has further confirmed that a forward-looking perspective is indeed an improvement on the only backward-looking perspective. Second, our results show that the hard information provided by the financial ratios is essential, and that it cannot be left out of any model of default prediction. Third, this study adds to the empirical studies that analyse the Italian SMEs in a very particular period, i.e. the Global Financial Crisis. In particular, it suggests some of the factors, including technical efficiency, that may have caused several SMEs to default in the year after the beginning of the financial crisis – that is, 2009. Further research should focus on longer and updated panel data on Italian SMEs that enable investigation of whether the level of technical efficiency before the onset of the financial crisis is a good predictor of the probability of default during the crisis that is still negatively affecting the Italian economic system.

ENDNOTES

1. The value of production is Y_i if the dependent variable is expressed in original units, $exp(Y_i)$ if the dependent variable is expressed in log.
2. Frontier is the command implemented in Stata sofware, which fits stochastic production or cost frontier models both for cross-section (frontier) and panel data (xtfrontier). In addition, Stata provides other two commands, *sfcross* and *sfpanel* (Belotti, Daidone, Ilardi & Atella, 2012), which enable estimation of Battese & Coelli (1995) model.
3. The Wald χ^2test shows a χ^2equal to 6719,63 with a *p*-value= 0,000 for 2007 and a χ^2equal to 7672,47 with a *p*-value= 0,000 for 2008. Moreover, since the production function is expressed as a *Cobb-Douglas* function, constant returns to scale imply that the sum of the coefficients on the cost of raw materials, consumables & merchandise per worker together with fixed assets per worker is one.
4. The test conducted is called *lincom.* It computes point estimates, standard errors, *t* or *z* statistics, *p*-values, and confidence intervals for linear combinations of coefficients.
5. In accordance with Mas-Colell, Whinston & Green (1995), a production technology *Y* exhibits non-increasing returns to scale if for any α∈Y, αy∈Y for all scalars α∈[0,1].
6. The robustness check considers only the technical efficiency components. The remaining explanatory variables are available under request.

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