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BANK LOAN AGREEMENT AND CEO COMPENSATION

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BANK LOAN AGREEMENT AND CEO COMPENSATION

ABSTRACT

Contrary to other forms of outside financing, the announcement of a bank loan agreement prompts a positive and significant market return. Throughout the literature, bank loans are deemed special and unique due to multiple benefits accruing to bank borrowers. The short-term positive market reaction is however inconsistent with the long-term underperformance of borrowing firms (Billet et al., 2006). We find that unlike shareholders, CEOs gain from the bank loan relation over the long-term. Specifically, we find that bank loan agreement elicits a significant increase in total compensation through an increase in non-performance based compensation components such as salary, bonus and other compensation. We also report a smaller proportion of performance based compensation following the bank agreement. Generally, the results suggest that subsequent to a major bank loan, CEOs seem to gain enough influence to shield their compensation from the firm's underperformance. In particular, this evidence supports the "uniqueness" of bank loan relations.

KEY WORDS: Bank loan, CEO compensation, corporate governance.

BANK LOAN AGREEMENT AND CEO COMPENSATION

I- Introduction

An extensive body of literature establishes the commercial banks' certification role pertaining to information advantage, special monitory abilities, and securities underwriting (e.g. Leland & Pyle, 1977; Diamond, 1984, 1991; Fama, 1985). Specifically, these studies argue that commercial banks possess the technical skills and capacities to monitor their corporate clients over extended periods of time and ensure more reliable disclosure. The capital market regards banks as firm insiders and therefore reacts positively to the announcement of a bank loan relation (e.g. James, 1987; Mikkelson & Partch, 1986; Billett, Flannery & Garfinkel, 1995). One may expect that this certification role affects corporate control mechanisms as well. In due course, commercial bank monitoring should be able to help mitigate corporate agency costs seeing that lending banks generally restrict managers from engaging in risky behavior and require more transparency and disclosure (Preece & Mullineaux, 1984).

An additional consequence of increased monitoring can equally be a valuable argument for a manager to negotiate higher compensation. In fact, when a CEO believes that there are no major risky investments to undertake in the near future, he would turn to a bank loan to finance the relatively safe investments (see Holthausen & Leftwich, 1986; Hand, Holthausen, & Leftwich, 1992). Bank loans provide less expensive capital and bank monitoring prevents the firm from engaging in risky investments, which is in line with the CEOs short-term strategy. Knowing that the firm is undertaking safer investments, the CEO does not expect to have outstanding return on investment and therefore higher compensation in the near future. Consequently, one would expect the CEO to aggressively demand higher compensation following the grant of a major bank loan and use this event to secure an above average increase in compensation. The increased monitoring from highly reputable banks is proved to send a positive signal to the capital markets. The CEO may typically advocate the positive stock market reaction following the announcement of the loan agreement along with the increased transparency and scrutiny provided by the bank relation. While major bank loans may benefit shareholders by improving profitability and providing leverage, it has uncertain economic merit and may increase the firms' total risk. A recent study by Billett, Flannery and Garfinkel (2006) examines the post-announcement performance of bank borrowers and finds that firms announcing bank loans suffer significant negative abnormal returns over the subsequent three years. This fact seems to contradict the market expectations from a bank loan agreement. CEO compensation is then affected by two opposing forces: the first is the favorable market reaction attributable to the bank relation and the second is the documented future underperformance. It is therefore interesting to study the behavior of CEO compensation following bank loan agreement.

The purpose of this paper is to examine the behavior of CEO compensation following the grant of a major bank loan. Using an extensive sample of 743 bank loan agreements from 1992 to 2007, we find that, despite the lower long-term returns for shareholders, CEOs benefit from the bank relation through an increase in total compensation and a reduction in pay-at-risk compensation components. Particularly, we conclude that borrowing CEOs gain a greater bargaining power that allows them to negotiate a higher compensation scheme unrelated to firm performance. Overall, the results have several implications on optimal compensation policy, CEOs incentive alignment, and corporate governance theory.

We make two major contributions to the literature. First, we document a substantial increase in CEO compensation following private loan agreement despite the firms' long-term underperformance. Second, our study analyzes the relation between managerial incentives and corporate financing decision.

II- Literature Review

Theories of financial intermediation emphasize the informational advantage of banks. Leland and Pyle (1977) and Diamond (1984) develop models in which banks are shown to have an information advantage and special monitoring ability over public lenders. There are several theories explaining the source of this information advantage. Some assert that banks can access additional information about their borrowers since they provide other intermediary and transaction services. However, the most common argument is the ability of banks to build long-term lending and personal relationships with their borrowers. The uniqueness of bank loans has since been extensively addressed in the literature. For instance, Fama (1985) concludes that there must be something special about bank loans in view of his findings that the reserve tax requirement is borne by banks' borrowers and depositors.

Diamond (1991) argues that firms tend to reduce adverse selection and build a reputation by taking monitored bank loans. After achieving a favorable track record, firms then turn to utilizing publicly traded debt. Accordingly, bank monitoring is an effective way for firms to eliminate the moral hazard problem and to obtain access to cheaper public financing. From a bank's perspective, yet using the same logic, Chemmanur and Fulghieri (1994) demonstrate that banks treatment of borrowing firms in financial distress is different from that of bondholders. In fact, banks tend to build a reputation for financial flexibility by promising borrowers that they will credibly devote more resources to evaluate renegotiation alternatives and hence avoid inefficient liquidation. Consequently, managers holding private information about the future prospects of the firm choose bank loans over bond financing. In both Diamond (1991) and Chemmanur and Fulghieri (1994), firms seem to benefits from bank loans through access to public debts and the flexibility of bank loan re-negotiability. Among other things, these studies suggest that banks are better suited than public creditors to reduce information asymmetries and screen and monitor the future prospects of their borrowers. Thus, the announcement of a bank loan agreement should evidently convey positive information.

Several studies have documented the stock market response to bank loans. Mikkelson and Partch (1986) are the first to report a positive market reaction to the announcement of new bank credit agreements. This study provides a limited analysis of bank loans since it primarily focuses on the negative market reaction to the announcement of common stock and convertible debt offerings. James (1987) extends the bank loan analysis and finds a similar positive market response. Further, he finds that the announcement of private placements and straight debt issues has an adverse market reaction, especially for issues used to repay bank loans. Another study by Lummer and McConnell (1989) distinguishes between new bank loans and renewals. While they find no significant excess returns following the announcement of new credit agreements, they report significantly positive announcement returns for favorable loan revisions, and significantly negative returns for unfavorable revised credit agreements. Accordingly, lending banks have no informational advantage at the initiation of a loan agreement. Nonetheless, banks achieve an information advantage as they develop a continuous credit relationship.

An extensive body of empirical studies also investigates the market response to other forms of external financing: seasoned equity offerings, initial public offerings, straight public debt, convertible debt, convertible preferred stock and private placements. These studies have systematically reported a negative stock price reaction to many of the above forms of financing (See Smith (1986) for a review of this literature).

A part from the positive market response to the announcement of bank loans, several studies also establish the uniqueness of bank loans. Dahiya, Puri and Saunders (2003) provide evidence of negative market reaction for a borrowing firm following the announcement of its loan sale in the secondary market by the lending bank. This negative certification effect is subsequently confirmed after the loan sale by the firm’s poor performance and the increased proportion of borrowers filing for bankruptcy. Hence, the information content of credit relationship termination through a loan sale seems to carry the opposite effect of a loan initiation and provide further support to the special role of banks. Within the same context, the recent dramatic expansion in the secondary market for bank loans may serve as an alternative source of information and therefore reduces a bank’s incentive to monitor. Gande and Saunders (2006) provide evidence to the contrary. They find that the initiation of bank loans trading in the secondary market triggers a positive market reaction for the borrowing firm. Most importantly, they find that the presence of the secondary market does not adversely affect distressed borrowers, known to benefit the most from a bank relationship. The study concludes that banks continue to be special despite the presence of a well-developed secondary market for bank loans. As such, banks and a secondary market for bank loans are complementary sources of information and monitoring.

Preece and Mullineaux (1994) extend the literature on the certification role to non-bank firms. They argue that non-bank firms are able to enter the commercial lending market largely due to technological advances and acquire some of the bank information advantages. Consequently, they find that the announcement of credit agreements with non-bank firms elicits positive stock returns for borrowing firms.

One strand of the literature focuses on the contractual characteristics of bank loans to explain the potential sources of gain to borrowers. For instance, the work of Preece and Mullineaux (1996) suggests that, in addition to the benefits of monitoring, contractual flexibility offered by private debt contracts could be a source of value to borrowing firms. They use the number of lenders as a proxy for contractual flexibility and ability to restructure the loan in the event of financial distress. The evidence suggests that the market reaction to a loan announcement is a decreasing function of the number of lending banks in a syndicate. Therefore, the increased capacity to renegotiate a loan among fewer lenders constitutes another source of value to borrowing firms. In addition, Billett, mark and Flannery (1995) find that the market reaction to a bank loan is also a function of the identity of the lending institution. Specifically, the market reacts more favorably to borrowers contracting with high credit rating lenders. They also find no difference between the market's reaction to loans issued by bank and non-bank institutions. However, as explained in Carey, Post and Sharpe (1998), non-bank institutions differ in their lending practices since they serve riskier and more leveraged borrowers. Similarly, Berger and Udell (1995) point out that some of the benefits inherent in a banking relationship are stronger for small borrowing firms, where asymmetric information is a more acute problem. Consistent with banks' information role, small borrowing firms with longer banking relationships enjoy lower interest rates and need to provide less collateral on their loans.

Slovin, Sushka and Polonchek (1993) provide further support to the uniqueness of bank relationship. Their study reports a significant correlation between a client firm value and the future prospects of the corresponding lending bank. Using a unique database of failed banks, the study documents that an increase in the probability of bank dissolution reduces the market values of its client firms, and the subsequent FDIC bank rescue enhances client firm value. This implies that borrowing firms are stakeholders in the banks from which they borrow. Reciprocally, Dahiya, Saunders and Srinivasan (2003) examine the effect of financially distressed borrowers on lending banks and find that the announcement of a major corporate borrower default or bankruptcy significantly reduces the lead lending bank value. This negative effect is even larger for banks having past lending relationships with the distressed borrowers.

From another perspective, recent technological progress has spurred a debate about whether banks can maintain their information advantages with the advent of low-cost and publicly available information sources (For example, Peterson & Rajan, 2002; Boyd & Gertler, 1994). These studies report substantial developments in the financial sector and a potential demise of the benefits drawn from bank lending relationships. This hypothesis is supported by the recent decline in the market valuation effect of bank loans as stated in Fields, Fraser, Berry and Byers (2006). Accordingly, they report a decline in abnormal returns following the announcement of a bank loan agreement. They also find that in recent years, bank loan abnormal returns have disappeared. This recent development in the market reaction to bank loan agreements is consistent with the notion that informational technology advances and the shift toward a market-based financial system have eroded the value of bank credit relationships (James & Smith, 2000).

Despite the extensive theoretical evidence of bank certification effect discussed above, recent work of Billett, Flannery, and Garfinkel (2006) on the long-term performance of bank loan borrowers raises serious questions about the reliance on market short-run valuation effects. They particularly provide evidence of bank borrowers' underperformance during the three years following the loan agreement. In addition, the analysis of the market reaction around the quarterly earnings announcement reveals significantly negative abnormal returns. This is also supported by the relatively worse operating performance of bank borrowers in the post-loan period and even in the year preceding the loan agreement. Such evidence contradicts the significantly positive abnormal return surrounding the announcement of the bank loan. According to the former study, there is no difference between bank loans and equity or public debt offerings since both are followed by significantly worse stock performance. In contradiction with the early literature (Slovin, Sushka & Polonchek, 1993; Dahiya, Saunders & Srinivasan, 2003), they report a negative relation between lender protection and borrower performance, suggesting that lenders effectively protect themselves from poor performance.

This long-run negative performance of bank borrowers motivates our study. Specifically, we examine the relation between managerial compensation and corporate financing decisions. This relation has been addressed by very few recent papers. For example, Harford and Li (2007) find that "following a merger, a CEO's pay and overall wealth become insensitive to negative stock performance, but a CEO wealth rises in step with positive stock performance". Another study by Jiang and Zhang (2008) reports the CEOs use of adjustments (Board compensation grant and portfolio adjustments) to offset the negative valuation effect of Seasoned Equity Offerings (SEOs). To our knowledge, we are the first paper to address the change in CEO compensation from the perceptive of bank loan financing. We fill in the gap in the literature and provide several contributions.

III- Hypotheses Development

The positive valuation effect of bank loans is widely established in the literature. However, private knowledge of poor future performance may induce CEOs to take actions to protect their wealth. First, they may sell some of their holdings to cash in on the abnormal stock price run up following the bank loan announcement. Second, they can affect the timing of compensation grants, so that they are awarded before the bank loan announcement.

From another perspective, contracting a major new loan increases the firm size and may change the scope of its operations. The loan financing decision hence provides an opportunity for the CEO to renegotiate his/her compensation. By securing a bank loan, the CEO sends a positive signal to the market, reduces information asymmetry, and facilitates future public financing (Diamond 1991). These facts are compelling arguments while negotiating a higher pay. In addition, the CEO's private knowledge of the firm's murky future performance (Billett et al.

2006) may lead to argue for less sensitivity to performance for the first few years. The CEO may also justify this downside protection arguing the restrictions on risk taking behavior and other covenants imposed by the loan agreement. This conjecture is however in contradiction with Almazan and Suarez (2003) who theoretically model for the borrowing firm's compensation. Their model predicts that firms with the proper compensation scheme will induce managers with the highest unobservable profitability prospects to be more inclined to submit to bank monitoring. Bank financing is then a signal of higher profitability. This is in turn consistent with the event study analysis of Dahiya, Saunders and Srinivasan (2003). Bank monitoring also reduces the manager's private benefits and hence complements the use of incentive compensation. A key prediction of this model is that borrowing firms tend to offer compensation contracts with higher pay for performance sensitivity to induce managers to accept bank scrutiny. Managers should be generously rewarded in cases of subsequent high-performance, except for those with low-profitability firms within the separating regime. If the bank loan is associated with managerial accountability and high profitability prospects, we should expect CEO compensation to become more sensitive to firm performance. In the event of negative abnormal returns during the post-announcement period, it is intrinsic to hypothesize that the post loan announcement CEO compensation should be negatively affected.

Based on the mentioned literature and the above discussion, the following null hypotheses can be tested:

Hypothesis 1: The announcement of a bank loan should have a long-run negative effect on CEO compensation components.

Hypothesis 2: Borrowing firm CEOs should have high-performance based compensation following a bank loan.

IV- Data

1- Identifying bank loans

Our sample consists of loan agreements involving U.S. borrowers collected from Loan Pricing Dealscan (Table "Package") data. The executive compensation data is from Standard and Poor's ExecuComp, and the firm-level financial data is from Compustat. We first merge the ExecuComp list of companies (for active and inactive companies) with the Loan Pricing Corporation Dealscan (Table "Package") data. Due to the lack of common company identifiers between the two databases, we simultaneously match by company name, zip code and SIC code. This procedure yields a total of 2,165 matched firms.

Next, we delete utilities (4900-4999 SIC codes) and financial service (SIC code 6000-6999) firms resulting in a loss of 145 and 176 observations respectively. After merging with Compustat database, we lose an additional 10 observations. Therefore, we end up with a final list of 1,834 observations.

Subsequently, we identify all bank loan agreements in Dealscan for each firm in our sample of 1,834 observations. We are technically limited to focusing on the period from 1993 to 2007 because Execucomp data is available beginning in 1992. Retrieving all the bank loan agreements relating to our sample's firms over this time period yields a total of 12,350 observations. Next, we delete 228 observations due to duplication and an additional 1,190 observations due to missing market capitalization data in Compustat. Among the remaining 10,932 observations, we select firms that do not have loan agreements in the preceding and following year. There are 3,894 observations that satisfy this condition. We subsequently delete 1,389 observations due to duplications in Dealscan. These duplications are due to multiple observations which reflect consequent amendments related to the same loan agreement. Among the 2,505 observations remaining, there are 613 cases where the firm had more than one bank loan during the year under consideration. These cases are rather relevant to our study and thus we compute the total value of these multiple loans, and add them to the analysis.

To increase the likelihood of capturing the effect of bank loan agreements on compensation and to minimize the influence of outliers, we further require that the loan value represent at least 10% of the borrowing firm market capitalization in the year preceding the bank loan agreement. We believe that this restriction is essential in our analysis. The data sources in earlier studies were primarily news media. For instance, Billett, Flannery, and Garfinkel (1995) use the Dow Jones News Retrieval Service and Best and Zhang (1993) use the Wall Street Journal for bank loan announcements. These studies have no restriction on loan size as anyone would expect the mainstream media to be mostly interested in major and newsworthy loan agreements. Whereas, LPC Dealscan systematically compiles loans filed with the Security and Exchange Commission and from other reliable public sources. By applying the 10% restriction, we further delete 695 observations.

Using the sample of firms with bank loan(s) higher than 10% of the company's market capitalization (sample size 1,810), we identify 941 ExecuComp firms for which the same CEO is in office during the year before the loan, the year of the loan and the year after.

2- Control Sample

We next match each of the 941 observations with a control firm. The same requirements of data availability in ExecuComp and the same CEO over the three years period also apply to the control sample. The matching procedure is as follows:

We first match firms by total assets within 80% and 120% of the borrowing firm and with the same four digits SIC codes. These restrictions resulted in 230 matching firms.

Then, we relax the matching criteria to total assets within 80% and 120% of the firm and with the same three digits SIC codes, resulting in an additional 124 matching firms.

Then, we relax the matching procedure to two digits SIC codes, and obtain 259 additional matching firms.

For the remaining observations, we relax the matching criteria to two digits SIC codes with total sales between 80% and 120% of the original firm. These constraints added another 130 matching firms.

Overall, we manage to match 743 of the 941 firms with a control firm. Therefore, our final sample contains 743 borrowing firms each with a corresponding matching firm. We also classify the borrowing firms by year and systematically check that none of the borrowing firms in that specific year is used as a matching firm.

3- Data Distribution and Characteristics

Table 1 reports the distribution of bank loans by industry and year. We categorize the sample firms based on the 48 Fama and French (1997) industry classifications, among which 42 industries are represented in our sample. The distribution of firms among the various industries seems uniform except for a relatively high concentration for industries such as Business Services, Retail, Machinery and Wholesale. Similarly, the firms' distribution across time is uniform. On average, there are fifty bank loan agreements satisfying our selection criteria every year. In general, Table 1 indicates that our sample firms are evenly distributed across industry and time dimensions. We therefore feel confident that our bank loan sample does not suffer from clustering.

In panel A of Table 2, we report some of the bank loans' characteristics. The average bank loan amount in our sample is around 350 million (USD) and a median value of 205 million (USD). These figures are relatively larger than the reported 116.9 and 45 respectively for mean and median in Billett, Flannery and Garfinkel (1995). Likewise, the borrowing firms in our sample are relatively larger with regard to both total assets and sales, and a lower beta by comparison with the above mentioned study.

The predominance of larger loan amounts and larger firms in our sample can be best explained by the restriction on the firm data availability in ExecuComp database, which covers fairly larger firms. A less compelling reason could be attributed to the sample period in Billett, Flannery and Garfinkel (1995) covering the period from 1980 to 1989; while our sample starts in 1993, and both samples are not inflation adjusted. From the other side, the lack of adjustment for inflation has no bearing on our results since our analysis compares the sub-sample of borrowing firms to that of matching firms and both are affected equally by inflation.

4- Compensation Variables

Compensation variables are constructed from ExcuComp. The variables' definitions are taken from ExecuComp Data Definitions table. The Salary variable represents the dollar value of the base salary earned by the CEO. The Bonus variable is the dollar value of the bonus paid to the CEO. The Restricted Stocks variable is the sum of the restricted stock and the stock awarded under plan-based awards. Similarly, the Stock Options variable is the sum of the aggregate value of stock options granted to the executive during the year and the fair value of all options awarded during the year as detailed in the Plan Based Awards. The Other Compensation variable sums up all other compensation received by the executive including perquisites and other personal benefits, termination or change-in-control payments, contributions to defined contribution plans (e.g. 401K plans), life insurance premiums, gross-ups and other tax reimbursements, discounted share purchases, the change in pension value and nonqualified deferred compensation earnings, and the amount paid out to the executive under the company's long-term incentive plan.

Table 1: Distribution of bank loans by Industry and by year

Panel A: Distribution of bank loans by Fama and French Industry

Industry	Number of firms	Industry	Number of firms
Agriculture	2	Miscellaneous	3
Food Products	15	Automobiles and Trucks	17
Candy and Soda	4	Aircraft	8
Alcoholic Beverages	1	Shipbuilding, Railroad Eq.	5
Recreational Products	2	Defense	2
Entertainment	5	Precious Metals	1
Printing and Publishing	15	Nonmetallic Mining	2
Consumer Goods	22	Coal	1
Apparel	21	Petroleum and Natural Gas	30
Healthcare	18	Telecommunications	11
Medical Equipment	27	Personal Services	4
Pharmaceutical Products	10	Business Services	71
Chemicals	27	Computers	17
Rubber and Plastic Products	3	Electronic Equipment	28
Textiles	8	Measuring and Control Equip	27
Construction Materials	26	Business Supplies	24
Construction	21	Shipping Containers	4
Steel Works, Etc.	38	Transportation	19
Fabricated Products	5	Wholesale	45
Machinery	56	Retail	63
Electrical Equipment	13	Restaurants, Hotel, Motel	22

Panel B: Distribution of bank loans by year.

Year	Bank Loans	Year	Bank Loans	Year	Bank Loans
1993	11	1998	52	2003	58
1994	30	1999	47	2004	63
1995	47	2000	42	2005	66
1996	57	2001	56	2006	69
1997	71	2002	62	2007	12

The data sample includes 743 bank loan observations. The data reported in Panel A represents the distribution of bank loans by industry using the 48 Fama and French (1997) industry dummies. The analysis excludes firms in utilities and financial services sectors. Panel B reports the distribution of bank loans by year.

Table 2: Sample Summary Statistics				
Panel A: Bank loans' characteristics				
	Mean	Median	Minimum	Maximum
Deal Amount ($ millions)	354.8	205	10	7000
Spread (%) (obs. = 570)	2.03	2	1	5
Panel B: Borrowers' characteristics				
	Mean	Median	Minimum	Maximum
Borrowers' Total assets ($ millions)	1877.1	919.8	35.58	28472.4
Sales ($ millions)	1030.5	918.1	35.58	28472
Beta	1.09	0.81	-0.23	9.9
P/E	34.06	18.25	2.13[*]	2835
ROA (%)	4.26	4.82	-56.36	25.01

This Table presents the bank loans' characteristics for loan granted to U.S. firm from 1993 to 2007 and retrieved from LPC Dealscan database. The sample contains 743 bank loans that represents at least 10% of the borrowing firm market capitalization at the year of the loan and conform to other restrictions pertaining to CEO tenure surrounding the year of the loan agreement. The Deal Amount is the total value of the loan grant. The spread represents the percentage spread over default base and it is reported for only 570 observations. The borrowers' total assets, sales, beta, price per earning (P/E), and return on assets (ROA) are all measured at the beginning of the year of the bank loan agreement.

[*] Due to missing values in Compustat, the P/E ratio minimum value is positive despite a negative minimum value for the ROA ratio.

We present the compensation components' descriptive statistics in Table 3 for both the borrowing firms and the matching firms. We report the mean and median for: Salary, Bonus, Restricted Stock, Stock Option, Other Compensation, and their sum in Total Compensation. In this Table and henceforth, we refer to the year preceding the bank loan agreement as "Year -1", the year of the loan as: "Year 0", and the year following the bank loan as: "Year +1"

V- Methodology

To measure the change in compensation, we use two different approaches. In the first approach, we measure the percentage change in compensation by dividing the value of the change in each compensation component, in a given year, by the value of that same component in the preceding year. we apply this approach to "Total Compensation", "Salary", and "Other Compensation" since these variables display non-zero values throughout the entire sample (except for 2 observations), which makes computing the percentage change from one year to another feasible. However, the remaining compensation components ("Bonus", "Restricted

Stocks", and "Stock Options") present zero values throughout the years since they are generally not granted every year. To avoid losing observations and any distortion in the analysis, we use a second approach in computing the change in these compensation components using portfolio deciles constructed as follows. We first compute the average of each compensation variable for each firm and its corresponding control firm over the three year span. In other terms, this is the average of each firm and its corresponding control firm over the three year period surrounding the bank loan.

Table 3: Compensation Variables Descriptive Statistics

	Borrowing Firms		Matching firms	
	Mean	Median	Mean	Median
Total Compensation:				
Year -1	2,850.3	1,764.7	3,309.8	1,914.8
Year 0	3,404.1	1,945.9	3,342.0	2,019.6
Year +1	3,444.3	2,129.6	3,639.9	2,087.6
Salary:				
Year -1	560.98	524.19	556.30	521.00
Year 0	608.60	573.81	596.46	565.58
Year +1	641.39	610.00	619.86	590.82
Bonus:				
Year -1	606.39	318.78	632.08	369.00
Year 0	597.35	305.00	570.21	329.33
Year +1	585.21	269.44	546.10	256.96
Restricted Stock:				
Year -1	372.73	0.00	267.32	0.00
Year 0	392.89	0.00	424.56	0.00
Year +1	514.17	0.00	478.22	0.00
Stock Options:				
Year -1	1,096.8	416.57	1,546.3	511.46
Year 0	1,344.9	396.57	1,346.6	486.54
Year +1	1,168.2	379.98	1,402.1	422.75
Other compensation:				
Year -1	213.43	35.63	307.75	33.37
Year 0	460.39	58.51	404.19	45.20
Year +1	535.29	83.95	593.64	70.06

This Table presents the descriptive statistics for borrowing firms and matching firms' compensation variables which include: total compensation, salary, bonus, restricted stocks, stock options and other compensation. The compensation variables are reported for the year of the bank loan (year 0), the year before the bank loan (year -1) and the year after the bank loan (year +1).

Second, we construct ten portfolios (deciles) by ranking these averages from the lowest to the highest and assign each firm and its corresponding control firm to the same portfolio decile. Then, we compute the average value of each portfolio decile. Finally, we measure the percentage change separately for borrowing firms and control firms as a percentage of the corresponding portfolio decile average. The significance of the differences in the percentage change in the value of compensation components is measured by the paired t-test and the Wilcoxon test.

1- Changes in the structure of CEO compensation

For changes in compensation structure, we measure the percentage change in the proportions of each compensation component. Specifically, we divide the percentage change in the proportion (with regard to total compensation) of each compensation component by the proportion of that same component in the preceding year. We run into the zero values for the variables: "Bonus", "Restricted Stocks", and "Stock Options" as well. Therefore, we construct ten portfolio deciles following the same approach described above, and measure the percentage change in compensation components' proportions with regard to the corresponding portfolio deciles.

VI- RESULTS

1- Market reaction to the announcement of a bank loan agreement

Since Former studies relate bank loan relationship benefits to the positive announcement period abnormal returns, we start our empirical analysis with an event study analysis to measure the market reaction surrounding the announcement of private loan agreements in our sample. For the announcement date, we use the "dealActivedate" variable defined in Dealscan as the date the deal was issued. In cases of multiple facilities within the deal, the date will be determined as the earliest facility date. Since the announcement period abnormal return is beyond the scope of our study, we rely on the deal active date variable provided by Dealscan as a proxy for the deal's public announcement date. Later, we show that there is no abnormal return on this deal active date. Accordingly, we speculate that the public announcement is subsequent to the deal active date since we find significant market reaction for the event windows following the deal active date. This also justifies our inclusion of various announcement period event windows in an attempt to capture the market abnormal returns.

We measure the mean daily abnormal returns (ARs) and the mean cumulative abnormal returns (CARs) for multiple event windows. Panel A of Table 4 provides the ARs and CARs for the full sample of borrowing firms. We notice an insignificant market reaction for the deal issuance date. However, we report a positive and significant abnormal return for the event window (0, +5) with a 1% significance level. There are also further evidence of positive CARs for the four days window (0, +3) and the 21 days window (-10, +10) surrounding the event day (10% significant level). In panel B of Table 4, we split the full sample into a subsample of bank loans issued before the year 2000 and bank loans after 2000. Testing the two subsamples announcement returns reveals a slight difference in market reaction. In the second half of our sample period, the positive abnormal returns are less significant. The disappearance of announcement returns in recent years is consistent with the findings of Fields et al. (2006). Next, we examine the effect of loan size on market reaction. Hence, we rank our sample loans by the total value of the loan proportional to the firm's market value of equity. We consider the lower half of our total sample as the small loan subsample containing loans with value between 10 to 27% of the firm's market value of equity. The upper half of our sample represents large loans with loan values higher than 27% of the firm's market value of equity. Then, we test for the announcement returns separately on both subsamples (Panel C of Table 4). We report statistically insignificant announcement returns for large loans. However, for the subsample of small bank loans, we find highly significant abnormal returns specifically for the (0, +5) event window. Consequently, we draw the conclusion that capital markets are less optimistic to the announcement of large loans due to higher leverage and insolvability risk.

Table 4: Test of market reaction to the announcement of a bank loan agreement using the full sample of borrowing firms

Panel A: Mean daily abnormal returns and cumulative abnormal returns for the full sample of borrowing firms.

Intervals of trading days[(a)]	Full Sample (N = 716)		
	Mean (%)	Z-statistic	%Positive
AR_{-1}	0.16	0.237	48.74
AR_{0}	0.06	0.885	46.65
AR_{+1}	0.03	0.312	48.88
$CAR_{-10,-1}$	0.08	0.985	50.14
$CAR_{-1,0}$	0.21	0.013	48.32
$CAR_{-1,+1}$	0.25	1.209	50.56
$CAR_{0,+3}$	0.06	1.957†	51.56†
$CAR_{0,+5}$	0.28	2.630**	53.21**
$CAR_{-10,+10}$	0.30	1.733†	51.54†

Panel B: Mean daily abnormal returns and cumulative abnormal returns for the full sample of borrowing firms before year 2000 and after year 2000.

Intervals of trading days[(a)]	Before 2000 (N = 302)			After 2000 (N = 414)		
	Mean (%)	Z-statistic	%Positive	Mean (%)	Z-statistic	%Positive
AR_{-1}	0.16	0.274	48.68	0.16	0.078	48.79
AR_{0}	0.18	-0.417	46.69	-0.03	-0.808	46.62
AR_{+1}	-0.14	-0.071	47.68	0.16	0.471	49.76
$CAR_{-10,-1}$	0.16	1.887†	53.31†	0.02	-0.316	47.83
$CAR_{-1,0}$	0.33	0.274	48.68	0.13	-0.218	48.07
$CAR_{-1,+1}$	0.19	1.081	50.99	0.29	0.668	50.24
$CAR_{0,+3}$	-0.06	0.965	50.66	0.14	1.749†	52.90†
$CAR_{0,+5}$	0.25	2.348*	54.64	0.31	1.454	52.17
$CAR_{-10,+10}$	0.36	1.196	51.13	0.25	1.258	51.69

Panel C: Mean daily abnormal returns and cumulative abnormal returns for the sub-sample of Large Loans and the sub-sample of Small Loans.

Intervals of trading days[(a)]	Large Loans (N = 358)			Small Loans (N = 358)		
	Mean (%)	Z-statistic	%Positive	Mean (%)	Z-statistic	%Positive
AR_{-1}	0.25	-0.908	45.81	0.07	1.243	51.68
AR_{0}	0.10	-0.061	48.04	0.01	-1.190	45.25
AR_{+1}	-0.03	-0.908	45.81	0.10	1.348	51.95
$CAR_{-10,-1}$	0.30	1.314	51.68	-0.14	0.079	48.60
$CAR_{-1,0}$	0.35	0.044	48.32	0.08	-0.027	48.32
$CAR_{-1,+1}$	0.32	0.362	49.16	0.18	1.348	51.95
$CAR_{0,+3}$	-0.11	0.679	50.00	0.23	2.089*	53.91
$CAR_{0,+5}$	-0.24	0.785	50.28	0.81	2.935**	56.14
$CAR_{-10,+10}$	0.52	0.362	49.16	0.07	2.089*	53.91

This Table reports the standard event-study announcement period mean abnormal returns (ARs), cumulative average abnormal returns (CARs), Z-statistics for the nonparametric generalized sign test, the percent of sample with positive returns at the

announcement of private loan agreement. Abnormal returns are calculated using the market model estimates from 110 day to 11 days prior to the event day. The Z-statistics are based on the standardized cross-sectional method (Boehmer et al., 1991).
2-tailed significance test, with: †, *, ** Significance level at the 10%, 5%, and 1% respectively.

2- Bank borrowers' long-term performance

The recent evidence of bank borrowers' long-term underperformance documented in Billett, Flannery and Garfinkell (2006) contradicts the announcement period returns and the notion of bank certification as a whole. To the extent that performance is a key determinant of compensation, it is essential to apply some form of long-term performance measurement to our sample. While it is evidently beyond the scope of our study, we should note that measuring long-term performance has been a contentious subject. Without addressing the complete array of measurement techniques, we apply the buy-and-hold abnormal returns (BHARs) performance measure, which is one of the methods of long-term performance used in Billett, Flannery and Garfinkell (2006). As explained in Ritter (1991) and Barber and Lyon (1997), we first compute the holding period returns (HPR) for each firm in our sample and its corresponding matching firm over the three year period following the bank loan announcement.

We then estimate the mean and median holding period return differences between the sample firms and the matching firms. We generally conclude that the borrowing firms underperform their peers over the three year period following the bank loan agreement. Specifically, the estimate for the mean difference over the three year period is equal to -4.76%. This mean difference is significant at the 0.1% level. For the median difference, we find an estimate of -3.11% with a 5% significance level. The presence of significant long-term underperformance in our sample firms enhances the importance of our compensation results as discussed below.

Table 5: Buy-and-Hold Abnormal Returns for the three years following Loan Announcements

	Mean Difference	**Median Difference**	**Number of Observations**
Three years combined	-4.76% (-3.43***)	-3.11% (-2.24*)	669

This Table presents the Holding-period returns (HPRs) for the three years following the year of the bank loan. We report the mean difference and median difference between the sample borrowing firms and their corresponding matching firms. The significance t-test is provided between brackets.
2-tailed significance test, with: *, ** Significance level at the 5%, and 1% respectively.

3- Change in value of compensation components

We expect the CEO to use the bank loan relationship as a bargaining tool to request an abnormal increase in compensation or to reduce the performance based compensation. In Table 6, we report a comparison of the percentage change in compensation between the borrowing firms and the matching firms. The results indicate a positive and significant increase in the percentage change in compensation in the year of the loan (significant at the 5% level). Similarly, there is a significant (1% level) increase in the year following the bank loan compared to the year preceding the loan. For Salary, there is a positive increase in percentage change both in the year of the loan and the subsequent year. To a lesser extent, this evidence is also supported when comparing the percentage changes using portfolio deciles. Nevertheless, there is a much more compelling and consistent evidence of a positive increase in the Other Compensation component during the year of the loan (significant at the 1% level). In panel B of Table 6, the results indicate a reduction in bonus awards to CEOs over the sample period. This reduction is more pronounced for non-borrowing firms when compared to borrowing firms. However, this difference is positive and significant at the 0.1% level. Within the portfolio deciles analysis, we also notice negative percentage changes in the values of stock options. Whereas, the percentage changes in restricted stock is positive and overall higher than that of borrowing firms. The differences for both restricted stock and stock options are not significant.

So far, the evidence suggests that borrowing CEOs benefit from the certification role of bank loan agreement through significant increase in compensation. It is however noteworthy to find that the increase involves only the compensation components that are least likely to be affected by poor performance. Additionally, this result suggests that borrowing CEOs gain a greater bargaining power that allows them to negotiate a higher compensation scheme unrelated to firm performance. Consequently, the significant increase in compensation justifies, to a certain extent, the reason why CEOs tend to tolerate the bank scrutiny, disclosures and covenants.

The results are consistent with the hypothesis suggesting that borrowing CEOs choose to submit themselves to bank scrutiny knowing that they will benefit from the bank relationship. As such, CEOs are rewarded by the board through an abnormal increase in salary, bonus, other compensation and hence total compensation. The bank certification effect benefits the shareholders through the short-term positive market reaction; however, to the CEO this positive effect is even more lasting despite the borrowing firm dire long-term performance.

4- Changes in the proportion of compensation components

Subsequently, we examine the change in the proportion of compensation components as a percentage of total compensation. Table 7 reports the results using the two approaches: percentage change in dollar value (panel A), and percentage change proportional to portfolio deciles (panel B). We find that the proportion of salary within the total compensation significantly drops using both approaches. For the Other Compensation, the results are mixed. The percentage changes are positive in the year of the loan and then negative in the year after. However, there is strong evidence of an increase in the proportion of bonus award. Specifically, there is a reduction in the proportion of bonus for matching firms that is more pronounced than that of the borrowing firms. For the year following the bank loan this change is significant at the 0.1% level using both the paired sample t-test and the Wilcoxon test.

Table 6: Percentage change in value of compensation components
Bank loan representing 10% or more of the firm value, sample size = 743.

Panel A: Percentage change in value								
	Borrowing firms			**Matching firms**			**Paired t-test**	**Wilcoxon test**
	Mean	Median	Std. dev.	Mean	Median	Std. dev.	t-value	Z-value
Total Compensation								
$Y_0 - Y_{-1}$	0.5387	0.1014	1.9353	0.3828	0.0539	1.9643	1.53	2.03*
$Y_{+1} - Y_0$	0.3767	0.0978	1.4260	0.3422	0.0672	1.3870	0.48	0.89
$Y_{+1} - Y_{-1}$	0.6775	0.2068	2.0954	0.4504	0.1143	1.5917	2.40*	2.77**
Salary								
$Y_0 - Y_{-1}$	0.1592	0.0526	0.9050	0.0877	0.0588	0.1617	2.12*	0.25
$Y_{+1} - Y_0$	0.0583	0.0460	0.1631	0.0450	0.0452	0.1821	1.48	-0.24
$Y_{+1} - Y_{-1}$	0.2271	0.1129	0.9675	0.1435	0.1138	0.2971	2.22*	0.69
Other Compensation								
$Y_0 - Y_{-1}$	10.553	0.0886	67.497	2.7593	0.0561	11.617	3.05**	2.33*
$Y_{+1} - Y_0$	15.770	0.0552	210.57	2.6369	0.0439	15.187	1.66†	0.17
$Y_{+1} - Y_{-1}$	30.054	0.2790	291.29	25.653	0.2093	430.99	0.22	1.57
Panel B: Percentage change in value using portfolio deciles analysis								
	Borrowing firms			**Matching firms**			**Paired t-test**	**Wilcoxon test**
	Mean	Median	Std. dev.	Mean	Median	Std. dev.	t-value	Z-value
Total Compensation Decile								
$Y_0 - Y_{-1}$	0.0979	0.0618	0.8493	0.0258	0.0269	0.08805	1.60	1.36
$Y_{+1} - Y_0$	0.0625	0.0635	0.8193	0.0647	0.0502	0.8452	-0.05	0.22
$Y_{+1} - Y_{-1}$	0.1604	0.1277	0.8131	0.0905	0.0830	0.9826	1.52	1.92†
Salary Decile								
$Y_0 - Y_{-1}$	0.0826	0.0502	0.1592	0.0688	0.0527	0.1176	1.98*	-0.04
$Y_{+1} - Y_0$	0.0517	0.0462	0.1522	0.0389	0.0472	0.2015	1.37	0.41
$Y_{+1} - Y_{-1}$	0.1343	0.1093	0.2208	0.1077	0.1072	0.2449	2.21*	1.04
Other Compensation Decile								
$Y_0 - Y_{-1}$	0.3363	0.0306	1.3315	0.1482	0.0099	1.0806	3.04**	2.43*
$Y_{+1} - Y_0$	0.2374	0.0149	1.6829	0.3731	0.0129	1.5588	1.65†	-0.68
$Y_{+1} - Y_{-1}$	0.5737	0.1370	1.6264	0.5213	0.0668	1.6852	0.61	1.43
Bonus Decile								
$Y_0 - Y_{-1}$	-0.0882	0.0411	1.4889	-0.3158	0.0000	1.3118	3.44***	4.69***
$Y_{+1} - Y_0$	-0.0615	0.0000	1.2553	-0.1040	0.0000	0.9915	0.75	1.95†
$Y_{+1} - Y_{-1}$	-0.1497	0.0000	1.5853	-0.4198	-0.0484	1.4383	3.95***	4.44***
Restricted Stock Decile								
$Y_0 - Y_{-1}$	0.0565	0.0000	2.4256	0.0250	0.0000	1.9987	0.27	1.29
$Y_{+1} - Y_0$	0.0685	0.0000	2.6352	0.2233	0.0000	2.1394	-1.25	-1.43

$Y_{+1} - Y_{-1}$	0.1250	0.0000	2.6095	0.2483	0.0000	2.1952	-1.00	-0.83
Stock Options Decile								
$Y_0 - Y_{-1}$	0.1267	0.0000	1.8965	-0.0345	0.0000	1.9257	0.48	-0.26
$Y_{+1} - Y_0$	-0.0659	0.0000	1.7333	-0.0454	0.0000	1.6217	-0.24	-0.25
$Y_{+1} - Y_{-1}$	-0.0532	0.0000	1.7411	-0.0799	0.0000	2.0264	0.28	-0.07

This Table presents the annual percentage change in the value of each of the compensation components. We use ($Y_0 - Y_{-1}$) to indicate the difference between the year of the loan and the preceding year, ($Y_{+1} - Y_0$) to indicate the difference between the year following the loan and the year of the loan, and ($Y_{+1} - Y_{-1}$) to indicate the difference between the year following the loan and the year preceding the loan. There are two different methods used in computing the percentage change. In Panel A, the percentage change is computed by dividing the value of the change in each component, in a given year, by the value of that same component in the preceding year. The compensation components: total compensation, salary, and other compensation have non-zero values throughout the entire sample (except for less than 2 observations), which makes computing the percentage change from one year to another feasible. In Panel B, we however use a different method in computing the percentage change since the data for the compensation components (bonus, restricted stock, and stock options) presented zero values. The later forms of compensation are generally not granted every year. To avoid losing observations and any distortion in the analysis due to dramatic changes in percentages (increase from a zero, decrease to a zero), we compute the change in these compensation components using portfolio deciles constructed as follows. These deciles are computed separately for bonus, restricted stock and stock options. We first compute the average value of each component for each firm and its corresponding control firm over the three year spam. In other terms, this is the average of each firm and its control firm over the three year period surrounding the bank loan. Second, we construct ten portfolios (deciles) by ranking these averages from lowest to highest. We assign each firm and its corresponding control firm to the same portfolio decile. Then, we compute the average value for each decile. Finally, we measure the percentage changes separately for borrowing firms and control firms as a percentage of the corresponding decile average. Essentially, the percentage changes in each compensation component are computed proportional to the corresponding deciles. For the sake of consistency and comparability, Panel B portfolio deciles analysis also includes the compensation components used in Panel A. The difference in the percentage change in the value of compensation components are measured by the paired t-test and the Wilcoxon test. The Wilcoxon test is a two-sample test with a normal approximation and two-sided test (Z-value). The paired t-test assumes that the differences between pairs are normally distributed. If this assumption is violated, the Wilcoxon signed-rank test would be a better alternative.
2-tailed significance test, with: *, **, *** Significance level at the 10%, 5%, 1%, and 0.1% respectively.

In addition, we notice a significant decrease in the proportion of restricted Stock for the year of the loan and the year after (significant at the 5% level for both years). This is an evidence of a shift toward a smaller proportion of pay-at-risk. Unlike restricted stock, we find that the difference between the borrowing and matching firm changes in stock options are consistently insignificant. So far, the evidence indicates that the shift in the proportion of total compensation is mainly dominated by an increase in the proportion of bonus award. In addition, there is a less compelling evidence for a reduction in the proportion of pay-at-risk compensation.

Table 7: Change in the compensation components as a percentage of total compensation
Bank loan representing 10% or more of the firm value, sample size = 743.

Panel A: Change in percentage of total compensation								
	Borrowing firms			**Matching firms**			**Paired t-test**	**Wilcoxon test**
	Mean	Median	Std. dev.	Mean	Median	Std. dev.	t-value	Z-value
Salary								
$Y_0 - Y_{-1}$	0.3858	-0.0287	1.9632	0.4460	0.0050	2.2923	-0.54	-1.84†
$Y_{+1} - Y_0$	0.2802	-0.0131	1.6514	0.4058	-0.0176	2.1705	-1.33	0.54
$Y_{+1} - Y_{-1}$	0.3540	-0.0571	2.0192	0.7319	0.0000	5.6638	-1.72†	-2.47*
Other								

Compensation								
$Y_0 - Y_{-1}$	10.419	0.0949	73.819	6.7536	0.0476	64.749	1.01	1.65†
$Y_{+1} - Y_0$	12.974	0.0248	188.98	8.3539	0.0127	56.163	0.61	-0.85
$Y_{+1} - Y_{-1}$	26.092	0.1842	247.71	14.949	0.1899	167.58	1.00	0.39

Table 7 continued								
Panel B: Change in percentage to total compensation using portfolio deciles analysis								
	Borrowing firms			**Matching firms**			**Paired t-test**	**Wilcoxon test**
	Mean	Median	Std. dev.	Mean	Median	Std. dev.	t-value	Z-value
Salary Decile								
$Y_0 - Y_{-1}$	-0.0271	-0.0241	0.7169	0.0288	0.0068	0.5845	-1.64†	-1.95†
$Y_{+1} - Y_0$	-0.0531	-0.0119	0.6456	0.0081	-0.0144	0.6698	-1.81†	-0.84
$Y_{+1} - Y_{-1}$	-0.0802	-0.0509	0.7414	0.0369	0.0000	0.7039	-3.19**	-2.62**
Other Compensation Decile								
$Y_0 - Y_{-1}$	0.2476	0.0335	1.3012	0.1191	0.0108	1.0290	2.13*	2.03*
$Y_{+1} - Y_0$	0.1770	0.0195	1.5486	0.3197	0.0029	1.4733	-1.84*	-0.90
$Y_{+1} - Y_{-1}$	0.4246	0.0709	1.5816	0.4387	0.0611	1.5571	-0.18	0.17
Bonus Decile								
$Y_0 - Y_{-1}$	-0.1711	0.0000	1.5608	-0.3544	-0.0495	1.3023	2.59**	3.27**
$Y_{+1} - Y_0$	-0.1355	0.0000	1.2225	-0.1956	-0.0108	1.0383	1.05	2.34**
$Y_{+1} - Y_{-1}$	-0.3067	-0.0066	1.5531	-0.5500	-0.2361	1.3605	3.54***	4.29***
Restricted Stock Decile								
$Y_0 - Y_{-1}$	-0.0194	0.0000	2.6420	0.0193	0.0000	1.5673	-0.34	-0.26
$Y_{+1} - Y_0$	0.0133	0.0000	2.4877	0.3033	0.0000	2.3831	-2.29*	-0.95
$Y_{+1} - Y_{-1}$	-0.0061	0.0000	2.6074	0.3226	0.0000	2.5038	-2.49*	-1.13
Stock Options Decile								
$Y_0 - Y_{-1}$	-0.0865	0.0000	1.6997	-0.0760	0.0000	1.4379	-0.13	-0.99
$Y_{+1} - Y_0$	-0.0907	0.0000	1.3505	-0.0986	0.0000	1.2795	0.12	0.46
$Y_{+1} - Y_{-1}$	-0.1773	0.0000	1.5945	-0.1747	0.0000	1.5116	-0.03	-0.17

This Table presents the annual percentage change of the compensation components as a percentage of total compensation. We use ($Y_0 - Y_{-1}$) to indicate the difference between the year of the loan and the preceding year, ($Y_{+1} - Y_0$) to indicate the difference between the year following the loan and the year of the loan, and ($Y_{+1} - Y_{-1}$) to indicate the difference between the year following the loan and the year preceding the loan. There are two different method used in computing the percentage changes. In panel A: the percentage change is computed by dividing the percentage change in the proportion (with regard to total compensation) of each component, in a given year, by the proportion of that same component in the preceding year. The compensation components: salary, and other compensation have non-zero values throughout the entire sample (except for less than 2 observations), which makes computing the percentage change from one year to another feasible. In Panel B, we however use a different method in computing the percentage change since the data for the compensation components (bonus, restricted stock, and stock options) presents zero values. The later forms of compensation are generally not granted every year. To avoid losing observations and any distortion in the analysis due to dramatic changes in percentages (increase from a zero, decrease to a zero), we compute the change in these compensation components using portfolio deciles constructed as follows. These deciles are computed separately for bonus, restricted stock and stock options. We first compute the average percentage of each component for each firm and its corresponding control firm over the three year spam. In other terms, this is the average of each firm and its control firm over the three year period surrounding the bank loan. Second, we construct ten portfolios (deciles) by ranking these averages from lowest to highest. We assign each firm and its corresponding control firm to the same portfolio decile. Then, we compute the average percentage for each decile. Finally, we measure the percentage changes separately for borrowing firms and control firms as a percentage of the corresponding decile average. Essentially, the percentage changes in the compensation components proportions are computed proportional to the corresponding deciles. For the sake of consistency and comparability, panel B portfolio deciles analysis also includes the compensation components used in panel A.

The differences in the percentage change in the value of compensation components are measured by the paired t-test and the Wilcoxon test. The Wilcoxon test is a two-sample test with a normal approximation and two-sided test (Z-value). The paired t-test assumes that the differences between pairs are normally distributed. If this assumption is violated, the Wilcoxon signed-rank test would be a better alternative.

2-tails significance test, with: †, *, **, *** Significance level at the 10%, 5%, 1%, and 0.1% respectively.

VII- Conclusions

Prior literature extensively establishes the "uniqueness" and the "special" nature of bank loans. This study extends this evidence to include a positive effect of bank loan agreement on CEO compensation. However, this positive effect seems to be at odds with the long-term firm underperformance following bank financing.

Using an extensive sample of 743 major bank loan agreements from 1993-2007, we find a positive and significant increase in the CEO total compensation, salary, bonus and other compensation over the two years following the bank loan. However, we do not find evidence of a significant increase in performance based compensation such as restricted stock and stock options.

This implies that borrowing CEOs benefit from the certification role of the bank loan relationship through a significant increase in compensation. It is however noteworthy to mention that the increase involves only the compensation components that are least likely to be affected by poor performance. Overall, we conclude that borrowing CEOs gain a greater bargaining power allowing them to negotiate a higher compensation scheme unrelated to firm performance. As such, the significant increase in compensation justifies, to a certain extent, the reason why CEOs tend to accept the added scrutiny and disclosure embedded in bank loan provisions. Overall, our results provide a better understanding of the managerial incentive alignment and suggest several valuable implications to both shareholders and regulators.

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Using real option analysis to improve capital budgeting decisions when project cash flows are subject to capacity constraints

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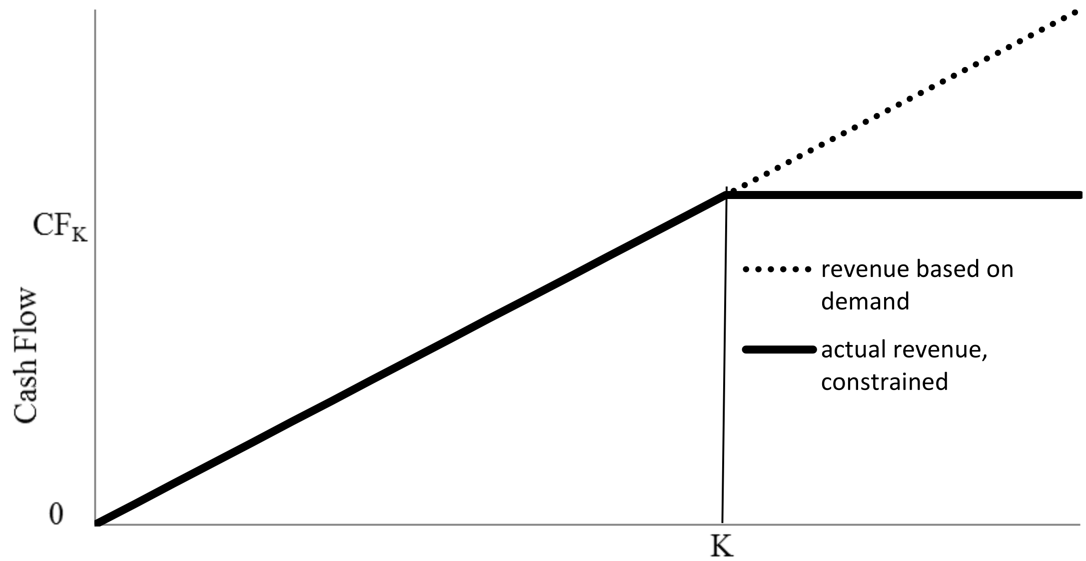
ABSTRACT

When a capacity constraint exists, using net present value analysis to make capital budgeting decisions risks improperly estimating expected cash flows. The may lead to decision errors due to incorrect valuation. Using real option analysis for those cash flows that are subject to capacity constraints may improve valuation estimates. This requires the analyst to identify the implicit option created by the capacity constraint, and determine values for the underlying variables that affect the value of the real option. These variables include the current value and volatility of the subject matter of the option (unlike the valuation of financial options, this value will not typically be a market price), and the "strike price", the level at which the constraint applies. This paper examines the valuation problem presented by a capacity constraint and illustrates how real option valuation can improve a capital budgeting analysis.

INTRODUCTION

Net present value analysis requires a financial manager to forecast expected net cash flows and discount them using an appropriate required return. Some projects have cash flows that are limited by capacity constraints. These constraints may also interfere with obtaining estimates of expected cash flows. For example, a real estate developer evaluating the feasibility of developing a hotel in a particular market may have accurate information about occupancy rates for similar properties already located in that market. However, on those days that the existing properties all operate at capacity, it is not possible to observe actual demand. Basing the valuation on an assumption that the proposed project can capture a portion of observed demand will underestimate the actual value of the project. Even when an analyst has good information about total demand, if the nature of the project (e.g., the size of a facility or the nature of its production process) create a limit on the revenue that can be realized in any particular period, a valuation that relies on demand without considering the effect of the constraint may overestimate project value. Figure 1 illustrates how a capacity constraint limits the ability to observe and/or to generate revenue from actual demand. The demand appears on the x-axis and the cash flow associated with the demand on the y-axis. When there is a capacity constraint at K, demand exceeding that level appears as demand of K units and revenue that can be generated is capped at CF_K.

Figure 1. Cash flow subject to a maximum constraint, K.



One way to include the effect of a capacity constraint when valuing a project affected by the constraint is to use real option analysis. The effect of the capacity constraint illustrated in Figure 1 has the same pattern as the payoff profile for an option. This suggests that option pricing principles may be useful provided the option can be identified and appropriate values determined for those variables needed to value the real option.

APPLICATIONS OF REAL OPTION VALUATION

The real option literature suggests that real options analysis may be more accurate than net present value for: mineral production projects (Davis, 1996; Mann, Goobie and MacMillan, 1992; Sick, 1990; Palm, Pearson and Read, 1986; and Brennan and Schwartz, 1985); real estate development (Rocha, Salles, Alcaraz Garcia, Sardinha and Teixeira, 2007; Williams, 1991; and Titman, 1985); and mergers and consolidations (Lambrecht, 2004; and Smit, 2001). The real option characteristics examined in connection with these projects do not consider the effect of capacity constraints.

In other application of real option analysis, even when the project can be appropriately valued using net present value principles, some changes in the business environment create fundamental changes in a business that can best be valued using real option analysis. Trigeorgis, 1993, shows how option pricing improves valuation from net present value alone when a project can be expanded in response to greater than expected demand. McDonald and Siegel, 1985, and Brennan and Schwartz, 1985, demonstrate use of option analysis to value an option to shut down. Other research uses real option analysis to value the option to abandon (Myers and Majd, 1990) or to wait and begin the project at a later date (Quigg, 1993). Real option analysis has also been used to determine the optimal initial investment when there may be value to expanding or reversing an investment in response to changes in demand (Abel, Dixit, Eberly and Pindyck, 1996). See also Bøckman, Fleten, Juliussen, Langhammer, and Revdal, 2007.

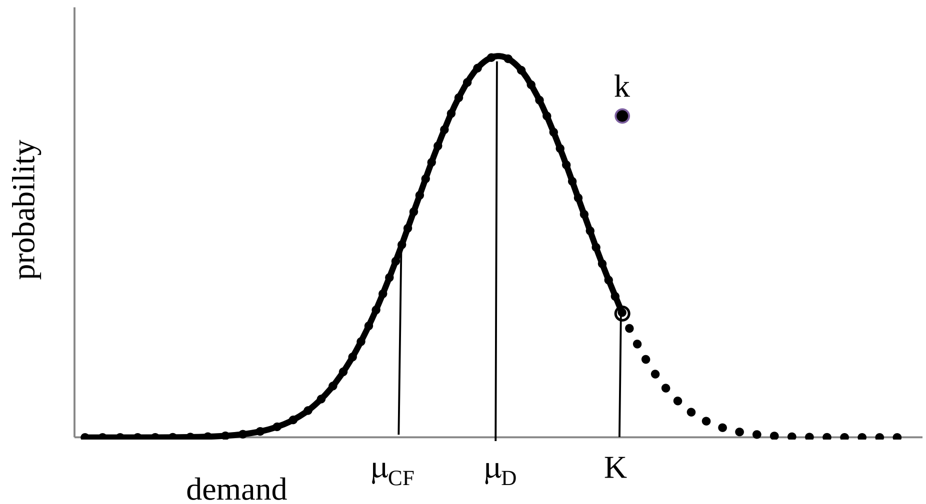
These foregoing studies consider the effect of a single future event that fundamentally alters future project cash flows and hence the project's value. This is analogous to the payoff on a financial option depending on whether it is in- or out-of-the-money based on the market price at a future date. Additionally, real option analysis is useful when a projects' periodic cash flows have option characteristics. This analysis requires the financial manager to separately value the option associated with each cash flow and include the aggregate value of all such options in the overall project value. Briys, Crouhy and Schöbel, 1991, use this approach to value interest rate caps, floors and collars, multi-period financial contracts. It has also been used to value projects with flexibility in product mix or in production methods. See, e.g., Gengtsson and Olhager, 2002; Andreou, 1990; Triantis and Hodder, 1990; Kulatilaka, 1988 and 1993; and Margrabe, 1978.

REAL OPTION VALUTION FOR CONSTRAINED CASH FLOWS

This paper examines the use of real option analysis for projects with cash flows that are subject to a capacity constraint. For these projects, cash flows increase or decrease with demand until reaching the constraint, at which time additional increases or decreases in demand have no effect on cash flow. The upper or lower limit associated with a capacity constraint creates option characteristics in the cash flows. Real option analysis may provide a more accurate measure of project value than traditional net present value analysis. The paper explains how to disaggregate the capacity constrained cash flow in order to use real option analysis and then describes the methodology of real option valuation.

When there is a capacity constraint, increases or decreases in demand lead to higher or lower revenue. With a constraint on production capacity, when demand exceeds the maximum capacity, cash flows no longer reflect demand but instead reflect the constraint. Observing cash flows. Figure 2 illustrates the how the observed demand may differ from actual demand when there is a capacity constraint at K. The dotted line shows the distribution of actual demand. The solid line together with the point "k" is the distribution of observed demand based on cash flows. The aggregate probability of demand greater than or equal to K is the probability associated with the point k. As a result, the mean demand based on observed cash flows, μ_{CF}, falls to the left of the actual mean for demand, μ_D. Present value estimates using mean cash flow underestimate those based on mean demand. Since actual demand is not observed, even if a potential new entrant into a market is able to accurately estimate the portion of demand it will be able to capture, it may not be able to accurately estimate currently unmet demand.

Figure 2. Distribution of actual and constrained demand



If a new entrant faces a capacity constraint similar to existing firms in the market, even if could estimate the mean of actual demand accurately, estimating cash flows based on actual demand will lead to an overestimate actual value, since in some instances the new entrant's own capacity constraint will limit its income when demand is high. Deviations of actual demand from mean demand on cash flow have an asymmetrical effect on cash flow. When demand is less than the mean, cash flows decline, but when demand exceeds the mean, cash flow increases are capped due to the capacity constraint. Valuation using mean demand overestimates cash flows. The magnitude of the error will depend on volatility of demand.

Valuing the project using real option analysis rather than traditional net present value overcomes this problem. A cash flow subject to a capacity constraint is first decomposed into an unconstrained cash flow and an option-like cash flow. This real option will have a value of zero over for a portion of the demand range and a value that is linearly related to the demand over the rest of the range. The analyst then estimates value for both the unconstrained cash flow and the real option. Combining these two values provides an estimate for the value of the constrained. This calculation must be done for each project period that is affected by the capacity constraint. So, for example, if the constraint affects the maximum cash flow that can be realized in a day, cash flows are comprise of a series of options that expire daily. It is necessary to value daily cash flows in order to accurately value the constrained cash flows.

To contrast net present value analysis with real option analysis, consider a project which has revenue that is subject to a capacity constraint, such as that illustrated in Figure 1. Net present value analysis aggregates the present value of all future expected revenue for the project. That is,

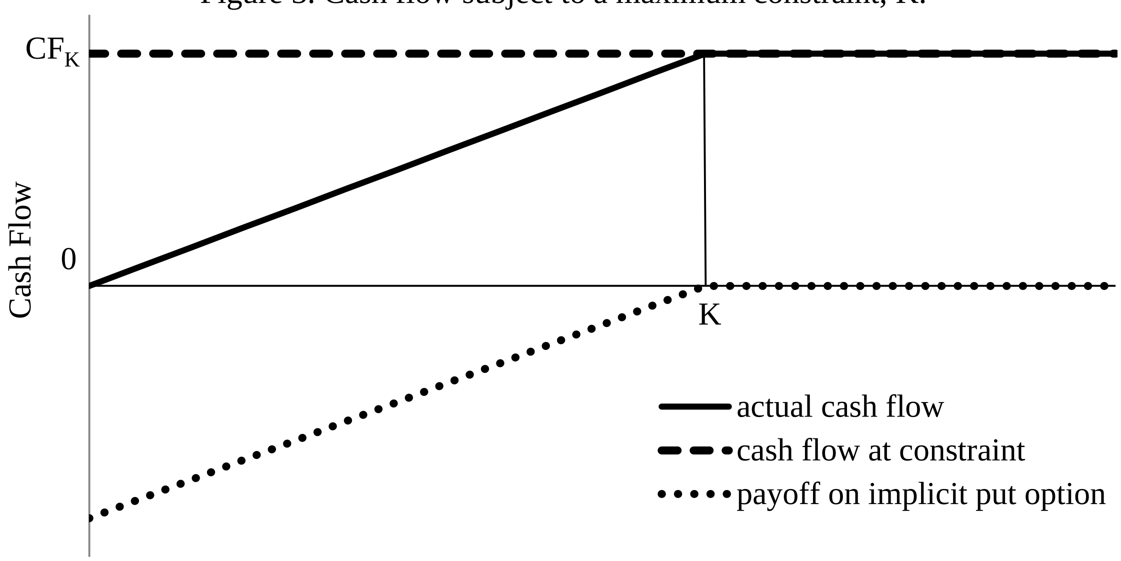
$$Present\ value\ of\ revenue = \sum_{t=1}^{T} \frac{E(Revenue_t)}{(1 + r_{Rev})^t}. \tag{1}$$

Using real option analysis, each period's revenue is disaggregated into an unconstrained cash flow and a real option. Figure 3 illustrates this separation. The heavy solid line indicates the actual cash flow as a function of demand. The dashed line equal to $\boldsymbol{CF_K}$ is the unconstrained payment, independent of demand. The dotted line is the real option. It has the same payoff as a written put option with demand as the underlying asset and a strike price of $\boldsymbol{K}$. Combining the unconstrained cash flow and the real option gives the same revenue as the solid line. So the combined value of the unconstrained cash flow and the put option is the value of the revenue,

$$Present\ value\ of\ revenue = \sum_{t=1}^{T} \left(\frac{Revenue_K}{\left(1 + r_f\right)^t} - P_t \right), \tag{2}$$

where: $\boldsymbol{Revenue_K}$ is the revenue when demand is at capacity, $\boldsymbol{K}$; $\boldsymbol{r_f}$ is the risk free rate; and $\boldsymbol{P_t}$ is the value of the real option the expires at time $\boldsymbol{t}$. The risk free rate is the used to discount revenues because the revenue is known. Aggregating each period's values provides the alternative valuation that specifically accounts for the option characteristics of project cash flows.

Figure 3. Cash flow subject to a maximum constraint, K.



The value of a project subject to a capacity constraint is thus equal to the value of the project if it produces at capacity each period (with revenue discounted at the risk free rate since there is no variance in revenue) less the aggregate value of the implicit put options. These options account for the reduced value due to production at less than capacity.

Valuing each put option is straightforward. Assuming the distribution of demand is loglinear, the real option is for valuation purposes equivalent to a put option on a commodity with a strike price equal to the cash flow at expected demand, which for valuation purposes is a commodity futures' price. From Black (1976), the value of the put equals:

$$P_t = \frac{1}{(1+r)^t}\left(Revenue_K N(-d_2) - Revenue_{Dt} N(-d_1)\right), \tag{3}$$

where:

$$d_1 = \frac{ln\left(\frac{Revenue_{Dt}}{Revenue_K}\right)}{\sigma t^{\frac{1}{2}}} + \frac{\sigma t^{\frac{1}{2}}}{2},$$

$\boldsymbol{d_2=d_1-\sigma t^{½}}$ and $\boldsymbol{N(-d_i)}$ is the value of the standard normal cumulative distribution function evaluated at $\boldsymbol{-d_i}$. $\boldsymbol{Revenue_{Dt}}$, in this real option a value analogous to the market price of the underlying asset for a traditional option, is the revenue based on time-t actual demand; $\boldsymbol{Revenue_K}$, the "strike price" for the real option, is the revenue at capacity. Other variables have the same meaning as in traditional options; **r** is the risk free interest rate, **t**, the time to expiration of the option is the period for which the value of the cash flow is being calculated, and **σ** is the standard deviation of demand, the underlying asset. The mean of actual demand and the standard deviation of demand are derived from observed demand using censored data moment estimation methods. See e.g. Tiku (1967).)

Replacing $\boldsymbol{P_t}$ in the expression in the parentheses in Eq. 2 with the Eq. 3 and rearranging indicates that the time **t** cash flow on a capacity constrained projected can be alternatively expressed as:

$$Present\ value\ of\ revenue = \sum_{t=1}^{T}\left(\frac{Revenue_K}{\left(1+r_f\right)^t}N(d_2) + \frac{Revenue_{Dt}}{\left(1+r_f\right)^t}\left(1-N(d_1)\right)\right) \tag{2'}$$

The initial term on the right-hand side of equation 2' is the value of a "cash-or-nothing" option that pays the present value of the cash flow at capacity if demand is greater than or equal to the "strike price", i.e., capacity constraint. The second term is the present value of cash at the mean actual demand less the value of a "share-or-nothing" option with a strike price equal to cash flow at the capacity constraint.

Figure 4. Cash flow subject to a minimum constraint, K.

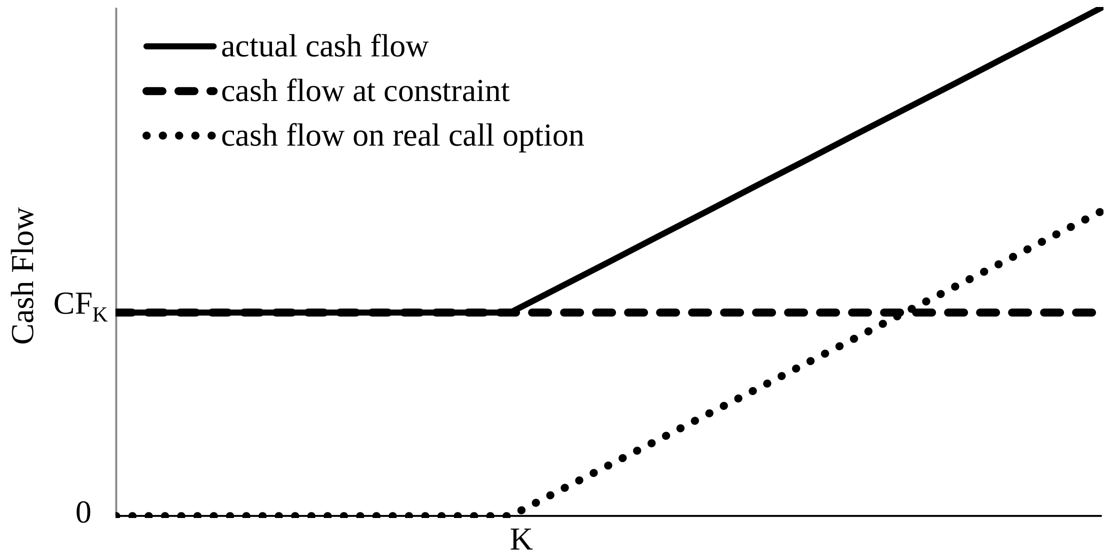


Figure 4 illustrates cash flow subject to a minimum constraint (the solid line in that Figure). Decomposition of this cash flow to facilitate real option analysis uses a fixed periodic cash flow at the minimum capacity level (the dashed line), together with a call option having a “strike price” equal to the capacity constraint (the dotted line). The real option equation to value this cash flow is:

$$Present\ value\ of\ revenue = \sum_{t=1}^{T}\left(\frac{Revenue_K}{\left(1+r_f\right)^t} - C_t\right), \tag{4}$$

where $\boldsymbol{C_t}$, is the value of a call option that expires at time $\boldsymbol{t}$ with a strike price equal to the revenue at the minimum capacity and value of time $\boldsymbol{t}$ cash flow in excess of the minimum capacity equals:

$$C_t = \frac{1}{(1+r)^t}\big(Revenue_{Dt}N(d_1) - Revenue_K N(d_2)\big). \tag{5}$$

Variables are defined as in Equation 3.

CONCLUSION

Real option analysis allows valuation of projects with capacity constrained cash flows. This method expressly incorporates the effect of the non-linearity of cash flows due to a capacity constraint. Because the cash flow includes the effect of the option characteristics, the value obtained using this method is more accurate than basing value on net present value of expected cash flow. In addition, because the risk free rate is used for valuing the option, it is not necessary to obtain a risky-cash-flow required return in order to value the constrained cash flows. However, that will still be necessary in valuing other project cash flows that are not subject to capacity constraints.

The valuation method described in this paper is consistent with the one proposed by Deng, Johnson and Sogomonian, 2001, for valuing peak load electrical production. "Peak load production" is characterized by zero production until high levels of power demand cause price to increase to the level at which producing is economical. Deng, et al., value time-t production using a "spark spread call option", where the payoff on the option depends on the spread between time-t price at which electricity can be sold and the production cost. Extending their analysis as described herein allows valuation not just of the time-t production decision but of the peak load producer itself by aggregating the time-t "spark spread option" values for all production periods. Since many different types of production and service business face capacity constraints of one kind or another, it is expected that this valuation technique will have wide application.

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THE BAA CORPORATE CREDIT SPREAD: ESTIMATION AND DETERMINANTS

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ABSTRACT

The purpose of this paper is to estimate the Baa corporate bond spread and identify its four determinants: a default risk premium, a tax premium, an illiquidity premium, and an excess risk premium. Especially important is the modeling of the default risk premium which is the product of the probability of default and one minus the recovery rate. Both these two parameters are assumed to be stochastic. But, since an analytical joint distribution for them is difficult to find, the paper resorts to Monte Carlo simulation. Although the number of obligor names is limited in bond portfolios the paper argues that time diversification, which arises from holding a bond portfolio for the long run, can reduce substantially the uncertainty and the negative skew in mean bond returns. The paper finds that the Baa spread of 144 basis points can be decomposed into a tax premium of 39 basis points, an illiquidity premium of 4 basis points, a default risk premium of 41 basis points, leaving 60 basis points for the excess risk premium. The paper concludes by that there is little evidence for a bond spread puzzle.

JEL Classification Codes: E43, E47, C22

INTRODUCTION

The purpose of this paper is to estimate the spread of the US Baa corporate bond yield relative to the yield of the US 10-year Treasury-bond, and to decompose this spread into its determinants. There are four determinants recognized in the literature (Elton et al., 2001; Dick-Nielsen et al., 2012). These compensate for default risk, differential taxes, and illiquidity, with the rest being an excess risk premium. The identification of the bond spread and its determinants is an important topic that is and should be of interest to practitioners like bond portfolio managers, and to theoreticians like academicians specializing in corporate finance. Policymakers, especially central bankers, are also among those who monitor the movements in the spread and its determinants. Finally, credit risk management and regulatory requirements necessitate the recognition of the components of this spread.

A specific issue is whether the default risk premium is high enough, or, equivalently, whether the bond excess risk premium is too large, and whether its magnitude is a puzzle (Amato and Remolona, 2003) akin to the puzzle of the excess equity return (Mehra and Prescott, 1985; Chen et al., 2009), and, finally, whether it is due to systematic or idiosyncratic risk (Amato and Remolona, 2003; Chen et al., 2009; Hull, 2012a, 2012b). This paper argues that, although bond yields are known to be heavily negatively skewed, and that diversification is limited because of default contagion and the small number of different bond issuers, diversification can still be highly possible if one takes into consideration time diversification. Time diversification comes about when the investor holds the bond portfolio for many years, and not just for one year. This means that the bond excess premium in the long run will mostly be due to systematic risk. This paper finds that the implied Baa corporate bond beta, which is a measure of systematic risk in the Capital Asset Pricing Model (CAPM), is estimated to be as small as 0.082, a figure which is highly realistic. Second, and as is stated in Amato and Remolona (2003), incremental taxes, even if rather low, do induce a sizeable tax premium, because taxes are levied on the *level* of the bond yield, and not on the credit spread.

This paper has the distinctive feature of assuming that the probability of default and the recovery rate are both stochastic, and that they are negatively related to each other with a correlation coefficient of -0.7, which is retrieved from statistical data in Moody's (2009). This negative correlation arises because defaults usually happen during the lows of the business cycle, at a time when bond sales are likely to be fire sales since in such times demand is deficient. In many parts of the literature the recovery rate is taken to be a constant, although the evidence for a stochastic recovery rate, for its pro-cyclicality, and for a negative correlation with the probability of default are now strong (Altman et al., 2003, 2004, 2005; Moody's, 2009; Bruche and González-Aguado, 2010). For example, Hull (2012a, 2012b) assumes a recovery rate for Baa bonds to be a constant of 40%. Dionne et al. (2010) initially assume a constant recovery rate of 49.42% for Baa bonds, but they find later that random recovery rates add some 5 basis points to the default risk premium, and make the latter more uncertain. Kitwiwattanachai (2012) relaxes the assumption of a constant recovery rate and relates this rate to a measure of industry distress. However, few of these references use the powerful tools of Monte Carlo simulation to generate the default premium and its distribution. Dionne et al. (2010) is an exception, but the simulation and estimation approaches they adopt are totally and materially different and much more complex than the methodology of this paper.

THE THEORETICAL MODEL

The theoretical model borrows from Portait and Poncet (2012). The gross return on a bond is comprised of two terms: (1) a promised return of $1+k$, with a probability $(1-p)$, where p is the probability of default conditional on no previous default, and where k is the promised yield-to-maturity and the promised coupon, and (2) a return of $\alpha(1+k)$ with a probability p, where α is the recovery rate. The expected return is therefore:

$$(1+k)(1-p)+\alpha(1+k)p = 1+r+\pi+\rho+t \tag{1}$$

In the RHS of equation (1) r is the risk-free rate, π is the excess risk premium, ρ is the illiquidity risk premium, and t is the tax premium. Since $(1+k)=(1+s+r)$, where s is the credit spread, then it can be proven that the spread s is equal to:

$$s = \frac{\pi+\rho+t+p(1-\alpha)+rp(1-\alpha)}{1-p(1-\alpha)} \approx \pi+\rho+t+p(1-\alpha) \tag{2}$$

The same result is obtainable by a different method. Suppose the expected cash flows are:

(1) $(1-p)^i k + (1-p)^{i-1} p\alpha(1+k)$ for period i

(2) $(1-p)^N (1+k) + (1-p)^{N-1} p\alpha(1+k)$ for the last period N

And if the gross discount rate is $(1+r+\pi+\rho+t)$, then equations (2) are similarly obtained, by equalizing the discounted expected cash flows to +1, i.e. the bond is priced at par, and by noting that a price at par implies that the net adjusted discount rate is equal to the expected interim cash flow (the final cash flow being +1):

$$\left(\frac{1+(r+\pi+\rho+t)}{1-p}\right)-1 = k + \frac{p\alpha(1+k)}{(1-p)} \tag{3}$$

THE CALIBRATION

In order to undertake a Monte Carlo simulation the probability distributions of the Baa corporate bond spread, of the default probability, and of the recovery rate must be established. Starting with the distribution of the probability of default, the 20-year cumulative probability of default for a Baa corporate bond is taken from Moody's (2009, Exhibit 38, p. 31) to be 13.228%. The implied mean hazard rate or the mean default probability, conditional on no previous default, is calculated as follows (Hull, 2012a, 2012b):

$$-\frac{\ln(1-0.13228)}{20} = 70.9431 \,\text{basis points} \tag{4}$$

The standard deviation of the Baa default rate is 43.7 basis points (Moody's, 2009, Exhibit 36, p. 29). Since in this exhibit there are 89 years considered, from 1920 to 2008, then the standard error of the hazard rate is 43.7/√89 basis points. This is the estimate that is adopted. As for the mean recovery rate, in Moody's (2009, Exhibit 27, p. 25) it is estimated to be 42.68%. This compares with a rate of 49.42% in Dionne et al. (2010), and with a rate of 43.5% in Davydenko et al. (2012). Bruche and González-Aguado (2010) estimate a standard deviation of the recovery rate of around 24% for 1124 firms, while Altman et al. (2003, 2004) report an estimate between 24.38% and 24.87% for this standard deviation, and Davydenko et al. (2012) estimate this standard deviation to be 22.7% for 175 firms. Hence the standard error of the recovery rate adopted in this paper is approximated by the figure 0.24/√1124 taken from the first former reference. Finally the probability distributions of the hazard rate and the recovery rates are generated in order to ensure a correlation coefficient of -0.7 between them (see the R-Squares in Moody's, 2009, Exhibit 9, p. 10).

The data for the monthly Baa corporate bond yield and for the monthly 10-year constant-maturity US Treasury bond yield are taken from the web site of the Federal Reserve Bank of Saint Louis, and spans the period between June 1, 1953 and November 1, 2013. As for the probability distribution of the Baa corporate bond spread it is inferred from an error-correction multiple regression, (Engle and Granger, 1987), on the change in the Baa corporate bond yield (Table 1). First it is ascertained that this change in yield has a statistically insignificant intercept (Table 1, 2nd column). Then the error-correction model is estimated (Table 1, 3rd column).

Table 1
REGRESSION RESULTS WITH THE CHANGE IN THE Baa CORPORATE BOND YIELD (Δ(Baa) AS THE DEPENDENT VARIABLE. THE MODEL IN THE LAST COLUMN IS:

$$\Delta(Baa) = c(1)*\Delta(TB) + c(2)*\Delta(baa(-1)) + c(3)*(Baa(-1) - c(4) - c(5)*TB(-1))$$

Variable	Estimate	Estimates
Constant	0.002380	
	(0.208759)	
c(1)		0.522804
		(19.20560)
c(2)		0.291654
		(6.541107)
c(3)		-0.022378
		(2.699517)
c(4)		1.443028
		(2.464843)
c(5)		1.080634
		(13.04743)
-1/c(3)		44.68735
		(2.699517)
c(5)-1		0.080634
		(0.973561)
c(1)/(1-c(2))		0.738064
		(12.80810)
(c(1)/(1-c(2)))-1		-0.261936
		(4.545552)
Adjusted R-Square		0.646599
Ljung-Box Q-statistic:		
k=6	0.000	0.093
k=12	0.000	0.098
k=24	0.000	0.125
Ljung-Box Q^2-statistic:		
k=6	0.000	0.209
k=12	0.000	0.000
k=24	0.000	0.000
Jarque-Bera normality test:	0.000000	0.000000
Breusch-Godfrey serial correlation LM test with 12 lags of the residual:	0.0000	0.0349

Notes: TB stands for the 10-year constant-maturity US Treasury bond yield. Δ is the first-difference operator. The symbols c(1) to c(5) stand for slope regression coefficient estimates. In parenthesis are absolute t-statistics. The Ljung-Box Q-statistics and the Ljung-Box Q^2-statistics are on the residuals, and the squared residuals respectively. The actual p-values for the Ljung-Box Q-statistics and the Ljung-Box Q^2-statistics, for the Jarque-Bera normality test, and for the Breusch-Godfrey test are reported. Heteroscedasticity and autocorrelation robust standard errors and covariance are applied (Newey and West, 1987), with the lags selected by minimizing the Akaike information criterion, and with a Newey-West automatic bandwidth and lag length. The sample period is monthly, from June 1, 1953 to November 1, 2013, i.e. 726 observations after adjustments.

The empirical results are extremely concordant with the theory. The adjustment factor is negative, as expected, and implies that adjustment to the long run takes around 44.69 months (t-statistic: 2.699517), a figure which is reasonable. Second, the coefficient on the first lagged value of the 10-year constant-maturity Treasury bond is 1.080634 (t-statistic: 13.04743), and this coefficient is statistically insignificantly different from +1 with a t-statistic of 0.973561. This implies that in the long run the Baa corporate bond yield varies proportionately with the Treasury bond yield, as expected theoretically. Although the total short run effect of the Treasury bond yield on the Baa corporate bond yield is close to +1, taking the value 0.738064, it is nevertheless statistically significantly different from +1 with a t-statistic of -4.545552. Finally, the average spread premium is estimated to be 144.3028 basis points, with a standard error of 58.5444 basis points. This average spread compares with the value of 132.8 basis points in Dionne et al. (2010), of 140 basis points in Luu and Yu (2011), of 160 basis points in Benzschawel and Assing (2012), and 169 basis points in (Hull, 2012a, 2012b). However average credit default swap (CDS) spreads are somewhat lower, at 127 basis points in Schneider et al. (2010), and at 79.27 basis points in Kitwiwattanachai (2012). Hence, in the Monte Carlo simulation, the Baa corporate credit spread is modeled to have a mean of 144.3028 basis points, and a standard error of 58.5444 basis points.

THE SIMULATION RESULTS

The Monte Carlo simulation starts by generating the fundamental variables, i.e. the spread, the default probability, the recovery rate, and the default premium, all according to their probability distributions as set in the previous section. Initially the excess return is defined as the difference between the spread and the default premium. In fact this excess return is equal to the sum of a tax premium, an illiquidity premium, and an excess risk premium. The tax premium is assumed to be the product of a tax rate of 4.875% and the mean Baa corporate bond yield (Elton et al., 2001). Since the sample mean corporate bond yield is 7.966236%, the tax premium is fixed at 38.84 basis points. The illiquidity premium is set at 4.35 basis points (Dick-Nielsen et al., 2012). Hereafter the analysis is on the spread, the default premium, and the excess return. Later the excess return is decomposed into its three determinants.

The number of simulation runs is 10,000, and these runs are repeated a hundred times. The figure of 10,000 may be thought of as gigantic. However it corresponds to a portfolio of 200 bonds held for 50 years, or 250 bonds held for 40 years, or even 334 bonds held for 30 years. Amato and Remolona (2003) write in their paper that collateralised debt obligations (CDOs) may not have more than 200 obligor names. This corresponds here to a holding period of 50 years.

The simulation results are presented in Table 2. The grand mean spread is estimated to be 144.3768 basis points with a mean standard deviation of 58.55393, while it is simulated to have a mean of 144.3028 basis points and a standard error of 58.5444 basis points. The difference is hence trivial. The grand mean has a standard error of 0.620646 basis points which is a bit higher than the expected standard error of $58.55393/\sqrt{10000}$, or 0.585539 basis points. Anyway the spread is statistically highly significantly different from zero in the long run with a t-statistic of 232.623. In Table 2 there are other statistics on the distribution of the standard deviation of the spread, of the t-statistics for the null that the spread is zero, and their associated p-values, and also on the distributions of the maxima and the minima. For example the highest t-statistic for the spread is 2.5103 and the minimum is 2.4208. The highest upper-tailed p-value is 0.007744 and the smallest is 0.006032. The maximum of the maxima of the spread is 442.2518, and the minimum of the minima is -128.9690 basis points. The maximum of the minima is -50.37500, and the minimum of the maxima is 332.4383 basis points, while the 95% confidence interval is between 29.6110 and 259.1425 basis points. All statistics follow a normal distribution except for the distribution of the maxima for which the p-value of the Jarque-Bera normality test is extremely low, rejecting normality at any conventional marginal significance levels. These results are confirmed in Table 3 with additional normality tests. There is no theoretical reason for the distribution of the maxima to be normal.

Table 2
DESCRIPTIVE STATISTICS ON THE DISTRIBUTIONS WITHIN THE SAMPLE OF THE 100 REPETITIONS OF THE 10,000 SIMULATION RUNS.
THE SAMPLE SIZE IS THEREFORE 100 FOR ALL STATISTICS.

statistic	Baa spread	Credit default premium	Excess return=Baa spread- credit default premium
Grand mean	144.3768	40.68484	103.5990
Grand median	144.3260	40.68699	103.6188
Grand maximum	145.8680	40.76771	105.2950
Grand minimum	142.8796	40.61211	102.2951
Standard deviation	0.620646	0.035273	0.612504
Normality test	0.497746	0.245998	0.754755
Standard deviation:			
Mean	58.55393	3.252217	58.65266
Median	58.55523	3.252503	58.68830
Maximum	59.40672	3.301616	59.63468
Minimum	57.51121	3.193714	57.35622
Normality test	0.774893	0.345285	0.233911
t-statistic:			
Mean	2.465724	12.51032	1.766383
Median	2.463909	12.51006	1.767367
Maximum	2.510292	12.75205	1.810095
Minimum	2.420751	12.32673	1.726351
Standard deviation	0.018357	0.075174	0.014522
Normality test	0.916565	0.124119	0.301581
p-value of t-statistic:			
Mean	0.006843	0.000000	0.038681
Median	0.006859	0.000000	0.038583
Maximum	0.007744	0.000000	0.042142
Minimum	0.006032	0.000000	0.035141
Standard deviation	0.000351	NA	0.001215
Normality test	0.859036	NA	0.454662
Maximum:			
Mean	369.0305	53.43288	329.7135
Median	365.3179	53.28941	328.7424
Maximum	442.2518	57.12609	382.8578
Minimum	332.4383	51.68501	299.7367
Standard deviation	19.03105	1.050870	16.22681
Normality test	0.000000	0.000000	0.000192
Minimum:			
Mean	-83.24963	28.36754	-119.6399
Median	-81.21745	28.57507	-116.9005
Maximum	-50.37500	29.95607	-94.49000
Minimum	-128.9690	24.44315	-163.2110
Standard deviation	17.40945	0.978568	17.00032
Normality test	0.147336	0.000025	0.029390

Notes: The normality test is the Jarque-Bera test for which the actual p-values are reported. All statistics are obtained with the use of the EViews 8 (2013) statistical software. NA stands for "not available." The spread is simulated to follow a normal distribution with mean 144.3028 and standard error 58.5444. The probability of default is simulated to have a normal distribution with mean 70.9431 and standard error $47.3/\sqrt{89}$. The recovery rate is simulated to have a normal distribution of 0.4268 and standard error $0.24\sqrt{1124}$. The probability of default and the recovery rate are simulated to have a correlation coefficient of -0.70. All figures are in basis points except for those corresponding to the t-statistics and their p-values.

The default premiums, which are the product of the simulated probabilities of default and one minus the simulated recovery rates, has a grand mean of 40.6848 basis points, and a mean standard deviation of 3.2522 basis points. This high precision implies very high t-statistics, higher than 11, for the null hypothesis of a zero mean, and very low corresponding p-values.

The maximum of the maxima of the default premium is 57.126, and the minimum of the minima is 24.443 basis points. The maximum of the minima is 29.956, and the minimum of the maxima is 51.685 basis points, while the 95% confidence interval is between 34.311 and 47.059 basis points. All statistics follow a normal distribution except for the distribution of the maxima and of the minima for which the p-values of the Jarque-Bera normality test are extremely low, rejecting normality at any conventional marginal significance levels. These results are confirmed in Table 3 with additional normality tests. Theoretically there is no reason for the maxima and the minima to be distributed normally.

Table 3
TESTS FOR NORMAL EMPIRICAL DISTRIBUTIONS. ACTUAL P-VALUES ARE REPORTED. THE NULL HYPOTHESIS IS A NORMAL DISTRIBUTION.
ALL VARIABLES ARE BASED ON 100 REPLICATIONS OF 10,000 SIMULATION RUNS.

Variable	Lilliefors (D)	Cramer-von Mises (W2)	Watson (U2)	Anderson-Darling (A2)
Means:				
Spread	0.0579	0.2323	0.2489	0.3486
Default premium	> 0.10	0.0657	0.0532	0.0772
Excess return	> 0.10	0.6900	0.6365	0.7203
Standard deviations:				
Spread	> 0.10	0.7402	0.6928	0.6664
Default premium	> 0.10	0.6112	0.6781	0.6010
Excess return	> 0.10	0.2297	0.2154	0.2527
t-statistics:				
Spread	> 0.10	0.3203	0.2899	0.3418
Default premium	> 0.10	0.6253	0.7621	0.5172
Excess return	> 0.10	0.7388	0.7167	0.6609
p-values of t-statistics:				
Spread	> 0.10	0.5215	0.4822	0.4777
Default premium	NA	NA	NA	NA
Excess return	> 0.10	0.7728	0.7346	0.7317
Maxima:				
Spread	0.0160	0.0008	0.0020	0.0003
Default premium	0.0001	0.0001	0.0003	0.0000
Excess return	> 0.10	0.0543	0.1152	0.0085
Minima:				
Spread	> 0.10	0.0585	0.0887	0.0692
Default premium	0.0049	0.0012	0.0024	0.0011
Excess return	0.0736	0.0066	0.0137	0.0027

See notes under Table 2.

Finally the statistics of the distribution of the excess return are analyzed. The grand mean of the excess return is 103.599 basis points, with a mean standard deviation of 58.653 basis points. The grand mean compares with an estimate of 101 basis points in Hull (2012a, 2012b). Hence the different methodology of this paper obtains nevertheless quite exact figures. However the estimates of the excess return are not statistically significantly different from zero. The highest t-statistic is 1.8101 and the smallest is 1.7264. The highest upper-tailed p-value is 0.04214, and the smallest is 0.03514. However holding a portfolio of bonds for a substantial amount of time reduces the standard deviation to 0.6125, while it is expected to be 0.5865.

Anyway in this latter case the average t-statistic becomes huge at 169.140, implying an extremely high likelihood of obtaining a positive excess return in the long run.

The maximum of the maxima of the excess return is 382.858, and the minimum of the minima is -163.211 basis points. The maximum of the minima is -94.490, and the minimum of the maxima is 299.737 basis points, while the 95% confidence interval is between -11.360 and 218.558 basis points. All statistics follow a normal distribution except for the distribution of the maxima for which the p-value of the Jarque-Bera normality test is relatively low, rejecting normality at a 1% two-tailed marginal significance level. These results are confirmed in Table 3 with additional normality tests, although some of the normality tests in Table 3 show low p-values for the distribution of the minima, implying that the distribution of the minima is non-normal. In fact, there is no theoretical reason for the distributions of the maxima and the minima to be normal.

Since the tax premium is fixed at 38.84 basis points and the illiquidity premium is set at 4.35 basis points, then an estimate of the mean risk premium of the Baa corporate bond is 60.41 basis points, lower than the estimate in Elton et al. (2001) of 74.40 basis points. Since the historical mean equity risk premium is estimated to be 6.18%, (Mehra and Prescott, 1985), then the beta, or systematic risk, of a Baa corporate bond is just 0.098 according to an application of the CAPM. Including more recent observations for the equity risk premium reduces further down the beta of the Baa corporate bond. Brealey et al. (2014) report an average equity risk premium of 7.4% since the year 1900. This implies a beta for the Baa corporate bond of just 0.082, a figure which is highly reasonable. Based on all the above it is apparent that the Baa corporate bond risk premium is not at all too large, and, hence, one cannot describe this premium as a puzzle.

CONCLUSION

This paper has the purpose of estimating the Baa corporate bond yield spread and to identify its four determinants: a default risk premium, a tax premium, an illiquidity premium, and an excess risk premium. Especially important is the modeling of the default risk premium, which is commonly equated to the bond yield spread (Portait and Poncet, 2012; Hull, 2012a, 2012b). The default risk premium is the product of the default probability and the loss given default (LGD). In turn the LGP in percent is equal to one minus the recovery rate. It is no longer acceptable to assume that the default probability and the recovery rate are non-stochastic. However if these two parameters are indeed stochastic, then an analytical solution for their joint distribution is complex, if not impossible. This justifies resorting to Monte Carlo simulation. This is the approach adopted in this paper. The results show that the Baa corporate bond spread of around 144 basis points can be decomposed into a tax premium of 39 basis points, an illiquidity premium of 4 basis points, a default risk premium of 41 basis points, and this leaves 60 basis points as the excess risk premium. This implies a Baa bond beta, which is a measure of systematic risk under the CAPM, of around 0.08, which is quite reasonable. In addition, the paper argues that, although diversification among obligor names is limited, and although bond returns are heavily negatively skewed, time diversification can reduce substantially the uncertainty in the mean return of a portfolio of bonds, ensure normality of mean bond returns, and explain the excess risk premium as mainly systematic, instead of being considered as idiosyncratic. Time diversification arises when the bond portfolio is held for the long run. The major conclusion is that there is little evidence for a credit spread puzzle because an excess risk premium of 60 basis points is adequate when the volatility of the level of the Baa bond yield is 2.95%, which represents around 15% of the volatility of a portfolio of stocks.

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PERFORMANCE OF EMERGING AND NON-EMERGING INDUSTRY INITIAL PUBLIC OFFERINGS

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ABSTRACT

IPO underpricing is one anomaly in the finance literature widely observed across different stock markets. The purpose of this study was to test aftermarket performance up to one year for samples of US emerging and non-emerging industry initial public offerings (IPOs). According to previous research, on average most IPOs are underpriced due to investor uncertainty about firm performance. It follows that the level of investor uncertainty for emerging industry firm performance would be greater than for the well established non-emerging IPOs. This study examines how the randomly selected sample of IPOs from 1996-2012 performed on days 1,5, 30, 100, 180, and 1 year after the firm goes public. Unlike previous studies this work controls for the effect of hot vs. cold markets. Using the S&P 500 to adjust for risk this study analyzed a randomly selected sample of 40 firms (20 emerging and 20 non-emerging) to test for evidence of underpricing performance variation of emerging and nonemerging IPOs from 1996-2012. This study found that underpricing in the emerging industry IPOs significantly exceeded the non-emerging industry IPOs in all holding periods up to one year after the firms went public. The greatest variation in return occurred in the one day and one year holding periods.

INTRODUCTION

The two ways firms can raise capital include debt and equity financing. One form of equity financing involves offering the firm's stock for sale to the public for the first time. This is commonly referred to as going public or an initial public offering (IPO). IPOs can be an important and fresh source of funds for firms. The initial performance of IPOs up to one year has been the focus of most IPO studies. The high initial returns of IPOs have puzzled finance researchers for decades.

Studies on IPOs have shown that IPOs perform well during the initial day or days of trading. However, IPOs underperform in the long run or 3 to 5 years. This idea of IPO underpricing is a phenomenon that researchers have tried to explain. Underpricing occurs when the initial offering price for a stock is below the closing price for the stock at the end of the first day of trading (Finkle and Lamb, 2002). Most finance literature on IPOs shows that on average most IPOs are underpriced. In fact, US IPOs have enjoyed an 18% first day return over the last several decades causing firms to "leave a considerable amount of money on the table". There have been several explanations cited as to why IPOs are underpriced. Uncertainty surrounding the IPOs is one reason frequently cited as an explanation for the underpricing phenomenon (Johnston, 2000), which leads to high abnormal returns on the first day due to the risk. An agency problem and the existence of investment banker asymmetric information are also possible explanations for the underpricing phenomenon.

The purpose of this study was to extend previous research by investigating the aftermarket performance up to one year for IPOs in emerging and non-emerging industries while controlling for the effect of hot vs. cold markets. Finkle and Lamb (2002) defined an emerging industry as one in which the majority of firms are less than 15 years old. This study utilizes a sample of 40 firms (20 from an emerging industry and 20 from a non-emerging industry) that went public 1996-2012 to address the phenomenon of underpricing for emerging and non-emerging industry IPOs. Similar to the study conducted by Finkle and Lamb (2002), this study will address the following questions:

Does underpricing exist within emerging and non-emerging industry IPOs and to what degree?
Do emerging and non-emerging IPOs exhibit different aftermarket performance behavior up to one year following going public?

If the results show that the emerging industry IPOs are significantly more underpriced compared to the non-emerging industry sample while controlling for hot vs. cold markets, then emerging industry IPOs could be relatively more risky than non-emerging IPOs and thus would support a higher premium for investors.

LITERATURE REVIEW

Emerging vs. Non-Emerging IPO Performance

This study expands the IPO literature by analyzing and comparing emerging vs. non-emerging short-run return performance up to 1 year after the IPO and in a more controlled setting than in previous research. Specifically, unlike previous studies, this study controls for the extraneous effect of hot vs. cold markets on the observed IPO return performance of emerging vs. non-emerging IPOs.

Lamb and Finkle (2002) found evidence of under-pricing in their study of emerging and non-emerging industry IPOs during hot markets and the results showed that the average return at the end of the first day of trading was higher for emerging firms than for non-emerging firms. Stated differently, investors perceived emerging industries as having more risk than non-emerging industries. This study extends the work of Finkle and Lamb (2002) by focusing on the short-term post IPO performance and by controlling for the effect of hot vs. cold markets. High investor optimism during hot markets may explain significant under-pricing of IPOs observed in previous studies (Helwege and Liang, 2004).

IPOs Performance in Hot vs. Cold Markets

IPO markets tend to alternate between hot and cold both for initial returns and in numbers of IPOs originated. After the October 1987 stock market crash, the number of new U.S. IPOs in each year from 1988 to 1990 fell significantly. IPOs peaked in 1996 but the number fell dramatically during 2001 following the burst of internet bubble in the late 1990s. Initial-day returns in 1987, 1988, and 1994 were below 10%, but increased to over 50% in 1999 and 2000. Recent one day returns to US IPOs are much more in line with long-run averages. As such, years like 1999 and 2000 have been classified as hot markets with a large number of IPOs. In contrast, the markets in from 1988 to 1990 were cold markets with fewer IPOs. Under-pricing increases during hot markets and declines amidst cold markets (Foerster, 2001). Clearly, the effect of hot vs. cold markets could significantly influence IPO return performance results and thus is controlled in this study. Control of this extraneous variance is an important contribution of the work.

IPO Under-Pricing

Numerous studies in the finance literature document the significant underpricing of IPOs. Using a sample of 360 listed companies on the South African Stock Exchange, Neneh and Smit (2013) found IPOs to be significantly underpriced with an average market adjusted first day return of 62.9%. Considerable empirical evidence indicates that IPOs of common stock on average generate large short run returns (Finkle and Lamb, 2002). The extent of underpricing has varied from study to study because of the number of IPOs used, the methodology used, and the time period examined within each study. The focus of these studies has been on first day returns for investors. Explanations for underpricing have an underlying argument based on or related to the risk perceived by potential incoming investors. According to Jog and Wang (2002), high risk IPOs would be underpriced more than low risk IPOs, which offers a positive relationship between the degree of the underpricing and the riskiness of the IPO. New firms like new industries represent greater uncertainty due to lack of investor information about the future of the firm resulting in an extra layer of risk tacked on to the emerging industry IPOs.

Another explanation of underpricing is the agency problem between issuing firms and underwriters. The agency problem suggests that underwriters have more information than issuing companies and investors. IPOs are therefore underpriced for higher commissions or business for other services from investment bankers. Clearly it would be in the underwriter's best self interest to underprice the issue to increase the probability of a successful sale and thereby avoid heavy underwriting losses. And logically, the less demanded IPOs are underpriced to increase chances of selling all shares (Kuo, 2002).

Rock (1986), explained underpricing using the asymmetric information model, which identifies an agency problem involving firms, underwriters, and investors each with different levels of information about new firm going public. For example, a different level of knowledge about the true value of the IPO exists between informed and uninformed investors. Underwriters, firms, and uninformed investors will purchase underpriced IPOs because they are uncertain about the true value of a firm (Johnston, 2000). If new shares were priced at their expected value, informed investors would try to purchase the good issues (Finkle and Lamb, 2002). In essence, underpricing attracts uninformed investors in pursuit of a normal return.

Long Run Post IPO Performance

Evidence of long run underperformance has also been a major question of most IPO studies. Studies show that IPOs tend to underperform the market over the long run for periods of one to five years (Finkle and Lamb, 2002). Vithessonthi (2008) studied Thailand's emerging market economy and found IPO long run underperformance to be 41.68% more than IPOs in the US and Germany. He concluded that IPO long run underperformance is more prevalent and significant in developing countries than in developed nations. Ritter and Loughran (1995) sampled 4,753 companies from the period 1970-1990 and found an average annual return of 5%

per year and showed significant underperformance for the 5 years following the offering of these IPOs.

Finkle and Lamb (2002) identify three theories to explain the long run underperformance of IPOs. First, valuations of optimistic investors may be much higher than for pessimistic investors if there is uncertainty about the value of an IPO. As time goes by however more information will become available and the stock price eventually decreases resulting in underperformance (Finkle and Lamb, 2002).

Another theory suggests that IPO markets are similar to fads prompting investment bankers to under price IPOs to create excess demand. Therefore, companies with the highest initial returns will have lower subsequent returns (Finkle and Lamb, 2002). The window of opportunity theory (Loughran and Ritter, 1995; Ritter 1991) claims that firms try to take advantage of high volume when going public to benefit investor sentiment. As such, it follows that emerging industry IPOs are expected to underperform more than nonemerging industry IPOs in the aftermarket (Finkle and Lamb, 2002).

DATA AND METHODOLOGY

This study examines two randomly selected samples of 20 IPOs each from the emerging and non-emerging industries over the time period 1996-2012. To control for the effects of hot and cold markets on IPO performance, each sample was constructed with the same ratio of hot to cold market IPOs. Hot IPO markets are years that experience a large number (triple digit) of IPOs while cold market IPO years exhibit a small number of IPOs. The dot-com bubble from 1996-2000 is an example of a hot market with the number of IPOs ranging from a low of 381 in 2000 to a high of 676 in 1996. In essence, 60% of each sample contains IPOs from a time period classified as a hot market and the other 40% includes IPOs from a year defined as a cold market. Research documents that hot market IPOs result in significantly greater underpricing than those IPOs during cold markets. Sample selection and industry classification (emerging vs. non-emerging) follow the methodology of Finkle and Lamb, (2002). Table 1 and 2 describe the sample.

Table 1
PERFORMANCE OF EMERGING AND NON-EMERGING INDUSTRY INITIAL PUBLIC OFFERINGS
Emerging Industry Sample

Industry	**Number**
Biotechnology	9
Internet information Providers	6
Semiconductor- Specialized	5
Total	**20**

Table 2 PERFORMANCE OF EMERGING AND NON-EMERGING INDUSTRY INITIAL PUBLIC OFFERINGS Non-emerging Industry Sample	
Industry	**Number of firms**
Metals & Materials	3
Auto Parts	3
Sporting Goods	1
Aerospace/Defense Products and Services	3
Beverages- Soft Drinks	2
General Equipment	1
Major Airlines	3
Apparel Stores	4
Total	**20**

To analyze initial first day, 5 day, 30 day, 100 day, 180 day, and one year (252 trading day) returns for emerging and non emerging industry IPOs and examine the difference in underpricing behavior between two samples, the study proposes the following hypotheses:

H0: The difference in the average market adjusted initial first day, 5 day, 30 day, 100 day, 180 day, and one year (252 trading day) returns for the sample of emerging industry IPOs and the average market adjusted initial first day, 5 day, 30 day, 100 day, 180 day, and one year (252 trading day) returns for the sample of non-emerging industry IPOs will be 0.

H1: The average market adjusted initial first day, 5 day, 30 day, 100 day, 180 day, and one year (252 trading day) returns for the sample of emerging industry IPOs will be significantly greater than the average market adjusted initial first day, 5 day, 30 day, 100 day, 180 day, and one year (252 trading day) returns for the sample of non-emerging industry IPOs.

This study uses a buy and hold strategy, similar to Finkle and Lamb (2002), where an IPO is purchased at the end of the first day of trading and held for a 252 day trading interval. The S&P 500 is used to control for risk. The methodology used to analyze the data follows:

1. Historical prices for sample firms and the S&P 500 index were obtained from Yahoo Finance for their first trading year after the IPO is offered.
2. Day 1 is the first day the firm started trading shares publicly.
3. First day returns were calculated using the Holding Period Return (HPR) for each firm and the corresponding S&P 500 using the following formulas:
   $R_{f=}$ (Adjusted close price $_{day\ 1}$– Open price $_{Day\ 1}$/ Open price $_{day\ 1}$)*100
   R_i= (Adjusted close price $_{day\ 1}$- Open price $_{day\ 1}$/ Open price $_{day\ 1}$)*100
   Where:
   $R_{f=}$ HPR for the firm
   $R_{i=}$ HPR for the S&P 500
4. R_f - R_i provides the market adjusted return for day 1
5. One year returns (2-252 trading days) were calculated using the following formulas:
   R_f = (Adjusted close price $_{day\ 252}$- Adjusted close price $_{day\ 1}$/ Adjusted close price $_{day\ 1}$)*100
   R_i = (Adjusted close price $_{day\ 252}$- Adjusted close price $_{day\ 1}$/ Adjusted close price $_{day\ 1}$)*100

6. $R_f - R_i$ provides the market adjusted HPR for day 2-252.
7. The same methodology outlined above was used to produce the 5 day, 30 day, 100 day, and 180 day IPO HPR.

QUANTITATIVE TESTS AND RESULTS

Did the sample of emerging industry IPOs exhibit higher market adjusted average returns from the first day of trading up to a year than the market adjusted average returns from the first day of trading up to a year for the non-emerging sample? Was there evidence of more severe underpricing among the emerging industry IPOs? Table 3 and 4 summarize the average market adjusted return for the emerging and non-emerging samples.

Table 3
PERFORMANCE OF EMERGING AND NON-EMERGING INDUSTRY INITIAL PUBLIC OFFERINGS
S&P 500 Adjusted Returns for Emerging Industry IPOs

1 Day (%)	5 Day (%)	30 Day (%)	100 Day (%)	180 Day (%)	252 Day (%)	AVERAGE ALL HPRS
17.31	.21	4.11	4.45	9.87	22.54	7.22

Table 4
PERFORMANCE OF EMERGING AND NON-EMERGING INDUSTRY INITIAL PUBLIC OFFERINGS
S&P 500 Adjusted Returns for Non-Emerging Industry IPOs

1 Day (%)	5 Day (%)	30 Day (%)	100 Day (%)	180 Day (%)	252 Day (%)	AVERAGE ALL HPRS
8.91	-.20	3.80	3.51	7.85	8.58	6.70

Emerging industry IPO HPRs exceeded the non-emerging IPO HPRs in all holding periods with a significant difference at the 1% level on the 1 day and 1 year market adjusted returns. Results support the null hypothesis (H0) for the 5, 30, 100, and 180 day holding periods. Results support the alternate hypothesis H1 for the 1 day and 1 year holding periods. The average market adjusted initial first day and one year (252 trading day) returns for the sample of emerging industry IPOs were significantly greater than the average market adjusted initial first day and one year (252 trading day) returns for the sample of non-emerging industry IPOs. Based on the results, the sample used in this study shows evidence of underpricing similar to the results of Finkle and Lamb (2002).

CONCLUSION

This study examined the average market adjusted initial first day, 5 day, 30 day, 100 day,180 day, and one year (252 trading day) returns for two 20 firm samples from emerging and nonemerging industry IPOs for the time period 1996-2012 to test for variation between the two industries while controlling for the effect of hot vs. cold markets. This study extends the work of Finkle and Lamb (2002) by focusing on the short-term post IPO performance and by controlling for the effect of hot vs. cold markets. Since high investor optimism during hot markets may explain the significant under-pricing of IPOs observed in previous studies, it is important to control for the effect of hot vs. cold markets (Helwege and Liang, 2004).

Using the S&P 500 to control for risk, holding period returns were calculated for each firm during the first the first year following the IPO. Multiple holding period returns from day1 to 1 year for each firm were then adjusted using the corresponding S&P 500 returns. Results support evidence of significant underpricing in emerging and non-emerging industry IPOs. As expected, emerging industry IPO HPRs exceeded the non-emerging IPO HPRs in all holing periods with a significant difference at the 1% level on the 1 day and 1 year market adjusted returns. After controlling for the effect of hot vs. cold markets, results here support the findings of Finkle and Lamb (2002)

The results of this study show that the emerging industry IPOs are significantly more underpriced compared to the non-emerging industry sample and therefore emerging industry IPOs appear to be relatively more risky than non-emerging IPOs and thus would support a higher premium for investors. Evidence here points to a higher level of investor uncertainty for emerging industry firm performance than for the well established non-emerging industry IPOs.

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DEBT AND DIVIDEND DECISIONS: AN ANALYSIS AND COMPARISON OF NON-STOCK ELECTRIC UTILITIES WITH INVESTOR OWNED FIRMS

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ABSTRACT

This micro scale study tests the trade-off and pecking order theories about the debt and dividend decisions for non-stock firms within the electric utility industry. The decision to finance investments with debt or equity determines the firm's capital structure. The trade-off theory posits an optimal balance of debt and equity, motivating the firm to use debt until its cost exceeds issuing equity thus deriving the firm's optimal capital structure. Meanwhile, the pecking order theorem contends the firm should use internal funds first, then debt, and equity as a last resort. Both theories have the same fundamentals for the payout of dividends, or capital credits, in the case of rural electric cooperatives (RECs). Larger, more profitable firms with less risk and debt should pay out larger capital credits as patronage capital. This study examines non-stock firms and compares results to a previous market wide macro study based on the Value Line Survey. The non-stock company sample includes 900 firms followed by the Cooperative Finance Corporation (CFC) and analyzes financial data using OLS regression to test the effects of selected financial variables on the debt and dividend/capital credit decisions. In the case of non-stock firms, both debt and dividend decisions appear to follow the pecking order theory (Smiy, 2009).

INTRODUCTION

The purpose of this study is to examine what drives debt and dividend decisions in non-stock firms within the electric utility industry and to compare the findings to similar research for stock firms. This study addresses questions such as: How do growth opportunities and the current financial structure influence these payments, and to what degree is profitability a factor for pay out decisions? Most importantly, what effect does the degree of financial leverage caused by debt financing have on dividend payout decisions?

This paper uses empirical models previously derived by scholars within the field to compare the effects of selected independent variables on capital credit payout and debt decisions within U.S. rural electric cooperatives. Pay out decisions in both stock and non-stock firms are found in the literature, but a comparison of the two has been overlooked in previous research. Previous studies on dividend and debt decisions examined firms in numerous industries. In order to gain a more accurate insight into these decisions this research examines a sample of non-stock RECs for comparison with previous research on stock firms. This research adds to the body of finance literature by analyzing debt and dividend decisions in non-stock firms and comparing the findings to previous research on stock firms.

LITERATURE REVIEW

A review of the finance literature claiming to explain the factors motivating the debt and dividend decisions lays the foundation for this research. Concepts and theories on debt and dividend decisions seem to be ever changing. This could be attributed to different groups of firms being tested or changing market conditions. However, scholars seem to agree upon a select group of independent variables that affect the debt and dividend decisions. This study utilizes variables suggested by the literature along with others, as deemed necessary with support by previous finance research within the relatively un-tested non-stock firm population. Debt and dividend variables utilized by Smiy in a study of non-stock electric utilities are used to examine what motivates the debt and dividend/capital credit decisions (Smiy, 2009). These functions are: debt decision= f (size, profitability, dividend payout, risk, fixed assets, growth, return on assets) and dividend decision= f (size, profitability, financial leverage, risk, fixed assets, growth, liquidity) respectively. Review of the literature in this area provides a basic framework and explanation of the underlying theory of debt and dividend decisions.

Basis for Debt Decisions

Debt decisions influence pay out decisions within a firm; however, several other factors can affect a firm's sentiment on debt decisions. Debt financing can lead to increased risk, which could lead to failure to meet financial obligations or bankruptcy. There are currently two main theories claiming to explain why firms use debt. The first is the pecking order theory, which states that firms would rather utilize retained earnings before moving towards debt or equity in order to finance investment opportunities. The second is the trade-off theory, which is the assumption that firms try to keep a balanced use of debt and equity to finance investment opportunities (Smiy, 2009). Due to the tendency of electric utilities to frontload large amounts of long-term debt, these firms tend to favor the pecking order theory. Another factor that surfaces in the literature is debt's effect on free cash flow problems. A free cash flow problem occurs when a firm has invested in all positive net present value investments and has cash left over. The manager must decide how to manage these funds. One scholar concluded that firms that have lower debt tend to pay out more to control free cash flow problems (Kim, 2010). Debt decision strategies may vary by industry suggesting that control for type of industry could strengthen the research findings on the effects of debt decisions (Zimbelman, 2010). As such, this study controls for type of industry. In this regard, the findings of this study of non-stock industry specific firms are compared to previous research on the effects of the debt decision from a market wide perspective.

Basis for Dividend/Capital Credit Decisions

There are numerous theories provided in the finance literature purporting to explain the factors surrounding dividend payouts. The theories found in Smiy's research are based on the principals of capital credits, the corporate equivalent of dividends for non-stock firms (Smiy, 2009). According to the Modigliani-Miller Dividend Irrelevancy Theorem, without tax considerations, investors are apathetic as to whether a firm pays dividends or reinvests them in profitable opportunities. This assumes that dividends are actually paid out for behavioral issues including market imperfections, such as taxes and agency costs, and the fact that people are generally risk adverse and typically enjoy the reliability of dividend income (Smiy, 2009).

The other two hypotheses include the pecking order and the trade-off theories. Both theories hypothesize a positive correlation between profitability and dividend payout. Smiy and others also found that firms with high financial leverage are less likely to pay out dividends (Smiy, 2009). This suggests that debt decisions and dividend payout may be negatively correlated. These two theories differ in that the trade-off theory assumes free cash flow problems and that firms need to be knowledgeable of when it is in the firm's best interest to pay out a dividend. This coincides with Kim's conclusion that firms with lower debt tend to pay out more dividends. This is because dividend payouts are preferred over debt activities when a firm is having significant free cash flow problems (Kim, 2010).

Geography and tax law are significant as well when looking at dividend decisions. For the purpose of this study, we will only be looking at RECs operating within the continental United States. The U.S. differs significantly in its tax codes for capital gains relative to dividend decisions. Since the 1980's Europe has taken steps to reduce the tax advantage of capital gains relative to dividends (Douglas, 2002)**.** This is not the case in the United States. It appears that perception plays a key role in dividend decisions. While dividends can be more costly to corporations, they are at times viewed as optimal over debt decisions (Douglas, 2002).

SELECTED VARIABLES

Size

Since larger firms tend to bring in greater revenues, larger firms tend to have smaller bankruptcy costs. In fact, it appears that the ratio of bankruptcy costs to the market value of the firm drops as the value of the firm increases (Warner, 1977). For the REC sample total utility plant or TUP serves as the proxy for size. The CFC Key Ratio Trend Analysis defines TUP as total "distribution, general, headquarters, intangible plant, transmission and all other utility plant. Along with electric plant in service, TUP includes electric plant purchased, sold or leased to others, other utility plant, nuclear fuel items and all incomplete construction work that is under way by cooperative staff or contractors, including expenditures on research, development and demonstration projects for construction of utility facilities" (CFC Key Ratio Trend Analysis, 2006). This value is expressed in thousands of dollars.

Profitability

Past research has found that high cash flow firms generally use less debt financing (Zimbelman, 2010). However, the operating structure of electric utilities is funded primarily through long-term debt and equity with relatively long payback periods. Because of this, return on equity will serve as the proxy for profitability in the REC sample. ROE is a measure of profit per dollar of equity. However, it is considered the true bottom-line measure of performance (Ross, Westerfield, & Jaffe, 2010, p. 55)

Dividend Payout

Dividend payout is used as both an independent and dependent variable in this study depending on which function is tested. However, dividend Payout is a bit different for the electrical cooperatives. As they are non-stock firms they do not pay out dividends. Instead, these co-ops pay what is called a capital credit, which is similar to a dividend. For the REC sample, annual capital credits retired per total equity as a percent will proxy for dividend payout. Annual capital credits retired per total equity is defined as the portion of a system's total equity that is being returned to the members as patronage capital (CFC Key Ratio Trend Analysis, 2006). The payout of these credits shows consumers that electric co-ops offer electricity at or slightly above cost. Generally there is a multitude of manners in which these credits can be paid out. However, tax benefits are normally associated with the payout of capital credits.

Risk

While risk is an umbrella term in the realm of finance, in this study risk will refer to the uncertainty of profits, the chance for the loss of profits, and the chance that a firm will be unable to meet its financial obligations. The CFC Analysis does not provide a well-defined ratio that represents financial risk. However, the system average interruption duration index – total (SAIDI) falls under this study's definition of risk. This index is defined as "the measure of total service interruption for consumers for any reason, measured in hours" (CFC Key Ratio Trend Analysis, 2006). With the interruption of service, a co-op will obtain dissatisfied customers, which will in turn result in lost revenues. Many causes of service interruption, like severe storms, have high costs associated with them. Therefore, this index presents an uncertainty for profits.

Fixed Assets

Fixed assets serve as a control variable for the size of the firm. This value allows for the evaluation of all firms on the same level (Smiy, 2009). Total utility plant investment per mile of line in dollars is used to proxy for fixed assets. This value equates to fixed assets and shows the average cost of total utility plant investment per mile of line in service (CFC Key Ratio Trend Analysis, 2006). Electric line is considered a long term asset and can provide returns for generations. Total miles of line could also serve as an appropriate value.

Growth

On average faster growing firms, use less debt financing (Zimbelman, 2010). High growth firms also tend to pay out fewer dividends because they would rather reinvest profits into future growth opportunities. The REC sample uses the annual growth in KWH sold as the proxy for growth. It is important to take into account that on average electric utilities have high start-up costs and are heavy on long term debt financing. However, this should not significantly affect annual growth rates.

Financial Leverage

Financial leverage serves as both an independent and dependent variable in this study. Debt financing is used in firms to increase operating income by purchasing fixed assets. Thus, firms invested heavily in fixed assets use more debt financing (Zimbelman, 2010). For the REC sample long-term debt as a percentage of total assets is used to proxy for financial leverage. The

CFC Analysis defines this ratio as a measure of the portion of assets that are financed with debt as opposed to internally generated funds. The ratio includes all long-term debt used to finance plant in service.

Liquidity

The most common ratio used to describe liquidity to date is the current ratio (Harper, 1995). The current ratio equals current assets divided by current liabilities. The current ratio shows the ability of a firm to turn its product into cash to handle financial obligations. The study uses the current ratio as a proxy for liquidity.

Past Conclusions

Finance scholars including Smiy (2009), Kim (2010), and Zimbelman (2010) have contributed significant research concerning the factors motivating the debt and dividend decisions. A brief summary of their findings and hypotheses follows:

1. Larger firms that are more profitable tend to pay out more dividends.
2. Larger Firms on average take on more debt.
3. A majority of firms issue debt as a last resort due to free cash flow problems.
4. Firms that are more profitable take on less financial leverage.
5. Studies have contained conflicting findings on the relationship of profitability to dividend payouts (this could be related to industry or changes in market).
6. Dividend payouts tend to be negatively correlated with risk and growth.
7. Firms can use dividend payout and debt interchangeably for controlling free cash flow problems.

It should be noted that these conclusions are based on market wide samples. As the tested sample becomes more industry specific some of these conclusions may change based on the unique characteristics of each industry.

METHODOLOGY

The relevant data for the analysis of the non-stock RECs was obtained from the Cooperative Finance Corporation, one of the industry's major lenders. The sample of non-stock firms consists of over 900 firms in the electric distribution. All tests employ Ordinary Least Squares regression with appropriate examination of potential multicollinearity. Hypotheses for each of the tests are shown below. Note that these functions are estimates and are subject to change. However, these variables show relatively the same trends so they can be used interchangeably. Each independent and dependent variable is discussed below.

The National Rural Electric Cooperative Association (the REC trade association at www.nreca.coop) represents the coops that serve over 42 million people in 47 states and provides services to 18 million businesses, homes, schools, churches, farms, irrigation systems, and other establishments in 2,500 of 3,141 counties in the United States. This includes 12% of the nation's population (Analysis, Co-op Facts & Figures, 2010). Also, cooperatives like well known credit unions are not-for-profit, which means that they pay off excess revenues as capital credits.

The Regression Model for the Dividend Decision

Dividend /Capital Credit Decision for REC Sample = f (Size, Profitability, Financial Leverage, Risk, Fixed Assets, Growth, Liquidity):

$H0_{divcap}$: There is no significant relationship between the dividend/capital credit payout decision and the proposed independent variables.

$H1_{divcap}$: There is a significant positive relationship between the dividend/capital credit payout decision and the proposed independent variables.

$H2_{divcap}$: There is a significant negative relationship between the dividend/capital credit payout decision and the proposed independent variables.

Table 1
VARIABLES AND HYPOTHESIS FOR
DIVIDEND/CAPITAL CREDIT DECISION FOR
NON-STOCK FIRMS

FACTOR	**VARIABLES**	**DEFINITIONS**	**HYPOSTHESIZED SIGN**
CAPITAL CREDIT PAYOUT	Annual Capital Credit Retired per Total Equity	Portion of equity that is being returned to members as capital credits	DEPENDENT VARIABLE
SIZE	Total Plant Utility	Value in thousands of dollars indicating size of the utility plant	PECKING ORDER (+) TRADE-OFF (+)
PROFITABILITY	Return on Equity	Net income returned as a percentage of shareholders equity.	PECKING ORDER (+) TRADE-OFF (+)
FINANCIAL LEVERAGE	Debt as % of Assets	1 – equity as % of assets	PECKING ORDER (-) TRADE-OFF (-)
POWER RELIABILITY (Risk)	System Average Interruption Duration Index (SAIDI)	Natural log of total service interruption for consumers in hours	PECKING ORDER (-) TRADE-OFF (-)
SIZE CONTROL VARIABLE	Total Utility Plant Investment per Mile of Line ($)	Value reflects type of area served by system	PECKING ORDER (-) TRADE-OFF (-)
GROWTH	Growth in KWH sold	Current year KWH sales minus previous year KWH sales / previous year KWH sales	PECKING ORDER (-) TRADE-OFF (-)
LIQUIDITY	Current Ratio	Current assets / Current liabilities	PECKING ORDER (-) TRADE-OFF (-)

The Regression Model for the Debt Decision

Debt Decision for the REC Sample = f (Size, Profitability, Dividend Payout, Risk, Fixed Assets, Growth):

$H0_{debt}$: There is no significant relationship between the debt ratio and the proposed independent variables.

$H1_{debt}$: There is a significant positive relationship between the debt ratio and the proposed independent variables.

$H2_{debt}$: There is a significant negative relationship between the debt ratio and the proposed independent variables.

Table 2 VARIABLES AND HYPOTHESIS FOR NON-STOCK DEBT DECISION			
FACTOR	**VARIABLES**	**DEFINITIONS**	**HYPOSTHESIZED SIGN**
FINANCIAL LEVERAGE	Debt as % of Assets	1 – equity as % of assets	DEPENDENT VARIABLE
SIZE	Total Plant Utility	Value in thousands of dollars indicating size of the utility plant	PECKING ORDER (+) TRADE-OFF (+)
PROFITABILITY	Return on Equity	Net income returned as a percentage of shareholders equity.	PECKING ORDER (-) TRADE-OFF (+)
CAPITAL CREDIT PAYOUT	Annual Capital Credit Retired per Total Equity	Portion of equity that is being returned to members as capital credits	PECKING ORDER (-) TRADE-OFF (-)
POWER RELIABILITY (Risk)	System Average Interruption Duration Index (SAIDI)	Natural log of total service interruption for consumers in hours	PECKING ORDER (-) TRADE-OFF (-)
SIZE CONTROL VARIABLE	Total Utility Plant Investment per Mile of Line ($)	Value reflects type of area served by system	PECKING ORDER (-) TRADE-OFF (-)
GROWTH	Growth in KWH Sold	Current year KWH sales minus previous year KWH sales / previous year KWH sales	PECKING ORDER (+) TRADE-OFF (+)

QUANTITATIVE TESTS AND FINDINGS

Using the discussed variables, the following functions describe the regressions performed in this study. $Credit_D = \beta*_0 + \beta*_1 Plant\ Utility_i + \beta*_2 ROE_i - \beta*_3 Debt_i - \beta*_4 SAIDI_i - \beta*_5 Investment_i - \beta*_6 KWH\ Growth_i + \beta*_7 Current_i + \varepsilon_i$. $Debt_D = \beta*_0 + \beta*_1 Plant\ Utility_i + \beta*_2 ROE_i - \beta*_3 Credit_i - \beta*_4 SAIDI_i - \beta*_5 Investment_i + \beta*_6 KWH\ Growth_i + \varepsilon_i$.

Table 3 REGRESSION RESULTS FOR DIVIDEND/CAPITAL CREDIT DECISION			
FACTOR	**VARIABLES**	**BETA COEFFICIENT**	**HYPOSTHESIZED SIGN**
CAPITAL CREDIT PAYOUT	Annual capital credit retired per total equity	N/A	DEPENDENT VARIABLE
PROFITABILITY	Return on Equity	+0.010730***	PECKING ORDER (+) TRADE-OFF (+)
LIQUIDITY	Current Ratio	+0.353416**	PECKING ORDER (-) TRADE-OFF (-)
GROWTH	Growth in KWH sold	-0.003269	PECKING ORDER (-) TRADE-OFF (-)
SIZE	Total Plant Utility	+2.04688E-05***	PECKING ORDER (+) TRADE-OFF (+)
POWER RELIABILITY (RISK)	System Average Interruption Duration Index (SAIDI)	-0.013331***	PECKING ORDER (-) TRADE-OFF (-)
SIZE CONTROL VARIABLE	Total Utility Plant Investment per Mile of Line ($)	-1.49868E-05***	PECKING ORDER (-) TRADE-OFF (-)
FINANCIAL LEVERAGE	Debt as % of assets	-0.024069***	PECKING ORDER (-) TRADE-OFF (-)
R square	0.861542		

N	819		

*** Significant at the 1% level
** Significant at the 5% level
* Significant at the 10% level

Correlation Results for the Dividend/Capital Credit Decision Independent Variables

	Total Utility Plant (size proxy)	*Return on Equity*	*Long-term Debt as a Percentage of Total Assets*	*System Average Interruption Duration Index (SAIDI)–Total*	*Total Utility Plant Investment per Mile of Line ($)*	*Annual Growth in KWH Sold*	*Current Ratio*
Total Utility Plant (size proxy)	1						
Return on Equity	0.115495032	1					
Long-term Debt as a Percentage of Total Assets	0.72920669	0.384021042	1				
System Average Interruption Duration Index (SAIDI)–Total	0.602055951	-0.064036742	0.29985844	1			
Total Utility Plant Investment per Mile of Line ($)	0.790365932	-0.041791567	0.465287944	0.88156603	1		
Annual Growth in KWH Sold	-0.14125342	-0.027615418	-0.002651156	-0.039317103	-0.060763164	1	
Current Ratio	0.947182751	0.127209514	0.708761282	0.801030229	0.876920172	-0.111940057	1

The regression analysis for the dividend/capital credit decision indicates that the following variables correlate negatively to the dividend decision as hypothesized, and are significant at the 1%: risk and financial leverage. The growth of the firm related negatively to the dividend decision but was not significant, which was an unanticipated result. The dividend decision correlated positively as hypothesized with the firm’s size and profitability, with the results significant at the 1% level. However, liquidity related positively with the dividend decision at a significance of 5%, resulting in unanticipated findings. Out of the seven variables tested against the dividend decision, five of the variables had hypothesized results at the 1% significance. Only one of the variables that was tested showed unanticipated results.

The results for the beta coefficients in the regression analysis are based off individual regressions done for each independent variable, as well as correlations between all the independent variables. A common problem with multiple regression analysis arises when the potential for collinearity among the selected independent variables or multicollinearity exists. To check for the presence of multicollinearity, we follow the process offered by Canavos (Canavos, 1984) that is, employ large samples of firms and test for collinearity among independent variables with a correlation matrix as shown in Table 4. According to Mason and Lind (Mason & Lind, 1996), “A common rule of thumb is that correlations among independent variables from negative .70 to positive .70 do not cause problems.” As shown in above, only a few of the selected independent variables for each of the four regressions were shown to be highly correlated since most were within the –0.70 to + 0.70 guidelines. Therefore, multicollinearity has a slight presence within this sample. The observation of additional variables may correct for this anomaly.

Table 4
REGRESSION RESULTS FOR DEBT DECISION

FACTOR	**VARIABLES**	**BETA**	**HYPOSTHESIZED SIGN**

		COEFFICIENT	
FINANCIAL LEVERAGE	Debt as % of assets	N/A	DEPENDENT VARIABLE
PROFITABILITY	Return on Equity	+0.686751***	PECKING ORDER (-) TRADE-OFF (+)
CAPITAL CREDIT PAYOUT	Annual capital credit retired per total equity	-3.641923***	PECKING ORDER (-) TRADE-OFF (-)
GROWTH	Growth in KWH sold	+0.172221***	PECKING ORDER (+) TRADE-OFF (+)
SIZE CONTROL VARIABLE	Total Utility Plant Investment per Mile of Line ($)	-8.2378E-05***	PECKING ORDER (-) TRADE-OFF (-)
SIZE	Total Plant Utility	+0.000205***	PECKING ORDER (+) TRADE-OFF (+)
POWER RELIABILITY (RISK)	System Average Interruption Duration Index (SAIDI)	-0.059630***	PECKING ORDER (-) TRADE-OFF (-)
R square	0.676219		
N	819		

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

Correlation Results for the Debt Decision Independent Variables

	Total Utility Plant (size proxy)	*Return on Equity*	*Annual Capital Credits Retired Per Total Equity (%)*	*System Average Interruption Duration Index (SAIDI)–Total*	*Total Utility Plant Investment per Mile of Line ($)*	*Annual Growth in KWH Sold*
Total Utility Plant (size proxy)	1					
Return on Equity	0.115495032	1				
Annual Capital Credits Retired Per Total Equity (%)	0.79048692	0.190412135	1			
System Average Interruption Duration Index (SAIDI)–Total	0.602055951	-0.064036742	0.131100149	1		
Total Utility Plant Investment per Mile of Line ($)	0.790365932	-0.041791567	0.338949927	0.88156603	1	
Annual Growth in KWH Sold	-0.14125342	-0.027615418	-0.187279072	-0.039317103	-0.060763164	1

The regression analysis results for the debt decision in Table 4 indicate that the following variables correlated positively to the debt decision as hypothesized and are significant at the 1%: Profitability, growth, and size. The regression analysis for the debt decision indicates that the following variables correlated negatively to the debt decision as hypothesized and are significant at the 1%: Risk and capital credit payout. There were no unanticipated results. Out of the six tested variables, all six proved to be in line with the hypothesis of either the trade-off theory or the pecking order theory.

The results for the beta coefficients in the regression analysis are based off individual regressions done for each independent variable, as well as correlations between all the independent variables. A common problem with multiple regression analysis arises when the potential for collinearity among the selected independent variables or multicollinearity exists. To check for the presence of multicollinearity, we follow the process offered by Canavos (Canavos, 1984) that is, employ large samples of firms and test for collinearity among independent variables with a correlation matrix as shown in Table 4. According to Mason and Lind (Mason & Lind, 1996), "A common rule of thumb is that correlations among independent variables from negative .70 to positive .70 do not cause problems." As shown in above, only a few of the selected independent variables for each of the four regressions were shown to be highly correlated since most were within the –0.70 to + 0.70 guidelines. Therefore, multicollinearity has a slight presence within this sample. The observation of additional variables may correct for this anomaly.

Results of the regressions appear to support several conclusions found in past research on non-stock firms. However, the results differ significantly from the conclusions based off the stock firms. In accord with previous research on RECs, this study finds the debt decision to correlate negatively with dividend payout and risk. Larger firms possess greater debt capacity and take on more debt to finance their future investments and high start up costs. This is apparent in the electric utility industry as firms frontload large amounts of long-term debt in order to establish the firm's infrastructure. Overall, size, growth, and profitability are positively correlated with debt decisions, while dividend payout and risk are negatively correlated.

The results of the dividend decision regression modeled past conclusions in relation to non-stock firms almost exactly, the exemption being liquidity. Accordingly, this study confirms that higher profit firms tend to pay out more dividends. The regression also shows that profitability, size and liquidity are positively correlated with dividend payout decisions, while risk, growth, and financial leverage are negatively correlated. Results show that larger well-established firms, where profitability is high, rely on dividend payouts to influence investors to continue to put their faith in the firms. However, this could also be perceived as a negative action and may indicate the RECs are charging too much for energy.

Stock vs. Non-Stock Firms

In comparison, past results for the debt decisions of non-stock firms differs slightly. This is a more focused study and results may vary due to the operational structure of a single industry. In my past study, regressions revealed that debt decisions correlate negatively with profitability and growth in relation to stock firms. This means that smaller less profitable firms tend to make more debt financing decisions. However, non-stock RECs use more debt as the firm grows and becomes more profitable. This is most likely due to the high start up costs associated with the electric utility industry. These costs are normally financed with long-term debt with unusually large payoff horizons. The past regression also shows that dividend payments are positively correlated with debt decisions, while there is a negative correlation with non-stock RECs. This study demonstrates that the relationship between growth, profitability, and dividend payout in relation to debt decisions for non-stock firms is opposite from stock firms. However, this may be attributed to an industry specific sample. Table 5 summarizes the correlation of debt decision drivers for stock and non-stock firms in relation to the hypothesized correlations.

Table 5
SUMMARY OF DEBT DECISION DRIVERS

DRIVER CORRILATION	HYPOTHESIS	STOCK FIRM	NON-STOCK FIRM
POSITIVE	• SIZE • GROWTH	• SIZE • DIVIDEND PAYOUT	• SIZE • GROWTH

		• RISK	• PROFITABILITY
NEGATIVE	• PROFITABILITY • RISK • DIVIDEND PAYOUT	• PROFITABILITY • GROWTH	• DIVIDEND PAYOUT • RISK

In relation to capital credit decisions for non-stock firms, an interesting story developed. Like stock firms, more profitable firms tend to pay out more capital credits. Profitability, size, and liquidity are positively correlated with capital credit decisions. Growth, risk, and financial leverage are negatively correlated with capital credit decisions. The dividend decision drivers for non-stock firms are almost the exact opposite of the stock firms. The only constants are profitability and risk. Table 6 summarizes the correlation of dividend and capital credit decision drivers for stock and non-stock firms in relation to the hypothesized correlations

Table 6 SUMMARY OF DIVIDEND OR CAPITAL CREDIT DECISION DRIVERS			
DRIVER CORRILATION	HYPOTHESIS	STOCK FIRM	NON-STOCK FIRM
POSITIVE	• SIZE • PROFITABILITY	• GROWTH • PROFITABILITY • FINANCIAL LEVERAGE	• SIZE • PROFITABILITY • LIQUDITY
NEGATIVE	• RISK • GROWTH • LIQUIDITY • FINANCIAL LEVERAGE	• RISK • SIZE • LIQUIDITY	• RISK • GROWTH • FINANCIAL LEVERAGE

CONCLUSION

Overall, it appears that for most firms' debt and dividend decisions are not used interchangeably within the operating structure of non-stock RECs as they are with stock firms. A negative correlation exists between debt and dividend decisions. Debt financing tends to increase for larger more profitable firms most likely seeking investment opportunities in the future. Dividend decisions also tend to increase for larger firms that are more profitable. However, this is more likely to build goodwill through strong positive signaling to investors. However, this signal can also be viewed as negative by some.

Profitability surfaces as a significant factor in both debt and dividend decisions. In this study, profitability is positively correlated with both debt and dividend decisions. This suggests that firms that are more profitable tend to pay out more capital credits and continue to expand their infrastructure through the use of debt financing. Industry should be taken into account when making an informed decision about a firm. In comparison, most stock firms can use debt and dividend decisions interchangeably. Debt financing decrease for more profitable firms, but tends to increase as firms get smaller. The same is true for capital credit decisions. However, one possible explanation for larger capital credit payments in relation to size is to boost goodwill to make up for poor performance.

Both stock and non-stock firms embrace the goal of maximization of value to the owner. However, there is no traded stock or market value for Rural Electric Cooperatives to compare to the stock prices of Investor-Owned Utilities. This limitation forces the comparison analysis to focus on fundamental financial data. In the case of non-stock firms, growth was positively correlated with debt and negatively correlated with capital credit decisions. Size was positively correlated with debt and capital credit decisions. This is the exact opposite of stock firms. This could possibly be related to the specific operating structure of the electric utility industry. A logical extension of this study would be to test additional industries to determine if decisions continue to differ from market wide conclusions. It is believed that decisions will differ from industry to industry as firms tend to operate in a similar manner within a single industry. The electric power industry is critical to any developed society's economic growth. Generation, transmission, and distribution of power to industrial, commercial, and residential consumers at the lowest possible cost is the mission of both non-stock and stock utilities. Due to the difference on the business models, debt and dividend decisions vary. Empirical research on these differences can test the relative success of either group's ability to efficiently serve society's needs. Non-stock electric utilities may represent a superior business model in achieving this critical mission.

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IS POLLUTION PROFITABLE? A CROSS-SECTIONAL STUDY

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ABSTRACT

Given the global emphasis on corporate social responsibility [CSR] and sustainability initiatives, and an increasing focus of public policy on CSR disclosure and attestation, we investigate whether profitability trumps policy concerns: Specifically whether it is profitable to pollute. Prior research has provided conflicting evidence on this issue. We employ annual returns as a proxy for financial performance, and assess environmental performance using 13 distinct variables. Our conclusion is that policy initiatives should focus on environmentally friendly activities that have the potential to enhance (or not burden) the financial performance of firms if we wish those initiatives to be embraced.

Keywords: corporate social responsibility, environmental performance, financial performance

Data Availability: Data are available from sources identified in the text

INTRODUCTION

The "Go green" initiatives seen at every level of society demonstrate society's concerns regarding the importance of preserving the environment. Attempts to protect the environment are seen at most, if not all, levels of society. Across borders, countries have worked on international environmental protection treaties such as the Kyoto protocol under which signatory nations committed to binding emission reduction targets (The Kyoto Protocol to the United Nations [UN] Framework Convention on Climate Change is an international treaty adopted on December 11, 1997 in Kyoto, Japan that places binding obligations on industrialized countries to reduce greenhouse gas emissions - of the member nations of the UN all but Andorra, Canada, South Sudan and the United States ratified the treaty). Within countries, governments and regulatory agencies have established rules and regulations to protect and preserve the surrounding environment, but the authority and effectiveness of these agencies varies from one country to another. In the United States, for instance, the Environmental Protection Agency [EPA] sets protective rules and applies clean-up sanctions on firms polluting the environment. In the corporate world, firms strive not just to avoid sanctions from the EPA, but also to maintain an environmentally conscious public image. Further, individuals are, in their daily actives, more aware and oriented towards recycling products and reducing waste. Wasteful activities endanger the environment whether by individuals or by businesses. Firms' large-scale operations constitute a greater threat to the environment especially when financial incentives and social incentives are at odds. In this study we shed light on the issue by providing evidence on the nature of the association between environmental and financial performance.

In the environmental performance literature there has been a vigorous debate about the association between corporate environmental performance and financial performance. One school supports the traditional perspective, which suggests that expenditures on environmental improvements involve additional costs that generally provide no additional value to the firm. Another school supports the relatively newer perspective, which suggests that expenditures on environmental improvements and pollution controls lead to increased firm value. A third school suggests that corporate environmental performance and financial performance have no association whatsoever. We seek to offer some resolution to the debate, and to provide specific guidance for public policy, by employing a variety of distinct attributes of corporate environmental performance in our models.

This research addresses the overall association between firms' environmental performance and capital market valuations. Prior research has provided conflicting evidence on this association, and has often followed an event study methodology that yields results that are not generalizable (See, for example, Blaconniere and Patten 1994, Blaconniere and Northcut 1997, Freedman and Patten 2004, and Griffin and Sun 2013). Unlike prior studies, we conduct an explanatory study to investigate the general association between corporate environmental performance and firms' annual returns independent of any particular environmental event. By taking this approach, we are able to present evidence regarding the nature of the association between environmental and financial performance that is generalizable and that explains the contradictory results of prior studies. We are also able to investigate how environmental attributes interact when combined into a single overall measure. The results of this study may provide guidance to investors, regulators and standard setters with respect to their understanding of the nature of the conflicts involved. It may also help regulators and standard setters identify relevant venues to resolve these conflicts. If, for example, profits are the objective firms seek when conducting operations that endanger the environment, then regulators and standard setters should impose financial sanctions to make such activities unprofitable. If, however, poor environmental performance is not motivated by profit objectives, then financial sanctions will punish firms but not alter their behavior.

LITERATURE REVIEW

The association between environmental performance and financial performance, measured by stock price changes, has been addressed by several studies. Some, such as Belkaoui (1976), Anderson and Frankle (1980), Solomon and Hansen (1985), and Burnett, Skousen and Wright (2001) support a positive association where the cost of a high level of corporate social responsibility is more than offset by increased employee morale, productivity and firm value.

Other studies, such as those by Ingram and Frazier (1980) and Jaggi and Freedman (1982) have found, however, that a negative relationship exists between corporate social responsibility and firm performance. Craig Deegan (2004) notes, however, that the study presents limited evidence and low power due to the small sample size and that this limits the generalizability of the results. Lorraine, Collison and Power (2004) on the other hand, find no association between abnormal returns and good environmental news, while bad news results in negative returns. Fryxell and Wang (1994) argue that inaccurate measures for a construct may lead to conflicting results and note that the strong association between the Corporate Reputation Index [CRI] and firms' financial performance stems from the fact that the Corporate Reputation Index is heavily weighted by the financial position of the firm.

McGuire, Sundgren and Schneeweis (1988) provide a summary of the three theoretical relationships between corporate social responsibility [CSR] and financial performance, which despite their contrary assertions, have all been supported by prior research. They first suggest a negative association since high levels of social responsibility cause firms to incur additional costs that put the firm at an economic disadvantage compared to other less socially responsible firms. They also suggest that a positive association exists between improved employee and customer goodwill (and consequently improved financial performance) and greater social responsibility. Lastly, they hypothesize that no association exists between environmental performance and financial performance because the costs of improving environmental performance, as significant as they may get, will be offset by other reductions in costs and/or increased revenues.

Supporting the first of these conjectures is Friedman (1962), who opines that "few trends would so thoroughly undermine the very foundation of our free society as the acceptance by corporate officials of a social responsibility other than to make as much money for their stockholder as they possibly can" (p. 133).

Ingram and Frazier, (1980), and Warsame, Neu and Simmons (2002) find that poorer performers actually make more CSR disclosures and conclude that since there are no controls on the disclosures firms may be attempting to bias the perceptions of investors, while Fryxell and Wang (1994) note that companies' financial performance may be the driver of CSR reputation whether deserved or not. Similarly, Roberts (1992) and Ling and Mowen (2013) find that CSR disclosures are likely a function of companies' strategic plans, while Walden and Schwartz (1997) find that environmental disclosures tend to be time and event specific.

Cho, Roberts, and Patten (2009) investigate whether or not self-serving biases are present in the language and tone of corporate environmental disclosures. They argue that the degree of bias in the disclosure narratives is based on firms' environmental performance. They find a positive association between firms' environmental performance and the certainty score of the firms' environmental disclosures.

Spicer (1978) also tests the association between economic and financial indicators and corporate social performance. His results indicate that firms with better pollution control records tend to be larger, more profitable, have lower total risk, lower systematic risk, and higher price/earnings ratios than companies with poorer pollution control records. He also finds, however, that there is a marked reduction in these associations over time. This suggests that such associations may be short-lived phenomena.

McGuire et al.'s (1988) second proposition (that there is a positive association between employee and customer goodwill, profitability and social responsibility), is supported by Lanis and Richardson (2012), Rao (1996) and Klassen and McLaughlin (1996). Lanis and Richardson (2012) for example, address the association between questionable corporate behavior (tax aggressiveness) and levels of CSR disclosure. They find that higher levels of CSR disclosure are associated with more conservative tax positions. Similarly, Rao (1996) addresses unethical behavior (environmental pollution), and stock performance. The results of that study indicate that actual stock performance for companies with unethical environmental performance is lower than the expected market adjusted returns, twelve months before through six months after, the environmental event. Klassen and McLaughlin (1996) study the association between environmental management efforts, "environmental reward" and "environmental crises," and firm financial performance. They find a significant positive association between environmental performance and firms' market values.

Similarly, Muoghalu et al. (1990) find that environmental lawsuits are associated with negative abnormal returns, but that abnormal returns at the disposition of the suits are statistically insignificant. Hamilton (1995), Konar and Cohen (1997) and and Jaggi (1988) also find negative financial consequences for firms when news of polluting behavior is released. In this same vein, Hoi, Wu and Zhang (2013) find that companies with irresponsible CSR activities tend to take risky tax positions that result in larger settlements with tax authorities.

Dhaliwal, Radhakrishnana, Tsang and Yang (2012) find that the mere existence of stand-alone CSR reports is associated with greater analyst forecast accuracy, while Dhaliwal, Li, Tsang and Yang (2011) find that reports disclosing superior CSR performance are associated with a lower cost of capital.

McGuire et al.'s (1988) third suggestion (that no association exists between environmental and financial performance), is supported by Lanoie, Laplante, and Roy (1998). They investigate the role that capital markets play in creating an incentive for, or pressure on, firms to improve their environmental performance by measuring how investors react to firms that appear successively on more than one environmental pollution list. They find that, in general, there is no association between firm value and appearing on the pollution lists. Only when firms appeared multiple and successive times on the lists did investors respond (negatively). The authors interpret their results as indicating that investors require extremely strong signals about firms' environmental performance before revising the expected value attributed to a firm.

With respect to positive environmental performance, both Bosch, Eckard and Lee (1998) and Aupperle, Carroll, and Hatfield (1985) find no significant association between concerns for society and financial performance. Aupperle et al., (1985) further find no significant differences in the financial performance of firms with or without a corporate social responsibility policy. Elliott, Jackson, Peecher and White (2013) find, however, that investors who do not explicitly evaluate CSR performance are swayed to over value firms based on positive CSR information, while investors who do explicitly evaluate the information assign lower fundamental values to those same firms. Pflugrath, Roebuck and Simnett (2011) find that CSR reports are viewed as more credible when they are: assured by an accountant, and when the company is from an industry where assurance is commonplace.

Yamashita, Sen and Roberts (1999) examine the relationship between environmental conscientiousness scores and stock returns. Environmental conscientiousness refers to legal environmental obligations as well as corporations' environmental policies and similar "progressive" activities. They find that the environmental consciousness of companies is not strongly related to financial condition, as there is no association between the environmental consciousness scores and company size, the debt-to-assets ratio, or earnings growth.

Lastly, Kreander, Gray, Power and Sinclair (2005) examine the financial performance differences between "ethical investment funds" and "non-ethical investment funds." They find no statistical difference in performance between ethical funds and the market benchmark, or between ethical funds and their matched group of non-ethical funds.

Thus, there is evidence to support each of McGuire et al.'s (1988) conflicting propositions. In this research we attempt to bring some resolution to these conflicts, by determining: which specific attributes of environmental strength or concern are associated with firm value (either positively or negatively) and which are not; and whether broad measures of environmental performance are informative with respect to forecasting the future cash flows of firms.

METHODOLOGY AND HYPOTHESIS

Various methods have been used to measure environmental performance. Some studies, such as Lorraine et al. (2004), Patten (2002), and Al-Tuwaijri et al. (2004), assess environmental performance each by employing a single variable unique to their study. Other studies, such as Ingram and Frazier (1980), Wiseman (1982), Fryxell and Wang (1994), and Cho, Lee and Pfeiffer (2013) use an index measure that is an aggregation of several variables. Many other investigations (as described in the literature review above) are event studies. Since the conflicting results of these studies may be a consequence of the measures used, in this research we attempt to fill the gap between those methodologies and employ measures that are generalizable across firms. We address environmental performance via single variables as well as with overall indices. We first regress, individual environmental performance measures on sample firm's annual returns, and then aggregate the individual measures to create environmental scoring measures. Finally, the environmental scoring measures are combined into an overall environmental rating measure.

The environmental performance measures we employ are based on those contained in the KLD Research & Analytics database (KLD is now MSCI Analytics). The KLD database provides information about firms' environmental performance based on 13 variables. Six of the variables are classified by KLD as "environmental strength" variables, and are related to firm activities and efforts that preserve the environment or reduce/control pollution. The other seven variables, are classified by KLD as "environmental concern" variables, and are related to the negative impact on the environment caused by the firm operations.

The KLD database is a data set that provides an annual snapshot of the environmental, social, and governance performance as assessed by KLD Research & Analytics, Inc. KLD covers approximately 80 indicators in seven major qualitative issue areas including community, corporate governance, diversity, employee relations, environment, human rights and product.

The data are gathered from several research processes. This process yields a full profile of the companies' performance.

Based on the criteria used for environmental performance measurement, the data is classified as either "environmental strengths" [ES] or "environmental concerns" [EC]. Whenever a strength activity is present, we code it "1," otherwise "0." Similarly whenever a concern activity is present, we code it "1," otherwise "0." Overall environmental performance is assessed by using both the strengths score and concerns score, as well as the overall combined score

We measure the market valuation of firms' environmental performance using annual stock market returns from the Center for Research in Securities Prices [CRSP] database. We employ annual stock returns to examine the association between environmental performance and firm valuation. Since the efficient markets hypothesis suggests that all information regarding a firm is impounded into price, the individual environmental variables (ES and EC) should be significantly associated with stock prices if the issues they represent, are viewed by market participants as impacting future cash flows. Because of the conflicting results in the prior research and the three competing propositions of McGuire et al. (1988), we make no predictions regarding the sign of the coefficients on our model variables.

Our initial hypotheses (in alternative form) are thus:

H1 *Individual environmental strength variables [ES_i] are associated with firms' annual stock returns.*

H2 *Individual environmental concern variables [EC_i] are associated with firms' annual stock returns.*

There are six "environmental strength" measures and seven "environmental concern" measures available from KLD. We employ all of these variables in this investigation. Each individual ES measure (ESi, where "i" ranges from 0 to 6) is regressed on annual stock returns. To test whether the magnitude of environmental strength is associated with firm value we combine the ESi scores into a total strength rating variable (TES) which, in turn, is regressed on annual stock returns. Likewise, each environmental concern measure (EC_i, where "i" ranges from 0 to 7) is regressed on annual stock returns and, similar to TES, combined into a total concern rating (TEC) which we use to test whether the magnitude of environmental concerns are associated with firm value. TES represents the accumulation of all environmental strength variables. Since these variables are dichotomous in nature, TES will range from 0 (in the case where a firm does not engage in any strength activities), to 6 (where a firm engages in all of the identified strength activities). TEC represents the accumulation of all environmental concern variables. As with the ES measures, these variables are also dichotomous in nature. TEC will thus range from 0 (in the case where a firm does not have any identified environmental concerns), to 7 (in the case where a firm is deemed to have all of the identified environmental concerns).

As above, we hypothesize that each of these constructs will be significantly associated with stock returns. Our third and fourth hypotheses (in alternative form) are thus:

H3 *The total strength rating [TES] is associated with annual stock returns*

H4 The total concern rating [TEC] is associated with annual stock returns.

A company's overall environmental rating measure [OER] is constructed by combining the total strength rating variable [TES] and total concern rating variable [TEC]. This rating is used to test the association between firms' overall environmental position and firms' annual stock returns.

Combining individual variables into an index or rating variable is a process that depends essentially on the nature of the variables that will be combined; two main characteristics of these variables, namely weights and independence, are of interest in this current context. All environmental rating variables are assumed to be independent and equally weighted. Thus, the combination process was performed by simply adding the scores of both individual environmental strength variables and environmental concern variables into a total environmental strength rating and a total environmental concern rating respectively and then adding the scores of both total rating variables into one overall environmental rating variable (OER).

The OER is calculated by subtracting TEC from TES to create a measure of overall environmental performance. The higher the TES score the better a firm performs environmentally, while the higher the TEC score, the worse a firm's environmental performance. Our fifth hypothesis (in alternative form) is thus:

H5: Overall environmental rating [OER] is associated with annual stock returns.

VARIABLES

Environmental Performance Variables

The environmental strength variables provided by the KLD database are: *beneficial products and services*; *pollution prevention*; *recycling*; *clean energy*; *managements system*s; and *other strengths*. The environmental concern variables are: *hazardous wastes*; *regulatory problems*; *ozone depleting chemicals*; *substantial emisssions*; *agricultural chemicals*; *climate change*; and *other concerns*. Exhibit 1, Panel A provides KLD's definitions for the six ES variables. Panel B provides the definitions of the seven EC variables.

Exhibit 1 - Definitions of Environmental Variables

Panel A – Strength Variables

Beneficial Products and Services	An environmental strength only if the company derives substantial revenues from innovative remediation products, environmental services, or products that promote the efficient use of energy
Pollution Prevention	An environmental strength only if the company has notably strong pollution prevention programs including both emissions reductions and toxics-use reduction programs
Recycling	An environmental strength only if the company is either a substantial user of recycled materials as raw materials in its manufacturing processes , or is a major provider of recycling services
Clean Energy	An environmental strength only if the company has taken significant measures to reduce its impact on climate change and air pollution through the use of renewable energy and clean fuel or through energy efficiency
Managements Systems	An environmental strength only if the company includes environmental objectives as part of the firm's overall plans
Other Strengths	An environmental strength only if the company has demonstrated a superior commitment to management systems, voluntary programs, or other environmentally proactive activities

Panel B – Concern Variables

Hazardous Wastes	An environmental concern only if the company's liabilities for hazardous waste sites exceed $50 million, or the company has recently paid substantial fines or civil penalties for waste management violations
Regulatory Problems	An environmental concern only if the company has recently paid substantial fines or civil penalties for violations of air, water, or other environmental regulations, or if the company has a pattern of regulatory controversies under the Clean Air Act, Clean Water Act or other major environmental regulations
Ozone Depleting Chemicals	An environmental concern only if the company is among the top manufacturers of ozone pollution chemicals such as HCFCs, Methyl chloroform, methylene chloride, or bromines
Substantial Emissions	An environmental concern only if the company's legal emissions of toxic chemicals from individual plants into the air and water are among the highest of the companies within the KLD database

Agricultural Chemicals	An environmental concern only if the company is a substantial producer of other polluting chemicals such as pesticides or chemical fertilizers
Climate Change	An environmental concern only if the company derives substantial revenues from the sale of coal or oil and their derivative products, or if the company derives substantial revenues indirectly from the combustion of coal or oil and its derivative fuel products
Other Concerns	An environmental concern only if the company has been involved in any environmental controversy that is not covered by the other EC variables

Annual Stock Returns

Monthly stock returns for the sample companies were obtained from the CRSP database and then transformed into annual returns [Cum_Ret] in the following fashion:

$$Cum\_Ret = [1 * (1 + Ret_1) * (1 + Ret_2) * (1 + Ret_3) * (1 + Ret_4) * (1 + Ret_5) * (1 + Ret_6) * (1 + Ret_7) * (1 + Ret_8) * (1 + Ret_9) * (1 + Ret_{10}) * (1 + Ret_{11}) * (1 + Ret_{12})] - 1 \qquad (1)$$

The cumulative annual returns are thus calculated by compounding the monthly returns where the initial base is 100% or 1, which corresponds to Cum_Ret at T=0. After one month, Cum_Ret will take the value $1*(1+Ret_1)$, which is the accumulation of the initial base 100% and Ret_1. After the second month, Cum_Ret will take the value $1*(1+Ret_1)*(1+Ret_2)$. This process is repeated until the twelve months are compounded.

Control Variables

Prior research indicates that a number of firm-specific factors are related to environmental performance. In order to more carefully investigate the association between firms' environmental performance and stock returns, we control for these factors. Specifically, we control for firm size, environmentally sensitive industry membership, profitability, financial leverage, capital intensity, and return on assets.

Firm Size (LnAs) and Environmentally Sensitive Industry Membership (SIC)

Prior studies, such as: Blacconiere and Patten (1994) and Cho et al. (2009), report that a significant association exists between firm size and environmental performance, with larger companies performing different environmentally than smaller companies. Consistent with general practice, our proxy for firm size is the natural log of total assets.

Similarly, various studies indicate that companies in industries whose activities have a significant impact on the environment performed differently, with respect to the environment, than firms in other industries. We control for industry membership by employing a dichotomous variable coded “1” for firms that belong to environmentally sensitive industries. Otherwise it is coded “0.”

Patten (2002), Cho and Patten (2007), and Cho et al. (2009) conclude that environmentally sensitive industries include firms that operate within the: chemical (SIC code 28XX); metals (SIC code 33XX); mining (SIC code 10XX); oil exploration (SIC code13XX); paper and pulp (SIC code 26XX); and petroleum (SIC code 2911) industries. We follow these classifications in coding industry membership.

Capital Intensity (Cap_Int), Return on Assets (ROA), and Profit Margin (Prf_Mrgn)

Although not as consistently documented as firm size and industry, in some cases, capital intensity (Aerts & Cormier, 2009; Clarkson et al, 2008; Reitenga, 2000) and profitability (Bewley & Li, 2000; Magness, 2006; Al-Tuwaijri et al,2004) are found to be associated with environmental performance. Capital intensity is measured by dividing total assets by total revenues. Profitability is measured using return on assets (net income divided by total assets), and profit margin (net income divided by sales revenue).

Financial Leverage (Fin_Lev)

Several studies employ financial leverage as a control variable (Freedman and Jaggi, 1992; Cormier and Megnan, 1999). Financial leverage indicates the extent to which the business relies on debt financing and is measured by dividing long-term debt by stockholders equity.

MODELS

Inclusion of the control variables (above) yields the following empirical test models. All variables are illustrated in Exhibit 2. The models used to test hypotheses 1 and 2 are thus:

$$\text{Cum\_Ret} = \alpha_0 + \alpha_1 ES_i + \alpha_2 \text{LnAs} + \alpha_3 \text{SIC} + \alpha_4 \text{ROA} + \alpha_5 \text{Fin\_Lev} + \alpha_6 \text{Prf\_Mrgn} + \alpha_7 \text{Cap\_Int} + \varepsilon \quad \text{(M1)}$$

$$\text{Cum\_Ret} = \alpha_0 + \alpha_1 EC_i + \alpha_2 \text{LnAs} + \alpha_3 \text{SIC} + \alpha_4 \text{ROA} + \alpha_5 \text{Fin\_Lev} + \alpha_6 \text{Prf\_Mrgn} + \alpha_7 \text{Cap\_Int} + \varepsilon \quad \text{(M2)}$$

The tests of total environmental Strengths and Concerns (hypotheses 3 and 4) employ the following empirical models:

$$\text{Cum\_Ret} = \alpha_0 + \alpha_1 TES_i + \alpha_2 \text{LnAs} + \alpha_3 \text{SIC} + \alpha_4 \text{ROA} + \alpha_5 \text{Fin\_Lev} + \alpha_6 \text{Prf\_Mrgn} + \alpha_7 \text{Cap\_Int} + \varepsilon \quad \text{(M3)}$$

$$\text{Cum\_Ret} = \alpha_0 + \alpha_1 TEC_i + \alpha_2 \text{LnAs} + \alpha_3 \text{SIC} + \alpha_4 \text{ROA} + \alpha_5 \text{Fin\_Lev} + \alpha_6 \text{Prf\_Mrgn} + \alpha_7 \text{Cap\_Int} + \varepsilon \quad \text{(M4)}$$

The test model for the Overall Environmental Profile variables (hypothesis 5) is:

$$Cum\_Ret = \alpha_0 + \alpha_1 OEP_i + \alpha_2 LnAs + \alpha_3 SIC + \alpha_4 ROA + \alpha_5 Fin\_Lev + \alpha_6 Prf\_Mrgn + \alpha_7 Cap\_Int + \varepsilon \qquad (M5)$$

Exhibit 2 Model Variables			
Dependent Variable			
Cum_Ret		=	Cumulative annual stock market returns, which represents the accumulation of monthly returns for each firm year. For model 6, Δ Cum_Ret = Annual $return_{2008}$ – Annual $return_{2006.}$
Variables of Interest in each Model			
M1	ESi	=	Environmental strength measures. "i" ranges from 1 to 6 where, i = 1 refers to clean energy, i = 2 refers to beneficial (green) products and services, i = 3 pollution prevention, i = 4 refers to recycling, and i = 5 management systems, i = 6 is other strengths. Equal to 1 if a firm performs any of these environmental activities, otherwise 0;
M2	ECi	=	Environmental concern measures. "i" ranges from 1 to 7, i = 1 refers to climate changes concern, i = 2 refers to regulatory problems, i = 3 refers to substantial emissions, i = 4 refers to ozone depletion chemicals concern, i = 5 refers to hazardous waste, i = 6 refers to agricultural chemicals, and i = 7 refers to other concerns. Equal to 1 if a firm has any of these concerns, otherwise 0;
M3	TES	=	Total environmental strength rating. Equal to the sum of the environmental strength variables. TES = ∑ (ESi)
M4	TEC	=	Total environmental concern rating. Equal to the sum of the environmental concern variables. TEC = ∑ (ECi)
M5	OER	=	Overall environmental rating. Equal to the total environmental concern rating less the total environmental strength rating. OER = TEC - TES
Control Variables			
LnAs		=	Natural logarithm of Total Assets;
SIC		=	1 if the firm operates in industries classified as environmentally unsafe, 0 otherwise;
ROA		=	Net Income / Average Total Assets;
Fin_Lev		=	(Debt in current liabilities + Debt in long term Liabilities) / Total Shareholder's Equity;
Prf_Mrgn		=	Net income / Total sales;

Cap_Int	=	Total Assets / Total Revenues.
e	=	Error term

Sample Selection

Sample firms were required to meet the following criteria:

1. Listed in the ratings of corporate social and environmental performance compiled by KLD Research and Analytics, Inc.
2. Financial accounting information available in the Standard & Poors' COMPUSTAT database.
3. Stock prices data available in the CRSP Monthly Returns database.

We collected environmental performance data available in the KLD database for the years 2006, 2007, and 2008. Earlier years could not be included in the sample because prior to 2006 some of the environmental performance variables were not available. We do not include observations beyond 2008 to avoid the confounding effects of the global financial crisis that began late in that year. A total of 6680 firm-years met the sample criteria and constitute the final sample as illustrated in Table 1.

Table1
Sample Selection

The overall cross-sectional sample set obtained for each year and the matched sample for years 2006 through 2008

	2006	2007	2008	Total
Environmental data	2,962	2,937	2,923	8,822
(-) firms with no annual returns	236	218	44	498
Environmental data and annual returns	2,726	2,719	2,879	8,324
(-) firms missing some or all of the accounting data	544	477	623	1,644
Final sample set	2,182	2,242	2,256	6,680
Match sample: 2006 through 2008				1,654

Table 2 presents selected descriptive information for the sample of 6,682 firm-year observations. More specifically, the table presents the minimum, maximum, mean, standard deviation, and variance of the variables used in the model. The data shows that, on average, the firms reported negative (-0.055) annual returns. The low mean of the environmental variables indicates that most firms were not assessed as meeting KLD's definitions of ES and EC, i.e. more firms reported 0 rather than 1 in regard to both environment strength and concern variables. Also, it appears that most firms do not belong to environmentally sensitive industries.

Table 2
Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
lnAs	6680	1.231	14.598	7.593	1.647	2.713
SIC_01	6680	0	1	0.149	0.356	0.127
Fin_Lev	6680	-782.545	1726.896	1.498	30.871	953.006
Prf_Mrgn	6680	-29319.000	21.846	-7.653	405.096	164103.117
Cap_Int	6680	-164.092	54344.300	16.767	692.937	480161.619
ROA	6680	-2.096	3.018	0.021	0.151	0.023
Cum_Ret	6680	-0.980	7.952	-0.055	0.453	0.205
Beneficial products and services	6680	0	1	0.024	0.153	0.023
Pollution prevention	6680	0	1	0.013	0.114	0.013
Recycling	6680	0	1	0.017	0.128	0.016
Clean energy	6680	0	1	0.043	0.202	0.041
Management system strength	6680	0	1	0.055	0.227	0.052
Other strengths	6680	0	1	0.007	0.084	0.007
Strength total	6680	0	4	0.158	0.532	0.283
Hazardous waste	6680	0	1	0.043	0.203	0.041
Regulatory problems	6680	0	1	0.069	0.254	0.065
Ozone depletion chemicals	6680	0	1	0.001	0.024	0.001
Substantial emissions	6680	0	1	0.055	0.227	0.052
Agricultural chemicals	6680	0	1	0.006	0.077	0.006
Climate change	6680	0	1	0.057	0.232	0.054
Other concerns	6680	0	1	0.019	0.137	0.019
Concern total	6680	0	5	0.250	0.693	0.480
OEP	6680	-5	4	-0.092	0.690	0.476
Valid N	6680					

RESULTS AND ANALYSIS

The models' goodness of fit and the R-square, and the analysis of variance are presented in Table 3 for the individual environmental strength models. All models reported high residual sums of squares in comparison to regression sums of squares. The F statistics for all of the models are, however, significant ($p \leq 0.001$), which indicates that the independent variables significantly explain the variation in the dependent variable.

Table 3
Model Summary and ANOVA Results of the Association between the Environmental Strength Variables and the Firms' Annual Return

$Cum\_Ret = \alpha_0 + \alpha_1 ES_i + \alpha_2 LnAs + \alpha_3 SIC + \alpha_4 ROA + \alpha_5 Fin\_Lev + \alpha_6 Prf\_Mrgn + \alpha_7 Cap\_Int + \varepsilon$

	Environmental strength variables	Model Summary		ANOVA		
		R Square	Adjusted R Square	Regression sum of squares	Residual sum of squares	Model significance
Model 1_1	Beneficial products & services (ES1)	0.0668	0.0658	91.549	1278.6	0.000
Model 1_2	Pollution prevention (ES_2)	0.0669	0.0659	91.647	1278.5	0.000
Model 1_3	Recycling (ES_3)	0.0669	0.0659	92.083	1278.07	0.000
Model 1_4	Clean energy (ES_4)	0.0668	0.0658	91.511	1278.64	0.000
Model 1_5	Management systems (ES_5)	0.067	0.066	91.742	1278.41	0.000
Model 1_6	Other strengths (ES_6)	0.0679	0.067	93.093	1277.06	0.000

Table 4 presents the unstandardized coefficients of the uncombined environmental strength regression models. The results indicate that, across all strength models, both industry classification and ROA are positively associated with the sample firms' annual returns while the coefficient on firm size is negative. All of these are as would be expected. Of the environmental strength variables, only Recycling ($p \leq 0.075$) and Other Strengths ($p \leq 0.004$) are significant at conventional levels. It is interesting to note, however, that while the coefficient on recycling is positively associated with returns, the coefficient on Other Strengths is negative. None of the other environmental strength variables would be significantly associated with returns, even if a one-tailed test could be justified. Thus, based on these results, H1 is accepted for Other Strengths and Recycling, and rejected for the rest. This result is interesting in that it points out that the measures employed can yield contrary results. The Recycling measure is consistent with the second proposition of McGuire, et al. (1998), and with the results of Spicer (1978), Anderson and Frankel (1980), and Ziegler et al. (2007). The Other Strengths measure is consistent with McGuire et al.'s first proposition and with the results of Klassen and McLaughlin (1996), Cho et al. (2009), and Spicer (1978). The failure to find a significant association, between returns and the remaining ES measures, is consistent with the third proposition of McGuire, et al. (1998), and with the findings of Mahapatra (1984), Aupperle, Carroll, and Hatfield (1985), Jaggi and Freedman (1992), and Kreander et al. (2005).

Table 4
Regression Results of the Association between the Environmental Strength Variables and

the Firms' Annual Returns $Cum\_Ret = \alpha_0 + \alpha_1 ES_i + \alpha_2 lnAs + \alpha_3 SIC + \alpha_4 ROA + \alpha_5 Fin\_Lev + \alpha_6 Prf\_Mrgn + \alpha_7 Cap\_Int + e$												
Model1	Model 1_1		Model 1_2		Model 1_3		Model 1_4		Model 1_5		Model 1_6	
Environmental strength variables	Beneficial products and services (ES1)		Pollution prevention (ES2)		Recycling (ES3)		Clean energy (ES4)		Management system (ES5)		Other strengths (ES6)	
	B	Sig.	B	Sig.	B	Sig.	B	Sig.	B	Sig.	B	Sig.
(Constant)	0.070	0.007	0.067	0.010	0.074	0.005	0.072	0.007	0.064	0.015	0.064	0.015
lnAs	-0.020	0.000	-0.019	0.000	-0.020	0.000	-0.020	0.000	-0.019	0.000	-0.019	0.000
SIC_01	0.051	0.001	0.052	0.001	0.049	0.001	0.050	0.001	0.052	0.001	0.053	0.000
ROA	0.790	0.000	0.791	0.000	0.789	0.000	0.791	0.000	0.792	0.000	0.791	0.000
Fin_lev	0.000	0.854	0.000	0.856	0.000	0.849	0.000	0.852	0.000	0.869	0.000	0.859
Prf_Mrgn	0.000	0.762	0.000	0.767	0.000	0.757	0.000	0.762	0.000	0.771	0.000	0.768
Cap_Int	0.000	0.654	0.000	0.659	0.000	0.649	0.000	0.654	0.000	0.663	0.000	0.661
ESi	0.022	0.540	-0.045	0.346	0.075	0.075	0.012	0.675	-0.029	0.240	-0.187	0.004

The individual environmental concern models' goodness of fit and the R-square, and the analysis of variance are presented in Table 5. As with the ES models, all models report high residual sums of squares in comparison to regression sums of squares. The F statistics for all of the models are, however, significant ($p \leq 0.001$), which indicates that similar to the ES models, the independent variables significantly explain the variation in the dependent variable.

Table 6 presents the regression results of the tests for an association between the uncombined environmental concern variables and returns. As with the ES models, we find that both industry classification and ROA are positively associated with firms' annual returns, while the coefficient on firm size is negative. The hazardous waste concern variable ($p \leq 0.032$), substantial emissions concern ($p \leq 0.008$), and agricultural chemicals concerns ($p \leq 0.000$) are all significantly associated with returns. Interestingly, the coefficients on each of these are positive which is consistent with the results of Ingram and Frazier (1980) and Freedman and Jaggi (1982) who report a negative association between environmental and financial performance. Thus, it appears as though hazardous waste concerns, substantial emissions and the use of agricultural chemicals may translate into greater profitability. Based on these results, H2 is accepted for hazardous wastes, substantial emissions and agricultural chemicals. Again, these results make sense. If, for example, firms that produce products that yield hazardous wastes were to alter their processes or treat those wastes so has to negate the hazard, their costs would likely be substantially increased thus reducing their profitability. The same could be said for firms that

Table 5

Model Summary and ANOVA Results of the Association between the Environmental Concern Variables and the Firms' Annual Returns

$Cum\_Ret = \alpha_0 + \alpha_1 EC_i + \alpha_2 LnAs + \alpha_3 SIC + \alpha_4 ROA + \alpha_5 Fin\_Lev + \alpha_6 Prf\_Mrgn + \alpha_7 Cap\_Int + \varepsilon$

	Environmental concern variable	Model Summary		ANOVA		
		R Square	Adjusted R Square	Regression sum of squares	Residual sum of squares	Model significance
Model 2_1	Hazardous and waste (EC_1)	0.067	0.066	92.358	1277.794	0.000
Model 2_2	Regulatory problems (EC_2)	0.067	0.066	91.905	1278.246	0.000
Model 2_3	Ozone depletion chemicals (EC_3)	0.067	0.066	91.629	1278.522	0.000
Model 2_4	Substantial emission (EC_4)	0.068	0.067	92.806	1277.345	0.000
Model 2_5	Agricultural chemicals (EC_5)	0.071	0.07	96.84	1273.312	0.000
Model 2_6	Climate changes (EC_6)	0.067	0.066	91.704	1278.448	0.000
Model 2_7	Other concerns (EC_7)	0.067	0.066	91.54	1278.611	0.000

Table 6

Regression Results of the Association between the Environmental Concern Variables and the Firms' Annual Returns

$Cum\_Ret = \alpha_0 + \alpha_1 EC_i + \alpha_2 LnAs + \alpha_3 SIC + \alpha_4 ROA + \alpha_5 Fin\_Lev + \alpha_6 Prf\_Mrgn + \alpha_7 Cap\_Int + \varepsilon$

Model2	Model 2_1		Model 2_2		Model 2_3		Model 2_4		Model 2_5		Model 2_6		Model 2_7	
Environmental variables	Hazardous and waste (EC_1)		Regulatory problems (EC_2)		Ozone depletion chemicals (EC_3)		Substantial emission (EC_4)		Agricultural chemicals (EC_5)		Climate changes (EC_6)		Other concerns (EC_7)	
	B	Sig.	B	Sig.	B	Sig.	B	Sig.	B	Sig.	B	Sig.	B	Sig.
(Constant)	0.084	0.002	0.079	0.003	0.070	0.007	0.085	0.001	0.074	0.004	0.067	0.010	0.068	0.009
lnAs	-0.022	0.000	-0.021	0.000	-0.020	0.000	-0.022	0.000	-0.020	0.000	-0.019	0.000	-0.020	0.000
SIC_01	0.046	0.003	0.046	0.003	0.050	0.001	0.043	0.006	0.041	0.007	0.054	0.000	0.052	0.001
ROA	0.789	0.000	0.788	0.000	0.790	0.000	0.785	0.000	0.784	0.000	0.790	0.000	0.791	0.000
Fin_lev	0.000	0.845	0.000	0.870	0.000	0.854	0.000	0.907	0.000	0.856	0.000	0.857	0.000	0.859
Prf_Mrgn	0.000	0.752	0.000	0.754	0.000	0.763	0.000	0.747	0.000	0.756	0.000	0.765	0.000	0.765
Cap_Int	0.000	0.643	0.000	0.645	0.000	0.655	0.000	0.638	0.000	0.646	0.000	0.659	0.000	0.658
ECi	0.059	0.032	0.033	0.135	0.195	0.373	0.066	0.008	0.370	0.000	-0.026	0.277	-0.023	0.565

elect to clean their emissions, or for firms that might choose to use organic rather than chemical fertilizers.

The positive associations between returns and Hazardous wastes, substantial emissions, and agricultural chemicals are consistent with the results reported by Spicer (1978), Anderson and Frankel (1980), and Ziegler et al. (2007). The regression results with respect to Regulatory problems, Ozone depletion, climate change, and other concerns are consistent with the results of Mahapatra (1984), Aupperle, Carroll, and Hatfield (1985), Jaggi and Freedman (1992), and Kreander et al. (2005).

The total environmental strength rating and total environmental concern rating models are significantly associated with stock returns ($p \leq 0.001$). The results of these tests are reported in panel A of tables 7 and 8, respectively. Panel B results show that, for both the TES and TEC

Table 7
Model Summary, ANOVA, and Regression Results of the Association between the Total Environmental Strength Rating Variable and the Firms' Annual Returns

$Cum\_Ret = \alpha_0 + \alpha_1 TES + \alpha_2 LnAs + \alpha_3 SIC + \alpha_4 ROA + \alpha_5 Fin\_Lev + \alpha_6 Prf\_Mrgn + \alpha_7 Cap\_Int + \varepsilon$

Panel A

	Model Summary		ANOVA		
	R Square	Adjusted R Square	Regression sum of squares	Residual sum of squares	Model significance
Model 3	0.067	0.066	91.508	1278.64	0

Panel B

Regression coefficients		
	B	Sig.
(Constant)	0.068	0.011
lnAs	-0.019	0
SIC_01	0.052	0.001
ROA	0.791	0
Fin_lev	0	0.858
Prf_Mrgn	0	0.766
Cap_Int	0	0.658
TES	-0.004	0.687

models, industry classification and ROA as a measure of profitability, are positively associated with annual returns while firms' size is negatively associated. The total environmental strength rating variable is not significantly associated with firms' annual returns at conventional levels ($p \leq 0.687$). The coefficient on the total Environmental Concern Rating variable is, however, positive and significantly different from zero ($p \leq 0.021$). From a comprehensive perspective, it appears that firm activities that are deemed to be environmental strengths do not translate into positive financial performance. Thus, Hypothesis 3 is rejected. The findings of the TEC model are consistent, however, with the negative perspective, thus Hypothesis 4 is supported.

Table 8
Model Summary, ANOVA, and Regression Results of the Association between the Total Environmental Concern Rating Variable and the Firms' Annual Returns
$$Cum\_Ret = \alpha_0 + \alpha_1 TEC + \alpha_2 LnAs + \alpha_3 SIC + \alpha_4 ROA + \alpha_5 Fin\_Lev + \alpha_6 Prf\_Mrgn + \alpha_7 Cap\_Int + \varepsilon$$

Panel A

	Model Summary		ANOVA		
	R Square	Adjusted R Square	Regression sum of squares	Residual sum of squares	Model significance
Model 4	0.068	0.067	92.5	1277.65	0

Panel B

Regression coefficients		
	B	Sig.
(Constant)	0.088	0.001
lnAs	-0.023	0
SIC_01	0.04	0.011
ROA	0.787	0
Fin_lev	0	0.87
Prf_Mrgn	0	0.746
Cap_Int	0	0.635
TEC	0.02	0.021

The evidence presented above indicates that, cross-sectionally, firm attempts to perform in an environmentally sensitive fashion are not associated with improved financial performance. Indeed, these results indicate that environmental disregard may be associated with higher returns. This result is consistent with the results reported by Ingram and Frazier (1980) and Jaggi and Freedman (1982). This could be because activities that may have a negative environmental affect (without establishing clean up or pollution reduction activities) could result in considerable cost savings. Even if clean up or pollution reduction activities are ultimately mandated, pushing those costs into future periods would result in greater near term cash flows and a higher net present value of firm earnings.

Although the overall environmental Rating (OER) could, theoretically, range from +6 to -7, the actual sample ranges from +4 to -5. The models' goodness of fit and the R-square for the firms' overall environmental rating model are presented in Table 9, Panel A. The regression results for the overall environmental rating model are presented in Panel B. Once again, the results show that both industry classification and ROA are positively associated with annual

Table 9
Model Summary, ANOVA, and Regression Results of the Association between the Overall Environmental Rating Variable and the Firms' Annual Returns

$$Cum\_Ret = \alpha_0 + \alpha_1 OER + \alpha_2 LnAs + \alpha_3 SIC + \alpha_4 ROA + \alpha_5 Fin\_Lev + \alpha_6 Prf\_Mrgn + \alpha_7 Cap\_Int + \varepsilon$$

Overall Environmental rating variable analysis

Panel A

	Model Summary		ANOVA		
	R Square	Adjusted R Square	Regression sum of squares	Residual sum of squares	Model significance
Model 5	0.068	0.067	92.63	1277.52	0

Panel B

Regression coefficients		
	B	Sig.
(Constant)	0.077	0.003
lnAs	-0.021	0
SIC_01	0.043	0.005
ROA	0.789	0
Fin_lev	0	0.887
Prf_Mrgn	0	0.759
Cap_Int	0	0.648
OER	-0.02	0.014

returns ($p \leq 0.005$ and 0.000 respectively), while firm size is negatively associated ($p \leq 0.000$). The coefficient on the overall environmental rating variable is negative and statistically significant at the $p \leq 0.014$ level. This result is consistent with McGuire et al.'s first proposition and with the results reported by Ingram and Frazier (1980) and Jaggi and Freedman (1982). Thus, hypothesis 5 is supported.

CONCLUSIONS

In this research, we shed light on the contradictory evidence of prior studies that examine firm performance and corporate social responsibility. We do this by investigating whether measures of firms' environmental performance are associated with annual returns independent of any particular environmental event. We find that only five out of the thirteen environmental variables we test, namely, the other strengths variable; the recycling variable; the hazardous waste concern variable; the substantial emissions concern variable; and the agricultural chemicals concern variable, are significantly associated with returns. The coefficients of the individual measures support the perspective of the negative association between environmental and financial performance. This is logical given the nature of the constructs. The positive association between returns and the recycling activities supports notion that firms will act with environmental sensitivity only when it increases profits. Similarly, profit-maximizing firms that choose to deal with hazardous wastes, emissions and agricultural chemicals in a manner that does not neutralize their negative environmental impact, would only do so (ceteris paribus) because alternative, environmentally friendly measures are more costly. Both perspectives can be integrated into a framework that suggests that profit maximization, as a primary objective of firms, will be sought either by engaging in environmental strength activities that increase profitability (such as recycling) or by engaging in less effective environmental activities, that are not as preventative or corrective, which gives rise to environmental concerns (such as the production of hazardous wastes).

These results are significant in that not only do they provide an explanation for the contradictory results of prior research into the association between firms' financial performance and corporate social responsibility, but they may provide guidance to regulators in developing environmental policy. In the context of McGuire et al. (1988), we find that proposition 2 (a positive association between corporate social responsibility and financial performance) only holds when the activity increases profits. Similarly, we find that proposition 1 (a negative association between corporate social responsibility and financial performance) holds when the responsible actions reduce profitability. Proposition 3 (no association between corporate social responsibility and financial performance) seems to be the case for many activities with environmental impact. In regards to policy implications, it is thus our conclusion that encouraging or facilitating recycling activities is likely to be viewed positively by firms and thus embraced by them. It is also our view that policies that require process changes or emissions reductions will likely be met with resistance and that regulators would have to mandate such activities if they want firms to engage in them.

We also tested whether individual environmental indicators are informative when combined into a single metric. Our results revealed a positive association between the total environmental concerns rating and firms' annual returns. This result is consistent with the results of the individual measures and leads to similar conclusions. The total environmental strength rating was not, however, significantly associated with annual returns. A look at the components of the environmental strength measure shows that other than recycling, none of the constructs were tied financial performance.

The last stage of our analysis addresses the interaction between the significant and insignificant individual environmental variables that yield an overall environmental rating measure. This overall measure was significantly and negatively associated with firms' annual returns, again indicating that with respect to environmental issues, greater corporate social responsibility is negatively associated with financial performance.

Together, these results suggest that environmental protection or remediation activities impose additional costs on firms that in turn lead to an economic disadvantage. The total and overall measures used in our analysis leads us to further conclude that indices and/or comprehensive measures may need further consideration and perhaps weighting before they can be applied in a meaningful sense as depictions of corporate behavior. Future research is required to develop and model the constructs regarding environmental performance, as there is some level of vagueness which raises the question of whether or not a component index assesses the same constructs as the individual measures or whether the individual measures are indeed unique attributes. Why, for instance, are substantial emissions negatively associated with financial performance, while ozone depletion and climate change are not?

This research contributes to the environmental performance literature by presenting evidence on the nature of the general association between environmental performance and firms' financial performance instead of just focusing on the immediate effect of a particular environmental event. We also provide an explanation for why prior research has provided conflicting results on this issue. Understanding how environmental activities affect capital markets should, likewise, be important in determining how regulatory agencies motivate and enforce environmentally sensitive regulations to promote the public good.

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DIVIDEND PAYOUTS OF COMMERCIAL BANKS

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ABSTRACT

In this paper, we examine relations between a bank's dividend payouts and stock and option holdings of the top five executives. We find a negative relation between dividend payouts and stock option holdings although the relation becomes significantly weaker after the enactment of Gramm-Leach-Bliley in 1999 and the dividend tax cut in 2003. We also find that dividend payouts are negatively related to managerial stock holdings prior to the dividend tax cut but this relation becomes significantly positive in the post dividend tax cut regime. This is consistent with firms increasing dividend payments for firms with executives with large stock holding in the post tax cut regime.

INTRODUCTION

Dividend policy of firms has garnered a substantial amount of research attention over the last several decades. Recently, Fama and French (2001) document that the number of US listed firms paying cash dividends has declined dramatically since 1978. DeAngelo, DeAngelo, and Skinner (2004) document that the decline in the number of dividend payers is confined to industrial firms and is not realized by financial/utility firms. They find that the number of payers for financial/utility (industrial) firms increases (declines) by 9.5% (58.9%) from 1978 to 2000. Although, they also note that the proportion of financial/utility dividend payers on CRSP declined by 8.3% over the same time period. For example, based on the Compustat database in 2005, the banking industry accounts for 11.20% of the total market capitalization of all the dividend-paying firms and the dividends paid account for 14.64% of the total dividends paid by all the public firms in that year. More specifically, publicly traded banks (two-digit SIC code 60) paid dividends of $75.53 billion, which is higher than any other industries classified by the first two-digit SIC code. Yet, even though financial institutions account for a substantial portion of total dividends paid by public firms, much of the previous research excludes financial institutions (a notable exception is Cloyd, Robinson & Weaver, 2005). Financial institutions are often excluded because of their unique financial structure (high debt-to-equity ratios) and their regulatory environment. In addition, some previous research suggests that bank dividend policy is different from other industries (Dickens, Casey & Newman, 2002).

The composition of executives' stock and option holdings has been shown to be an important determinant of payout policy for industrial firms (Brown, Liang & Weisbenner, 2007). Managerial ownership as an incentive mechanism to reduce agency problems may mitigate free cash flow problems, thus result in higher payouts (Fenn & Liang, 2001). Because dividends also provide executives with liquidity and aid in diversification, higher stock ownership may be associated with higher dividends. On the other hand, managerial ownership may be a substitute for dividends to address agency problems (Agrawal & Jayaraman, 1994). Thus, the relation between stock ownership and dividend policy is an empirical question. Given most executive options are not dividend protected (Murphy, 1999) and option values decline when dividends are paid, a negative association between stock option ownership and dividends is expected. We examine these relations between managerial stock/stock option holdings and dividend payouts in financial institutions as well and expect that they may be influenced by the bank regulatory environment.

We analyze dividend policy for banks during deregulation in the 1990s and early 2000s and consider the impact of managerial stock and stock option holdings. We examine stock holdings and options held by the top five executives. We gather data from 1992 to 2007. We begin with 1992 to obtain lagged data since we utilize the ExecuComp database for executive compensation data which begins in 1993. We define two dates associated with deregulation: in 1996, the Economic Growth and Regulatory Paperwork Reduction Act improved the flow of credit to businesses and consumers and streamlined the mortgage lending process. In 1999, Gramm, Leach, Bliley Act removed many of the barriers which restricted the integration of commercial banking, insurance and investment banking. Another exogenous change in the business environment we study in the paper is the 2003 dividend tax. The deregulation provided bank managers more growth opportunities, competition and markets for corporate control. We expect the relations between managerial ownership and dividend policy for financial institutions to become stronger with the progress of deregulation.

The Jobs and Growth Tax Relief Reconciliation Act of 2003 that decreased the individual tax rate on dividends from 38.6 percent to the top rate of 15 percent has been shown to induce many firms to initiate dividends or increase dividends (Auerbach & Hassett, 2006). Analyzing firm responses to the 2003 dividend tax cut, Brown, Liang and Weisbenner (2007) find a significantly greater likelihood of a dividend increase following the dividend tax cut for executives with greater stock ownership. This relation does not exist, however, in the decade prior to the tax change. Executives with large stock option holdings were less likely to increase dividends both before and after the dividend tax cut. We extend this line of study to consider the impact of the dividend tax code change in May 2003 on the dividend policy of financial institutions. We have a longer post-tax cut period than that of Brown, Liang and Weisbenner (2007) to better explore the effect of the tax cut on dividend policy.

This paper is organized as follows: we first describe the related literature regarding dividend policy and managerial ownership and develop our research questions. We next describe our data and empirical methodology. Lastly, we present our empirical results and conclude the study.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Why does a firm pay dividends? Miller and Modigliani (1961) propose the tax clientele theory that a firm establishes its dividend policy to attract clienteles formed based on investors' tax brackets. Secondly, signaling theory (Bhattacharya, 1979; John & Williams, 1985; Miller & Rock, 1985) suggests firms use dividends to signal their private information to investors. The free cash flow hypothesis as developed by Easterbrook (1984) and Jensen (1986) suggests that dividend payments can be used to reduce cash available for managers to invest in negative net present value projects, in other words, to reduce the overinvestment problem. Smith and Watts (1992) and Gaver and Gaver (1993) find firms with potentially the greatest agency costs have high dividend payouts. More recently, Baker and Wurgler (2004) propose a catering theory of dividends that managers cater to investors by paying dividends when investors put a stock price premium on payers. DeAngelo, DeAngelo and Stulz (2006) show that dividend payouts are related to firms' retained earnings, supporting a life cycle theory of dividends.

Managerial ownership as an incentive mechanism helps to align the interests of managers and those of shareholders, which may mitigate the free cash flow problems. Thus managerial ownership and dividend payouts may serve as substitutes or complements with regards to the free cash flow problem. Fenn and Liang (2001) find a positive relation between managerial stock ownership and payouts in firms with the most serious excess cash flow problems but no relation at other firms. Alternatively, Agrawal and Jayaraman (1994) finds that dividend payouts are negatively related to managerial stock holdings. Dividends also provide liquidity for managers because managers face restrictions on when they can sell stock and also may face mandatory stock ownership requirements (Core & Guay, 1999; Core & Larcker, 2002). In addition, dividends aid in diversification for managers who have undiversified wealth in the firm. Therefore, managers with large stock ownership may prefer dividend payouts. The study of White (1996) suggests that managerial stock ownership encourages dividend payments.

Stock options are not dividend protected (Murphy, 1999) and thus produce a disincentive for managers to pay dividends. Given that the value of the option will fall when stocks begin to trade ex-dividend, managers with a large portfolio of unexercised options would have a financial incentive to keep dividends low. A negative relation between dividends and management stock options has been found in several studies (Cuny, Martin & Puthenpurackal, 2009; Fenn & Liang, 2001; Lambert, Lanen & Larcker, 1989;). Also a number of studies (Bartov, Krinsky & Lee, 1998; Jolls, 1996; Kahle, 2002; Weisbenner, 1998) associate the increased use of stock repurchases rather than dividends to distribute cash to investors with the increased use of stock options by firms.

The existence of deposit insurance and the high leverage (high debt-to-equity ratio) for financial institutions may lead to greater agency problems. Therefore, managerial incentives for the executives of financial institutions may become more important in corporate dividend policy than for the counterparts in industrial firms. The free cash flow hypothesis or the personal incentive effect of managerial stocks predicts a positive relation between dividend payouts and managerial stock holdings. Alternatively, the substitution of dividend payouts with managerial ownership to reduce agency problems predicts a negative relation between dividend payouts and managerial stock holdings.

H1 *The dividend payouts are unrelated to managerial stock holdings for financial institutions*.

Stock options are expected to be negatively related to dividend payments considering the personal financial incentive perspective of managers or based on the free cash flow hypothesis.

H2 *Dividend payouts are negatively related to managerial stock option holdings for financial institutions.*

In addition, we examine the relation between managerial ownership and dividend policy subject to exogenous variation. Investigating the effect of exogenous events on the relation between managerial ownership and dividend payouts provide additional insights on the dynamics of how the relation is altered to react to a changing business environment. As noted by Becher, Campbell and Frye (2005), in the 1990s, the regulatory environment changed dramatically for financial institutions. They outline the dramatic changes associated with deregulation, changing technology and the rapid consolidation in the industry. There are three major changes in regulation during our sample period. In 1994, the Riegle-Neal Interstate Banking and Branching Efficiency Act allowed interstate banking and branching increasing the opportunities for financial institutions to grow across state lines through branching and acquisitions. Despite this change, our sample begins in 1993 (due to Execucomp constraints) which does not allow us to isolate this regulatory change. In 1996, the Economic Growth and Regulatory Paperwork Reduction Act improved the flow of credit to businesses and consumers and streamlined the mortgage lending process expanding the lending opportunities for financial institutions. In 1999, the Gramm, Leach, Bliley Act removed many of the barriers which restricted the integration of commercial banking, insurance and investment banking thus increasing financial institutions' growth opportunities. The deregulation provides bank managers with expanded opportunities, increased competition and an expanding market for corporate control. Becher, Campbell and Frye (2005) find evidence that suggests that deregulation is associated with banks adopting more equity based compensation for directors and thus improving internal monitoring. Crawford, Ezzell and Miles (1995) find deregulation increases bank CEO pay-performance sensitivities. Similarly, Hubbard and Palia (1995) find stronger pay-performance sensitivity after deregulation that permitted changes in interstate banking. Hence we expect deregulation may have an impact on the relation between managerial stock and option ownership and dividend payouts.

H3 *The relation between managerial stock holdings and dividends for financial institutions becomes stronger with deregulations.*

H4 *The relation between managerial stock option holdings and dividends for financial institutions becomes stronger with deregulations.*

The 2003 dividend tax cut that makes dividends more attractive to individual investors may affect firms' dividend payouts. Several studies (Auerbach & Hassett, 2006; Zhang, Farrell & Brown, 2008) find firms initiated or increased dividends in response to the dividend tax cut. Analyzing the impact of the dividend tax cut of 2003, Blouin, Raedy, and Shakelford (2004), Nam, Wang, and Zhang (2010) and Chetty and Saez (2005) also find dividend increases after the tax cut are positively related to managerial stock ownership. Brown, Liang and Weisbenner (2007) find a significantly greater likelihood of a dividend increase following the dividend tax cut for executives with greater stock ownership. This relation does not exist, however, in the decade prior to the tax change. Executives with large stock option holdings were less likely to increase dividends both before and after the dividend tax cut. However, these studies do not separately examine financial institutions. An exception is a recent working paper by Cloyd, Robinson and Weaver (2005) who examine the response of private and public bank holding companies to the 2003 dividend tax cut. They find that dividend yield increases for both private and public bank holding companies after the tax cut. Since options are not dividend-protected, their effect on dividends should not vary with a change in dividend tax rates.

H5 *The relation between managerial stock holdings and dividends for financial institutions strengthens after the 2003 dividend tax cut.*

H6 *The relation between managerial stock option holdings and dividends for financial institutions are unrelated to the 2003 dividend tax cut.*

DATA AND METHODOLOGY

We examine the number of shares and options held by the top five executives in commercial bank holding companies. To identify the sample, we begin with Bank Compustat and identify all firms within the SIC codes between 6000 and 6099 (depository institutions) during 1992-2007. Our initial screen results in a sample of 11,560 firm-year observations. Bank Compustat is the source for firms' financial information. To gather stock and option data, we match the Bank Compustat sample to Execucomp, and the sample size decreases to 1,465 firm-year observations, representing 192 unique financial institutions. We do not require firms to have all the dependent and explanatory variables. Hence, the number of observations varies across regressions.

Table 1 reports the descriptive statistics for the stock and option ownership variables. The average percentage share ownership of the top five executives is 2.48%. Based on a sample of bank CEOs during a comparable sample period, Belkhir and Chazi (2010) document that the average bank CEO holds 2.99% of outstanding stock. The percentage of options held by the top five executives is 1.77%.

To investigate the relation between the propensity to pay dividends and management option holdings and stock ownership during deregulation and the 2003 dividend tax cut period, we use the fixed-effect Tobit model following Cuny, Martin and Puthenpurackal (2009). Including a firm specific fixed effect alleviates the endogeneity problems caused by omitted firm specific variables, such as management capability or corporate governance which will affect both dividend payouts and managerial compensation. Since dividend payouts are left centered at zero, the Tobit model is the appropriate estimation method.

$$
\begin{aligned}
DIV\_YLD_{i,t} = {} & \alpha_0 + \alpha_1 O_{i,t-1}(S_{i,t-1}) + \alpha_2 SIZE_{i,t-1} + \alpha_3 ROA_{i,t-1} + \alpha_4 MTB_{i,t-1} \\
& + \alpha_5 RETTA_{i,t-1} + \alpha_6 TIER1\_CAP_{i,t-1} + \alpha_7 NIM_{i,t-1} + \alpha_8 D_1 \times O_{i,t-1}(S_{i,t-1}) \\
& + \alpha_9 D_2 \times O_{i,t-1}(S_{i,t-1}) + \alpha_{10} D_3 \times O_{i,t-1}(S_{i,t-1}) + \varepsilon_{i,t}
\end{aligned}
$$

Where DIV_YLD_t is dividend yield and is defined as ordinary common dividends divided by the market value of common shares. The average dividend yield in our sample is 2.45% as shown in Table 1. Aboody and Kasznik (2008) show a dividend yield of 1.69% in 2002 and 2.56% in 2003 for a sample that includes both financial and industrial firms. O_{t-1} is the percentage of executive option ownership and is defined as the number of options held by top five executives deflated by total shares outstanding at the beginning of the year. S_{t-1} is the percentage of executive stock ownership and is defined as the number of shares held by top five executives deflated by total share outstanding at the beginning of the year. Following prior studies (Brown, Liang & Weisbenner, 2007; Cloyd, Robinson & Weaver, 2005; DeAngelo, DeAngelo & Stulz, 2006; Fenn & Liang, 2001), we also control for firm size, market to book ratio, profitability, retained earnings, capital risk, and operating efficiency. These control variables are all measured at the beginning of the year. $SIZE_{t-1}$ controls for firm size and is defined as the logarithm of the total assets. ROA_{t-1} is return on assets, a profitability measure, and is defined as net income deflated by the total assets. MTB_{t-1} is the market to book ratio and is defined as the market value of total assets deflated by the book value of total assets. $RETTA_{t-1}$ is defined as retained earnings deflated by total assets at the beginning of the year. $TIER1\_CAP_{t-1}$ is the risk-adjusted tier 1 capital ratio, a capital risk measure, and is defined as the tier 1 capital of a bank deflated by net risk-weighted assets. NIM_{t-1} is an operating efficiency measure and is defined as the difference between interest income and interest expense deflated by total assets. To test the impact of deregulation and the 2003 dividend tax cut on financial institutions' dividend payout, we also include three year dummy variables. D_1 is a year dummy that equals one for years 1996 – 1998; 0 otherwise. D_2 is a year dummy that equals one for years 1999 – 2002; 0 otherwise. D_3 is a year dummy that equals one for years 2003 – 2007; 0 otherwise.

Table 1

This table reports the key statistics of the dependent and independent variables during 1993-2007. Since we do not require financial institutions to have all dependent and independent variables, the number of observations are different based on model specifications. DIV_YLD_t is dividend yield and is defined as common dividends (ordinary) divided by the market value of common shares. All remaining variables are measured at the beginning of the year (t-1). O_{t-1} is defined as the number of options held by top five executives deflated by total shares outstanding. S_{t-1} is defined as the number of shares held by top five executives deflated by total share outstanding at the beginning of the year. $SIZE_{t-1}$ is defined as the logarithm of the total assets. ROA_{t-1} is defined as net income deflated by the total assets. MTB_{t-1} is defined as the market value of total assets deflated by the book value of total assets. $RETTA_{t-1}$ is defined as retained earnings deflated by total assets. $TIER1\_CAP_{t-1}$ is defined as the tier 1 capital of a financial institution deflated by net risk-weighted assets. NIM_{t-1} is defined as the difference between interest income and interest expense deflated by total assets.

Variables Summary Statistics

Variables	N	Mean	Median	STD	Min	25%	75%	Max
DIV_YLD_t	1,455	0.0245	0.0240	0.0144	0.0000	0.0153	0.0326	0.1925
S_{t-1}	1,167	0.0248	0.0086	0.0481	0.0000	0.0033	0.0234	0.3767
O_{t-1}	1,231	0.0177	0.0113	0.0206	0.0000	0.0064	0.0221	0.3086
$SIZE_{t-1}$	1,349	9.4594	9.2550	1.4256	5.0521	8.4421	10.4466	14.1938
ROA_{t-1}	1,349	0.0118	0.0118	0.0050	-0.0298	0.0096	0.0142	0.0396
MTB_{t-1}	1,268	1.1033	1.0842	0.0887	0.8955	1.0439	1.1395	1.6421
$RETTA_{t-1}$	1,348	0.0521	0.0504	0.0277	-0.0285	0.0338	0.0656	0.2214
$TIER1\_CAP_{t-1}$	1,349	0.1008	0.0960	0.0315	0.0429	0.0805	0.1152	0.3760
NIM_{t-1}	1,348	0.0337	0.0346	0.0082	0.0049	0.0289	0.0394	0.0648

RESULTS

The Tobit regression results are reported in Table 2. The first two columns of Table 2 report results where we analyze the relation between dividend yield and option ownership over the entire sample period (model 1) and then allowing for the effect of the changing regulatory environment (model 2). We document a negative and significant relation between the percentage option ownership of the top five executives and dividend yield as predicted by hypothesis 2. We also note that the relation becomes less negative during 1999-2002 and during 2003-2007. It appears that the change in the dividend tax law has a significant impact on a firm's willingness to pay dividends even if the executives own a large percentage of stock options.

Columns three (model 3) and four (model 4) of Table 2 report regression results where we analyze the relation between dividend yield and stock ownership over the entire period and during the changing regulatory environment, respectively. Over the entire sample period, we find a negative relation between executive stock ownership and dividend yield. This negative relation, however, becomes insignificant when we control for the changing regulatory environment. In fact, we find a positive and significant relation between percentage share ownership and dividend yield after the 2003 dividend tax cut.

Table 2

The following regressions are estimated for the period over 1993-2007. The dependent variable is DIV_YLD_t and is defined as common dividends (ordinary) divided by the market value of common shares. The subscript (t-1) depicts variables measured at the beginning of the year. O_{t-1} is defined as the number of options held by top five executives deflated by total shares outstanding. S_{t-1} is defined as the number of shares held by top five executives deflated by total share outstanding. $SIZE_{t-1}$ is defined as the logarithm of the total assets. ROA_{t-1} is defined as net income deflated by the total assets. MTB_{t-1} is defined as the market value of total assets deflated by the book value of total assets. $RETTA_{t-1}$ is defined as retained earnings deflated by total assets. $TIER1\_CAP_{t-1}$ is defined as the tier 1 capital of a financial institution deflated by net risk-weighted assets. NIM_{t-1} is defined as the difference between interest income and interest expense deflated by total assets. D_1 is a year dummy that equals 1 for years 1996 – 1998; 0 otherwise. D_2 is a year dummy that equals 1 for years 1999 – 2002; 0 otherwise. D_3 is a year dummy that equals 1 for years 2003 – 2007; 0 otherwise. *t*-values are reported in parenthesis. ***, **, *, indicate statistical significance at 1%, 5%, and 10% levels, respectively.

Tobit Regression Results

	Dependent Variable (DIV_YLD_t)			
Variable	*Option Ownership*		*Stock Ownership*	
	(Model1)	(Model 2)	(Model 3)	(Model 4)
Intercept	0.0242^{***}	0.0282^{***}	0.0231^{***}	0.0216^{***}
	(3.42)	(3.88)	(3.18)	(3.04)
O_{t-1}	0.0518^{**}	-0.1494^{**}		
	(-2.49)	(-2.42)		
S_{t-1}			-0.0192^{**}	-0.0451
			(-2.20)	(-1.62)
$SIZE_{t-1}$	0.0036^{***}	0.0033^{***}	0.0037^{***}	0.0037^{***}
	(10.31)	(9.66)	(10.94)	(11.12)
ROA_{t-1}	0.5949^{***}	0.5717^{***}	0.5742^{***}	0.5767^{***}
	(5.50)	(5.30)	(4.97)	(5.11)
MTB_{t-1}	0.0444^{***}	-0.0460^{***}	-0.0458^{***}	-0.0445^{***}
	(-8.45)	(-8.47)	(-8.37)	(-8.23)
$RETTA_{t-1}$	0.0011	0.0013	0.0102	-0.0014
	(0.07)	(0.084)	(0.62)	(-0.09)
$TIER1\_CAPt_{-1}$	0.0210	0.0206	0.0145	0.0206
	(1.36)	(1.35)	(0.94)	(1.36)
NIM_{t-1}	0.2208^{***}	0.2354^{***}	0.2420^{***}	0.2531^{***}
	(4.03)	(4.32)	(4.38)	(4.67)
$D_1 \times O_{t-1}$ *or* $D_1 \times S_{t-1}$		-0.0466		-0.0365
		(-0.70)		(-1.17)
$D_2 \times O_{t-1}$ *or* $D_2 \times S_{t-1}$		0.1120^{*}		-0.0021
		(1.79)		(-0.07)
$D_3 \times O_{t-1}$ *or* $D_3 \times S_{t-1}$		0.1273^{**}		0.1000^{***}
		(2.04)		(3.35)
N	1,226	1,226	1,162	1,162
Log Likelihood	3,364	3,374	3,175	3,202

Specifying a model where we include both share and option ownership variables (as shown in Table 3), we find that the negative relation between option holdings and dividend yield persists but managerial ownership becomes insignificant. However, once we include the dummy variables for the different regulatory periods we find that the negative relation between options and dividend yield appears to be concentrated in the 1996-1998 period and then the positive relation between share ownership and dividend yield becomes significant in the post dividend tax cut regime (between 2003-2007).

Table 3

The following regressions are estimated for the period over 1993-2007 with both option and share ownership variables in the model specification. All the variables have the same definition as Table 2. *t*-values are reported in parenthesis. ***, **, *, indicate statistical significance at 1%, 5%, and 10% levels, respectively.

Tobit Regression Results

Variable	Dependent Variable (DIV_YLD_t)	
	Model 1	Model 2
Intercept	0.0274^{***}	0.0283^{***}
	(3.71)	(3.80)
O_{t-1}	-0.0615^{**}	-0.1077
	(-2.56)	(-1.50)
S_{t-1}	-0.0084	-0.0322
	(-0.88)	(-1.02)
$SIZE_{t-1}$	0.0035^{***}	0.0034^{***}
	(9.65)	(9.64)
ROA_{t-1}	0.5767^{***}	0.5743^{***}
	(4.99)	(5.07)
MTB_{t-1}	-0.0456^{***}	-0.0460^{***}
	(-8.35)	(-8.34)
$RETTA_{t-1}$	0.0054	-0.0030
	(0.33)	(-0.19)
$TIER1\_CAPt_{-1}$	0.0163	0.0214
	(1.02)	(1.38)
NIM_{t-1}	0.2098^{***}	0.2195^{***}
	(3.74)	(4.02)
$D_1 \times O_{t-1}$		-0.1014
		(-1.20)
$D_2 \times O_{t-1}$		0.1617^{**}
		(2.10)
$D_3 \times O_{t-1}$		0.0226
		(0.30)
$D_1 \times S_{t-1}$		-0.0036
		(-0.10)
$D_2 \times S_{t-1}$		-0.0421
		(-1.17)
$D_3 \times S_{t-1}$		0.0995^{***}
		(2.87)
N	1,158	1,158
Log Likelihood	3,171	3,208

Our results thus far suggest that during the period prior to the dividend tax cut, as deregulation took place and firms awarded more options, options induced managers to constrain dividend yields. However, the dividend tax cut made dividends much more attractive to managers with high stock ownership causing options to become less relevant in determining dividend policy.

CONCLUSIONS

Given that financial institutions are major dividend payers but often excluded in existing studies on dividend policy and they differ from other industries in many aspects, we focus on the dividend policy of this unique industry to fill the gap in the dividend literature. Specifically, we focus on the impact of deregulation and the 2003 dividend tax cut on the relations between a bank's dividend payouts and stock and option holdings of the top five executives during the sample period 1993-2007. We find a negative relation between dividend payouts and stock option holdings although the relation becomes significantly weaker after the enactment of Gramm-Leach-Bliley in 1999 and the dividend tax cut in 2003. We also find that dividend payouts are negatively related to managerial stock holdings prior to controlling for deregulation and the dividend tax cut. The relation becomes significantly positive in the post dividend tax cut regime. This is consistent with firms increasing dividend payments for firms with executives with large stock holding in the post tax cut regime.

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IMPACT OF NON-AUDIT ASSURANCE LEVEL (COMPILATION VERSUS REVIEW) ON PRODUCTION MANAGEMENT OF PRIVATE MANUFACTURING COMPANIES

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ABSTRACT

Private small companies have been the subject of much interest by accounting regulators recently. The AICPA issued SSARS 19 and the Financial Reporting Framework for Small- and Medium-Sized Entities in 2009 and 2013, respectively. The Financial Accounting Foundation issued the Blue Ribbon Panel Report on Standard Setting for Private Companies in 2011. This is apparently the first study to compare reporting practices of small private companies whose financial statements are compiled or reviewed.

Overall results indicate that reviewed companies tend to exhibit positive abnormal production while compiled companies tend to exhibit negative abnormal production. However, for the companies most likely to engage in earnings management, only separately taxable reviewed entities tend to manage earnings higher to meet earnings benchmarks. External users of reviewed and compiled statements should be aware of the tendencies of the different types of entities to manage production and inventory levels.

INTRODUCTION

The AICPA (2013) recently issued its *Financial Reporting Framework for Small- and Medium-Sized Entities* (FRF for SMEs). The Framework resulted from concerns that traditional GAAP statements were expensive and perhaps not useful or relevant to relatively small business enterprises. This Framework and the *Blue Ribbon Panel Report on Standard Setting for Private Companies* from the Financial Accounting Foundation (2011) indicate a heightened interest in financial reporting by relatively small business entities, sometimes called the Big GAAP/Little GAAP debate (Burton and Hillison 1979; Grusd 2006; Thrower 2010; Wright et al. 2012). However, a paucity of research has been conducted on United States companies' non-audited financial statements.

This study focuses on financial reporting for private companies whose financial statements have been provided non-audit-level assurance (reviewed) or no assurance (compiled) by independent accountants. Information obtained from Sageworks Incorporated’s privately held company database was used for analyses. The Sageworks database contains many data items for some included private companies. However, many observations from reviewed or compiled data lack information on many items necessary to construct complex earnings management measures used in previous research.

Most private manufacturers in the Sageworks database provide sufficient information to examine one form of earnings management through inventory and production decisions. Only manufacturers can substantially increase or decrease reported income by adjusting work in process and finished goods inventories to time the expensing of fixed manufacturing costs.

Consequently, due to data limitations, I focus on use of this real earnings management technique manufacturing industries. Following previous studies (Gunny 2010; Chien et al. 2011; Cohen et al. 2008; Roychowdhury 2006), I use an abnormal production measure to examine whether differences exist in production levels between statements possessing the different assurance levels. I also examine whether the tax status (separately taxed or pass-through entities) of these companies impacts their abnormal production.

SSARS 10, *Performance of Review Engagements* (AICPA 2004), issued in 2004, provided substantial clarification and guidance for independent accountants' review services. One major change was that this standard required accountants performing review services to make specific fraud related inquiries of management and expanded documentation requirements. My sample comes from financial statements impacted by SSARS 10: 4,883 yearly observations of 2,709 private companies over the period of 2005-2008 from the Sageworks database. (Note: Sageworks made entity-level data available to researchers for a short period of time, but their data is no longer publicly available other than in summary form.)

I find that abnormal production differs between companies whose financial statements were reviewed and those whose statements were compiled. Overall, financial statements that were reviewed tend to exhibit relatively more income-increasing abnormal production than compiled financial statements, while compiled financial statements tend to exhibit relatively more income-decreasing abnormal production than reviewed statements. Overall, abnormal production in reviewed and compiled statements does not appear to be impacted by organizational tax status. I also examine abnormal production of manufacturing companies most likely to have an incentive to engage in earnings management. Reviewed taxable companies just meeting earnings benchmarks exhibit significantly higher abnormal production, but this behavior is not evident for other company groups.

The next section of this article contains a review of related literature and a discussion explaining my hypotheses. The following sections describe the sample, explain statistical methods, and discuss results of empirical analysis. The article ends with a conclusions section.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Financial reporting quality has been examined in conjunction with earnings management in financial statements. One method of earnings management (sometimes referred to as real activities management) involves managing operational activities to impact bottom line earnings. Roychowdhury (2006) and Gunny (2010) found that companies use real activities management to avoid reporting losses or just meeting earnings benchmarks. Real activities management has direct cash flow consequences that may negatively affect future operating performance (Gunny 2010; Zhao et al. 2012).

Examples of real activities management include: offering unusual price discounts at end of a period to increase sales, reducing selling, general, and administrative expenses (SG&A), reducing research and development expenditures, and decreasing or increasing production and inventory levels to increase or decrease costs of goods sold. Several studies have found such activities have impacted short-term reported earnings of publicly-traded companies (e.g. Cohen et al. 2008; Cohen et al. 2010; Eldenburg et al. 2011; Gunny 2010; Roychowdhury 2006; Thomas and Zhang 2002; Zhao et al. 2012). Due to data limitations, I focus on one method of real activities management: decreasing or increasing production and inventory levels to increase or decrease costs of goods sold. Consequently, my sample only includes manufacturing companies.

Level of Assurance

I also limit the sample to privately held companies whose financial statements were either compiled or reviewed by an independent accountant to focus on whether an independent accountant's review helps to reduce earnings management through actual production and inventory decisions or reporting decisions. Barefield, et al. (1993) found that economic forces impacting the market for audit services also apply to compilation and review services. Demand for review services increased with the size of the client and the existence of accounting based loan covenants. They also found that accountants charged significantly more for review engagements than for compilations. Like audit engagements, Munter and Tatum (1994) found that accountants conducting SSARS engagements apparently consider, at least implicitly, inherent and control risk factors.

Reinstein et al. (2006) noted that for some time, CPAs have worried that financial statement users place too much confidence in limited-assurance statements prepared for nonpublic entities. Based on a survey of practicing CPAs and bankers, they concluded that both groups had more confidence in relying on financial statements for decision making when a CPA was somehow associated with the statements. In 2004, the AICPA (2004) offered substantial clarification and guidance related to review services in *SSARS 10, Performance of Review Engagements*. This standard required specific fraud related inquiries of management and clarified and expanded documentation requirements for review engagements. Most of my data comes from years in which *SSARS 10* would be in effect for review engagements. I present the following hypotheses (in the null form):

H_{1a} *Reviewed financial statements for private-taxable companies and those compiled for taxable companies exhibit similar levels of abnormal production.*

H_{1b} *Reviewed financial statements for private pass-through entities and those compiled for pass-through entities exhibit similar levels of abnormal production.*

Tax Status

Private company owners have several options for the legal form of their business entities. Publicly-traded corporations are formed as C Corporations under Internal Revenue Service regulations and pay separate income taxes at the corporate level. IRS (2013) statistics indicate that C Corporations are much more likely to be audited by the IRS than are other business entities. Owners of C Corporations are taxed directly only on dividends distributed from the company. According to the IRS (2011) data, only 5.7% of companies filing tax returns with the Internal Revenue Service in 2008 were C corporations. Consequently, most privately held companies in the United States are not organized as C Corporations.

Other legal forms available for private companies include: incorporating as an S corporation or limited liability corporation (LLC), forming as a limited liability partnership (LLP) or other form of partnership, and individual ownership. Earnings of these other legal forms of business are not generally taxed at the entity level; earnings typically flow through to owners and are included on owners' individual income tax returns. Consequently, legal forms other than a C-corporation can reduce the combined tax liability of a business and its owners, which can produce different incentives for private companies to adjust inventory levels to increase or decrease income, depending upon their tax status.

H_{2a} *Reviewed financial statements for private-taxable companies and reviewed statements for pass-through companies exhibit similar levels of abnormal production.*

H_{2b} *Compiled financial statements for private-taxable companies and compiled statements for pass-through companies exhibit similar levels of abnormal production*

Size of the Company

The largest manufacturing company in the Sageworks database for any year had $150 million in sales. Owner-managers of small private companies might be able to easily adjust production and inventory to achieve a desired level of taxable income. Consequently, I also limit the sample to manufacturing companies with sales of at least $1 million. Previous research has found that earnings management is impacted by company size. Larger companies may experience more difficulty manipulating earnings because they have more effective internal control over financial reporting and may be subject to closer scrutiny by internal and external accountants, and tax auditors. Also, the incentives to increase or decrease income may vary between relatively different sized companies. I examine the following hypothesis to investigate the size impact on abnormal production:

H_3 *The size of private companies with reviewed or compiled financial statements does not impact the level of abnormal production.*

EMPIRICAL ANALYSES

Data

Sageworks Incorporated maintains a database of private company financial information collected from Sageworks' customers (mainly banks and CPA firms) who enter financial statement information from their clients/customers into the Sageworks system. Sageworks provides summary information by industry segment, client size, and other factors to their banking and accounting firm customers. Sageworks ' customers then can compare individual client financial statement information to peer company summary information (Minnis 2011).

For a brief time, Sageworks made firm level data from their database available to researchers with companies identified only by an ID number. The Sageworks data set contains many items including: balance sheet and income statement items, calculated ratios, some cash flow items, the Level of Assurance provided by independent accountants, industry (NAICS code), legal form, and location. The amount of information available varies greatly by company. A few companies report all items, while many report only a few items.

I obtained data for 2001 through 2008 from a Sageworks database. (The latest year used was 2008 because at the time the data set was obtained, complete data for 2009 was not available.) My sample selection approach is summarized in Table 1. The database contained 423,631 observations for 2001 through 2008. My research questions deal with production and inventory decisions. Consequently, I limited my analyses to manufacturing companies reporting sales in the NAICS codes 311822 to 339999, which included 31,835 observations. I identified 3,765 of these observations as duplicate annual observations or quarterly data. After dropping those observations, 28,070 observations remained. Relative to later years, years prior to 2005 contained considerably less observations that had three consecutive years' data necessary for analysis. Sageworks had fewer subscribers during their start-up phase for the data set in the early 2000s (Minnis 2011). Selection bias may be present in earlier years; thus, I omitted all observations prior to 2005, leaving 20,542 observations.

Table 1
SAMPLE

	Sageworks Total Observations	Sageworks Manufacturing Observations with sales
2001-2004	87,655	7,528
2005	73,914	5,671
2006	89,674	6,548
2007	92,410	6,534
2008	79,978	5,554
	423,631	31,835
Less duplicates and quarterly		3,765
Corrected total of manufacturing observations		28,070
Less: 2001-2004 observations		7,528
Manufacturing observations from 2005-2008		20,542
Less: Observations < 3 yr lags or missing variables, or < $1 million in sales		12,624
Less: Observations in 3-dig NAICS Codes < 15 observations in a year. Plus, for Sageworks, observations whose data source was audited, company prepared, annualized, tax return, blank, or other.		2,475
Usable Observations with all variables		5,443
Less: extreme observations		560
Sample for main analyses[1]		4,883

[1] The sample included 2,709 separate Sageworks companies.

For small companies, a small manipulation in production and inventory levels could have a magnified effect on income. Or conversely, small companies may not be as able to manage earnings as larger companies. Consequently, I restricted the sample to companies with sales of $1 million or greater. I also needed three consecutive years' data to estimate abnormal production for an observation. These two criteria eliminated another 12,624 observations.

Also, to limit my sample to observations in which independent accountants offered a low level of assurance, or no assurance on the financial statements, observations were deleted that had a data source listed as audited, annualized, company prepared, other, tax return, or left blank. (Only the audited source contained a substantial number of observations.) In addition, at least 14 other observations from the same three-digit NAICS code for a year were required for the abnormal production calculation. This resulted in the deletion of companies from three-digit NAICS codes with few observations. Deletion of companies with financial statements other than those compiled or reviewed by an independent accountant or in a three-digit NAICS code with few observations left 5,443 Sageworks observations.

I followed Minnis (2011) and deleted extreme observations he defined as firm-years where: (1) net income, cash flow from operations, or property, plant and equipment, exceeded total assets at year-end (2) sales decreased by more than 50% or increased by more than 100%, or (3) two times total assets were less than total liabilities. Consequently, 560 observations were deleted as extreme, leaving 4,883 private company observations from 2,709 separate companies as a sample for the main analysis.

The sample consists of observations from a broad range of manufacturing industries, with over 21% coming from fabricated metal products manufacturing companies and over 15% from machinery manufacturing. The percentages of observations by three-digit NAICS codes are similar for the sample broken down by reviewed and compiled observations. The distribution of the sample in total and by assurance level (reviewed and compiled) and by tax status (pass-through and taxable) remains relatively stable from 2005 to 2008. The number of observations increases substantially from 2005 to 2006 and from 2006 to 2007; total observations are essentially the same for 2007 and 2008.

Statistical Models

I used Roychowdhury (2006: 345) equation 4, and Cohen et al. (2008: 766) equation 7, within each three-digit NAICS code for each year, to estimate abnormal production.

$$PROD_{t,f}/A_{t-1,f} = \alpha_0 + \alpha_1(1/ A_{t-1,f}) + \alpha_2(Sales_{t,f}/ A_{t-1,f}) + \alpha_3(Salechg_{t,f}/ A_{t,f}) + \alpha_3(Salechg_{t-1,f}/ A_{t-1,f}) + \varepsilon_{t,f} \qquad (1)$$

where: $PROD_{t,f}$ = (cost of goods $sold_{t,f}$ + change in $inventory_{t,f}$)

A_{t-1} = total assets at the beginning of the year,

$Sales_t$ = current year net sales,

$Salechg_{t,f}$ = change in sales during current year,

$Salechg_{t-1,f}$ = change in sales during previous year, and

$\varepsilon_{t,f}$ = abnormal production (Ab_Prod_t) is the error term from the regression; a positive Ab_Prod_t would increase income while a negative Ab_Prod_t would reduce income.

To follow analyses similar to Gunny (2010), I also constructed variables to identify companies most likely to want to manage their incomes: those wanting to avoid reporting a loss or reporting lower net income than that of the previous year. My variables include: (1) MEET_0 = 1 if net income scaled by beginning total assets was less than 0.01, but greater than or equal to 0.00, (2) MEET_last = 1 if net income of the current year scaled by net income of the previous year was less than 0.01, but greater than or equal to 0.00, and (3) the greatest incentive/likelihood of engaging in earnings management to increase income would be for any observations falling within these categories and consequently were coded as BENCH = 1.

I used the following formula, based on Gunny (2010), to examine if companies most likely to manage income had different Ab_Prod_t than other companies:

$$Ab\_Prod_t = \alpha_0 + \alpha_1(BENCH_t) + \alpha_2(Size\_lnA_{t-1}) + \alpha_3(ROA_t) + \alpha_4(Industry_f) + \alpha_5(Year_g) + \varepsilon_t \quad (2)$$

where: Ab_Prod_t was defined as the residual from Equation 1above,
$BENCH_t$ was defined in the previous paragraph,
$Size\_lnA_{t-1}$ = the natural log of total assets at the beginning of the year,
ROA_t = income before extraordinary items divided by total assets at the beginning of the year,
$Industry_f$ = 1 if company is in industry f (based on 3-digit NAICS codes), 0 otherwise,
and
$Year_g$ = 1 if the observation is from year g, 0 otherwise.

To compare abnormal production of different groups within the sample, I conducted analyses for the sample over all and four subgroups of (1) reviewed taxable companies, (2) reviewed pass-through entities, (3) compiled taxable companies, (4) or compiled pass-through entities.

Results

Table 2 provides the means for the total Sageworks company sample and the four subsample groups for variables from Equations 1 and 2. The null Hypotheses 1_a and1_b state that financial statements that are compiled or reviewed will exhibit similar abnormal production, while null Hypotheses 2_a and 2_b state that financial statements for separately taxed companies and pass-through entities will exhibit similar abnormal production. The means for abnormal production ($Ab\_Prod\__t$) reported in Table 2 for all subsamples are significantly different from zero; the means of reviewed groups are positive while the means are negative for the compiled groups. These results provide evidence to support rejection of Hypotheses 1_a and1_b, but no evidence to reject Hypotheses 2_a and 2_b.

For the full sample and subsamples, Table 3, Panel A presents the parameter estimates and t-statistics resulting from the Model 2 regression analysis (with $Ab\_Prod\__t$ as the dependent variable). To keep the table manageable, I report statistics for analyses without the data year or three-digit NAICS code indicator variables. $BENCH_t$ in Model 2 is designed to measure whether companies most likely to manage earnings actually exhibit higher abnormal production. (In analyses for overall and for separate sample subgroups, no dummy variables for the data year were significant in any model. No sign or significance on any other variables changed when data years were included in the model. The only change of sign or significance when the three-digit NAICS codes were included in the model was that the negative t-statistic for Sales_quint_low becomes marginally significant in Table 3, Panel B.)

In line with evidence provided in Table 2, $BENCH_t$ exhibits a positive, significant parameter estimate for the reviewed taxable group. However, $BENCH_t$ parameter estimates are insignificant over all and for the other sample subgroups. These results provide support to reject H_{1a} which hypothesizes no difference in the abnormal production of reviewed-taxable and compiled-taxable companies. No support is found to reject H_{1b}: no difference between reviewed pass-through and compiled pass-through companies. The parameter estimates on BENCHt provide evidence to reject hypothesis H_{2a} because tax status appears to influence Ab_Prod_t

Table 2
MEANS AND STANDARD DEVIATIONS OF VARIABLES
FOR THE FULL SAMPLE AND VARIOUS SUBSAMPLES

Variable	N=	All 4883	Reviewed-Taxable 1226	Reviewed-Pass-Through 1526	Compiled - Taxable 1010	Compiled Pass-Through 1121
PROD_A_t_1		1.968	1.780	1.977	1.991	2.142
		1.514	1.058	1.318	1.844	1.809
Sale_A_t_1		2.767	2.435	2.679	2.901	3.130
		1.876	1.198	1.512	2.251	2.412
salechg_A_t_1		0.206	0.148	0.203	0.228	0.252
		0.748	0.533	0.571	0.676	1.125
salechg_1_A_t_1		0.233	0.152	0.217	0.254	0.325
		0.734	0.529	0.517	0.814	1.032
$BENCH_t$		0.059	0.082	0.045	0.072	0.044
		0.236	0.274	0.206	0.259	0.205
Size_ln_TA		14.878	15.011	15.234	14.489	14.597
		1.053	0.914	0.953	1.088	1.100
ROAt		0.113	0.052	0.140	0.075	0.179
		0.204	0.114	0.215	0.147	0.272
AB_PROD		0.000	0.035	0.022	-0.032	-0.039
		0.389	0.334	0.349	0.422	0.453
|AB_PROD|		0.279	0.249	0.253	0.294	0.335
		0.270	0.225	0.241	0.305	0.308
AB_PROD = 0 (two-tailed Z test stat)`		0.00	3.67***	2.46**	-2.41**	-2.88***

,*--Significant at .05 and .01, respectively.

Variable Definitions:
PROD_A_t_1 = (cost of goods $sold_{t,f}$ + change in $inventory_{t,f}$)/total assets at the beginning of the year.
Sale_A_t_1 = current year net sales/total assets at the beginning of the year.
salechg_A_t_1 = change in sales during current year /total assets at the beginning of the year.
salechg_1_A_t_1 = change in sales during previous year /total assets at the beginning of the year.
$BENCH_t$ = 1 if net income scaled by total assets at the beginning of the year was greater than or equal to zero, but less than 0.01, or if net income of the current year scaled by net income of the previous year was greater than or equal to zero, but less than 0.01, else 0.
Size_ln_TA = the natural log of total assets at the beginning of the year.
ROAt = income before extraordinary items divided by total assets at the beginning of the year.
AB_PROD = the error term from the regression of PROD_A_t_1 is abnormal production.

Table 3

CROSS-SECTIONAL REGRESSIONS RELATING ABNORMAL PRODUCTION TO COMPANIES JUST MEETING ZERO OR PREVIOUS YEAR'S EARNINGS FOR THE FULL SAMPLE AND VARIOUS SUBSAMPLES

Panel A: AB_PROD as dependent variable	All	Reviewed-Taxable	Reviewed-Pass-Through	Compiled - Taxable	Compiled Pass-Through
Variable N=	4883	1226	1526	1010	1121
Intercept	0.014	0.678	-0.141	-0.010	0.178
	0.16	4.17***	-0.97	-0.05	1.01
BENCHt	0.014	0.063	-0.034	0.036	-0.014
	0.65	2.06**	-0.86	0.76	-0.24
Size_ln_TA	0.003	-0.041	0.016	0.001	-0.008
	0.57	-4.11***	1.73*	0.11	-0.72
ROAt	-0.646	-0.643	-0.685	-0.724	-0.645
	-16.87***	-6.44***	-11.58***	-6.38***	-9.05***
Adjusted R^2	0.082	0.057	0.133	0.045	0.093

Panel B: AB_PROD as dependent variable	All	Reviewed-Taxable	Reviewed-Pass-Through	Compiled - Taxable	Compiled Pass-Through
Variable N=	4883	1226	1526	1010	1121
Intercept	0.037	0.048	0.087	-0.019	0.009
	4.70***	3.77***	6.99***	-1.05	0.41
BENCHt	0.012	0.057	-0.028	0.032	-0.031
	0.58	1.84*	-0.70	0.68	-0.52
ROAt	-0.649	-0.623	-0.702	-0.718	-0.631
	-16.71***	-6.33***	-11.74***	-6.29***	-8.60***
Sales_quint_low	0.042	0.060	-0.014	0.067	0.093
	2.98***	2.59***	-0.45	2.34**	2.97***
Sales_quint_high	0.078	-0.004	0.072	0.065	0.144
	5.94***	-0.15	3.85***	1.76*	4.51***
Adjusted R^2	0.088	0.048	0.143	0.050	0.108

Parameter estimates and t-statistics for independent variables from Gunny (2010), other than market to book value, and variables for highest and lowest sales quintiles. (T-statistics calculated with Roger's Robust standard errors as recommended by Petersen, 2009.)

*, **,***--Significant at .10, .05 and .01, respectively.

Table 3
(continued)

Variable Definitions:
$BENCH_t$ = 1 if net income scaled by total assets at the beginning of the year was greater than or equal to zero, but less than 0.01, or if net income of the current year scaled by net income of the previous year was greater than or equal to zero, but less than 0.01, else 0.
Size_ln_TA = the natural log of total assets at the beginning of the year.
ROAt = income before extraordinary items divided by total assets at the beginning of the year.
Sales_quint_low = 1 if observation in the smallest sales quintile, else 0.
Sales_quint_high = 1 if observation in the largest sales quintile, else 0.

behavior of the taxable reviewed group compared to pass-through reviewed companies. Taxable companies tend to manage earnings upward to meet earnings benchmarks. Insignificant parameter estimates for BENCHt on the compiled statement groups provide no support to reject H_{2b}.

As mentioned previously, motivations to manage earnings may differ depending upon the size of the relatively small manufacturing companies included in my sample. In Table 3, Panel A, Size_lnA_{t-1} indicates that, for reviewed taxable companies, abnormal production decreases as size increases. In contrast, reviewed pass-through companies exhibit more abnormal production as size increases, at a slightly significant level. Gunny (2010) found insignificant results for a similar size variable when examining the abnormal production of public companies.

Due to the mixed results with Equation 2 reported in Table 3, Panel A, I also examine the impact of size with another equation. Because inclusion in my sample was restricted by sales between \$1 and \$150 million, I replace Size_lnA_{t-1} with indicator variables for the smallest quintile and the largest quintile of companies based on sales. The following equation provides another test for size difference impacts on abnormal production.

$$Ab\_Prod_t = \alpha_0 + \alpha_1(BENCH_t) + \alpha_2(ROA_t) + \alpha_3(Sales\_quint\_low_t) + \alpha_4(Sales\_quint\_high_t) + \alpha_5(Industry_f) + \alpha_6(Year_g) + \varepsilon_t \quad (2a)$$

where: Ab_Prod_t, $BENCH_t$, ROA_t, $Industry_f$, and $Year_g$ were defined previously,
$Sales\_quint\_low_t$ = 1, if the observation falls in the lowest quintile of sales for the full sample, 0 otherwise,
and,
$Sales\_quint\_high_t$ = 1, if the observation falls in the highest quintile of sales for the full sample, 0 otherwise.

Table 3, Panel B reports the results of these analyses which reveal similar findings to those in Panel A. (1) $Sales\_quint\_low_t$ has a significant positive parameter estimate for the reviewed taxable sample while Sales_quint_high is insignificant, and (2) Sales_quint_high has a positive and significant parameter estimate for the reviewed pass-through group while Sales_quint_low is insignificant. These results are hard to explain. Managers of smaller reviewed taxable companies may deliberately manage earnings upward to enhance their ability to increase their availability of credit from lenders. Alternatively, larger reviewed taxable companies face more deterrents to earnings management in general, including the potential for an IRS audit.

The overall, compiled taxable, and compiled pass-through samples exhibit significant positive parameter estimates on Sales_quint_high and $Sales\_quint\_low_t$. Results for the compiled company groups suggest that abnormal production may be positive in both the smallest and largest companies in those groups. Results reported in Table 3, Panels A and B, support rejection of Hypothesis 3; size does tend to impact the abnormal production of these privately held companies.

CONCLUSION

Private small companies have been the subject of much interest by accounting regulators recently. Pronouncement SSARS 19 (AICPA 2009) (Codified as AR 9080 and AR 9090) which was effective for compilations and reviewed statements prepared for periods ending on or after December 15, 2010, provided new guidance for compilations and reviews. In 2013, the AICPA issued the Financial Reporting Framework for Small- and Medium-Sized Entities (FRF for SMEs). FRF-MSEs followed the Financial Accounting Foundation's issuance of the *Blue Ribbon Panel Report on Standard Setting for Private Companies* in 2011. The Blue Ribbon Panel (BRP) Report noted that many private companies report financial information under some Other Comprehensive Basis of Accounting (OCBOA) than GAAP. Apparently, this study is the first study that compares reporting practices of companies whose financial statements are compiled and those that are reviewed.

My study is subject to several limitations. I only analyzed data from manufacturing companies because, due to data limitations, my study focused on inventory and production activities management and reporting. Earnings management patterns may differ in other ways between taxable and nontaxable small companies, and compiled and reviewed financial statements, in other industries. Kvaal et al. (2012) found differences in the real earnings management patterns of nonfamily-owned private companies and family-owned private companies. The Sageworks database did not provide any information on ownership of companies included in my sample. Future research could address these limitations.

Overall results indicate differences in abnormal production depending on whether financial statements have been reviewed or compiled by an independent accountant; reviewed companies tend to exhibit positive abnormal production while compiled companies tend to exhibit negative abnormal production. However, for the companies most likely to engage in earnings management (indicated by $BENCH_t$), only separately taxable reviewed entities tend to manage earnings higher to meet earnings benchmarks.

Contributions to Literature

This study extends previous research substantively. Only a few studies have examined financial information from large data sets of privately-owned small companies in the United States. This is the first study that examines reporting differences related to abnormal accruals between financial statements that are compiled and those that are reviewed. The results offer insights to users of reviewed and compiled statements about how different entities perhaps manage earnings through production and inventory decisions.

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THE IMPACT OF DISCLOSING MANAGEMENT'S PAST FORECAST ACCURACY ON NONPROFESSIONAL INVESTORS' HEURISTIC DECISION-MAKING

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ABSTRACT

We performed an experiment to determine the effects of explicitly disclosing management's past forecast accuracy on nonprofessional investors' decision-making. Study participants were provided with information about two fictitious firms and were asked to indicate which they considered to be the better firm. The case materials initially presented one firm as the "intuitive" choice based on heuristics commonly used by investors. After reading of managements' forecast past accuracy for both firms (either high or low), the participants were given forecasted income statements which indicated that the non-intuitive option was expecting better performance. Our results confirm the nonprofessional investors' use of heuristic cues in expected ways. We also find that information about management's past forecast accuracy can influence investors' reliance upon their heuristically-determined choices. Further, our results indicate that nonprofessional investors may use information they consider to be unreliable when making their decisions. We conclude with a discussion of practical and regulatory implications.

Keywords: nonprofessional investor decision-making; intuition; heuristics; management earnings forecast

INTRODUCTION

With the dramatic increase in the availability of personal investment websites and the increasing number of individuals choosing to manage their own investment portfolios (Looney et al., 2006), understanding the needs for, and uses of, publicly-available information by nonprofessional investors when making their investment decisions have become more important (Barron et al., 2004). The nonprofessional investor is challenged by the need to predict future earnings, stock returns, and risk (Moser, 1989). In addition, behavioral research in finance and accounting indicates that, because of the inherent uncertainties in the decision-making process, investors often rely on heuristics (rules-of-thumb) when making investment decisions (DeBondt, 1998).

Heuristics are decision rules which develop over time and are stored in memory (Chen et al., 1999). Their use is triggered by the receipt of heuristic cues which are information items related to the decision at hand. Heuristic cues used in investment decisions may include company name recognition (Teoh & Wong, 1993), CEO reputation (Cianci & Kaplan, 2010), and past stock prices (DeBondt, 1998). While heuristic cues such as these can be helpful when making investment decisions, they can also lead to poor choices because they often don't have a direct relationship to the firm's earning potential or investment worthiness (DeBondt, 1998).

The use of heuristics results in investors developing intuitions about their investment decisions (DeBondt, 1998). This first impression (or initial preference), once formed, functions as a decision default (Chaiken et al., 1989). The decision to stay with, or switch away from, the initial preference depends upon the strength of "constraint information" which is information that either contradicts the initial preference or supports an alternate decision (Simmons & Nelson, 2006). Accordingly, as investors obtain additional information about the firms they are considering for investment, their initial preferences may be strengthened or weakened. Unfortunately, some types of constraint information related to investment decisions can be difficult for nonprofessional investors to use because the information may be difficult to interpret and/or access. An example of this type of information is management's earnings forecast.

A well-established literature stream has shown that management's earnings forecasts provide decision-useful information to investors (Waymire, 1984; Pownall & Waymire, 1989). From the individual investor's perspective, management forecasts provide forward-looking information that can be useful when predicting future cash flows. However, the interpretation of earnings forecasts can be difficult because its value is dependent, at least in part, upon the perceived reliability of the forecast. For instance, a reputation for highly accurate forecasting based on past disclosures increases the perceived reliability of subsequent management forecasts (Benjamin & Strawser, 1974; Williams, 1996). While knowing how accurate management has been in the past is helpful, this information is often difficult to acquire because it is not currently a required disclosure. Thus, managements' earnings forecasts potentially represent an important source of constraint information, but the appropriate use of this information may be dependent upon the knowledge and/or experience of the investor.

The present study is an initial exploration into nonprofessional investors' use of management's earnings forecasts. Specifically, we consider the impact of specifically stating management's past forecast accuracy after investors have already established an initial investment preference. The experiment included 102 business students with limited investment experience assuming the role of nonprofessional investors. Each was presented with case materials describing two fictitious firms being considered for investment. Using heuristic cues such as CEO reputation, stock price trends, and brand name, the case materials presented one firm as the “intuitive” choice. After considering the heuristic cues, each participant indicated which of the two companies they initially felt was better. They also gave an assessment of their confidence in this initial preference. Participants were then given information on the accuracy of managements’ past earnings forecasts for both firms. They were told that the management teams of both firms had either been very accurate or very inaccurate in making their forecasts in previous years. This manipulation resulted in two treatment groups: high accuracy and low accuracy. All participants then received current earnings forecasts for both firms. The forecasts presented to both groups indicated that the “non-intuitive” choice expected better performance. Participants were again asked which was the better company and indicated their confidence level. In addition, each provided a choice for the best investment.

Our results show that participants initially used the heuristic cues in ways consistent with prior research. Specifically, the firm with the trendy name, more accomplished CEO and higher historical stock prices was rated as the better company across both treatment groups. When considering the use of managements’ earnings forecasts, we find a difference based on past forecast accuracy. For those in the high accuracy group, the forecasts appeared to moderate the participants’ initial investment preferences and led them toward the non-intuitive option. In contrast, members of the low accuracy group continued to consider the intuitive option to be the better company, though the preference did weaken. Additional analysis shows that the low accuracy group also lost a significant amount of confidence in its preference. Overall, our findings suggest that management’s past forecast accuracy can play a role in how nonprofessional investors use earnings forecasts. However, the effect is not as straight-forward as was expected. The initial preferences were moderated by highly accurate forecasts, but less accurate forecasts had unexpected effects on strength of preference and confidence.

Our study contributes to the literature on investor behavior and financial disclosure in several ways. First, while many previous studies have focused on professional investors (e.g., analysts), we focus on the growing number of nonprofessional investors. This population of investors is worthy of study because the growth of online investing “increases the likelihood that the information they process will eventually be aggregated in share prices” (Barron et al., 2004, p. 22). We also find support for earlier results by providing evidence that nonprofessional investors will rely on heuristics and heuristic cues in predictable ways when making investment decisions. Next, our study shows that management’s past forecast accuracy can influence nonprofessional investors’ interpretation and use of earnings forecasts. This finding highlights the importance of past forecast accuracy information being made readily available to these investors. Finally, our participants’ unexpected reliance upon less accurate forecast information certainly calls for further investigation.

The remaining sections of this paper are as follows. The next section summarizes prior research that relates to our study. We then discuss heuristic decision-making and put forth three hypotheses. Next, we present our experimental task and describe our research design. Finally, we discuss our analyses, results, and the implications to be drawn from our findings.

BACKGROUND AND HYPOTHESIS DEVELOPMENT

Investors' Decision-Making and Use of Heuristics

DeBondt (1998) reviewed 40 years of behavioral finance literature and presented a detailed description of small-investor behavior. One of his conclusions was that many investors have problems distinguishing between "good" stocks and "good" companies. As stated by DeBondt (1998), "on average, highly reputed companies seem overpriced since they become poor stock market performers afterwards" (p. 834). For example, firms that display rapid earnings growth or appear on covers of business magazines are perceived to be better investments while firms that report losses or reduced market share are perceived as inherently bad investments (DeBondt, 1998).

Shefrin and Statman (1995) offered an explanation as to why many investors believe that "good" stocks are those issued by "good" companies. The authors argued that investors use the representativeness heuristic when evaluating potential investments. This heuristic can be described as a cognitive error in which individuals reach their conclusions based on how similar one thing is to another while ignoring information about actual proportions and probabilities (Kahneman & Tversky, 1973). Shefrin and Statman (1995) wrote that the use of the representativeness heuristic leads investors to ignore the fact that the proportion of the stocks of "good" companies that perform well is smaller than the proportion of the stocks issued by "bad" companies that perform well.

When individuals use heuristics to aid in decision-making, they are said to engage in heuristic processing. In the cognitive psychology literature, this term refers to the fast, automatic and unconscious processing of information when making decisions (Chaiken et al., 1989). Intuitive thoughts are believed to be the result of processing heuristic cues related to the decision at hand (Simmons & Nelson, 2006). The heuristic cues frequently used by investors are based on characteristics of the firm or management team that are often not directly related to the future performance or earning potential and can lead to poor investment decisions (DeBondt, 1998). Table 1 presents several common heuristics used by investors.

For example, firm and management reputations are two of the factors that can influence the firm's appeal as an investment choice (Chajet, 1997). Cianci and Kaplan (2010) found that CEO reputation affected investors' judgments of a firm's future performance. However, research has shown that investors tend to err by expecting higher returns from their perception of "safe" stocks offered by highly-reputed companies (Shefrin & Statman, 1995; Shefrin, 2001).

Auditor size is also considered by investors. Teoh and Wong (1993) performed a regression of abnormal stock returns on earnings surprises for firms with Big-8 versus non-Big-8 auditors. They found that auditor size was perceived to be an indicator of audit quality (i.e., a Big-8 auditor implied higher audit quality). Since the auditors' reputation affects the credibility of the financial statements under audit, these findings imply that auditor size affects a firm's attractiveness as an investment (Teoh & Wong, 1993).

Table 1
COMMON HEURISTICS USED BY INVESTORS

Better firms have…	**Source(s)**
…favorable reputations.	Shefrin & Statman (1995); Shefrin (2001)
...CEOs with favorable reputations.	Chajet (1997); Cianci & Kaplan (2010)
...highly recognizable brand names.	Goldstein & Gigerenzer (1999); Anderson & Rakow (2007)
..."Big 8/6/5/4" auditors.	Teoh & Wong (1993)
…higher historical stock prices.	DeBondt (1998)

Investors may also use a firm's name recognition when making decisions. The rationale in this scenario is that a recognizable name implies higher associated value (Goldstein & Gigerenzer, 1999). Use of this recognition heuristic can also be problematic for investors. Anderson and Rakow (2007) concluded that, "with respect to changes in value, selecting stock on the basis of name recognition is a near-random method of portfolio construction that offers little, if any, benefit to the personal investor" (p. 29).

Once they are formed, these initial preferences function as decision defaults and will likely be relied upon by the individual (Simmons & Nelson, 2006) when he or she is either unmotivated or unable to engage in further processing (Chaiken et al., 1989). Thus, when subsequently faced with a plausible alternative which contradicts the initial preference, the decision maker's primary task is to determine whether they should stay with the original choice, or switch to the new option (Simmons & Nelson, 2006). When faced with the "stay or switch" decision, individuals consider constraint information. This refers to information obtained after an initial (heuristic) preference has been formed and which either opposes the heuristic choice or supports an alternative choice. Simmons and Nelson (2006) put forth the "constraint magnitude hypothesis" which predicted that people would choose the heuristic option less frequently when presented with stronger constraint information. The current study presents management's past forecast accuracy and current earnings forecasts as potential constraint information. We examine how nonprofessional investors use this constraint information and whether these disclosures affect their reliance on heuristic decision-making.

Based on these findings, and to establish initial preferences, we expect heuristic cues to influence investor decision-making.

H_1 *When no financial statement data is available, investors will focus on heuristic cues when comparing companies to determine which is better than another.*

Management Forecast Accuracy & Investors' Responses

Prior research has established that management's earnings forecasts provide useful information to investors (Waymire, 1984; Pownall & Waymire, 1989). Management forecasts have been shown to serve two key functions. They aid investors in understanding firm performance (Kim & Shi, 2011) and they allow management to correct market opinions regarding firm performance (Ajinkya & Gift, 1984; Waymire, 1984). While earnings forecasts are clearly relevant to investment decisions, investors' responses depend, in large part, upon the perceived reliability of the forecasts (King et al., 1990).

One of the factors influencing investors' assessments of management credibility and disclosure reliability is management's accuracy on prior forecasts. Benjamin and Stawser (1974) provide early evidence regarding the inclusion of forecasts with financial statements. They showed that projections and financial statements matter to investors, but that larger negative variance in prior forecast accuracy decrease both the EPS predictions and the decision weight given to forecast information. Williams (1996) examined whether management's accuracy on prior earnings forecasts impacted analysts' assessments of the believability of management's most recent earnings forecasts. Her archival evidence indicated that the magnitude of analysts' forecast revisions in response to management's current forecasts was associated with management's prior forecasting accuracy. She concluded that management teams establish forecasting reputations based on prior forecasting accuracy (Williams, 1996).

In a later study, Hirst et al. (1999) found that forecast form and prior forecast accuracy interact to influence investor judgments. Specifically, the authors found that the precision of the forecast (point or range format) more strongly influenced investment decisions when management was perceived as more accurate in their past forecasts (Hirst et al., 1999). Thus, taken as a whole, both archival and experimental studies have provided evidence that knowledge of management's past forecast accuracy is decision-useful for both investors and analysts (Benjamin & Strawser, 1974; Williams, 1996; Hirst et al., 1999).

Given that management's earnings forecasts provide relevant information for investment decisions, these forecasts could subsequently constrain any heuristic preferences nonprofessional investors may have formed. Therefore, we expect that management's past forecast accuracy will play a role in the ability of the forecast information to constrain investors' initial preferences.

H_2 *After receiving earnings forecasts indicating that another firm expects better performance, investors perceiving the forecasts to be reliable will be more likely to:*

A: Shift their preferences for the better company from the initial preference to the alternative option than will investors who perceive the forecasts are less accurate.

B: Consider the alternative option to be a better investment than will investors who perceive the forecasts are less accurate.

METHODOLOGY

Task

Each participant was provided with introductory information which stated that they were to assume the role of an investor deciding between the common stock of two companies: Emerging Innovation ("Emerging") and Banks Manufacturing ("Banks"). Emerging was described as a manufacturer of small, high-powered technologies that are used in hand-held devices. Banks, also a manufacturer, was described as a producer of high-powered machine engines for trucks and tractors. They were informed that the case materials were not intended to provide all of the information that would normally be available when making investment decisions. Despite this, each was asked not to make any inferences about missing items and to base their decisions only upon the information contained within the case materials.

Part A of the case provided company profiles and general information about each firm. The descriptions contained industry information and comparative graphs of stock price trends along with information about each firm's CEO and audit firm. Thus, the information contained in Part A presented several heuristic cues which are often relied upon by the nonprofessional investor when making investment decisions. The cues were designed to present Emerging as the better company (i.e., the heuristic/intuitive choice). After reviewing the information in Part A, participants were asked to indicate which of the two firms "appears to be the better company." We intentionally omitted any definition or description for the word "better" in order to force participants to rely on their individual heuristic processes in reaching this decision. Responses were provided on an eleven-point Likert-type scale with end-points labeled "Definitely Emerging" and "Definitely Banks." The participants also rated their level of confidence in that decision on an eleven-point scale (end-points were labeled "Not at All Confident" and "Extremely Confident").

In Part B, participants were told that both firms had used accounting policies consistent with other firms in their industries and that both firms' financial statement ratios were consistent with their respective industry averages. Participants were also told of management's forecasting accuracy (MGTACC) based on prior years' actual and forecasted financial performance. MGTACC was manipulated at two levels: high (HIACC) and low (LOACC). The HIACC group was told that the management teams of both firms "have been very accurate in the past with regard to forecasted financial results," and that any differences between forecasted and actual earnings had been immaterial. The LOACC group was told that the management teams of both firms "have experienced substantial inaccuracies with regard to forecasted financial results," and that many of the differences between actual and forecasted earnings had been of material magnitude. Both the HIACC and LOACC groups were told that any differences between the companies' prior forecasts and the actual realizations were neither consistently positive nor negative.

After reading of management's past forecasting accuracy, participants were presented with press releases containing the prior-year audited and current-year forecasted income statements along with common-size income statements for both firms. The press releases also contained statements from management about future expectations. Both forecasts contained good news; Banks (the non-heuristic choice) forecasted an eleven-percent increase in net sales, while Emerging (the heuristic choice) projected a two-percent increase in net sales.

All participants received identical income statements (both actual and forecasted) in Part B. However, the MGTACC (HIACC vs. LOACC) manipulation caused the forecasted information in the LOACC condition to be ambiguous (i.e., relevant but not reliable). After reviewing the financial statement information, participants were again asked to indicate which firm seemed to be better and to rate their confidence level. Each of these responses was provided on scales similar to those described above. In addition, participants were asked to indicate which of the two companies would be the best investment using an eleven-point scale (end-points were marked “Definitely Emerging” or “Definitely Banks”).

The study concluded with manipulation checks and demographic questions. The two manipulation checks asked participants to indicate management’s forecasting accuracy and the reliability of the forecasted income statements. The end-points on these eleven-point scales were “Not at All” and “Extremely.”

Design and Administration

The study used a 1 x 2 mixed design. The independent variable was the accuracy of management’s prior forecasts (MGTACC). This variable was manipulated as high (HIACC) or low (LOACC). The variables we analyzed were: the initial and final choices for best company (BEST1, BEST2), confidence in those choices (CONF1, CONF2), the changes in these variables (BEST2 – BEST1, CONF2 – CONF1) and the choice for best investment (BESTINV).

All of the participants completed the materials in classroom settings. Students were given extra course credit for their participation and were randomly assigned to one of the two experimental conditions. One of the authors was present for each task administration.

Participants

Both graduate and undergraduate business students participated in this study. The experimental task was designed for the nonprofessional (“unsophisticated”) investor and was used to investigate a cognitive processing issue. The use of students in this study is consistent with Libby et al. (2002) who indicated that the use of students is appropriate in accounting studies that focus on general cognitive abilities. While studies of this nature typically focus on graduate students, many of the undergraduate students in our study are considered “non-traditional” in terms of their age and work experience. On average, the participants in the present study had completed 2.10 finance classes and had little investing experience (1.85 years). As our study examines general cognitive processes, the participants in this study were deemed to be reasonable proxies for nonprofessional investors.

A total of 113 students submitted case packets. However, eleven respondents were omitted because of failure to complete all sections of the case. The analyses reported below are, therefore, based on a sample of 102. Descriptive statics are reported in Table 2.

Table 2 DESCRIPTIVE STATISTICS					
Measure	Average	Std. Dev.	Program	Count	Percent
Age	28.44	8.51	MBA	28	27%
# Accounting Classes	6.45	4.27	MACC	40	39%
# Finance Classes	2.10	2.34	Other	34	33%
Years Investing Experience	1.85	3.94		102	
Years Work Experience	5.65	7.87			
			Gender	Count	Percent
			Male	53	52%
			Female	49	48%
				102	

RESULTS

Preliminary Analysis and Manipulation Checks

We first tested the between-group means of the dependent variables for the students' programs of study. The means and the results of this analysis are presented in Table 3. The results indicate few differences across programs of study, only a marginally significant difference in CONF2 was found among the primary dependent variables. As the task was primarily of a cognitive nature, we did not expect to find any differences between groups. Based on these results, we used the responses of all participating students in testing our hypotheses.

Table 3
RESPONSES BY PROGRAMS OF STUDY

PANEL A: Means

	HIACC			LOACC		
	MBA	MACC	OTHER	MBA	MACC	OTHER
BEST1	(2.50)	(1.98)	(2.34)	(2.29)	(2.16)	(2.11)
BEST2	0.68	0.35	0.06	(0.21)	(1.50)	(0.53)
CONF1	3.04	2.18	2.31	2.57	2.05	2.44
CONF2	2.46	2.55	2.66	1.36	2.39	1.75
BESTINV	0.96	1.33	1.22	0.14	(1.29)	(1.39)

PANEL B: Kruskal-Wallis Results (HIACC)

	BEST1	BEST2	CONF1	CONF2	BESTINV
Chi-Square	0.67	0.41	1.12	0.70	0.34
df	2	2	2	2	2
Sig. (2-tailed)	0.71	0.82	0.57	0.71	0.84

PANEL C: Kruskal-Wallis Results (LOACC)

	BEST1	BEST2	CONF1	CONF2	BESTINV
Chi-Square	0.24	2.29	0.84	5.58	3.51
df	2	2	2	2	2
Sig. (2-tailed)	0.89	0.32	0.68	0.06	0.17

For manipulation checks, participants were asked to indicate the levels of forecast accuracy and reliability. The overall and group means are displayed in Table 4. Mann-Whitney (MW) testing indicates that the HIACC group perceived the forecasts to be both more accurate and more reliable than did the LOACC group ($p < 0.00$ for both). Thus, we considered the manipulation of management's forecast accuracy to be effective.

Table 4
MEANS

PANEL A: High Accuracy (HIACC) Group (n = 51)	Mean	Std. Dev.
Accuracy (manipulation check)[a]	1.83	1.72
Reliability (manipulation check)[a]	2.07	1.82
BEST 1 (1st response for better company)[b]	(2.24)	2.12
BEST 2 (2nd response for better company)[b]	0.34	2.86
CONF 1 (confidence in 1st response)[a]	2.45	1.84
CONF 2 (confidence in 2nd response)[a]	2.53	1.47
BESTINV (choice for best investment)[b]	1.15	2.94

PANEL B: Low Accuracy (LOACC) Group (n = 51)	Mean	Std. Dev.
Accuracy (manipulation check)	0.52	1.91
Reliability (manipulation check)	(0.08)	2.40
BEST 1 (1st response for better company)	(2.18)	2.18
BEST 2 (2nd response for better company)	(0.80)	2.51
CONF 1 (confidence in 1st response)	2.33	1.74
CONF 2 (confidence in 2nd response)	1.88	1.61
BESTINV (choice for best investment)	(0.93)	2.52

PANEL C: Full Sample (n = 102)	Mean	Std. Dev.
Accuracy (manipulation check)	1.18	1.92
Reliability (manipulation check)	1.00	2.38
BEST 1 (1st response for better company)	(2.21)	2.13
BEST 2 (2nd response for better company)	(0.23)	2.74
CONF 1 (confidence in 1st response)	2.39	1.79
CONF 2 (confidence in 2nd response)	2.21	1.57
BESTINV (choice for best investment)	0.11	2.92

Responses were provided on an eleven-point Likert-type scale. A zero value indicates neutrality.
[a] *Values range from -5 (Not at All) to +5 (Extremely)*
[b] *Values range from -5 (Emerging) to +5 (Banks).*
A negative (positive) value indicates a preference for Emerging (Banks).

Hypothesis Testing

Hypothesis 1 predicted that participants would rely on heuristic cues when making their initial choice for better company, prior to receiving any financial statement data. Thus, in our context, we expected the participants to identify Emerging as their initial preferences. Table 4 contains the means of BEST1 for both treatment groups (HIACC = -2.24, LOACC = -2.18). Both group means for this variable are negative which indicates a preference for Emerging (the heuristic/intuitive option). MW testing reveals that these group means are not statistically different from each other (Table 5, $p = 0.99$). No differences were expected at this point because all participants received exactly the same information. These results support for Hypothesis 1 and provide a baseline for Hypothesis 2A.

Table 5
HYPOTHESIS 1
(Between-group comparison of first choice for better company)

Panel A: Mean Ranks	
HIACC	51.52
	n = 51
LOACC	51.48
	n = 51
Panel B: Mann-Whitney Results	
Mann-Whitney U	1299.50
Sig. (2-tailed)	0.99
Dependent Variable = Better Company (1st Response)	

Hypothesis 2A predicted that participants in the HIACC (LOACC) group would be more (less) likely to shift from the initial preference for the better company toward the alternative option after reviewing forecasts indicating that the alternative firm expects better performance. Testing of this hypothesis focused on the differences between the BEST1 and BEST2 variables for each group. Means of these variables are reported in Table 4 and results of Wilcoxan Signed Ranks (WSR) testing are displayed in Table 6. For the HIACC group, mean responses for BEST1 and BEST2 are -2.24 and 0.34 respectively. The change of signs (total change of +2.58) indicates a significant shift in preference from Emerging toward Banks ($p < 0.00$). The means of BEST1 and BEST2 for the LOACC group are -2.18 and -0.80 respectively, yielding a total change of +1.38. The signs stayed negative for the LOACC group indicating that the overall preference for better company remained with Emerging (the intuitive option). However, the shift toward Banks (the alternative/non-intuitive option) was also significant ($p < 0.00$). These results partially support Hypothesis 2A. However, the significant shift of the LOACC group toward the alternative firm was unexpected.

In the present study, both groups received constraint information that favored the alternative/non-intuitive option. However, participants in the HIACC considered the information to be more accurate and reliable than did the members of the LOACC group because of the differences in management's reported past forecast accuracy. We argue that the MGTACC manipulation changed the magnitude of the constraint information (i.e., the forecast favoring the non-intuitive option) such that it was perceived as "stronger" by members of the HIACC group. As a result, the average change from BEST1 to BEST2 for the HIACC group (+2.58) was significantly higher than that of the LOACC group (+1.37) (MW test, $p = 0.015$).

Table 6
HYPOTHESIS 2A
(Between-group comparison of difference between first and second choices for best company)

Panel A: Mean Ranks (Best2 - Best1)		
	HIACC	LOACC
Negative Ranks	12.08	16.17
Positive Ranks	25.21	23.00
	n = 51	n = 51
Panel B: Wilcoxan Signed Ranks Results		
	HIACC	LOACC
Z	-5.13	-3.08
Sig. (1-tailed)	0.00**	0.00**
Dependent Variable = Change from Best1 to Best2		

Hypothesis 2B predicted that investors in the HIACC (LOACC) group would select Banks (Emerging) as the best investment. The means for BESTINV were 1.15 and -0.93 for the HIACC and LOACC groups respectively. The positive sign of the HIACC mean indicates a preference for Banks (the alternative/non-intuitive option) while the negative sign of the LOACC mean represents a preference for Emerging (the heuristic/intuitive option). MW testing reveals that the HIACC mean is significantly higher than the LOACC mean ($p < 0.00$). This result supports Hypothesis 2B and indicates that the MGTACC manipulation resulted in a different investment preference for the two groups, even though the information contained in the press releases was identical. Results are displayed in Table 7.

Table 7 **HYPOTHESIS 2B** **(Between-group comparison of choice for best investment)**	
Panel A: Mean Ranks	
HIACC	62.20 n = 51
LOACC	40.80 n = 51
Panel B: Mann-Whitney Results	
Mann-Whitney U	755.00
Sig. (1-tailed)	0.00**
Dependent Variable = Best Investment	

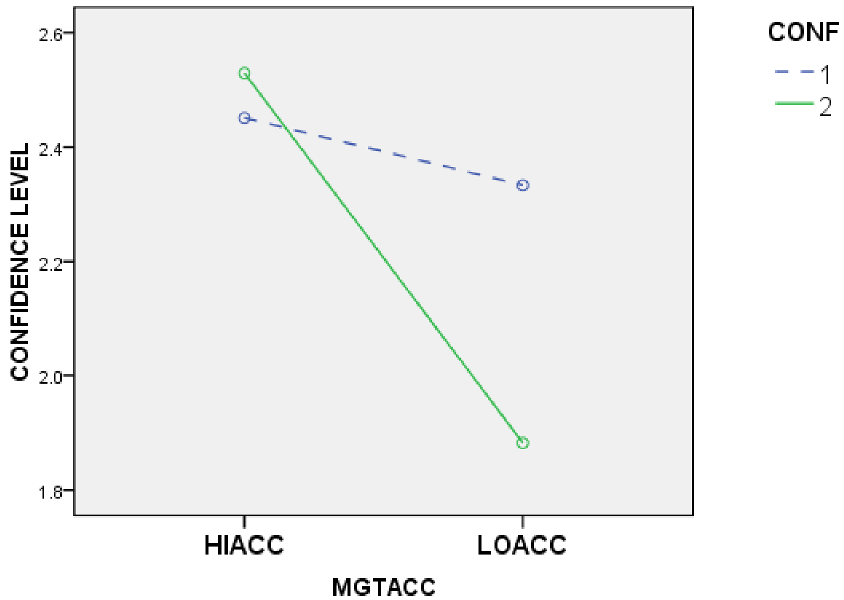
Post-Hoc Analysis

Simmons and Nelson (2006) also proposed the "intuitive betrayal hypothesis." Here, the authors predicted that people who betray their intuitions (i.e., select a non-intuitive option) would be less confident in their decisions than those who choose in line with their intuitions. As part of the present study, we asked the participants to indicate their confidence levels after making each of their better company choices (see Table 4). The CONF1 means were 2.45 and 2.33 for the HIACC and LOACC groups respectively. MW testing shows no significant difference between these two means ($p = 0.60$). Note that no difference was expected because all participants had received the same information up to this point in the study.

The CONF2 means were 2.53 and 1.88 for the HIACC and LOACC groups respectively. MW testing indicates a marginally significant difference between-groups ($p = 0.06$) which suggests that the members of the HIACC group may have been more confident in their final investment decisions than were the members of the LOACC group. This is contrary to the expectations of the intuitive betrayal hypothesis since the average preference of the HIACC group shifted away from the intuitive choice while the LOACC group did not appear to do so.

On average, the changes from CONF1 to CONF2 were +0.08 and -0.45 for the HIACC and LOACC groups respectively. We performed a WSR test on the two confidence responses to determine if the changes were significant. The 2-tailed p-values were 0.68 and 0.03 for the HIACC and LOACC groups respectively. These results indicate that the HIACC group experienced no significant change in confidence whereas the LOACC group lost a significant amount of confidence as their selection for best company shifted away from the intuitive option. Figure 1 graphically displays this apparent interaction.

Figure 1
CHANGE IN CONFIDENCE BY GROUP



Since confidence appeared to be related to our participants' investment judgments, we next performed several Spearman's Rho correlations for both groups. We tested CONF1 with BEST1 and CONF2 with BEST2, BESTINV, and the change from BEST1 to BEST2. The results are shown in Table 8. For both groups, we find significant, negative correlations between CONF1 and BEST1. The implication here is that confidence decreases as BEST1 increases (i.e., moves away from the intuitive option). This finding is consistent with the intuitive betrayal hypothesis of Simmons and Nelson (2006).

We found different correlation results for the two groups when we focused on the CONF2 variable. For the HIACC group, CONF2 shows no significant correlation with any of the other variables of interest. We suggest that this occurred because the "stronger" constraint information (based on management's reported forecast accuracy) allowed those in the HIACC group to remain confident in their judgments though the company evaluations changed. Conversely, we find that CONF2 is significantly and negatively correlated with all of the variables tested for the LOACC group. This suggests lower confidence in all of the investment decisions made by the LOACC group after receiving the forecast information.

Recall that the mean preferences for best company and best investment for the LOACC group remained with the heuristic/intuitive option while the mean preferences shifted toward the alternative/non-intuitive option for the HIACC group. The drop in confidence found in the LOACC group is somewhat consistent with the intuitive betrayal hypothesis proposed by Simmons and Nelson (2006). It appears that the members of the LOACC group used the constraint information which favored the non-intuitive option while making their decisions. However, they did not appear to believe the constraint information was strong enough to cause a definite switch in their preferences. The "weakness" of the constraint information also appeared to increase their uncertainty (Kahneman & Tversky, 1982) which resulted in a drop in confidence.

In contrast, the members of the HIACC group did appear to switch their preferences because the constraint information was considered to be more accurate and reliable. As a result, their final decisions were accompanied by slightly (but not significantly) higher confidence. These findings suggest that, when deciding whether to stay with an intuitive option or switch to a non-intuitive option, a change in confidence may be moderated by the strength of the constraint information.

Table 8
POST-HOC CONFIDENCE CORRELATIONS

PANEL A: Spearman's Rho (HIACC)			
	BEST1		
CONF1	-0.56**		
	BEST2	BEST2 - BEST1	BESTINV
CONF2	-0.07	-0.06	0.02
PANEL B: Spearman's Rho (LOACC)			
	BEST1		
CONF1	-0.45**		
	BEST2	BEST2 - BEST1	BESTINV
CONF2	-0.47**	-0.36**	-0.46**

*** p < 0.01*

DISCUSSION AND CONCLUSION

The judgment differences between the two groups of investors in this study provide some evidence as to how heuristic investment decisions may be affected by the strength of constraint information (i.e., disclosure of management’s past earnings forecast accuracy) obtained after an initial preference is formed. This study contributes to the behavioral financial accounting literature by providing evidence that explicitly disclosing management’s past forecast accuracy can influence nonprofessional investors’ reliance on their heuristically-determined preferences when making investment decisions. Specifically, when participants were made aware of management’s past forecast accuracy (inaccuracy), the forecasts were considered to be more (less) reliable. The group receiving the “accurate” forecasts shifted from the intuitive option toward the non-intuitive option to a greater extent than did the group receiving “inaccurate” information. In addition, the HIACC group chose the non-intuitive firm as the best investment while the LOACC group chose the intuitive option, even though the earnings forecasts received by both groups were identical

The findings reported in this study have significant implications for investor decision-making. Prior research has shown that investors tend to err by relying on heuristics when making investment choices. The present study implies that making investors aware of the accuracy of management's past disclosures can help the investor to make corrections. The case used in this study explicitly stated management's past forecast accuracy. In a real-world setting, this information can be determined by investors who perform proper research. However, nonprofessional investors may not realize how useful this information can be. Additionally, many of these individuals may lack the skill and/or means to perform this type of research. A potential long-term result of this research may be the mandatory reporting of management's past forecast accuracy with earnings forecasts and/or within firms' quarterly and annual SEC filings.

Our research has limitations in two primary areas. First, we utilize university students, and while we believe these students serve as reasonable proxies for nonprofessional investors, results could be different with older individuals faced with real financial risks. Second, we use an experimental design which sacrifices a degree of external validity for enhanced internal validity. This sacrifice includes limited information as compared to an actual investment decision scenario, and participants may have made different decisions if they'd had access to this information. These issues should be addressed in future studies.

Future research should also consider the effects of a mixture of good news and bad news within the earnings forecasts. Another potential study would vary the levels of management forecast accuracy and include a control group for which no accuracy information is provided. In addition, researchers should investigate ways to measure participants' levels of heuristic and systematic processing and whether the individual's need for cognition (Cacioppo, Petty & Kao, 1984) affects the type(s) of cognitive processing in which the participants engage. All of these proposed studies have the potential to improve financial reporting and/or identify ways in which individual investors may improve their investment decisions.

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FINANCIAL FLEXIBILITY AND CAPITAL STRUCTURE

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ABSTRACT

This study examines the relation between financial flexibility through share repurchases and capital structure. Financial flexibility has been shown to be the top consideration among CFOs when determining firm debt levels (Graham and Harvey (2001)). Additionally, Graham and Harvey (2001) identify share repurchases instead of dividends as one method to improve financial flexibility. I find that higher levels of financial flexibility through share repurchases are positively related to higher levels of firm debt. The positive relation is greatest among firms with debt levels above the median for their industry, which may be lacking additional debt capacity. These results indicate that firms achieving greater financial flexibility through share repurchases may be willing to accept less financial flexibility through higher debt levels.

Keywords: financial flexibility, trade credit, payout policy

JEL Classification G31 G32 G35

INTRODUCTION

A substantial amount of research has addressed the issue of firm capital structure and its determinants. Much of the literature focuses on the trade-off theory of debt which assumes firms decide on a target debt level by balancing the costs of bankruptcy associated with debt against the tax benefits of debt [Kraus and Litzenberger (1973); Myers and Majluf (1984)] and the pecking order theory of debt (Myers and Majluf (1984)) that retained earnings are preferred to debt and that debt is preferred to issuing equity. An additional concern when issuing debt is discussed by Graham and Harvey (2001), which provides survey results from CFOs that shows the number one consideration affecting the decision to issue debt is the ability to maintain financial flexibility. Once the firm issues debt, there is a financial commitment that removes a portion of flexibility available to the firm. Firms have a high interest in both maintaining and improving financial flexibility [Graham and Harvey (2001); Denis (2011); Brav et al (2005)], which enhances the ability to take advantage of positive NPV projects as well as assists firms in avoiding financial distress. This study focuses on financial flexibility through share repurchases, and how it affects firm capital structure decisions. I find that greater financial flexibility in payout policy is positively related to firms' debt levels. Additionally, I find that this positive relation is especially focused among firms that may be lacking additional debt capacity. These results are consistent with prior research which demonstrate share repurchases as a method to improve financial flexibility [Brav et al (2005); Bonaime et al (2014)], and identify one potential outcome of this improved flexibility to be an increased willingness to accept lower financial flexibility through higher debt levels.

This study is significant because prior literature emphasizes both the desire for firms to possess financial flexibility and how this desire impacts individual areas of decision making including capital structure [Byoun (2008); Lins et al (2010)], financial flexibility [(Guay and Harford (2000); Jagannathan, Stephens and Weisbach (2000)] and cash management policies [Opler et al (1999); Bates et al (2009)]. While this prior research has effectively identified flexibility's impacts on individual areas for decision making, it has not explored how trade-offs in flexibility between these areas may occur based on the firm's overall objectives. It may be understood that less debt and a higher percentage of repurchases can both result in greater financial flexibility, but this paper explores whether an increase in flexibility in one of these areas of financial decision making (payout policy) effects the firm's decision making in the other (capital structure). This is, to my knowledge, the first paper to make such a connection.

LITERATURE REVIEW

DeAngelo and DeAngelo (2007) provide evidence of financial firms' financial decisions being influenced and made with the desire of maintaining financial flexibility. Empirical evidence discusses one of these financial decisions as the tendency for managers to choose share repurchases as the method for paying out profits that are cyclical or derived from higher levels of non-operating cash flows [Guay and Harford (2000); Jagannathan, Stephens and Weisbach (2000)]. This potential flexibility from repurchases stands in contrast to the possibility of dividends being a financial constraint that could motivate managers to reduce investments when facing cash shortfalls (Daniel, Denis and Naveen (2010)). Using a survey of CFOs, Graham and Harvey (2001) provide further evidence that managers may favor share repurchases over dividends because the repurchases are viewed as providing greater financial flexibility. Graham and Harvey's (2001) analysis finds that the desire to maintain financial flexibility is one of the most important factors affecting capital structure.

Capital structure refers to the level of firm financing derived from either debt or equity. When firms decide to use debt as opposed to equity, they are making the decision to receive cash up front that must then be repaid using future cash flows (Frank and Goyal (2009)). The decision to use debt can be problematic to firms because they are then committed to a financial obligation that may not be met if there are changes to either the economic environment or the fortunes of the firm. This explicit financial obligation could be restrictive to the firm's growth opportunities and may reduce its financial flexibility. The question remains as to how firms decide what proportion of their financing should be composed on debt versus equity. Two theories have predominantly determined the research and motivations of capital structure. Kraus and Litzenberger (1973) and Myers and Majluf (1984) propose a trade-off theory of capital structure where firms choose the level of debt that balances the tax benefits of debt with the increased costs of potential bankruptcy. Myers and Majluf (1984) discusses the pecking order theory of capital structure which states firms should first elect to use retained earnings for financing, followed by debt issues and finally equity issues. A variety of both theoretical and empirical studies have taken place to identify the determinants of capital structure. Frank and Goyal (2009) examine many of the determinants previously discussed in prior literature and identify the six factors that are most reliable in explaining market leverage. These factors are median industry leverage, market-to-book ratio, asset tangibility, firm profits, firm size and expected inflation. I follow the model of Frank and Goyal (2009) when using the determinants of capital structure in this study.

This paper seeks to identify a specific link between financial flexibility through repurchases and a firm's capital structure. Debt in capital structure is a financial obligation often viewed as a limitation on the ability of the firm to maintain its flexibility. Similarly, dividends have been viewed as another form of financial commitment that may reduce flexibility (Daniel, Denis and Naveen (2010)). However, instead of looking at either payout policy or capital structure as an individual decision, firms may instead be balancing the flexibility benefits of either in an effort to help the firm achieve its overall flexibility goals. Increases in debt may be an opportunity for the firm to take advantage of positive NPV projects. However, if the firm perceives the necessary increase in debt as too costly based on the lost financial flexibility, then the project may be passed over. One solution to this problem may be an improvement in financial flexibility through payout policy decisions, which may then allow the firm to maintain its total flexibility goals. This flexibility through payout policy would be reflected by a higher percentage of total payout in the form of share repurchases. Overall, I hypothesize a direct relation between financial flexibility through repurchases and capital structure.

H1: Financial flexibility and capital structure have a positive and significant relation.

Prior literature has identified leverage as one tool for maintaining financial flexibility [Byoun (2008); Lins et al (2010); Billet et al (2007)]. Graham (2000) provides evidence that one method firms may use to provide financial flexibility is to maintain debt capacity. Firms with additional debt capacity may experience less financial flexibility benefit from electing share repurchases than firms without additional debt capacity. To identify firms with additional capacity, I identify each firm's debt level in comparison to the industry median. If a firm is below the industry median they are identified as having additional capacity. Firms above the industry median are considered to be lacking additional capacity. I follow the identification of Arslan-Ayaydin, Florackis and Ozkan (2014) and identify firms lacking additional debt capacity as high leverage or 'HL' firms. I expect financial flexibility through repurchases to have a greater effect on debt levels among HL firms.

H2: The relation between financial flexibility and capital structure is greater among HL firms.

Finally, Frank and Goyal (2009) explore changes to firms' balance sheets and cash flow statements over time and identify changes in the determinants of capital structure. I similarly identify the effect of financial flexibility through time. Grullon and Michaely (2002) demonstrate the increase in repurchase activity that is coming from both the increased propensity for young firms to initiate repurchases instead of dividends and the increase in repurchases from larger firms that have established dividend programs. As repurchases have become a more regular part of payout policy, there may be less recognizable benefit to financial flexibility by electing share repurchases. Thus, I expect the benefit of financial flexibility through share repurchases to be declining over time. However, I expect the relation to remain greater among firms without additional debt capacity, or HL firms.

H3: The relation between financial flexibility and capital structure is declining over time.

H3a: The relation between financial flexibility and capital structure is greater among HL firms.

DATA & METHODOLOGY

The sample for this study comes from all firms in Compustat from fiscal years 1970-2013, excluding financial firms (SIC codes 6000-6999) and regulated utilities (4900-4999). While prior data for capital structure is available in Compustat, repurchase activity is not included until 1970. I drop all firms with either sales or total assets that are less than zero. The total number of firm-year observations for which my dependent variable is present is 276,579. Missing observations in other variables may lead to fewer observations for the regressions. Table 1 presents summary statistics for the data set. All ratios are winsorized at the one percent level for each tail to reduce the effect of outliers.

Table 1
Summary Statistics

Table 1 presents summary statistics for firms in the sample. The sample includes all nonfinancial and nonutility firms in Compustat for fiscal years 1970 through 2013. *DTA and TDM* are both measures for firm debt. *Industry Debt* is the median debt level for a firm's industry in a given year. *Market to Book* is the market-to-book ratio. *Tangibility* refers to asset tangibility. *Profitability* is firm profitability. *Size* is the log of firm assets. *Flexibility* is the percentage of total payout from share repurchases.

Variable	Mean	Standard Deviation
DTA	0.255	0.273
TDM	0.252	0.253
Industry Debt	0.203	0.097
Market to Book	2.230	4.120
Tangibility	0.312	0.274
Profitability	0.037	0.291
Size	4.500	2.480
Flexibility	0.366	0.436

I use the model of Frank and Goyal (2009) to identify the independent variables in my regressions and include *Flexibility* as the independent variable of interest. *Flexibility* is measured following Bonaime et al (2014), which measures repurchases as a percentage of total payout. The following equation is used to identify the relationship between capital structure and financial flexibility:

$$(Debt)_{it} = \alpha_i + \beta_1 IndustryDebt_{t-1} + \beta_2 MB_{t-1} + \beta_3 Tangibility_{t-1} + \beta_4 Profit_{t-1} + \beta_5 Size_{t-1} + \beta_6 Inflation_{t-1} + \beta_7 Flexibility_{t-1} + \varepsilon_{i,\,t} \qquad (1)$$

Similar to Frank and Goyal (2009) I use more than one measure for debt. Table 2 presents the major variables used (including both measures for debt), as well as how they are created.

Table 2
Variable Definitions

Table 2 presents variable definitions for this study. The sample includes all nonfinancial and nonutility firms in *Compustat* for fiscal years 1970 through 2013. The variables have a definition provided as well as the calculation of the variable using *Compustat* variables.

Variable	Definition
TDM	Total debt to market value of assets. (DLC+DLTT)/[(PRCC_F*CSHPRI)+ DLC + DLTT + PSTKL - TXDITC]
DTA	Total debt to total assets (DLC+DLTT)/AT
Industry Debt	Median industry leverage represents the median value of total debt to the market value of assets by Fama French Industry
MB	Market-to-Book ratio is the ratio of market value to total assets. [(PRCC_F*CSHPRI)+ DLC + DLTT + PSTKL - TXDITC]/AT
Tangibility	Asset tangibility. (PPENT/AT)
Profitability	Firm profitability. (OIBDP/AT)
Size	Log of total assets.
Rate	Expected inflation rate over the next year as reported in the Livingston Survey.
Flexibility	Share repurchases as a percentage of total payout. PRSTKC/(PRSTKC+DV)
HL	Indicator variable equal to 1 if a firm is above the median level of leverage for its industry.

MULTIVARIATE RESULTS

I estimate Equation (1) using a fixed effects model. The results are in Table 3, with Column A reporting results using TDM and Column B using DTA as the measures for firm leverage. The coefficient for the *Flexibility* variable is positive and significant, indicating that firms with greater financial flexibility through share repurchases are willing to accept a higher level of leverage in their capital structure. These results are consistent with my hypothesis that firms may increase financial flexibility by choosing to make a higher percentage of payouts through share repurchases and that this allows the firm the ability to increase its debt levels. The results for the six original determinants are similar to the findings of Frank and Goyal (2009).

Table 3
The Effect of Financial Flexibility on Capital Structure

Table 3 presents a firm fixed effect regression with firm debt as the dependent variable. *Industry Debt* is the median debt level for a firm's industry in a given year. *Market to Book* is the market-to-book ratio. *Tangibility* refers to asset tangibility. *Profitability* is firm profitability. *Size* is the log of firm assets. *Flexibility* is the percentage of total payout from share repurchases. *Rate* is the expected rate of inflation over the next 12 months as reported from the Livingston Survey. The regression also includes industry effects, with standard errors adjusted for within firm clustering. *, ** and *** identify estimates that are statistically significant at 10%, 5% and 1% levels, respectively.

Variable	Results using TDM	Results using DTA
Industry Debt	0.34***	0.25***
MB	-0.01***	0.01***
Tangibility	0.18***	0.14***
Profitability	-0.32***	-0.16***
Size	0.04***	0.02***
Rate	1.19***	0.25***
Flexibility	0.01***	0.01***

As repurchases have become more valuable through time for both established firms as well as younger firms electing to begin profit payouts (Grullon and Michaely (2002)), this may eliminate the flexibility benefits associated with repurchases over dividends. To identify the effect of *Flexibility* over time, I repeat Equation (1) over four sub-samples based on date. The first is for all observations in years 1970-1979, with the second, third and fourth groups being the 1980's, 1990's and 2000's, respectively. Results are presented in Table 4, with results using TDM and DTA presented in Panels A and B, respectively.

Table 4
The Effect of Financial Flexibility on Capital Structure

Table 4 presents firm fixed effect regressions through time with firm debt as the dependent variable. Results in Panel A and Panel B display results with two measures for firm debt; total debt to total market value and total debt to total assets, respectively. *Industry Debt* is the median debt level for a firm's industry in a given year. *Market to Book* is the market-to-book ratio. *Tangibility* refers to asset tangibility. *Profitability* is firm profitability. *Size* is the log of firm assets. *Flexibility* is the percentage of total payout from share repurchases. *Rate* is the expected rate of inflation over the next 12 months as reported from the Livingston Survey. The regression also includes industry effects, with standard errors adjusted for within firm clustering. *, ** and *** identify estimates that are statistically significant at 10%, 5% and 1% levels, respectively.

Panel A: Total Debt to Total Market Value

Variable	1970's	1980's	1990's	2000's
Industry Debt	0.33**	0.20***	0.26***	0.49***
MB	-0.01***	-0.01***	-0.01***	-0.01***
Tangibility	0.25***	0.20***	0.18***	0.19***
Profitability	-0.48***	-0.37***	-0.25***	-0.15***
Size	0.05***	0.09***	0.08***	0.07***
Rate	2.64***	1.46***	2.51***	2.46***
Flexibility	0.03***	0.02***	0.02***	0.01

Panel B: Total Debt to Total Assets

Variable	1970's	1980's	1990's	2000's
Industry Debt	0.33***	0.12***	0.15***	0.27***
MB	0.01***	0.01***	0.00	0.01***
Tangibility	0.25***	0.08***	0.15***	0.13***
Profitability	-0.26***	-0.22***	-0.11***	-0.07***
Size	0.06***	0.06***	0.04***	0.03***
Rate	1.33***	0.43***	0.55***	1.28***
Flexibility	0.02**	0.02***	0.01**	0.00

The results in Table 4 show a decline in the coefficient value for *Flexibility* over time from a high of .03 to a low of 0. For both measures of firm debt, *Flexibility* has no significant relation to capital structure in the final time period. These results are consistent with the idea that as more firms have adopted the use of share repurchases there may be less flexibility benefit from the repurchases which may remove the incentive for firms to be willing to accept higher debt levels.

Graham (2000) provides evidence that firms may maintain financial flexibility by keeping additional debt capacity in the event the firm needs access to capital. Firms that are able to maintain this additional capacity may have less incentive to utilize repurchases as a tool for flexibility. Firms without additional capacity, or low cost additional capacity, may elect a payout policy that utilizes higher levels of repurchases in an effort to improve financial flexibility. In an effort to identify firms that may be lacking additional debt capacity, I follow the identification of Arslan-Ayaydin, Florackis and Ozkan (2014) by labeling firms with debt levels above the industry median as high leverage or 'HL'. These firms have an indicator variable equal to one for any year in which their debt level was above their industry's median debt level in the same year. Similarly, firms not identified as 'HL' are considered low leverage or 'LL' firms which may have additional debt capacity.

In Table 5 I estimate Equation (1) on two sub-samples which are based on firms classified as either HL or LL. I again estimate Equation (1) based on time periods to compare the effect of *Flexibility* over time. I expect that more financial flexibility through share repurchases will have a greater impact on HL firms which should persist through time. Results are shown in Panels A and B for HL and LL firms, respectively.

Table 5

The Effect of Financial Flexibility on Capital Structure

Table 5 presents firm fixed effect regressions with firm debt (total debt to total market value) as the dependent variable. Results in Panel A and Panel B display results for HL and LL firms, respectively. *Industry Debt* is the median debt level for a firm's industry in a given year. *Market to Book* is the market-to-book ratio. *Tangibility* refers to asset tangibility. *Profitability* is firm profitability. *Size* is the log of firm assets. *Flexibility* is the percentage of total payout from share repurchases. *Rate* is the expected rate of inflation over the next 12 months as reported from the Livingston Survey. The regression also includes industry effects, with standard errors adjusted for within firm clustering. *, ** and *** identify estimates that are statistically significant at 10%, 5% and 1% levels, respectively.

Panel A: HL Firms

Variable	1970's	1980's	1990's	2000's
Industry Debt	0.95***	0.14**	0.22***	0.48***
MB	-0.02***	-0.01***	-0.01***	-0.01***
Tangibility	0.19***	0.15***	0.11***	0.13***
Profitability	-0.45***	-0.49***	-0.41***	-0.28***
Size	0.03***	0.09***	0.08***	0.08***
Rate	0.83***	1.64***	1.62***	2.86***
Flexibility	0.04***	0.03***	0.02***	0.01**

Panel B: LL Firms

Variable	1970's	1980's	1990's	2000's
Industry Debt	-3.46***	-0.01	0.03	0.13***
MB	-0.01	-0.01***	-0.01***	-0.01***
Tangibility	0.11***	0.14***	0.10***	0.11***
Profitability	-0.17***	-0.12***	-0.06***	-0.04***
Size	-0.01	0.03***	0.02***	0.02***
Rate	2.97***	0.76***	0.96***	0.34***
Flexibility	0.02**	0.00	0.00	0.00

Results in Table 5 demonstrate that the relation between *Flexibility* and capital structure has been driven by HL firms. In fact, while every time period has a positive and significant relation among HL firms, there is no significant relationship between *Flexibility* and capital structure for LL firms after the 1970's. These results provide evidence that the relation between financial flexibility through share repurchases and capital structure is greatest for HL firms. Additionally, these results provide evidence that while financial flexibility through repurchases may have a declining impact on capital structure decisions, it is still of importance among firms that may lack flexibility from additional debt capacity. When considering lost financial flexibility as a cost of debt, it would make sense that HL firms view an increase in debt as more costly than LL firms due to the greater loss in flexibility. Thus, the relation between capital structure and repurchases is greatest for firms that would otherwise view this increase in debt as most costly.

CONCLUSION

In this study, I seek to establish a link between capital structure and payout policies that exists because of managers' efforts to maintain financial flexibility. I provide evidence that flexibility through payout policy may play a role in capital structure decision making by empirically examining the relation between capital structure and financial flexibility through share repurchases, and results indicate it is positive and significant. Further evidence indicates that this positive relation is specifically observed among high leverage firms which may otherwise lack financial flexibility in the form of additional debt capacity. These results indicate that while managers do consider both capital structure and payout policies to maintain flexibility.

Because firms have increased their flexibility through payout policy decisions, there appears to be a willingness to accept less flexibility through increased debt levels. While prior literature has examined manager's desires to maintain financial flexibility, this is the first paper to identify how a firm may be willing to make trade-offs in flexibility between different financial decisions within the firm. Overall, this study is unique because it extends prior literature that explores financial flexibility within specific areas of firm decision making, and finds that when making financial decisions, firms have a willingness to take a more holistic approach that balances the total level of flexibility available. Because both debt and dividends may be viewed as financial constraints that restrict flexibility [Graham (2000); Daniel, Denis and Naveen (2010)], firms appear to consider both payout policy and capital structure decisions together when striving to maintain a necessary level of financial flexibility.

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CHARACTERISTICS OF LARGE ACCELERATED FILERS WITH INTERNAL CONTROL WEAKNESSES

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ABSTRACT

In this paper, we examine a sample of large accelerated filers (experimental group) with internal control weaknesses to identify the characteristics of these firms. We matched the sample with firms with good internal control from the same sectors. These firms are required to report on effective of their internal control. Data for these firms were collected for the 2007 and 2008 Six variable were tested; firm's size as measured by total assets, return on assets, debt/equity ratio, restructuring, number of segments and revenue growth. ANOVA and logistic regression techniques were used. The results show that large accelerate filers with internal control weaknesses are smaller and less profitable. When firms with severe internal control weaknesses (experimental) segregated and tested against control group, the results show that experimental group are smaller, less profitable and to some extent have more segments.

Key words: internal control weaknesses, Large accelerated filers, Sarbanes-Oxley Act,

INTRODUCTION:

Sarbanes-Oxley of 2002 (SOX) imposed several requirements on public companies among them the establishment of effective internal control. Recognizing the difficulty of compliance with the requirement, its implementation was postponed by the Securities and Exchange Commission (SEC) more than one time. For the purpose of filing, the SEC classified companies as small firms, non-accelerated filers and accelerated filers. In December 2005, the SEC created new category called “large accelerated filers” which was generally defined as companies with a worldwide market value of outstanding voting and non-voting common equity held by non-affiliates of at least 700 million dollars. Large accelerated filers are required establish effective internal control and to report on it for the fiscal year ending on or after December 15, 2006 under Section 302 and Section 404 of SOX (Leech, 2003).

According to the Committee of Sponsoring Organization (COSO) of the Treadway Commission, internal control is “a process affected by an entity’s board of directors, management, and other personnel, designed to provide reasonable assurance regarding the achievement of objectives” (COSO, 1992).

Public Company Accounting Oversight Board in its Auditing Standard No. 2 identifies three types of control deficiencies. These are:

A control deficiency exists when the design or operation of a control does not allow management or employees, in the normal course of their performing assigned functions, to prevent or detect misstatements on a timely basis (AS No. 2 paragraph 8).

A significant deficiency is a control deficiency or combination of control deficiencies that adversely affects the entity’s ability to initiate, authorize, record, process, or report external financial data reliably in accordance with generally accepted accounting principles such that there is more than a remote likelihood that a misstatement of the company’s annual or interim financial statement that is more than inconsequential will not be prevented or detected (AS No. 2 paragraph 9).

A material weakness in the internal control is a significant deficiency or combination of significant deficiencies that results in more than likelihood that a material misstatement of the annual or interim financial statements will not be prevented or detected (AS No. 2 paragraph 10).

In this paper, we only focus on the last type that is material weakness.

Effective internal control helps companies in providing reliable financial statements, safeguarding the company’s assets, promoting efficient operations, and complying with laws and regulations.

Ashbaugh-Skaife *it al.* (2006) examined the determinants of internal control deficiencies prior to the SOX mandated audits. They found that firms with internal control deficiencies tended to be complex, were more often engaged in mergers and takeover, held more inventory and were fast growing. Kinney and McDaniel (1989); Doyle, Ge, and McVay (2007b); and Ashbaugh-Skaife, Collins, and Kinney (2007) point out that weak internal controls are likely to increase the probability of material errors in accounting disclosures and/or lead to low-quality accounting accruals from intentional earnings management and unintentional accounting errors. Previous research used samples of firms that either disclosed material deficiency prior to the Section 404 required mandatory disclosure, Ashbaugh-Skaife, Collins, and Kinney (2007) or that disclosed material weaknesses during 404 mandatory disclosures Doyle, Ge, and McVay (2007a).

This research uses a sample of firms that disclosed internal control weakness after it became mandatory. Therefore, the purpose of the paper is to examine the characteristics of the large accelerated filer with internal control weaknesses. The Remainder of this paper is organized as follows, the next section covers related literature and Securities and Exchange Commission (SEC) firms classifications, section three covers hypothesis development and sample selection section four results analysis and finally summary and conclusion.

RELATED LITERATURE

Bryan and Lilien (2005) attempted to identify the characteristics of firms declaring a material deficiency and to determine the effects of the declaration of a material deficiency on the firm's stock price in the interval around and on the date of disclosure. The researchers identified a sample of 161 firms across 19 industrial categories that declared the existence of a material deficiency. Bryan and Lilen found that within their industry categories firms that had declared a material deficiency were smaller, weaker and had higher equity risk (betas) relative to the mean values within the industry. Interestingly Bryan and Lilien (2005) found that there was significant price variation in the three-day period around the announcement of the material deficiency (two days prior to the announcement and including the date of the announcement). Returns for the day of the announcement were significantly negative however the returns for the three day period were not significantly different from zero. Particularly relevant to this study, Bryan and Lilen found that in the case examined the existence of earnings management on the part of the firm. Specifically, they found that the market responded to "guidance" on the part of the firm through the provision of pro forma earnings in setting market expectations rather than the announcement of material deficiencies. The authors concluded that since the market responded to firm originated guidance rather than declared material deficiencies and restated earnings, the provision of guidance was evidence of earnings management on the part of the firm.

Doyle, Ge and McVay (2007a) also examined the simultaneity of material weaknesses and firm attributes. The firm characteristics studied were size, age, financial health, financial reporting complexity, number of reported segments and existence of foreign currency transactions, rapid growth (merger and acquisition as well as sales growth), restructuring charges and corporate governance. Their sample included 970 firms that reported at least one material weakness in the August 2002 to August 2005 interval. Doyle et al. (2007a) found that the presence of at least one material weakness was negatively associated with the characteristics of size, age, and financial strength. The presence of a material weakness was found to be positively associated with complexity, growth and the existence of and scale of restructuring charges. The research also categorized material weaknesses into account–specific weaknesses and company-level weaknesses. Those firms with account-specific weaknesses were found to be larger, older and in better financial health than those reporting company-level weaknesses. Additionally firms with account-specific weaknesses tended to have higher rates of growth and were more segmented. Those firms reporting account-specific weakness with respect to complexity (segmentation) were larger, older and financially weaker than the average Compustat firm. Whereas firms with company-level weaknesses were said to be deficit in the resources and/or experience necessary to maintain effective control systems. For the latter group, Doyle *et al.* (2007a) found that these firms were younger, smaller and financially weaker and reported losses more often than those reporting account-specific weaknesses.

Our paper defers from Doyle *et al*. (2007a) paper in three ways. First, their sample represents all companies that are required to file 10-Ks with the SEC. These include large accelerated filers, accelerated filers, non-accelerated filers, and small companies. Our sample consists only of large accelerated filers. Given that establishing and maintaining internal control is costly, large accelerated filers are assumed to have enough resources to establish and maintain effective internal control while smaller firms have no such advantage. Doyle *et el*. (2007a) find that firms with internal control weaknesses are more likely to be smaller, less profitable, more complex, growing rapidly, or undergoing restructuring. It is possible that large accelerated filers have different determinants of internal control weaknesses or some of the determinants found by Doyle *et al*. (2007a) are not valid for this group under consideration. Second, Doyle *et al*. (2007a) selected their sample from firms disclosing weaknesses in their internal control during the period from August 2002 to August 2005. During this period, the SEC extended the implementation of internal control requirements to November 15, 2004 for large accelerated filers and accelerated filers while for non-accelerated filers and small firms were deferred to later dates. In the population used by Doyle *et al.* (2007a), most of the firms identified as having internal control weaknesses voluntarily disclosed such information raising the issue of self-selection. Finally, the majority of the firms had little or no experience in establishing and maintaining effective internal control. Where such is the case, internal control weaknesses maybe attributed to the lack of experience. Our sample represents firms disclosing internal control weaknesses from January 2006 to January 2008. It is assumed that all firms have acquired the necessary experience prior to this period.

In the following section, we present several hypotheses that we intend to test along with a brief explanation. Firms that experience substantial increases in revenues in a short period of time may need adjustments to sustain the unexpected increase in revenue. The adjustments may include increases in personnel, modification and adjustment of processes, and adjustment of and changes in technology to meet the increased demand on a timely basis. All such changes imply a need for increased managerial control. Some firms have ignored this fact and have even overridden or ignored existing controls. Kinney and McDaniel, (1990), Stice (1991), and Ashbaugh-Skaife, *et al*. (2007) indicated that fast growing firms may outgrow their existing controls and may take the time to establish new and better controls. In order to establish and implement new and more effective controls additional personnel, processes, and technology are required. Therefore, our first hypothesis is:

H1: *Firms that experience sudden increases in their revenues tend to have internal control weaknesses.*

The establishment of effective of internal controls as stipulated by SOX Sections 302 and 404 requires additional resources to implement. It is assumed that large firms, whether measured by market capitalization or total assets, are more likely to have the resources, expertise, and technology, and to enjoy economies of scale and can, therefore, more likely satisfy SOX requirements. In contrast, smaller firms are more likely to lack these necessary components to mobilize to fulfill the requirements of SOX Sections 302 & 404. Therefore, among those firms categorized the large accelerated filers, we expect the smaller firms within this group to have weak internal controls vis-a-vis the larger firms. Namely, we expect the lower layer smaller firms to have weaknesses in their internal control. Hence, our second hypothesis is:

H2: *Small firms within large accelerated filers' category tend to have internal control weaknesses.*

All firms operate in a dynamic environment and need to adapt by continually restructuring their operations to improve efficiency and reduce their costs with the goal of being able to compete more effectively in the market. Consequently, they may be required to eliminate unnecessary and unprofitable operations, departments, terminate employees, dispose of groups of assets or segments, and/or acquire new subsidiaries. These changes may not be accompanied simultaneously by the required changes in appropriate controls. Moreover, such restructuring may also require a firm to make complex estimates of accruals and adjustments (Dechow and Ge 2006). Thus, a consequence of restructuring may be that some processes are without controls or that the existing controls may become ineffective. Thus, we posit the following:

H3: *Firms that restructure their operations are expected to have weakness in their internal control.*

The total debt/equity ratio is a measure of the relative proportions of shareholder's equity and debt used to finance a firm's assets. The mean value of the ratio differs from industry to industry but in general it should be less than 1, although though for a capital intensive industry like auto industry it may reach 2. A high debt/equity ratio generally means that a company has an aggressive financing policy (high degrees of financial leverage). High financial leverage may lead to volatile earnings as a result of a modest change in revenue. For short-term debt, a firm has to satisfy its obligations from current assets. For long- term debt, the firm has to pay periodic interest and the principal when it becomes due. If firms have a high debt/equity ratio, they may need to find and mobilize the majority of their resources to meet these obligations leaving little or nothing to meet other needs including those necessary for effective internal control. This is the basis of our fourth hypothesis:

H4: *Firms that have high debt/equity ratio tend to have weak internal control*

Profitability is a necessary condition for survival. Increasing profits provide firms with more resources to devote to meeting its needs including the allocation of resources necessary for effective internal control. If a firm incurs loss or if its rate of return is very low, it will have limited its ability to mobilize resources to establish good internal controls. DeFord and Jiambalvo (1991) finds that financial reporting errors are negatively associated with firm's performance while Krishnan (2005) finds that the existence of a loss is positively associated with weak internal control in firms that change auditors. Therefore, we expect that firms with a low rate of return (ROA) on assets where ROA as a measure of financial health, to have weaknesses in their internal control. This is captured in our fifth hypothesis:

H5: *Firms with low or negative rate of return on assets compared with other firms tend to have weaknesses in their internal control.*

It is easier for a single-segment firm to establish and monitor internal controls than it is for a multi-segmented firm. These multi-segmented firms have a need for sophisticated internal control systems. The more segmented a firm has, regardless of the basis for segmentation (geographical or line of business), the more difficulties the firm will have in consolidating information for financial statements, as some segments or divisions may well operate in different institutional and legal environments. Thus, it is more likely that firms with multi-segments will have weak internal control. Thus, our sixth and final hypothesis is:

H6: *Firms with more segments tend to have weak internal control.*

SAMPLE SELECTION AND METHOD OF ANALYSIS

The Securities and Exchange Commission (SEC) categorizes firms that are required to file 10-Ks, into four categories based on firm size: large accelerated, accelerated, non-accelerated, and small reporting companies. Both accelerated filers and large accelerated filers are required to file a report on the effectiveness of their internal controls and provide control attestation of their 10-K. Large accelerated filers must file their annual reports on Form 10-K within 75 days for fiscal years ending before December 15, 2006 and 60 days for fiscal years ending on or after December 15, 2006. Beginning with fiscal years ending on or after November 15, 2004 the Management Report and the Control Attestation were to become a part of that annual report.

Large accelerated filers generally include companies with an aggregate market value of voting and non-voting common equity held by non-affiliates of the issuer (referred to as “public float”) of more than $700 million as of the last business day of the issuer’s most recently completed second fiscal quarter. The definition of a large accelerated filer is based, in part, on the requirements for registration of primary offerings for cash on Form S-3. Previous researchers selected their samples from companies across all four categories. Since the small firms and non-accelerated filers were not required to report on the effectiveness of their internal controls during the period under consideration, they were excluded from our sample. Accelerated filers, on the other hand, have fewer resources than large accelerated filers and there is a question as to whether or not they will be able to maintain effective internal controls. Therefore, in the current research the authors chose large accelerated filers as their population of interest.

Sample selection consists of two phases; first the database search; and second, the screening process of the 10-Ks. The Accounting Research Manager is the database used to search for companies with internal control weaknesses. The database contains 1851 companies identified as large accelerated filers. The authors searched the database for large accelerated filers with material weaknesses disclosed in their 10-Ks between January, 2006 and January, 2008. This period was chosen for two reasons; first to avoid the recession period as a confounding variable; and second, the earlier period was excluded on the assumption that during that period these companies would not have sufficient experience to maintain effective internal controls. Three terms were used to search the database; "material weaknesses", "a deficiency or a combination of deficiencies" and "adverse opinion". The first two terms produced mixed results while the third one resulted in 183 firms that had the term in their 10-Ks.

Phase two began by individually screening each 10-K, specifically the management report on internal controls and the auditor opinion on the effectiveness of internal controls. The final sample consists of 96 companies that disclosed material weaknesses in their 10-K and management report. Other companies had either effective internal control, were duplicates, lack sufficient data or were late in filing their previous 10-Ks in the period under consideration. Table 1 shows the distribution of these companies across each business sector. It is worth noting that more than one-third of the experimental group comes from the technology sector. This finding is consistent with previous research (Bulkeley *et. al*, 2005). It may be difficult for technology firms to establish and monitor good internal control due to the fact that most of the controls in these firms are invisible. If some controls are either missing or are ineffective, they will not be detected. It is noteworthy that approximately 99% of both experimental and control groups were audited by big four.

Table 2 classifies the firms according to the type of internal control weaknesses. It is noteworthy that one-third of these firms has weaknesses at the company level or in revenue recognition process.

Anderson & Yohn (2002) argue that revenue recognition may be perceived by investors to be more intentional than restatements related to expense items. Firms appear to manage their earnings through the manipulation of revenue recognition. Dole *et. al*. (2007a) finds that firms with financial difficulty might decide to have internal control weaknesses over revenue recognition to be able to manage earnings. The same conclusion might apply to firms with internal control weakness at the firm level.

Table 1
Distribution of firms to different sector

Sector	Experimental	Control	Sector	Experimental	Control
Basic material	6	6	Service	13	13
Consumer goods	8	8	Tech	33	33
Healthcare	19	19	Utilities	5	5
Industrial goods	13	13			
Total					97

Table 2
Classification of Firms according to their type of weaknesses

Type of Weakness	No	%*	Type of Weakness	No	%
Revenue Recognition	10	10.3	Stock compensation	18	18.5
Control environment	23	23.7	Complex transactions	25	25.7
Tax	42	43.3	Segregation of duties	8	8.2
Trained Personnel	30	31	Other accounts	28	28.8

**Many firms have more than one type of weakness; therefore the number of firms and the percentage are more than 97 and 100% respectively.*

The control group with effective internal controls was obtained to match the same number from each sector in the experimental group. We used the term “large accelerated filers” to search for the control group. As we mentioned above, the database has annual reports for 1851 large accelerated filers. The auditor’s reports included in these annual reports were used to identify the firms that received unqualified opinion for their internal control. The second step was to collect the same number of firms in each sector to match the experimental group. Once this requirement was satisfied, we collected the same variables collected for the experimental group. Thus, the final sample includes 97 companies with strong or effective internal controls that represent the control group and 97 companies with weak or ineffective internal controls that comprise the experimental group.

We obtained the firms' data on the following: total assets for the year of disclosure, and total revenues for the year of disclosure and previous year, and the number of business segments. Return on assets was computed by obtaining net income for disclosure year scaled by average total assets. Restructuring charges were scaled by total assets for the same year, the ratio reflecting the size of restructuring. The debt/equity ratio was computed for the same year. We also collected income from operations and cash flows from operating activities adjusted for extraordinary items for both experimental and control groups. All these variables were obtained from 10-Ks of both experimental and control groups. Tables (1, & 2) show sector classification, and type of internal control weaknesses for both experimental and control groups.

EMPIRICAL RESULTS OF ONE-WAY ANOVA TEST

Table 3 presents the descriptive statistics for both the experimental and control groups. The mean value of total assets for the experimental group is approximately $5 billion compared to the approximate $17 billion value for the control group. Clearly firms with internal controls weaknesses tend to be much smaller than firms with good internal controls.

The mean value for the return on total assets for the experimental group is 4.51% relative to 7.29% for the control group. This illustrates that the experimental group is less profitable than the control group. The difference in mean values of the other variables is much less striking. Table 4 presents the Levene Test of Homogeneity of Variance. The assumption of homogeneity of variance for the return on total assets, the debt/equity ratio, restructuring, the number of segments and the change in sales revenue is valid. The level of significance is greater than 5% for each of them with the exception of total assets. However, both the Welch and the Brown-Forsythe test show that the means for both total assets and the return on assets variables are different for our experimental and control groups.

Table 3
Descriptive Statistics for both Experimental and Control Groups

		N	Mean (000)	Std. Deviation (000)	Std Error (000)	95% Confidence Interval for Mean Lower Bound (000)
Assets	.00	97	17276095	29695295	3015100	11291168
	1.00	97	5273082	9408127	955251	3376925
	Total	194	11274589	22778337	1635389	8049059
RetOnAssets	.00	97	.0729	.05336	.00542	.0622
	1.00	97	.0451	.08323	.00845	.0283
	Total	194	.0590	.07111	.00511	.0489
DebtEquity	.00	97	1.7226	4.06341	.41258	.9037
	1.00	97	1.6353	2.68929	.27306	1.0933
	Total	194	1.6790	3.43689	.24675	1.1923
Restructuring	.00	97	.0026	.00669	.00068	.0013
	1.00	97	.0028	.00645	.00066	.0015
	Total	194	.0027	.00656	.00047	.0018
Segments	.00	97	3.1959	2.06478	.20965	2.7797
	1.00	97	2.7938	1.85931	.18878	2.4191
	Total	194	2.9948	1.96998	.14144	2.7159
ChaneInSale	.00	97	.1739	.24045	.02441	.1254
	1.00	97	.1945	.30275	.03074	.1335
	Total	194	.1842	.27287	.01959	.1456

Table 4
Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Assets	27.937	1	192	.000
RetOnAssets	1.127	1	192	.290
DebtEquity	.047	1	192	.828
Restructuring	.011	1	192	.917
Segments	.013	1	192	.909
ChaneInSale	.847	1	192	.358

The results of one-way ANOVA support our prediction of mean differences for only the total assets and the return on total assets variables. Table 5 shows the results of ANOVA tests. The F test for both total assets and the return on total assets are significant with an F (1, 192) =14.402, *P=.00,* for total assets and an F (1, 192) = 7.689, *P= 00,* for the return on total assets. The F-tests for the debt/equity ratio, restructuring, The number of segments and change in sales revenue are found to be not significant.

Table 5
ANOVA Results for both Experimental and Control Groups

		Sum of Squares	df	Mean Square	F	Sig.
Assets	Between Groups	6987507020152607	1	6987507020152607	14.402	.000
	Within Groups	93151049618032400	192	485161716760585		
	Total	100138556638185008	193			
RetOnAssets	Between Groups	.038	1	.038	7.689	.006
	Within Groups	.938	192	.005		
	Total	.976	193			
DebtEquity	Between Groups	.370	1	.370	.031	.860
	Within Groups	2279.383	192	11.872		
	Total	2279.753	193			
Restructuring	Between Groups	.000	1	.000	.035	.851
	Within Groups	.008	192	.000		
	Total	.008	193			
Segments	Between Groups	7.840	1	7.840	2.031	.156
	Within Groups	741.155	192	3.860		
	Total	748.995	193			
ChaneInSale	Between Groups	.021	1	.021	.276	.600
	Within Groups	14.350	192	.075		
	Total	14.370	193			

Table 6
Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Assets	Welch	14.402	1	115.080	.000
	Brown-Forsythe	14.402	1	115.080	.000
RetOnAssets	Welch	7.689	1	163.519	.006
	Brown-Forsythe	7.689	1	163.519	.006
DebtEquity	Welch	.031	1	166.562	.860
	Brown-Forsythe	.031	1	166.562	.860
Restructuring	Welch	.035	1	191.745	.851
	Brown-Forsythe	.035	1	191.745	.851
Segments	Welch	2.031	1	189.929	.156
	Brown-Forsythe	2.031	1	189.929	.156
ChaneInSale	Welch	.276	1	182.637	.600
	Brown-Forsythe	.276	1	182.637	.600

LOGISTIC REGRESSION

The results of logistic regression reinforce the results of ANOVA. The mean differences in total assets and the return on total assets variables are significant. The Wald test for the difference in total assets means is 9.67 and *P=00* and for the difference in return on total assets variables is 6.30 and *P*=01 while the Wald tests for the mean difference in the remaining variables are not significant (Table 7).

Table 7
Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Assets	.000	.000	9.686	1	.002	1.000
	RetOnAssets	-6.593	2.627	6.298	1	.012	.001
	DebtEquity	-.008	.044	.036	1	.850	.992
	Restructuring	4.997	23.768	.044	1	.833	148.014
	Segments	-.037	.082	.206	1	.650	.964
	ChaneInSale	.293	.574	.261	1	.609	1.341
	Constant	.872	.356	5.992	1	.014	2.391

a. Variable(s) entered on step 1: Assets, RetOnAssets, DebtEquity, Restructuring, Segments, ChaneInSale.

The Omnibus tests of the model coefficients are significant, *P=00.* The Chi-square of Hosmer-Lemeshow goodness of fit is 10.27 and *P*=0.25. Both the Omnibus and Hosmer-Lemeshow test results support the model (Table 8).

Table 8
Omnibus Tests of Model Coefficients & Hosmer and Lemeshow Test

Step 1	Chi-square	df	Sig.
Step	28.622	6	.000
Block	28.622	6	.000
Model	28.622	6	.000
Hosmer and Lemeshow Test			
Step	Chi-square	df	Sig.
1	10.267	8	.183

Table 9 Test of Homogeneity of Variances				
	Levene Statistic	df1	df2	Sig.
Assets	7.884	1	128	.006
ResOnAssets	.001	1	128	.980
DebtEquity	.303	1	128	.583
Restructuring	.027	1	128	.870
Segments	.025	1	128	.876
ChaneInSale	7.498	1	128	.007

ANOVA statistics were computed for firms with severe internal control weaknesses –lack control over revenue recognition or/and at the firm level- and for the control group. As was the case with the logistic model, the F-tests for total assets, the return on assets and to some extent the number of the segment are significant. However, the F-test for number of segments is not robust, as it value was 0.09 (Table 10). The lack of significance of the number of segments variable might be attributed to the fact that the FASB limited the maximum number of the segment to be disclosed to ten.

Large accelerated filers vary widely in size as measured by total assets. It is assumed that larger accelerated companies tend to have access to additional resources and have a well-developed infrastructure that enables them to establish effective internal controls. This premise as the results indicate can be applied to the larger firms but not for smaller firms in the large accelerated filer category. Not unexpectedly, the costs of effective internal control over firms with more transactions, more segments, more customers, more foreign transactions, and investments are higher than the costs for other firms lacking these attributes. These results show that smaller firms of the large accelerated filers' category lack sufficient resources and may have not as well-developed infrastructure relative to the larger firms. The combination of insufficient resources and less-developed infrastructure may well preclude the smaller firms from establishing good internal control. The larger accelerated filers in this category are more likely to enjoy economies of scale and scope along with the additional resources that make it easier to develop the procedures and policies such as segregation of duties that are necessary for good internal control.

Table 10 ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Assets	Between Groups	3077234048262900.500	1	3077234048262900.500	4.380	.038
	Within Groups	89932657186954080.000	128	702598884273078.800		
	Total	93009891235216976.000	129			
ResOnAssets	Between Groups	.044	1	.044	15.628	.000
	Within Groups	.364	128	.003		
	Total	.409	129			
DebtEquity	Between Groups	6.922	1	6.922	.447	.505
	Within Groups	1981.476	128	15.480		
	Total	1988.398	129			
Restructuring	Between Groups	.000	1	.000	.113	.738
	Within Groups	.007	128	.000		
	Total	.007	129			
Segments	Between Groups	12.448	1	12.448	2.987	.086
	Within Groups	533.521	128	4.168		
	Total	545.969	129			
ChaneInSale	Between Groups	.183	1	.183	1.990	.161
	Within Groups	11.747	128	.092		
	Total	11.930	129			

Additionally our research reveals that profitability is an important factor in determining the existence of internal control weaknesses. If a firm is profitable, it has the necessary resources to devote to establishing and maintaining effective internal control. Unlike the less profitable firms or those that incur losses. These firms may not be able to establish or maintain good internal control due to the lack of resources. More over these firms may find that they are willing to relax some controls thus enabling them to manage their earnings in order to meet financial analysts' expectations, achieve a desired profit level, or renew their contracts and/or achieve bonuses.

Comparing the results of this research with those of Doyle, *et al.* (2007a), we find that our results strongly re-enforce their results with respect to firm's size and profitability and to some lesser extent more segments. Thus, large accelerated filers can sustain rapid growth, meet their obligations and restructure without disruption of their internal control.

SUMMARY AND CONCLUSION:

The Sarbanes-Oxley Act of 2002 requires all public firms to establish and maintain effective internal control over financial reporting and to disclose any material weaknesses. The SEC classified these firms with respect to filing dates into four categories: small, non-accelerated filers, accelerated filers, and large accelerated filers. Large accelerated filers are assumed to have the well-developed infrastructure and sufficient resources to devote to establishing and maintaining effective internal control. In this paper, we tested a sample of large accelerated filers matched with a sample of firms with strong internal control to identify the determinants of internal control weaknesses. Using ANOVA and logistic techniques, six variables were tested. These were total assets, change in revenue, number of segments, return on assets, debt-equity ratio and those that undergo restructuring. The results indicate that total assets and return on assets are significant in determining the internal control weakness. When the tests were run for a subsample with severe weaknesses in their internal control against the control group, profitability, total assets and the number of segments variables were significant though the number of segments was not robust.

The major limitation of the research is that these results may be specific to large accelerated filers only. Other categories of firms may have different determinants. These firms may have different characteristics depending on the resources available for internal control.

Another limitation is that we have used only financial variables in our model. This notwithstanding, our findings are important as they carry significant informational value for regulators, financial statement users, and auditors. That is, less profitable firms and/or small size of firms in the category of large accelerated filers tend to have weak internal control. Therefore, their financial statements may not be reliable. As a result, regulators may scrutinize the financial statements of these firms for possible intentional errors. The findings of this research may also alert financial statements users of the low quality of earnings of these firms. Auditors may expand their substantive tests to collect more and larger samples and carry the tests at the different point of times.

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EFFECT OF INVESTOR RELATIONS ON COST OF DEBT CAPITAL

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ABSTRACT

This study analyzes the effect of firms IR (Investor Relations) on cost of debt capital. Information asymmetry and the consequential variation in capital costs is recognized as one of the firm value determinants as role and scale of capital market are expanded in firms fund supply. As information on general firm management, IR is a voluntary activity providing even non-quantified information. Firm is thought to convey transparent information to investors itself. If firm has voluntary disclosure incentives to reduce financing expenses caused by information asymmetry, IR is expected to decrease firms capital costs by mitigating information asymmetry of participants in the capital market. For this reason, this study has a purpose of analyzing what actual influence IR has on firms cost of debt capital.

The empirical analysis shows the following results: First, 23.2% of firms among the whole firms held investor relations. Average holding frequency of investor relations was 4.09 times. Second, as a result of difference analysis between the top 50% and the bottom 50% firms in cost of debt capital, firms with high cost of debt capital showed significantly low holding frequency and investor relations. Therefore, it is concluded that firms IR decrease cost of debt capital. Third, as a result of influence analysis of investor relations on cost of debt capital, whether firms held investor relations or not has a positive relevance, insignificant with cost of debt capital. It proves effect of investor relations are not shown in every firm en bloc, but there is a difference in effect depending on characteristics of firms.

Lastly, as a result of influence analysis of investor relations on cost of debt capital depending on firm size and foreign ownership that reflect on firm characteristics, firm IR whose size is big and foreign ownership are high shows a negative relevance, significant with cost of debt capital.

Ⅰ. INTRODUCTION

Corporate disclosure is effective in reducing the share of private information in the capital market and the incentives for investors to search for exclusively available information, easing information asymmetry(Diamond, 1985；Verrecchia, 2001). Corporate disclosure, in this sense, contributes to reducing capital cost coming from information asymmetry and is regarded to reflect corporate strategic choices for the purpose of information asymmetry decrease (Diamond and Verrecchia, 1991).

According to the hypothesis on capital market transactions by Healy and Palepu (2001), firms have incentives to voluntarily disclose information to reduce their capital procurement costs caused by information asymmetry. IR (Investor Relations) means a self-initiated corporate activity to offer general information about the whole firm management status including non-quantified data. IR is understood as a voluntary behavior by firms to deliver transparent information to investors. Therefore, IR activities are not obligatory but a voluntary tool to disclose corporate information on management performances and other related activities for the purpose to maintain firm soundness for investors. More recently, IR has become recognized as a positive means of enhanced corporate reliability and corporate information provision, further increasing its significance (Argenti et al., 2005).

IR has grown important because only after a desirable investment climate is established based on IR and stocks should be valued in the market in the first place, a firm can efficiently procure necessary funds for proper management and perform diverse projects without a failure. Of course, the corporate disclosure related laws and regulations have obligated firms to disclose corporate financial details and other major management matters to the stock market. However this is rather a passive behavior of providing only minimum amount of information. On the other hand, through IR, firms release not just quantified corporate information but also non-quantified data. Firms can swiftly, accurately and continuously inform their own project and performance details on a voluntary basis through IR, maximizing corporate promotion effects.

The positive effects of IR have been proven by relatively higher stock market returns and trading volumes in actual trades. According to the announcement of the Korea Exchange in March 2010, the average one-month stock transaction volume of 68 KOSDAQ-listed firms which had organized an IR in 2009 rose by approximately 55% for one post-IR month than before. The figure is far above 0.7%, the entire KOSDAQ transaction volume increase during the same period. The 68 firms' average stock price increase in 2009 was about 78%, exceeding the KOADAQ index rise of 51%.

According to the 2010 report by the Korea IR Service, IR was found to be most frequently utilized in South Korea to facilitate understanding of corporate and business projects. In the IR activity fact-finding investigation for listed firms, understanding of firms and its business projects and appropriate stock price formation ranked higher with similar scores. Also 80.7% of the surveyed firms said they were undervalued in the stock market. That is, the management was found to have utilized IR to secure management stability or firm value increase and IR activities in Korea unlike in other countries, were used not just for corporate image upgrade but also stock price management and fundraising (Na and Kim, 2000).

When it is said that firms have incentives to disclose information on a voluntary basis to reduce own fundraising expenses stemming from information asymmetry, IR can be expected to help lower corporate capital expenses by relieving information asymmetry among capital market participants. Also IR can induce capital market investors and debtors to develop a more favorable viewpoint towards the corresponding firm, affecting positively to corporate fundraising.

This research sampled the period between 2007 and 2011 to look at the effects of corporate IR on the cost of debt. To this end, we analyzed if there existed any difference, according to the cost of debt, in terms of IR hosting Y/N and frequency, return on assets ratio, debt ratio, firm size, foreign ownership, market to book-value ratio, auditing corporation, etc. To look into the effects of corporate IR on borrowed capital, we operated a regression analysis with the cost of debt being a dependent variable. Also, as we expected possible gaps in the effects of IR on cost of debt according to firm sizes and foreign ownership ratio, we conducted an additional analysis on this matter.

This paper is organized as follows: section 2 presents the literature review and provides the background of this study. Section 3 introduces the research methods. Section 4 provides Sample Selection and the empirical results, and Section 5 offers our concluding remarks

II. LITERATURE REVIEW

IR is not an obligatory disclosure activity performed by all of the listed firms but a voluntary disclosure effort by firms with a view to enhanced firm transparency and reliability along with fewer capital cost ultimately to increase firm value. After 2000, corporate IR activities have become more stimulated and many researches have been going on about the usefulness and effectiveness of IR. However, almost no study has been conducted so far on the effects of IR hosting on a company's cost of debt. In this sense, analyzing IR effects on a company's cost of debt seems an appropriate research theme for the purpose of reducing corporate information asymmetry and protecting investors and debtors, etc.

A professional investment research institute examined the investment earnings rates of firms actively hosting IRs from 2007 to 2009 among the 1750 KOSDAQ-listed firms. According to its release, firms with higher reliability in the market, organizing at least 2 rounds of IRs annually and sharing related data materials exhibited 20~40% higher earnings than the market average(Park and Ji, 2010). To reinforce IR efforts, firms should fist structure an excellent intra-company governance system. Here, it is noticed that the independence and specialty of board of directors and audit unit are related to more frequent IR hosting. And firms with the concentrated vote system and written vote system were found to organize IRs more often to a statistically significant level according to a research (An et al., 2010). This suggests that the more excellent a firms governance structure goes, the more the firms organizes IRs to disclose internal information, indicating that forms with a good governance tend to control arbitrary management decisions while inducing private information disclosure to the outside for narrower information asymmetry.

Lee et al. (2008) examined the effects of disclosure quality decrease due to the designation of unfaithful disclosure firms on the capital market by using the cost of debt. As an alternative to the cost of debt, he used the borrowing rate calculated based on the credit ranking from credit-rating agencies and financial statements. As a result, the credit ranking of unfaithful disclosure firms were statistically significantly lower than other non-designated firms and their borrowing rate rose by about 1.4%, signaling a relatively larger portion of the cost of debt in unfaithful disclosure firms than others. This means that disclosure quality downgrade from the designation of unfaithful disclosure company had an unfavorable effect on the capital market to cause increased cost of debt as the capital market had a high expectation on fairness and reliability in disclosed information. Choi and Cho (2004a) studied exchanged firms and KOSDAQ companies to find out the effects of corporate IR on stock prices as a management strategy to ease information asymmetry among investors in the stock market. As a result of his comparison according to major stockholders' share ratios, he found a smaller excess earning rate in a management-governed firms with ownership-management separation (lower shareholding ratio by major shareholders) and higher excess earnings ratios were found among exchanged mid-sized firms as well as KOSDAQ-listed venture companies during the post-IR period. Son and Jeon (2000) utilized IR estimation to verify the information effects of manager's estimation information and found that disclosing the manager's estimation information invited and abnormal trade volume increase around the point of disclosure. In previous studies, it was found that stock prices rose after IR with an indication that investors took IR as good news. Building on this, the present research anticipated corporate financial cash flow could be facilitated with IRs. Jung(2000), in his research, used a financial leverage as an alternative to the cost of debt to examine the relationship with corporate voluntary disclosure and found voluntary disclosure increased in firms with decreasing financial leverage ratios. Trueman (1986) also stated that a manager had an incentive to participate in the voluntary disclosure to let others know his or her competency. That is, companies with a heavy debt ratio and high dependence on loans are expected to have a smaller incentive to organize IR, thus their regression coefficient would be negative (-). In other words, companies with larger (smaller) debt have a bigger incentive to disclose (conceal) corporate performances and related financial information to the outside world. Therefore, their IR activities will be far stimulated. An et al. (2009) analyzed the relationship between IR and corporate cash flow, centering on the main IR purposes of corporate image improvement and fundraising. He reported that firms utilized IR for own image upgrade and fundraising and affected investors' decision making process and, at the same time, they took advantage of IR to actively inform own investment plans to help facilitate financial cash flow.

Kim et al. (2008) analyzed the relationship between IR, a type of voluntary disclosure activity, and information asymmetry levels with a main information asymmetry measurement based on PIN (probability of informed trading) of the research by Easley et al. (1997). He found a significant negative correlation between IR hosting and the information asymmetry level of the subsequent quota. Such information asymmetry ease was found to be because of the reduced trading volume of informed traders. The 2-phased least square method considering IR-hosting firm-specific characteristics also found the robustness of the results. This indicates that, even after factoring in the issue of self-selection bias, IR can effectively relieves the degree of information asymmetry. In the case of hosting IRs for two consecutive quarters, additional information asymmetry relieving effects were found to be poor. Similar results were also found if Huang and Stoll (1997)'s adverse selection cost was considered as another measurement of information asymmetry.

Ahn and Choi (2011) empirically analyzed if IR mitigated information asymmetry among capital market participants to effectively reduce corporate cost of equity capital. He applied IR materials and accounting information to the RIM(Residual income model) to gain ICOE(Implied cost of equity) estimation and analyzed its relationship to find that investors used corporate governance level as a ground for evaluating the reliability of information provided through IR and the IR effects to alleviate information asymmetry and reduce capital cost were not constant in every firm but different according to firm features.

Lee et al. (2012) looked at the relationship between corporate earnings management and IR based on account BTD(Book-Tax Difference) data. Accordingly, he found a negative correlation between account BTD and IR hosting Y/N and its frequency, representing the degree of firm earnings management grew lower as IR increased.

Despite this importance of IR activity, however, relevant studies have mostly on the relation between IR and information asymmetry, IR incentives, IR and stock price change and transaction flexibility changes, etc. No study has been conducted to see if IR alleviated capital market information asymmetry to actually help reduce corporate cost of debt. Against this backdrop, the present research studied South Korean listed firms to empirically investigate the effects of IR on corporate cost of debt.

III. RESEARCH METHOD

3.1 Hypothesis

This research reviews the relation between corporate IR and cost of debt by examining, from 2007 to 2011, stock-listed firms with account settlement in December, excluding the financial service sector. In addition, this research aims to perform an empirical analysis on the effects of IR on the cost of debt according to firm-specific characteristics such as firm sizes and foreign ownership ratios. For such purposes of this research, we established hypothesis as follows:

Information asymmetry between firm management and outside stakeholders in the capital market increases the risk or uncertainty level perceived by the outside stakeholders. And such a perception leads to capital cost rise, dropping firm value. Market imperfection due to information asymmetry elevates information cost and causes different capital costs. Companies which cannot borrow funds from outside at an affordable interest could lose a potentially profitable investment opportunity. Therefore, companies have incentives to adopt proactive disclosure policies to help alleviate information asymmetry and lower borrowing rates (Verrecchia 1983).

Corporate IR is not any coercive disclosure obligation to be followed by each and every listed firms but a voluntary information sharing activity. Unlike the general disclosure scheme that offers investors and stakeholders information within a minimum designated range including mainly quantified and standardized information such as security details or issuing firms' financial and management status, IR offers even non-quantified information and in this sense, it is essential for information asymmetry alleviation between inside and outside a company. To test if such corporate IR eases information asymmetry and actually helps reduce corporate cost of debt, we established hypotheses as follows:

H1 Corporate IR will help reduce the cost of debt.

Generally, large firms have a lot of information-searching people such as financial analysts, institutional investors, etc. Therefore, they can easily attract investors' interest compared with smaller firms. Such a demand for corporate information of the capital market helps alleviates the problem of information asymmetry between firms and investors thus, lowers information risk caused by uncertainty (Gebhardt et al., 2001). Therefore, we expect IR would have different effects on the cost of debt depending upon firm sizes and established the following hypothesis.

H2 Effects of corporate IR on the cost of debt would vary according to firm sizes.

Foreign investors are in a favorable position than other normal investors in private information collecting activities or data analysis. And they are expected to exercise larger pressure on firm information disclosure to narrower information asymmetry or investment risk. Moreover, compared to major shareholders of domestic firms or institutional investors, etc., they may not easily collect intra-company information. For this reason, foreign investors' pressure on firm data disclosure is expected to be greater than domestic investors. Firms with a higher foreign ownership ratio are expected to experience relatively less information asymmetry than those with a lower foreign ownership ratio. Therefore, foreign ownership ratios would cause a difference in IR effects on the cost of debt. We structured a hypothesis as follows:

H3 Effects of corporate IR on the cost of debt would vary according to foreign ownership ratios.

3.2 Research Model

In this research, to examine the effects of IR on the cost of debt, we employed the following model equation to operate the regression analysis. First of all, the equation (1) was used to identify the effects of IR hosting Y/N and its frequency on the cost of debt.

$$CI_t = \alpha_0 + \alpha_1 IR(IRN)_{t-1} + \alpha_2 ROA_t + \alpha_3 LEV_t + \alpha_4 SIZE_t + \alpha_5 FOR_t + \alpha_6 MB_t + \alpha_7 AUD_t + \alpha_8 NEGE_t + \alpha_9 \sum_k IND_{kt} + \alpha_{10} \sum_k YR_{kt} + \varepsilon \qquad \text{equation (1)}$$

CI = Cost of Debt Capital (Total financial cost/average interest bearing debt) * 100(1-tax rate)
IR = If Investor Relations hosting firm is 1, and 0 otherwise.
IRN = Investor Relations hosting frequency
ROA = Net Income / Total Assets
LEV = Total Liabilities / Total Assets
SIZE = Log of Total Assets
FOR = the ratios of foreigners' ownership
M/B = market value to book-value ratio
AUD = If BIG4 Audit Corporation is 1, and 0 otherwise.
NEGE = 1 when net Income is negative, and 0 otherwise
IND_k = 1 when the data belong to industry k, and 0 otherwise
YR_k = 1 when the data belong to year k, and 0 otherwise (k=2007, 2008, 2009, 2010, 2011).

The dependent variables of the equation (1) are the cost of debt from dividing average interest bearing debt by total financial costs. A main explanatory variable is the variable of IR hosting yes or no. IR is not an obligatory disclosure to be coercively performed by all listed firms but it is a voluntary disclosure effort by firms, which enhances corporate transparency and reliability, reduces corporate capital cost and ultimately upgrades firm values as a decent promotional activity. Thus, firms with active IR performance, compared to those not, are expected to have a lower cost of debt.

Firm management performance needs to be controlled first before analyzing the effects of IR variable on the cost of debt. As ROA represents the overall corporate earnings status, it is expected to be a negative code with regards to the cost of debt. LEV shows a company's dependence on borrowed funds of the entire funds and the company's' soundness to pay back the principle and interest of its long-term debt. The higher the LEV grows, the higher the debt payment failure risk becomes. So we expect a positive mark for it in relation to the cost of debt. SIZE was measured by applying the natural logarithms to the total asset. As it becomes bigger, more stakeholders are involved, imposing more incentives for a manager to disclose more reliable information. And large firms can gain a more stable ranking through financial cross guarantee. For these reasons, we see it as a control variable with a negative effect on the cost of debt. FOR is expected to have a negative mark as foreign investors prefer firms with good financial performance and stability. MB represents corporate sales performance and future earnings growth potential. Managers will be motivated to pursue more IRs to increase stock prices in the case of lower profit or stock undervaluation. Therefore, MB is expected to have a negative mark in its relation with the cost of debt. And as large-sized accounting firms prefer a more conservative manner of accounting treatment in consideration of the independent auditor's liability for damages, AUD is expected to be in minus. In previous studies, the relationship between net income and stock price showed different shapes, being qualitatively greater in the case of negative (-) net income than in the case of positive (+) net income (Hayn 1995; Collins et al. 1997). The present study intends to show the difference in the regression coefficient of net income in case of both positive (+) and negative (-) net income and negative (-) net income by including the dummy variable (NEGE). Likewise, if the dependent variables are determined by the economic situation for a certain year regardless of the independent variables, a cross-sectional correlation in the observed values and a time series autocorrelation exists in the nature of the financial variables, which causes an autocorrelation of the residual. Since the estimated regression coefficient and the standard error may be unbiased due to this cross-sectional and time-series correlation, the dummy variables by year (YR) were added to control for these (Park et al. 2004).

As in the following, we additionally employed the equations (2) and (3) under the assumption that firm sizes and foreign ownership ratios would make differences in the effects of IR on the cost of debt.

$$CI_t = \alpha_0 + \alpha_1 IR(IRN)_t + \alpha_2 IR(IRN)*DUM^{SIZE} + \alpha_3 ROA_t + \alpha_4 LEV_t + \alpha_5 SIZE_t + \alpha_6 FOR_t + \alpha_7 MB_t + \alpha_8 AUD_t + \alpha_9 NEGE_t + \alpha_{10}\sum_k IND_{kt} + \alpha_{11}\sum_k YR_{kt} + \varepsilon \quad \text{equation (2)}$$

$$CI_t = \alpha_0 + \alpha_1 IR(IRN)_t + \alpha_2 IR(IRN)*DUM^{FOR} + \alpha_3 ROA_t + \alpha_4 LEV_t + \alpha_5 SIZE_t + \alpha_6 FOR_t + \alpha_7 MB_t + \alpha_8 AUD_t + \alpha_9 NEGE_t + \alpha_{10}\sum_k IND_{kt} + \alpha_{11}\sum_k YR_{kt} + \varepsilon \quad \text{equation (3)}$$

DUM^{SIZE} = 1 when SIZE is upper 50%, and 0 otherwise
DUM^{FOR} = 1 when FOR is upper 50%, and 0 otherwise

The equation (2) is a model to examine the effects of IR hosting on the cost of debt according to firm sizes. Its main explanatory variable was found based on the interaction between the IR hosting and firm size dummy variables. If firm sizes affect the effects of IR on the cost of debt, the main explanatory variable will show an effective value. Also, the equation (3) is a model to investigate the effects of IR hosting on the cost of debt according to foreign ownership ratios. The main explanatory variable was found based on the interaction between IR hosting and foreign ownership ratio dummy variables. If foreign ownership ratios affect the effects of IR on the cost of debt, the explanatory variable will demonstrate an effective value.

IV. SAMPLE SELECTION AND RESULTS OF EMPIRICAL ANALYSIS

4. 1 Sample selection

For the research examination of the effects of IR on the cost of debt, we selected a sample among the listed companies from 2007 to 2011 based on the following criteria:

(1) Sample firms exclude financial firms.
(2) Sample firms have December 31 fiscal year-ends.
(3) Sample firms exclude firms without necessary financial data.
(4) Sample firms with Cost of Debt Capital.
(5) Variables used in the empirical analysis should be less than 1% of the top and bottom range.

<Table 1> Sample Firms

	2007	2008	2009	2010	2011	Total
Listed companies by year	746	765	770	777	791	3849
(-)Non December 31 fiscal year-ends.	86	84	83	82	82	417
(-)Financial firms	14	14	15	16	16	75
(-)Firms without necessary financial data	37	37	38	34	35	181
(-)Firms without Cost of Debt Capital	75	74	70	87	83	389
(-)Outliers for each variable	10	12	12	6	11	51
Final Sample Firms	524	544	552	552	564	2736
IR hosting Firms	124	137	128	128	118	635
Non IR hosting Firms	400	407	424	424	446	2101

There were 3,357 firms-years with December account settlement which were listed on the stock exchange from 2007 to 2011, excluding the financial service sector. Of them, the excluded were those with financial data omission, having no cost of debt capital, and belonging to the top and bottom 1% to remove extreme value distortion and the remaining final sample was 2,736 firms. Of them, IR-hosting firms were 635 in total and non-IR-hosting ones were 2101.

4.2 Descriptive Statistics

<Table 2> shows the descriptive statistics of main variables used to analyze the effects of IR on the cost of debt. The average of the cost of debt was 5.430 with the median of 4.803. The minimum value is 0.014 whereas the maximum value is 39.331, demonstrating a large standard deviation. This research's key explanatory variable of IR hosting Y/N averaged at 0.232. Of the entire sample of 2736 firms, 635 or 23.2% of firms were organizing IR. The frequency of IR was 0.950 in average while the maximum value was 26 rounds, representing a large standard deviation[1]. The average (median) of ROA, representing corporate management performance, was 0.013 (0.030). The average debt ratio (median), showing a firm's dependent on borrowed capital, was 0.470 (0.474). In this research, the average (median) firm size–company-specific variable affecting IR was 23.635 (26.367). The average (median) foreign ownership was 0.092 (0.035), accounting for 9.2% of the total issued stocks. The average (median) of market to book-value ratio was 1.174 (0.806), signaling market value was higher than book value. The average (median) audit corporation was 0.697 (1.000), implying that, of the whole auditing firms, Big 4 auditing firms were accounting for 69.7%. Concerning IR hosting frequency, the maximum value was 26 and 33.9% or 215 of the 635 IR-holding companies were hosting once. 119 were holding IR twice and 37 were three times.

<Table 2> Descriptive Statistics

Variable (N=2736)	Mean	Median	Standard Deviation	Minimum	Maximum
CI	5.430	4.803	3.305	0.014	39.331
IR	0.232	0.000	0.422	0.000	1.000
IRN	0.950	0.000	2.692	0.000	26.000
ROA	0.013	0.030	0.134	-1.900	0.451
LEV	0.470	0.474	0.189	0.009	0.989
SIZE	26.635	26.367	1.562	22.233	32.398
FOR	0.092	0.035	0.132	0.000	0.872
M/B	1.174	0.806	1.332	0.104	20.917
AUD	0.697	1.000	0.459	0.000	1.000
NEGE	0.226	0.000	0.418	0.000	1.000

Variable definition: CI = Cost of Debt Capital (Total financial cost/average interest bearing debt) * 100(1-tax rate), IR = If Investor Relations hosting firm is 1, and 0 otherwise, IRN = Investor Relations hosting frequency, ROA = Net Income / Total Assets, LEV = Total Liabilities / Total Assets, SIZE = Log of Total Assets, FOR = the ratios of foreigners' ownership, M/B =

market value to book-value ratio, AUD = If BIG4 Audit Corporation is 1, and 0 otherwise, NEGE = 1 when net Income is negative, and 0 otherwise.

4.3 Analysis of Differences

<Table 3> shows the result of analyzing the difference of main variables according to the cost of debt. We differentiated the upper 50% and lower 50% depending upon their cost of debt for difference analysis. And we found that firms with a higher debt cost demonstrated significantly lower values of IR hosting Y/N and its frequency. ROA was significantly higher in firms with a lower debt cost. Debt ratios were significantly higher in those with a high cost. Firm size and foreign ownership were significantly larger in firms with lower debt cost. This means firms having lower debt cost hold more IR and had larger ROA, firm size and foreign ownership as well.

<Table 3> Difference Analysis by the Cost of Debt

	Total (N=2,736)		higher debt cost (N=1,368)		lower debt cost (N=1,368)		t-statistics	z-statistics
	Mean	Median	Mean	Median	Mean	Median		
CI	5.430	4.803	7.382	6.315	3.478	3.750	38.283***	45.291***
IR	0.232	0.000	0.213	0.000	0.251	0.000	-2.402**	-2.400**
IRN	0.950	0.000	0.756	0.000	1.144	0.000	-3.780***	-2.991***
ROA	0.013	0.030	-0.024	0.011	0.049	0.046	-14.674***	-19.593***
LEV	0.470	0.474	0.518	0.532	0.421	0.423	13.839***	13.498***
SIZE	26.635	26.367	26.421	26.146	26.848	26.549	-7.215***	-7.719***
FOR	0.092	0.035	0.078	0.022	0.107	0.050	-5.889***	-7.004***
M/B	1.174	0.806	1.158	0.750	1.191	0.857	-0.655	-4.281***
AUD	0.697	1.000	0.654	1.000	0.741	1.000	-5.015***	-4.993***
NEGE	0.226	0.000	0.372	0.000	0.080	0.000	19.513***	18.284***

Variable definition: CI = Cost of Debt Capital (Total financial cost/average interest bearing debt) * 100(1-tax rate), IR = If Investor Relations hosting firm is 1, and 0 otherwise, IRN = Investor Relations hosting frequency, ROA = Net Income / Total Assets, LEV = Total Liabilities

/ Total Assets, SIZE = Log of Total Assets, FOR = the ratios of foreigners' ownership, M/B = market value to book-value ratio, AUD = If BIG4 Audit Corporation is 1, and 0 otherwise, NEGE = 1 when net Income is negative, and 0 otherwise.

4.4 Correlation Analysis

<Table 4> show the results of the correlation analysis for firms. The cost of debt was found to have a negative correlation with IR hosting Y/N, representing IR-hosting firms had lower debt cost than non-IR-hosting firms. Also a significant negative correlation was seen with IR frequency thus, the higher the IR frequency grew, the lower the debt cost became. ROA showed a highly significant correlation with -0.361 with debt cost. Firm size, foreign ownership and auditing firm also had a negative correlation with the cost of debt, implying that the larger the firm was, the higher the foreign ownership was and having one of Big 4 auditing firms in the country, the lower the cost of debt grew. Also debt ration and negative earnings showed a significant positive correlation, meaning that firms with a higher debt ratio and minus earnings faced a higher cost of debt.

<Table 4> Correlation Analysis

	CI	IR	IRN	ROA	LEV	SIZE	FOR	M/B	AUD
IR	-0.044**								
IRN	-0.068***	0.642***							
ROA	-0.361***	0.085***	0.111***						
LEV	0.181***	0.079***	0.051***	-0.303***					
SIZE	-0.193***	0.482***	0.519***	0.237***	0.148***				
FOR	-0.066***	0.317***	0.373***	0.180***	-0.100***	0.488***			
M/B	-0.076***	0.200***	0.195***	-0.129***	0.185***	0.039**	0.123***		
AUD	-0.102***	0.208***	0.194***	0.159***	0.006	0.406***	0.247***	0.018	
NEGE	0.339***	-0.096***	-0.113***	-0.588***	0.308	-0.189***	-0.164***	0.045**	-0.124***

See Table 3 for the definition of variables.
Superscript *, **, *** denote statistical significance at the 0.10, 0.05, 0.01 levels(two-tailed), respectively.

4.5 Regression Analysis

The panel A of <Table 5> is the results of this research analysis on the effects of IR hosting Y/N on the cost of debt. The model's dependent variable is the cost of debt and the main explanatory variable is IR hosting Y/N. If the IR hosting Y/N shows a significant negative correlation with the cost of debt, hypothesis 1 would be supported. As a result of our analysis, the regression coefficient of the main explanatory variable of IR hosting Y/N was 0.260 an insignificant positive correlation with the cost of debt, failing to support the hypothesis 1 that IR would help reduce the cost of debt[2]. This was found to be because IR effects were not constant in all firms but different according to company-specific features. To test the hypothesis 2 herein that corporate IR would have a differentiated effect on the cost of debt depending upon firm sizes, we added a variable found by interacting IR hosting Y/N and firm size dummy variables together, in addition to the main explanatory variable. As a result, we found a significant negative correlation with the cost of debt. The regression coefficient (t value) was -0.781 (-2.453) showing a significant negative correlation higher than the IR regression coefficient of 0.772. It says that larger firms can decrease the cost of debt through IR. This finding is consistent with the hypothesis 2. To verify the hypothesis 3 that corporate IR would have a different effect on the cost of debt depending upon foreign ownership ratio, we added a variable found by interact the dummy variables of the main explanatory variable of IR hosting Y/N and foreign ownership ratio. And we found its regression coefficient was -0.513, a significant negative correlation. Therefore, firms with a high foreign ownership ratio can help lower the cost of debt through IR. The hypothesis 3 was successfully supported.

ROA, used as a control variable, was found to have a significant negative correlation. This means that the higher the ROA becomes, the more the cost of debt decreases. Debt ratio showed a significant positive correlation, meaning the higher the debt ratio moves, the more expensive the cost of debt becomes. Firm size represented a significant negative correlation with the cost of debt whereas foreign ownership ratio gave a significant positive correlation.

H1 Corporate IR will help reduce the cost of debt.	Reject
H2 Effects of corporate IR on the cost of debt would vary according to firm sizes.	Supported
H3 Effects of corporate IR on the cost of debt would vary according to foreign ownership ratios.	Supported

The panel B is the results of examining the effects of IR frequency on cost of debt so that we could be able to confirm the robustness of the panel A outcomes. The model 1 has the IR regression coefficient showing an insignificant positive correlation with the cost of debt as in the panel A description. The model 2 has IR*DUMSIZE regression coefficient of -0.363, smaller than the panel A's -0.781, still a significant negative correlation. Also in the model 3, IR*DUMSIZE regression analysis is -0.196, smaller than the panel A's -0.513 but still a significant negative correlation consistent with the panel A results as well as this research hypothesis.

<Table 5> Effect of Investor Relations on Cost of Debt Capital

Panel A Effect of Investor Relations Hosting on Cost of Debt Capital

	Model 1		Model 2		Model 3	
	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics
IR	**0.198**	**1.210**	**0.772**	**2.938*****	**0.599**	**2.322****
IR*DUM^{SIZE}			**-0.781**	**-2.453****		
IR*DUM^{FOR}					**-0.513**	**-1.674***
ROA	-4.535	-8.034***	-4.598	-8.358***	-4.567	-8.295***
LEV	1.511	3.989***	1.704	4.610***	1.703	4.605***
SIZE	-0.373	-7.004***	-0.358	-6.395***	-0.388	-7.284***
FOR	1.910	3.551***	2.032	3.876***	2.180	4.072***
M/B	0.042	0.876	0.039	0.819	0.037	0.776
AUD	0.016	0.112	0.016	0.121	0.017	0.124
NEGE	1.432	8.058***	1.337	7.714***	1.336	7.703***
YR, INR Dummies	Not Reported		Not Reported		Not Reported	
Adjusted R^2	0.191		0.201		0.200	

Panel B Effect of Investor Relations Hosting Frequency on Cost of Debt Capital

	Model 1		Model 2		Model 3	
	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics
IRN	**0.031**	**1.187**	**0.386**	**2.414****	**0.219**	**1.944***
IRN*DUM^{SIZE}			**-0.363**	**-2.252****		
IRN*DUM^{FOR}					**-0.196**	**-1.717***
ROA	-4.603	-8.359***	-4.630	-8.412***	-4.585	-8.329***
LEV	1.721	4.649***	1.739	4.701***	1.720	4.648***

SIZE	-.402	-7.605***	-0.384	-7.181***	-0.401	-7.579***
FOR	1.985	3.769***	1.998	3.797***	2.127	3.991***
M/B	0.039	0.820	0.030	0.639	0.036	0.767
AUD	0.024	0.173	0.019	0.137	0.018	0.135
NEGE	1.333	7.681***	1.328	7.662***	1.334	7.691***
YR, INR Dummies	Not Reported		Not Reported		Not Reported	
Adjusted R^2	0.199		0.200		0.200	

Variable definition: CI = Cost of Debt Capital (Total financial cost/average interest bearing debt) * 100(1-tax rate), IR = If Investor Relations hosting firm is 1, and 0 otherwise, IRN = Investor Relations hosting frequency, DUM^{SIZE} = 1 when SIZE is upper 50%, and 0 otherwise, DUM^{FOR} = 1 when FOR is upper 50%, and 0 otherwise, ROA = Net Income / Total Assets, LEV = Total Liabilities / Total Assets, SIZE = Log of Total Assets, FOR = the ratios of foreigners' ownership, M/B = market value to book-value ratio, AUD = If BIG4 Audit Corporation is 1, and 0 otherwise, NEGE = 1 when net Income is negative, and 0 otherwise, IND_k = 1 when the data belong to industry k, and 0 otherwise, YR_k = 1 when the data belong to year k, and 0 otherwise (k=2007, 2008, 2009, 2010, 2011).

Superscript *, **, *** denote statistical significance at the 0.10, 0.05, 0.01 levels(two-tailed), respectively.

V. CONCLUSION

This study analyzed the relation between corporate IR and cost of debt, from 2007 to 2011, stock-listed firms with account settlement in December.

Main findings of this research are as follows: First, the average (medium) cost of debt was 5.430 (4.803) and the minimum value was 0.014 whereas the maximum value was 39.331, showing a large standard deviation of 3.305. This research's main explanatory variable is IR hosting Y/N and its average was 0.232 or 23.2% of the entire firms in South Korea were hosting IR. IR hosting frequency was 0.950 on average and the average of IR-hosting firms was 4.09 times. Second, we divided firms into upper 50% with higher cost of debt and lower 50% with lower cost of debt for difference analysis and found that firms with higher cost of debt had significantly lower values of both IR hosting Y/N and its frequency. Also firm sizes and foreign ownership were also high in companies with lower cost of debt. Third, we analyzed the correlation between variables utilized herein for hypothesis test and found that the cost of debt showed a significant negative correlation with IR hosting Y/N and frequency, indicating that IR-hosting firms' cost of debt was lower than that of non-IR-hosting firms. Also firm size and foreign ownership showed a genitive correlation with the cost of debt, signaling that larger firms having a high foreign ownership ratio faces smaller cost of debt. Forth, we examined the effects

IR on the cost of debt and discovered an insignificant positive correlation of IR hosting Y/N with the cost of debt, rejecting the hypothesis 1. This implies that the effects of IR are not constant in all firms altogether but different according to company-specific features. To test the hypothesis 2, we added a variable made based on the interaction between IR hosting Y/N and firm size dummy variables for further analysis. As a result, a significant negative correlation was found with the cost of debt. IR organized by large-sized firms could reduce the cost of debt in support of the hypothesis 2. Also to test the hypothesis 3, we added a variable based on the interaction between IR hosting Y/N and foreign ownership dummy variables and found a significant negative correlation with the cost of debt. This means firms with a high foreign ownership ratio can decrease the cost of debt by organizing IR in support of the hypothesis 3. Finally, to check the robustness of the hypothesis herein, we examined the effects of IR frequency on the cost of debt and found that the IR frequency effects were not constant in every company's cost of debt at the same level but different depending upon firm size and foreign ownership ratio.

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ENDNOTE

1 Concerning IR hosting frequency, the maximum value was 26 and 33.9% or 215 of the 635 IR-holding firms were hosting once. 119 were holding IR twice and 37 were three times.

2 Concerning the relation between corporate IR frequency and cost of debt, non-IR-hosting firms showed the average cost of debt of 5.90 whereas IR-hosting firms gave an average 6.23 if they held it once and 5.37 if they held twice. It means that the more the IR is hosted the more the cost of debt decreases.

Frequency	cost of debt	6	4.5096957	13	4.6494458	21	2.5963300
0	5.8981727	7	4.6821924	14	4.3834186	22	4.0800400
1	6.2261465	8	4.6760345	15	4.3588138	23	6.0251650
2	5.3696635	9	6.9962500	16	4.3745240	24	3.8703300
3	4.7845751	10	4.6039088	17	4.6762025	26	4.0316600

4	4.6176861	11	4.0638920	19	4.5770700		
5	6.2400117	12	4.5137885	20	6.9365050		

DECISION MAKING UNDER UNCERTAINTY THE IMPACTS OF EMOTIONAL INTELLIGENCE AND BEHAVIORAL PATTERNS

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ABSTRACT

This paper provides a review of factors influencing and enhancing the decision making process in financial assets. Market participants may strive at reducing the degree of volatility in their wealth as well as reaching a satisfactory return on investment. Given the state of uncertainty prevailing in the financial markets investors may aim for obtaining adequate reward, avoid losses and minimizing regret from their actions. This appears to be as a result of reflexive responses, feelings and emotions as well as reflective processes. In particular, understanding, managing and regulating emotions appear to help in the decision making process. That is, the findings in the modern portfolio theory, psychology of investing as well as discoveries in neuroscience can collectively help in improving the decision making process.

INTRODUCTION

Since the early 2000s an exciting school of thought has emerged in exploring the role of emotional intelligence in the investment management process as a result of the interaction between neuroscience and financial economics. Emotions are unconsciously experienced as outcomes are guessed or imagined by an investment manager when faced with information disadvantage or partial ignorance in a highly dynamic and competitive investment environment. It is shown that indicators and ranking criteria for evaluating the degrees of emotional intelligence (for example, Mayor, Salovey and Caruso, 2002), generally reveal that investors with the ability to analyze and evaluate their emotional states as well as regulating and managing their emotional intelligence tend to make better decisions and appear to learn much from their mistakes especially when faced with an uncertain environment in which exact calculations are not possible (Ameriks, Wranik and Salovey, 2009).

This is further reinforced in findings by Coricelli, Critchley, Joffily, O'Doherty and Sirigu (2005) who show a strong relationship between emotions and signals encoded in the brain in that emotions such as regret or excitement appear to be tied to reward prediction errors that are processed in the regions of the brain similar to a mathematical risk prediction error function. Blackman (2014) states that "great strategies seem to draw on emotional and intuitive parts of the brain…" shown by neuroimaging. And that "A good strategic thinker would pay attention to emotion and social thinking, social temperature… and neuro-feedback for training the brain in learning endeavors." Loewenstein (2000) stresses that emotions were included as a part of utility analysis in 1789 by Jeremy Bentham in the decision making process. Maximization of the utility of the final wealth, for example, has been the prevalent rule in investment decisions since the1950s with the development of the mean-variance analysis leading to the capital asset pricing model in portfolio theory.

Modern theories of finance are however based on the notion of rational behavior in the decision making process and on restrictive assumptions including the existence of complete information regarding the payoff structure of financial assets. This implies that the average return and the likely fluctuations around it are known in advance. Furthermore, investors are assumed to be risk averse and thus would be willing to invest as long as the average payoff is expected to exceed the cost of the asset. An investor who is risk averse is expected to take a risky venture when the rise in wealth is expected to be greater than the fall in wealth. While the pleasure of gaining a dollar, on average, is less than the suffering from losing a dollar, investments are made as long as there is a net premium or reward for taking the risk involved.

Investors however may possess a loss aversion behavior and aim for avoiding the decline in wealth. Empirical evidence during the past three decades shows that investors appear to sell financial assets that have risen in price too quickly while keeping the loss producing ones for a long time. That is, investors react differently to gains and losses as they feel positive emotion from a gain in price but a much stronger negative emotion from an equal amount of loss. This behavioral financial pattern is, in part, due to cognitive heuristics and biases. In the mind of an investor a dollar gained in the retirement account does not cancel a dollar lost in the personal account. Furthermore, investors view a dollar received in dividend income differently from a dollar gained in capital gain even in the absence of differential taxes and transactions costs as they appear to consume the dividend while saving the capital gain. The feeling is that earning the capital gain had required more effort—taking more risk—as compared with the receiving the predictable stream of dividend income (Kahneman and Tversky, 1979; Thaler, 2000 and Statman, 2010). This view is different from those in the neoclassical finance as for example in Modigliani and Miller’s (1958) irrelevance of the dividend policy of the firm as the dividend income and the capital gains are assumed to have the same value for the investor in the absence of differential taxes and transactions costs.

The notion of loss aversion, among other factors, brought about the development of behavioral finance in the 1980s by explaining the role of psychology and social psychology in the investment management process. Wood (2010) notes that the reaction of investors in the market is a combination of psychology, social psychology and the functioning of the brain in their decision making process. It is further likely that people may not process the available information in a comprehensive way. Instead, they reduce and simplify the existing information by using psychological shortcuts and rules of thumb (Dreman,1995).

Ameriks, Wranik and Salovey (2009) examine the role of emotions in the investment decision making process. They study the degree to which investors identify, understand, interpret and effectively use their emotions. Emotional intelligence will add value in decisions with uncertain outcome. The authors measured the degree of emotional intelligence for investors in a retirement account and found that those with a higher level of emotional intelligence appear to manage a reasonable degree of allocation to equity or common stock and were thereby able to manage the portfolio risk. Such investors did not pursue a highly active trading strategy and were more conservative. In effect they utilized both reflexive as well as reflective planning in managing their investment portfolios. Furthermore, highly anxious and emotionally charged investors were less likely to make extreme asset allocation and tend to seek more information.

Mayew and Venkatachalam (2012) note and review that emotions conveyed by voice and its valence can transmit useful information to investors in the market. They study the conference calls data maintained by Thomas Reuters StreetEvents database for evaluating the positive and negative signals emitted by the tone of voice and its relationship with the firm’s future earnings report as well as its stock performance. They find that investors perceive both positive and negative information conveyed by the tone of the voice, but security analysts appear to account for only the positive one. In this manner, Mayew and Venkatachalam show that emotions reflected in voice provide a signal regarding the thinking processes by the respondents which can help in revealing possible private information. This is in line with Frijda (1988) who explains that emotions are the results of the evaluation of important events which are influencing the individual's concerns that are in part tied to the individual's line of thinking. Frijda (1993) further notes that "Emotion refers to a feeling that occurs in response to events, while affect is viewed as a valence of an emotional state."

Sapra and Zak (2010) note that when individuals are faced with risk, their reflexive part of the brain will influence a fast response for immediate safety in the short run at the same time that they will be using their reflective part of the brain looking for signals in a Bayesian revision process in the longer span of time with a delayed response. This will cause sharp changes in asset prices in the short run away from the equilibrium level.

EMOTIONS AND INFORMATION THEORY

The notion of uncertainty in financial economics is often viewed as risk and measured as variance, standard deviation or covariance. Variance or standard deviations are indications of movements around an average value in the past. Covariance denotes the degree to which two assets are performing in relation to each other. That is, the manner in which their performance may converge over time. The variance-covariance analysis is further extended into beta which allows performance of an asset in relation to the market portfolio. Some problems associated with these notions of risk include the reliance of past data, the assumption of a normally distributed return and the extension of past observation into the future. Alternatively, one may use a forecast of such a probability distribution. However, as Sargent (2014) notes we do not know how an individual or the market may arrive at such a probability distribution and the states of nature. In addition the assumption that all market participants may think in the same manner is questionable.

Uncertainty however relates to cases of error in estimate, the inability to predict the outcome, the presence of noise in the market, or a case of novelty in which no prior information is available. In addition, there may be a dispersion of beliefs among the participants in the market as in Hirshleifer (1973). The role of lack of information or the state of ignorance in construction of a probability distribution in asset prices is studied by Sargent (2014) noting that numerous models are built on the basis of the likely future outcome and their associated probabilities. This assumed probability distribution however appears to be based on the convergence of opinions of market participants all of whom might have some degree of ignorance regarding the market. Further that such a rule of large numbers and the notion of complete market fail in the face of occurrence of some infrequent trades with large impacts and incomplete information.

While Bayesian revision estimates may be used in the decision making processes, Sargent notes the Ellsberg Paradox in which decision makers did not appear to apply it due to an ambiguity or uncertainty regarding the initial probability distribution. In such a case, Sargent notes that the decision maker would likely pursue the mini-max regret as we tend to maximize our welfare in the face of perception that the market may be minimizing our gain. In line with this, ambiguity is measured by entropy as a measure of divergence between the expected and observed distributions (Hansen and Sargent, 2008). In Addition, Hansen and Sargent (2010) further note that changes in the degree of ambiguity and incomplete information tend to lead to market fragility in which decision makers would pursue the mini-max regret behavior in dealing with uncertainty. Such a behavior could potentially cause large swings in the market especially on the down side. This model of investor behavior is noted to appear to be in line with Black and Littlerman (1992) stating doubts in the mind of decision makers regarding the estimated average returns while showing agreement on the estimated covariance.

In this line of thinking, Shackle (1972) reviews the notion of uncertainty resulting from economic decisions and explains the nature of the feelings that result from the outcome. In each decision one is limited to a single action. In some circumstances the decision maker might have taken such actions before, for example, trading a type of bond or common stock. However the rules underlying such decisions are based on past information, the likely reactions of others in the market, the evolving nature of information disseminated to the market as well as the change in the nature of the market. Shackle compares the observed results of an action with the expected or anticipated outcome. The occurrence of an event which was expected should cause no surprise to the decision maker. The divergence of the outcome and what was expected causes a surprise. That is, Shackle defines surprise as a notion of uncertainty as one's state of feelings regarding the degree of divergence between the observed result and the expected outcome. The greatest surprise is associated with the occurrence of an event which was not expected. Uncertainty is thus measured as the degrees of surprise in line with an entropic design in the context of information theory.

In doing so, an individual may not necessarily pursue the pure optimization process and instead would take into account the resulting emotions from any decision. In effect investors would be pursuing a satisfying approach to decision making as in Simon (1955). While the cognitive aspects and magnitude of risk may remain unchanged, emotional notions and degrees of risk vary and may intensify rapidly. Loewenstein indicates that the intensity of emotions resulting from an event leads to a change in the degree of risk aversion. In line with this behavioral pattern, in order to see how winners, for example, tend to make more bets and losers would stay away from taking more risk one can consider the asymmetric interdependence of actions and outcomes as shown by Perez and Tondel (1965) in which the dependence of x on y may differ from the dependence of y on x as the interdependence may be path dependent. If informational dependence of x on y is denoted as $I\ \left(\frac{x}{y}\right)$, information contained in an action or event x is denoted as I (x) and the information contained in an action or event y is denoted as I (y) and the joint information contained in both x and y is denoted as JI (x, y) then informational dependence of x on y is denoted $I\ (\frac{x}{y}) = \frac{\text{JI(x,y)}}{\text{H (x)}}$ and informational dependence of y on x is denoted as $I(\frac{y}{x}) = \frac{\text{JI(x,y)}}{H(y)}$ where the numerical values of $I\ \left(\frac{x}{y}\right)$ or $I\left(\frac{y}{x}\right)$ are in between zero and one.

This entropic view of correlation shows the amount of information that may be needed to make a decision based on an observation and thereby the state of ignorance or uncertainty in the system. At the same time, it shows how each outcome can influence the decision maker in later actions. Information denotes an increase in knowledge while entropy refers to the amount of information that is needed to remove the uncertainty in the decision making process as a measure of divergence or discrepancy between $I\left(\frac{x}{y}\right)$ and $I\left(\frac{y}{x}\right)$. One may consider an action (x) to be reflexive in nature while as for action (y) due to the reflective decision making processes.

EMOTIONS AND INVESTMENT DECISIONS

Emotional intelligence complements the theories formed in behavioral finance. Ackert, Bryan and Deaves (2003) show the role of emotional responses in enhancing decision making without contaminating judgment. Emotional intelligence in effect provides guidance for optimal decisions under uncertainty (Schwarz, 1990). In an interview-structured research design, Tuckett and Taffler (2012) analyzed statements of professional investment managers and found it to be a case of decision making with incomplete information in both the amount and quality of the available knowledge in regards to the state of the financial markets.

Tuckett and Taffler (2012) study the role of emotions and feelings in investment portfolio management and trading processes when decisions are made in a rapidly changing environment and in which every decision must be highly convincing. They strive at appraising the role of cognitive as well as emotions in the decision making process. While investors are speculated to act on the basis of fear, greed and hope, Tuckett and Taffler perceive the process to be the case of excitement, anxiety and denial. They note that this may be due to “cognitive biases” and “affect heuristic” as the outcome of decisions cannot be known in the presence of ambiguity in the market.

Emotions, intuition, and gut feeling appears to be an integral part of thinking and decision making and tend to raise the capacity and in the speed of actions by combining the reflective and reflexive parts of the brain. In a market characterized by conflicting signals money managers may form an opinion based on the likely actions of others by increasing the state of knowledge and gaining information advantage by the merits of signals transmitted by business enterprises. In this process Tuckett and Taffler believe that money managers form an emotional relationship with their investments tantamount to love and hate depending on the outcome.

Tuckett and Taffler further indicate that this ambivalent relationship causes feelings of pleasure and anxiety at the same time. Money managers may avoid or repress the negative thought or their state of ignorance and make actions with no doubt. This may be strengthened by group thinking. That is a divided state of mind may be formed which is a case of excitement and anxiety as a pervasive neurophysiological emotional state which is unconscious with powerful impact on investment decisions. On the contrary an integrated state of mind may prevail among the money managers in which uncertainty is recognized and the occurrence of possible outcomes are explained which appears to be in line with Shackle (1972) and Simon (1955).

Decisions based on feeling could be either more risk averse or less risk averse depending on personality characteristics. Past negative experiences in the market often cause fear of losing thereby making trading decisions in a highly cautious manner. On the contrary, an investor may have a hope to benefiting from a constantly developing investment opportunities and thereby making fast and frequent trading decisions. Fenton-O’Creery, Soane, Nicholson and William (2011) find that traders who control and regulate their emotional responses have a better performance. As an indicator of superior performance the authors used the subsequent rise in pay in major investment banks. The traders noted that their own emotions appear to be a useful source of information regarding the likely state of the market.

Hirshleifer (2001) notes that misevaluation and risk are tied to expected return on assets. While an investor’s mind uses heuristics and rules of thumb that are similar among the participants causing systematic biases as in Kahneman and Tversky, investors are subject to emotions that can influence cognitive processes. Investors are further influenced by regret aversion when making decisions. Simon (1955) explains a bounded rational behavior leading to a satisfying goal in the decision making process due to limited time and cognitive power when faced with a complex environment.

Tuckett and Taffler (2012) note that the notion of risk to money managers is asymmetric as losses from their actions have negative consequences while outperforming the market does not appear to be rewarded. Thereby, they tend to stay close to their perception of the average market asset allocation. Meanwhile, the risk of shortfall and the pressure to outperform the market causes anxiety and fear. Faced with this emotional conflict, money managers strive at finding a connection between the observed information, its implications and probable outcome in order to reduce uncertainty enabling them to make a decision. The lack of complete information, or when faced with partial ignorance, combined with the varying degrees of interpretation of financial events were found to lead to a state of anxiety among these investors. Tuckett and Taffler found that their selected professional investors viewed each decision in an isolated environment in which the outcomes were guessed or imagined but not known which stimulated emotions.

Zweig (2010) states that emotion may override cognitive and analytical reasons in the decision making process and is contagious in the market. Emotional reactions of losing money for example is based on the function of amygdala in the brain as the risk perceived by the reflexive part of the brain, which will lead to a fast response in deciding to sell. As many people appear to share the same information, the intensity of selling will rise and lead to a sharp decline in price. Ricciardi (2010) notes ambiguity as an important source of risk which includes cognitive as well as emotional dimensions. In particular MacGregor, Slovic, Berry and Evensky (1999) estimate that worry, volatility and knowledge explain 98 percent of perceived risk.

CONCLUSION

The capital markets may be viewed as a noisy channel transmitting large amount of data in a sporadic manner and often contradictory to investors expectations. Various techniques are used to recognize probable patterns and information for enhancing the quality of the investment decisions. Yet the ambiguous nature of the markets creates an uncertain environment causing anxiety and fear when faced with negative outcomes. In the presence of anxiety and the lack of ability to make a sound judgment, an investor may perhaps follow a path of minimizing regret, as opposed to maximizing gain. In effect, decisions may be based on maintaining a desired level of satisfaction as a result of the interactions between the emotional and reflective responses. In this paper the various views regarding the notion of uncertainty are explained and noted that the investment environment is highly observed and thereby it is imperative for the investor to perceive, identify, understand, use and manage their emotions to maintain an acceptable level of performance.

Measures of risk such as variance, covariance, entropy and informational dependencies of events in the market are useful tools and a guide to action. In addition, the market participants are noted to be further influenced by their reflexive and emotional responses as an additional source of information in the decision making process. That is, a psychologically attuned and emotionally intelligent investor should be able to add value, perhaps by balancing the reflexive and reflective forces. It is noted that knowledge gained from the findings in behavioral science and neuroscience help in increasing our knowledge regarding the decision making process in the capital markets. This, in part, helps in reducing the emotional conflicts caused by errors in judgment.

While investors may pursue a risk averse or loss averse behavior, they may further aim for minimizing the maximum regret not just for the present but for the probable later state of their feelings. This may result in quick responses to events in the market causing much short term fluctuations in asset prices while their reflective judgment as a group would tend to bring such market conditions to an equilibrium level. Emotional intelligence appears to help investment managers and traders in the capital markets to form an opinion regarding the likely actions of others and thereby reducing the degree of ambiguity in the market.

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ESTIMATING RISK IN BANKS: WHAT CAN ACADEMIC RESEARCH TELL US?

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ABSTRACT

It is generally agreed that like other types of insurance, deposit insurance premiums should be proportional to risk. A failure to do so can introduce economic inefficiencies in the sense that low risk-takers would, in effect, be subsidizing high risk-takers. Deposit insurance that is not responsive to risk-taking also introduces moral hazard in the sense that managers might take on excessive risk knowing that deposit insurance provides protection, but does not discipline the manager through higher insurance premiums. The decision to operate deposit insurance with premiums that are responsive to risk carries with it a need to determine risk levels across insured institutions. This article summarizes the academic research on measures of risk in banking with a focus on the areas that would be of primary interest to bank deposit insurers, regulators and supervisors.

INTRODUCTION

Deposit insurance has been implemented in numerous countries, as it is commonly believed to prevent bank runs and thereby stabilize the financial system. As long ago as the 1980s it has been recognized that charging a flat rate to banks for deposit insurance, often as a percentage of deposits, has two major drawbacks. First it encourages bank risk-taking to maximize profits and second it means that lower-risk banks are subsidizing higher-risk banks (Bloecher et al, 2003). The question of how best to set the price of bank deposit insurance has become of increasing importance since the onset of the global financial crisis as the potential huge costs of bank bailouts have become apparent. It is generally agreed therefore that like other types of insurance, deposit insurance premiums should be proportional to risk. This article summarizes the academic research on measures of risk in banking with a focus on the areas that would be of primary interest to bank deposit insurers, regulators and supervisors. It is therefore not a comprehensive summary of all available research.

In attempting to quantify differential risk across financial institutions, one is attempting to find differentiation in a phenomenon that is very similar across banks and also very small. In addition, bank risk is not directly observable as is the case with measuring a distance or a weight and is not necessarily particularly well defined: there are many possible future outcomes including eventualities that are not necessarily even imagined today, and it is difficult to pin down the probabilities of those outcomes.

Rather, bank risk is a construct: an idea containing various conceptual elements not based on empirical evidence. Since bank risk is not directly observable there is no empirical evidence for bank risk directly. Instead there is empirical evidence of the proxies that stand in for the not-directly-measurable 'bank risk'. Since these proxies inform us about bank risk only approximately: a) it is difficult to pin down an exact absolute level risk; and, b) it is difficult to correctly rank order the banks by level of risk.

There may be additional complications depending on how well or poorly defined risk is. This is often discussed in terms of the difference between risk and uncertainty (Knight, 1921). Imagine that through clever use of proxies one is able to develop a pretty good understanding of things like expected default frequency, the probability of default given a particular fact situation, or the statistical properties of things like the size and arrival pattern of shocks that are likely to destabilize a bank. In such a circumstance, one is dealing with risk – essentially, there is plenty of information available for decision-making. In situations where such things are not reasonably quantifiable one is dealing with uncertainty and the analytic tools available in the context of risk are not fully available.

While the question of how to estimate risk in banks is therefore not a straightforward one, this article is intended to assist deposit insurers to use what is in the academic literature to guide them in premium setting. Getting premiums 'right' is important both for the deposit insurer to ensure the fund and the insurance scheme functions properly, but also for the financial system so that they don't introduce perverse incentives of some kind through imperfections in pricing. It is important to preserve the link between the fee setting process and the risk behaviour of members because doing otherwise can distort competitiveness. Imposing higher premiums when there is no incremental risk – in other words, where premiums become disconnected from risk – penalizes the affected bank and would typically impede that bank's ability to compete.

THEORETICAL UNDERPINNINGS OF THE FEE SETTING PROCESS

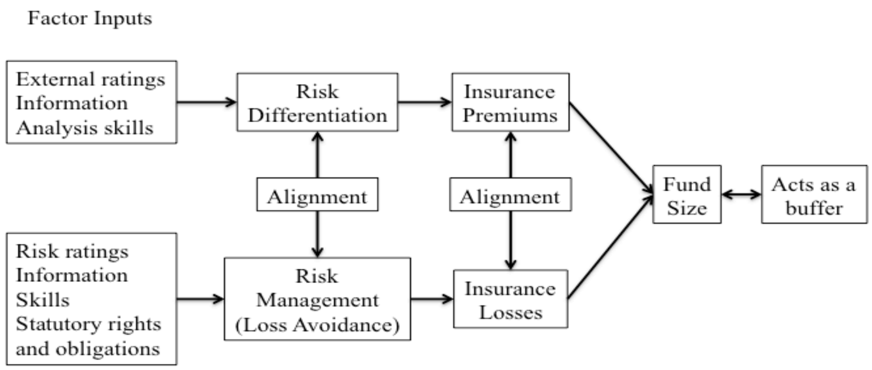
The Link Between Premiums Charged and Expected Losses

One approach to financial management of an insurer is to charge for risk in a way that covers losses over time. In addition to the obvious benefit of helping the insurance scheme achieve self-funding status, it also addresses the moral hazard that arises if the price of the insurance is insensitive to the risk taking behaviour adopted by the insured parties.

In this kind of paradigm the way in which one measures risk, manages risk and charges for risk are interlinked. A key measure in such a case is the potential contribution of risk to future losses. Also key is the risk management approach of the deposit insurer or supervisor. For example, if the premium for a particular risk level is to be small, then the risk managers have to organize themselves to manage risk and intervene in such a way as to keep insurance losses related to that risk commensurately small. The following graphic attempts to depict the idea.

Figure 1

Deposit Insurance System View



An implication of thinking in this way is that risk factors that are interesting for one reason or another, but not linked to insurance losses, are relatively less important in a system that assesses risk for the purpose of setting fees. A good example here is liquidity risk. Table 1 suggests that there may be a link between liquidity and potential insurance losses, but there is not necessarily always a link. In Table 1, an up arrow indicates an elevated level and a down arrow indicates a depressed level. A horizontal arrow indicates a middling level – neither elevated nor depressed. Problem areas are italicized. The implication of this is that while liquidity itself, and liquidity measures might be important for many reasons, they are not necessarily closely linked to expected losses, and are therefore not necessarily linked to a rational premium-setting process.

Table 1
Scenario Analysis
With Suggested Effects

	Strong Competitive Advantage		Weak Competitive Advantage	
	Good Asset Coverage	Bad Asset Coverage	Good Asset Coverage	Bad Asset Coverage
Good Liquidity Coverage	LGD ⇓ EDF ⇓	*lgd* ⇑ EDF ⇓	LGD ⇒ EDF ⇒	*lgd* ⇑ EDF ⇒
Bad Liquidity Coverage	LGD ⇓ *edf* ⇑	*lgd* ⇑ *edf* ⇑	LGD ⇒ *edf* ⇑	*lgd* ⇑ *edf* ⇑

This being said, liquidity problems can be an indicator of deeper underlying problems such that a risk-based differential premium system might benefit by including a measure of this risk factor such as a Liquidity Coverage Ratio ("LCR").

COGNITIVE DISSONANCE IN PREMIUM SETTING

It is possible in considering the matter of risk and premium levels that, despite sensible analysis, the premium simply seems too small, which may lead to the pursuit of risk indicators that result in a premium level that has more face validity. There are some reasons why an analytically determined premium level may lack face validity:

Human beings are notoriously bad heuristic statisticians. For example, it is difficult at a heuristic level to accept that one can estimate the general attitude of a multimillion person population quite accurately by a sample of only a few thousand people. Similarly, it is difficult to accept the analytic result that the insurance premium for organizations as large and subjectively risky as banks can be so small;

The context within which risk is to be measured and premiums are to be set is qualitatively more similar to uncertainty than risk – that is, although there are quantitative attempts to deal with risk, it is difficulty to avoid an underlying concern that there are issues beyond those that can be captured in the quantitative analysis – in other words, 'uncertainty'; and,

There is a misalignment between how expected losses are viewed in the premium calculation on the one hand, and the heuristic view of the losses that the insurer is likely to face in a resolution on the other hand. Target funds are often determined based on EDFs and estimated Loss Given Default ("LGD") on an individual bank basis.

Cognitive dissonance concerning the premium levels can occur if the LGD estimate imagines the unfolding of a resolution – who gets protected, how they get protected, and to what extent – in one way and an observer of the premium scheme imagines it unfolding in a different way.

MARKET-BASED RISK INDICATORS

Market-based measures either based on stock market prices or interest rates are theoretically appealing as they are more forward-looking than historical accounting measures. One such method that has been applied to the pricing of deposit insurance draws on the Black-Scholes model of option pricing. Under this structural approach deposit insurance is modeled as a put option written on the bank's assets by the deposit insurer and held by bank shareholders. Bankruptcy is assumed to occur when the market value of the bank's assets declines below that of its liabilities (Merton, 1977). Moodys-KMV has developed a commercial product that uses a similar approach to this to predict probabilities of default. While theoretically interesting this method is only feasible for publicly traded banks. Since deposit insurance premiums must also be set for privately held institutions this is a significant drawback.

An alternative methodology, often known as the reduced form approach, treats default as a stopping point whose distribution depends on covariates such as leverage, economic conditions and credit rating (Duffie et al, 2003). Once again, though, estimates of market-based credit spreads are needed which makes this method difficult to apply to banks without observable credit spreads.

Another market-based risk measure that has been used frequently is equity market volatility which measures total risk and can easily be subdivided into systematic and idiosyncratic components (Stiroh, 2006). Laeven & Levine (2008) used the volatility of equity returns to measure risk in their study of the relationship of risk-taking by banks to their ownership structure and national bank regulations. Brewer (1998) used a similar measure to show that diversification into non-banking activities was negatively correlated with risk for bank holding companies. Demsetz (1997) relied on the annualized standard deviation of the weekly stock return to measure risk and found that higher franchise value is correlated with lower levels of risk taking. Further, when franchise value is low ownership structure was related to risk but if it was high there was no link. Imai (2007) used a different market-based risk measure in the form of the interest rate spread on subordinated debt to examine the correlation of risk with four key accounting ratios measuring asset quality, liquidity, earnings and capital. He found correlation did exist but it was not strung. Further details on market-based measures and how they have been used to measure risk are summarized in Appendix 1.

In addition to the fact that the market-based data needed for all of these methods is only available for certain banks, they also are somewhat complex for the user to understand. Bloecher et al's (2003) criteria for an ideal deposit insurance pricing system include five factors: accuracy, simplicity, flexibility, appropriate incentives, and fairness; these market-based measures fail to meet the criteria of simplicity. Accounting-based measures of risk might better meet these criteria and have also regularly been investigated by academic researchers. While admittedly having drawbacks of their own, they have the advantages of greater simplicity and availability for all banks. In the following sections we discuss the main types of these measures that have been used in research on bank risk.

RISK INDEX

A commonly used accounting-based risk measure is what is known as the risk index. It is calculated as:

$$Risk\ Index = \frac{\left(\left(\frac{\Pi}{A}\right)+\left(\frac{K}{A}\right)\right)}{\sigma\Pi/_{A}} \qquad (1)$$

In (1) Π is net income, A is total assets and K is total regulatory capital held by the bank. Returns are measured relative to total assets rather than relative to equity to eliminate the impact of leverage, which for banks can be very substantial. Further, they are a direct measure of management's ability to generate returns on a portfolio of assets (Rivard & Thomas, 1997). The asset measure typically includes both on and off-balance sheet assets.

The higher the risk index, the greater is the equity capital and average level of returns available to cushion against a loss relative to volatility of returns. This means the probability of failure is lower. The risk index has the advantage of combining, in a single measure, profitability, leverage and return volatility. It increases when profitability and the capital held by the bank relative to assets go up and decreases when profit volatility increases.

Hannan & Hanweck (1988) explained their derivation of the risk index by pointing out that insolvency for banks occurs when current losses exhaust capital or, equivalently, when the return on assets is less than the negative capital-asset ratio. They go on to show that the probability of insolvency is:

$$p \leq \left(1/_{2}\right)\frac{\sigma^2}{\left(E\left[\frac{\Pi}{2}\right]+\frac{K}{A}\right)^2} \qquad (2)$$

The ½ in this inequality accounts for the fact that failure occurs only in one tail of the distribution. If profits follow a normal distribution then the risk index is the inverse of the probability of insolvency. It measures the number of standard deviations that a bank's return on assets has to drop before equity is wiped out (Beck & Laeven, 2006). Because of this relationship, the risk index has sometimes been referred to as the probability of failure (see, for example, Kwan & Laderman, 1999).

Even if returns on assets are not normally distributed, the risk index is still useful for relative comparisons (Boyd & Gertler, 1994). It likely underestimates the true probability of bankruptcy since, by definition, it assumes failure only if one-period losses exceed a bank's total capital. Realistically though, banks experiencing losses of a much smaller scale could experience liquidity problems, creditor runs and regulatory interventions (Boyd & Graham, 1986).

While the risk index has its advantages shortcomings must also be noted. First, it measures risk in a single period of time and therefore does not take into account that higher levels of risk resulting from a sequence of losses over more than one period. It also relies on the accuracy of accounting data, which may not be a well-founded assumption since the literature indicates that banks tend to smooth earnings (Beck & Laeven, 2006). Notwithstanding these concerns, the risk index still can be a useful measure of relative risk between groups of banks at a point in time as is required in the setting of deposit insurance premiums.

The risk index has been widely and regularly used as a proxy for risk in the financial and non-financial literature since Roy (1952). It has commonly been referred to as the distance-to-default and the z-score, but differs from Altman's (1968) z-score which is a predictor of corporate financial distress based on accounting ratios. Studies utilizing the risk index include: Boyd & Graham (1986) who looked at the relationship between risk and the degree of involvement in non-bank activities; Hannan & Hanweck (1988) who investigated whether there was, as they expected, a positive relationship between bank risk-taking and the spreads over the default free rate and Kimball (1997) who compared banks specializing in small business micro-loans with a mixed peer group matched by size and location and found that the focused group was riskier than the diversified group. Modified versions of the risk index have also been tried. Ianotta et al (2007) for example calculated the index using the stock market value of equity rather than accounting book value in the numerator and Wall (1987) used return on equity rather than return on assets in his research. Further examples of the use of the risk index in the academic research are summarized in Appendix 2.

OTHER RISK MEASURES

Standard Deviations of Return on Equity and Assets

Various other accounting-based measures have also been used as a proxy for risk as described in Appendix 3. Standard deviations of returns measured relative either to equity or assets have also been commonly used as a proxy measure of risk in academic research. Liang (1989) used the standard deviation of net income relative to assets to study the effects of market concentration on firm profits and found that the effects of market concentration on firm profits become larger when risk is controlled for and that market concentration for banks and firm risk are positively related. She attributed this to local market uncertainty leading to higher concentration and risk levels. De Young et al (2004) measured risk through the excess of the return on equity over the risk-free rate divided by the standard deviation of the return on equity and found that medium-sized community banks exhibited higher levels of risk than their larger counterparts. Berger & Mester (2003) used the standard deviations of returns on gross total assets to show that bank risk decreased during the 1986 to 1997 time period while returns increased substantially. Similarly, earnings volatility relative to both total assets and common equity was employed by Nicholas et al (2005) to examine the risk of publicly-traded versus privately-held banks Contrary to their thesis, they did not find that the two types of banks differed in terms of their risk measures. They did however find that public ones had lower capital ratios. De Young (2007) measured risk by standard deviations of returns on equity and found that small banks engaged in traditional bank lending with high levels of core deposits exhibited the lowest risk profile while large transaction-oriented banks had the highest. This latter group also engaged in substantial loan securitization and had a high degree of non-interest income.

While commonly-used and having the virtue of simplicity, it should be noted that the return on assets ratio is simply the denominator of the risk index and thus does not also include information on the banks' leverage and profitability in the way the risk index does. Therefore it may not be optimal for use in setting deposit insurance premiums.

Dimensions of Capability

One could estimate bank risk by examining the individual banks' capabilities along important dimensions and where differences in capabilities are identifiable, find a measurable phenomenon that acts as a proxy measurement for the capability (see Appendix 4). For example, lenders are supposed to be skilled at deal origination, deal screening and deal monitoring. A reasonable conceptual starting point, therefore, is that banks more skilled along these dimensions are more stable than banks that are less skilled. The idea is that:

> Weak deal origination capability leads a bank to acquire the relatively less attractive customers, or to find deals that are relatively less favorable than do the more capable banks;
> Weak deal screening leads to completion of relatively more deals on inappropriate terms so book value of the loan exceeds intrinsic value at the outset;
> Weak screening leads to relatively more loan degradation after booking so that as time goes by the shortfall of intrinsic value against book value widens on average.

An indicator of these skills would be the tendency for the value of booked loans to fall below initial booked value. This approach depends on the availability of data on such matters, which is sparse given that accounting standards are still relatively tightly tied to transacted values rather than intrinsic value. While this is so at the moment, this may not always be the case – see the Milburn article on so-called market-value accounting (Milburn, 2012). Also, many studies of bank risk use observable measurements that stand in for accounting for loans at intrinsic value such as provisioning, loan write-offs, and the levels of under-performing or non-performing loans. Acharya et al (2002) used doubtful and non-performing loans relative to assets and their standard deviations in their study of the relationship between loan diversification and risk-return trade-offs.

Capital

It is typically assumed that financing by way of equity capital contributes to financial stability by:

> Providing a buffer between the level of assets and liabilities – in theory, the greater the asset coverage the safer the holders of issued liabilities feel; and,
> Providing a buffer between the level of income collected and the level of fixed, committed payments that have to be made to the bank's financiers.

Theory also holds that capital strengthens bank's incentive to monitor its relationship borrowers and lessens the attractiveness of riskier assets (Berger & Bouwman, 2013). There is an open question about whether a bank that holds total capital comprised only of Tier 1 capital is more risky or less risky than a bank whose capital includes Tier 2 capital with fixed committed payments (e.g. subordinated debt, preferred shares). If these kinds of differences in the composition of capital signal differences in overall bank risk, then this is a possible risk-differentiating measure. One's view of this may depend on a number of factors, but one of them would be whether one regards the following three things, or combinations of them, as different or the same:

A common share dividend cut or suspension;
A preferred share dividend cut or suspension; or,
A failure to pay subordinated debt interest in full.

A possible influencer in the matter is the probable behaviour of the issuing bank: that is, would a bank in financial difficulty cut payments to all three financing tranches or would it cut them sequentially depending on its financial ability? In this vein, if earnings are down is there a different signal to the financial markets between:

For a bank with total capital that includes preferred shares and subordinated debt, suspending the common share dividend while continuing to pay the preferred share dividend and the subordinated debt interest; versus,
For a bank with total capital comprised only of common equity, reducing the common share dividend to bring it into line with its reduced earnings.

The academic literature on the direction of the relationship between risk and levels of capital is not unanimous though. Certain researchers (e.g. Flannery, 1989) have found a positive association as higher capital levels may induce banks to increase asset portfolio risk in search of profitability and thus also raise the probability of default. Overall though academic research shows 'the scales are tilted in favor of the prediction that capital has a salutary effect on the probability of survival' (Berger & Bouwman, 2013, p.147).

Asset Mix

It may be appropriate to differentiate among banks based on the mix of asset types in a bank. This approach recognizes that some assets, and their respective income streams are risker than others. It also recognizes that recovery rates, costs of recovery, and time to recovery likely differ by asset type leading to the possibility that some banks' assets may tend toward desirable mixes whereas for others the converse may be true. In addition, there may be differential ability to realize on assets held domestically relative to those held outside the home country of the bank in a resolution situation. Table 2 presents a stylized example of the relationship between asset mix and risk of loss. On the left hand side most assets are in the 'difficult to recover' category whereas the reverse holds on the right hand side. Analysis of differences across banks may be difficult to implement due to data limitations.

Table 2

Hypothetical Liquidation Comparison

	Bank A: Unfavorable asset mix			Bank B: Favorable asset mix		
		Recovery			Recovery	
Liquidation:		**Rates**	**Recoveries**		**Rates**	**Recoveries**
Difficult	40,000	75%	30,000	10,000	75%	7,500
Easy	10,000	90%	9,000	40,000	90%	36,000
Net Recoveries			39,000			43,500
Insured Deposits			40,000			40,000
		Shortfall	-1000		Surplus	3500

Bank Size

There is some suggestion that the size of a bank relative to local GDP is a useful risk differentiator – certainly some jurisdictions have ended up with banks that are very large in relation to their local economy, or more to the point, that have relatively small populations in relation to the size of the bank. In considering this issue it is important to differentiate between problems that arose exclusively due to the size of the bank, versus problems that arose because the bank had substantial obligations in a currency in other than the currency the local central bank controls.

CONCLUSIONS

In general any system of setting deposit insurance premiums would require multiple measures in order to capture the multiple sources of risk for banks. In practice this is reflected by the systems of certain existing deposit insurance systems such as those of the CDIC and the FDIC, however the risk measures used by these agencies differ from those typically employed in the academic literature such as the risk index.

APPENDIX 1

SUMMARY LITERATURE REVIEW OF MARKET-BASED RISK MEASURES

Author	Observed Effect	Explanatory Variables	Finding
Brewer (1989)	Volatility of bank holding company stock market returns.	Diversification into non-banking activities.	Showed that diversification into non-banking activities was negatively correlated with risk for bank holding companies.
Gallo et al (1996)	A two factor model including market risk and financial services industry risk variables was used to estimate systemic risk.	Diversification into mutual fund activities.	Diversification into mutual fund activities was linked to a decline in systemic risk after the mid-point of the 1987 to 1994 period. The sample of 47 bank holding companies was divided into three categories: money centre, super-regional and regional banks, with all three demonstrating the same shift but with the money centre banks demonstrating it one year earlier. Unsystematic risk did not decline.
Demsetz et al (1997)	The annualized standard deviation of the weekly stock return.	The relationship between franchise value, ownership structure and risk. Franchise value is measured as the ratio of the sum of market value of equity plus book value of liabilities divided by the book value of tangible assets is	They found that higher franchise value is correlated with lower levels of risk taking. Further, when franchise value is low ownership structure was related to risk but if it was high there was no link.
Imai (2007)	The spread on subordinated debt	The relationship of risk to accounting ratios measuring asset quality, liquidity, earnings and capital.	He found risk was correlated, although not strongly, to the four key accounting ratios.
Schrand & Unal (1998)	Total firm risk was measured by stock return volatility while credit risk was measured by the accounting ratio of commercial loans to total loans.	Are stock institutions more risky than mutual associations?	They found that the stock companies engaged in higher levels of hedging to decrease interest rate risk but this was more than offset by higher credit risk. The authors found a link between higher credit risk and incentives such as stock options given to management after the demutualization.
Stiroh (2004)	Based on portfolio theory; empirically-based using accounting results as the measures of risk; market-based proxies for risk.	Relationship between diversification and risk.	Research seems to lean towards the view that there is a negative correlation between diversification and bank risk.

Author	Observed Effect	Explanatory Variables	Finding
DeYoung & Roland (2001)	The earliest research based on portfolio theory used industry-level data from the 1950's to the 1970's to compare the volatilities and correlations of earnings of banks with other financial industries such as securities firms, insurance companies, real estate brokers, leasing companies and thrift institutions.		Since the correlations were very low or sometimes even negative, diversification, defined as adding non-bank financial services to their existing banking business was assumed to lower risk.
Allen & Jagtiani (1999)	Standard deviation of monthly stock market returns.	Synthetic universal banks consisting of a bank, a securities firm and an insurance company to test the relationships with bank risk.	They found that the resultant entity had lower levels of overall risk but higher systematic risk when compared to undiversified banks. The securities firm exposed the merged entity to the additional risk while the insurance company had no significant effect. They pointed out that the higher systemic risk meant the diversified banks were more prone to a common economic shock which could impact the entire banking system.
Stiroh (2006)	Total risk was measured by the variance of the bank's stock returns and idiosyncratic risk was quantified by the variance of the residuals from a market model.	The impact of diversification into non-interest based banking segments such as fees, fiduciary services and trading.	He found that risk increased while average equity returns did not. This finding persisted even after controlling for bank size and equity ratios which the author felt in turn controlled for management skills, internal diversification and leverage. He concluded that the largest US banks may have become overexposed to activities that generate non-interest income possibly due to internal agency problems or managerial incentives to expand into newly allowed business segments.
Templeton & Severiens (1992)	Variance of shareholder returns; regression coefficient for the market factor in their two factor model; and, regression coefficient for the interest rate factor in their two factor model.	Diversification and its relationship with bank risk.	They found support for a link between diversification and lower risk levels although they noted that a small amount of diversification into non-bank activities provided most of the benefits with diminishing marginal benefits quickly becoming apparent. In order to answer the question as to the direction of causality or whether diversification leads to lower levels of risk or risk averse management choose to diversify the authors divided the sample into two halves, one with higher risk levels and one with lower. Regression equations were recalculated for both groups with only the higher risk group reaching significant levels indicating that diversification decreases risk.

Author	Observed Effect	Explanatory Variables	Finding
Eisenbeis et al (1984)	Abnormal stock market returns	Announcements by banks that they were adopting a legal structure known as a one bank holding company.	The authors found that those announcing the adoption of this structure generated excess returns in the few weeks surrounding the announcement date. They attributed this finding to investors favouring the diversification it allowed, presumably because it enhanced the banks' risk-return potential.
Bhargava & Fraser (1998)	Variance in total stock market returns for sixty days before and after the announcement date.	The impact of announcements that the Federal Reserve Bank would allow certain banks to diversify into investment banking.	Their data supported the hypothesis of increased risk following the announcement.

APPENDIX 2

SUMMARY LITERATURE REVIEW FOR THE RISK INDEX

Author	Observed Effect	Explanatory Variables	Finding
Roy (1952)	The risk index	Various	
Boyd & Graham (1986)	The risk index	The degree of involvement in non-bank activities; the amount of non-bank assets relative to total assets.	No statistically significant link
Hannan & Hanweck (1988)	The risk index and its component parts.	Spreads over the default free rate on uninsured deposits.	Return on assets and the asset to capital ratio have a negative relationship with deposit account spreads while variability in returns was positively related.
Eisenbeis & Kwast (1991)	The risk index; standard deviation of return on assets	Real estate (more than 40% of assets in real estate loans) concentration versus diversified	They found little difference in results between the two but found that real estate banks had higher returns with less risk.
Liang & Savage (1990)		Focused versus diversified	Risk is related to concentration. Kimball (1997) explained this apparent contradiction by pointing out that Eisenbeis and Kwast (1991) included low risk residential real estate categories that Liang and Savage (1990) did not.
Kimball (1997)	The risk index and other accounting measures	Specialization in small business micro-loans versus a diversified peer group	The focused group was riskier than the diversified group.
Sinkey & Nash (1993)	The risk index	Focus on credit cards (75% of assets in credit cards) versus diversified	Card banks were riskier but generated higher returns than their more diversified counterparts
Boyd et al (1993)	The risk index; the median standard deviation of return on equity	Whether simulated mergers resulted in riskier combined entities.	They found that mergers with life insurance and property and casualty companies were linked to lower risk but mergers with securities or real estate firms were related to higher levels of risk. Both the accounting and market based measures provided similar results giving credence to the use of accounting ratios as measures of risk.
Lown et al (2000)	The risk index; standard deviation of returns on equity	Simulated mergers of banks with life insurers	A similar study using the risk index but covering a later period 1984-98 found simulated mergers of banks with life insurers linked to lower risk levels while those with securities or property and casualty insurers showed slightly higher levels of risk.
Craig & Santos (1997)	The risk index	Risk of merged banks versus risk of the individual merger partners	The risk index of merged banks was higher than that of the individual merger partners prior to their amalgamation. They concluded that mergers therefore are on average related to lower levels of risk, possibly reflecting diversification benefits.

Author	Observed Effect	Explanatory Variables	Finding
Whalen (1998, 1999a, 1999b)	The risk index	Whether the existence of foreign subsidiaries engaged in the securities and insurances businesses was related to the risk of their domestic parents.	In the first of these he found that the overseas subsidiaries were riskier than their domestic bank parents but that a combination of the two exhibited lower levels of overall risk. In the second of the series he reported similar findings for insurance subsidiaries although these were less risky than the securities entities. In the most recent of these studies he again focused on foreign securities subsidiaries but examined the relationship between risk and organizational structure. He found that bank-owned subsidiaries were not riskier than those owned by holding companies.
Emmons et al (2004)	The risk index along with the Federal Reserve Bank's risk rank model	Simulated mergers of small community banks	They found that the strongest relationship between risk and type of merger was related to increases in the size of the merged banks rather than from geographic diversification. They attributed this finding to the pooling of idiosyncratic risk being more important than local market risk. Other observers commented that this study may not be representative as it was based on a period of time, 1989-1993, when the level of risk facing banks was very high (Furlong, 2004).
De Nicolo et al, (2004)	The risk index	Study of the relationships between bank consolidation, internationalization, conglomeration and financial risk.	They found that large conglomerate banks exhibited higher levels of risk in 2000 than smaller and more focused firms. In contrast risk levels were equal five years earlier. Countries where the banking sector was highly concentrated measured by market share held by the five largest banks in each country in the study were also riskier than in less concentrated ones. This trend was evident in 1993 to 2000 but accelerated during 1997 to 2000.
Demirgüc-Kunt et al (2006)	Moody's financial strength rating along with the risk index	Measure bank soundness and assess whether it was related to compliance with the Basel Banking Committees Core Principles for Effective Banking Supervision.	They found that there was a positive and statistically significant correlation between it and Moody's Financial Strength Ratings.
Beck & Laeven (2006)	The risk index	Examined the link between measures of deposit insurance and the institution responsible for bank failure resolution and bank fragility during the period 1997-2003.	They found that in countries where the deposit had responsibility of intervening and resolving failures banks tended to be less risky.
Laeven & Levine (2008)	The risk index along with the volatility of equity returns and the volatility of earnings	Assessment of the relationship of risk-taking by banks to their ownership structure and national bank regulations.	They found that regulation has different effects on bank risk-taking depending on the bank's corporate governance structure.

Author	Observed Effect	Explanatory Variables	Finding
De Nicolo & Loukoianova (2007)	The risk index	Bank concentration	They found a positive and significant relationship between the risk index and measures of bank concentration. Further they found this relationship was stronger when type of ownership was considered. They divided their sample into three types of owners: private domestic, state-owned, and foreign and also found that foreign banks were riskier than both private domestic and state-owned institutions. They attributed the higher risk levels of the private domestic banks to the larger market shares of the other two types.
Iannotta et al, 2007)	The risk index with the capital ratio in the numerator calculated using the stock market value of equity	The relationship between ownership and bank risk-taking and performance	The ownership types serving as the independent variables included public sector banks, mutual banks and privately-owned banks. The researchers found that public sector banks had higher levels of default risk and mutual banks had lower levels of risk as measured by this variation on the z-score.
Rajan (2005)			"Among practitioners risk in banking is typically defined in terms of earnings volatility"
Wall (1987)	The risk index except with return on equity rather than return on assets in the numerator	Investigation of the effect of non-bank subsidiaries on the risk of banking organizations.	He found that this form of diversification was risk-moderating in the sense that it tended to increase the risk of less risky banks but decrease it for riskier ones.
Boyd & Graham (1988)	The risk index and the standard deviation of the return on equity.	Simulated results of merging bank holding companies with other financial firms including those in the life insurance, property and casualty insurance, insurance brokerage, securities, real estate development and other real estate businesses.	His data indicated that certain mergers were linked with reduced risk but others such as between banks and securities or real estate firms were not.
Laderman (2000)	The risk index and variability of return on assets.	Simulated mergers and risk.	Her data indicated that substantial diversification into life insurance underwriting, casualty insurance underwriting and securities brokerage was related to reduced overall risk.

APPENDIX 3

SUMMARY LITERATURE REVIEW FOR THE OTHER RISK MEASURES

Author	Observed Effect	Explanatory Variables	Finding
Liang (1989)	Standard deviation of net income relative to assets	The effects of market concentration on firm profits	She found that the effects of market concentration on firm profits becomes larger when risk is controlled for and that market concentration for banks and firm risk are positively related which she attributed to local market uncertainty leading to higher concentration and risk levels.
Esty (1997)	The standard deviation of the time series quarterly return on assets and of the cross-sectional cumulative return on assets	Linkage of corporate structure to risk in the savings and loan industry during 1982 to 1988.	
Reichert & Wall (2000)	The coefficient of variations of return on equity and assets calculated as the standard deviations of the two measures divided by their mean		
DeYoung et al (2004)	The excess of the return on equity over the risk-free rate divided by the standard deviation of the return on equity	Size and risk	They found that medium-sized community banks exhibited higher levels of risk than their larger counterparts.
Berger & Mester (2003)	Standard deviations of returns on gross total assets		Risk decreased during the 1986 to 1997 time period while returns increased substantially.
Nichols et al (2005)	Earnings volatility relative to both total assets and common equity	Risk of publicly-traded versus privately-held banks	Contrary to their thesis, they did not find that the two types of banks differed in terms of their risk measures. They did however find that public ones had lower capital ratios.
Kuritzkes & Schuermann (2006)	The standard deviation of pre-tax net income divided by risk-weighted assets as specified in the Basle I Capital Accord.	They hypothesized that bank risk arises from two major categories, financial and non-financial, further subdivided into five sub-groups: market, credit, structural asset/liability in the first and operational and business risk in the second.	They found that credit was linked to almost half of all risk with market sources relating to about 5%. The diversified banks' level of risk was about one-third lower than their focused counterparts.
DeYoung (2007)	Standard deviations of returns on equity	Examined safety and soundness in US banking	He found that small banks engaged in traditional bank lending with high levels of core deposits exhibited the lowest risk profile while large transaction-oriented banks had the highest. This latter group also engaged in substantial loan securitization and had a high degree of non-interest income.

Author	Observed Effect	Explanatory Variables	Finding
Dick (2006)	Loan losses as a measure of risk	Examined the link between charged-off losses and loan loss provisions relative to total loans and deregulation in the form of liberalized interstate banking	As measured by both ratios the level of risk increased: increased diversification opportunities presented by the deregulation allowed banks to take higher levels of credit risk. Alternatively the higher risk level may have been caused by the increased competition deregulation allowed. These findings were in contrast to Jayaratne and Strahan (1996) who found a decrease in risk followed a slightly earlier period of deregulation.
Berger & Udell (1990)	The risk premium (the annualized loan interest rate minus the rate for a treasury security of equal duration) and the net charge-off rates of loans relative to the total amount of commercial and industrial loans.	Investigated the relationship between collateral and bank risk.	Banks with a higher proportion of secured lending also tended to display higher levels of risk.
Gorton & Rosen (1995)	Non-performing loans as a percentage of total loans.	Their study tested a model that explained excessive risk-taking by bank management as resulting from management entrenchment due to their ownership of shares in the bank.	They found support for their hypothesis.
O'Hara (1981)	The percentage of real estate owned relative to average assets; borrowed funds relative to average assets.	Are stock companies riskier than mutual associations?	As she expected stock companies were riskier than mutual associations.
Fraser & Zardkoohi (1996)	Nine different accounting ratio risk proxies. These included investments in various types of risky real estate and loans along with measures of liquidity, leverage and profitability.	Examined the relationship between corporate structure and risk	Found evidence that the corporate structure was linked to higher levels of risk.
Cordell et al (1993)	Proportional holdings of higher risk real estate, above-average asset growth and low capital.	Examined the relationship between corporate structure and risk	Found evidence that the corporate structure was linked to higher levels of risk.
Valnek (1999)	Risk was measured by loan loss provisions and reserves and by standard deviation of return on assets.	Are banks owned by stockholders riskier than mutual building societies?	He found evidence that banks owned by stockholders were riskier than mutual building societies. The author concluded that while corporate-form banks do not take undue risk, they are not sufficiently compensated for the risks they do take.

Author	Observed Effect	Explanatory Variables	Finding
Kwan (2004)	a) the ratio of past due and non-accrual loans to total loans; b) the standard deviation of returns on assets; c) the ratio of total capital including preferred and common stock and retained earnings to total assets.	Are public banks riskier than private?	After controlling for firm size, risk was found to be essentially the same at the public and private banks but the public banks held significantly greater amounts of capital.
Rhodes & Rutz (1982)	The coefficient of variation of profit rates which was calculated as the standard deviation of return on assets divided by the return on assets; equity capital, total loans and net loan losses all measured relative to total assets.	The relationship between market power and bank risk.	They found support for their “quiet life” hypothesis which held that banks with a high degree of market power measured by their market share pursued a lower risk strategy.
Hirtle (2003)	The standard deviation of daily trading profits and losses; the average of the three largest daily trading losses each quarter.	Relationship of regulatory capital to future market risk levels.	She showed that the regulatory capital required to be held against market risk was predictive of future levels of market risk as she defined it.
Rose (1987)	Net loan losses relative to equity capital; total liquid assets to total assets; interest-sensitive liabilities to earning assets.	The relationship between mergers and risk.	He did not show a decrease in overall risk following the mergers and many of the more specific risk types actually increased. Further, banks that engaged in more than one merger during the period showed even higher levels of increased financial risk than those that participated in a single merger.
Keeley (1990)	The margin of the interest rate spread on uninsured deposits.	The relationship of market power, defined as those with higher market to book value ratios, to capital and risk.	He found that banks with substantial market power held more capital and were less risky than their counterparts with low market power. This tendency was attributed to managements’ reluctance to risk losing their valuable banking charter offsetting the attraction of the deposit insurance put option.
Acharya et al (2002)	Doubtful and non-performing loans relative to assets, the standard deviation of doubtful and non-performing loans relative to assets and the annualized stock return volatility for the publicly-traded banks	Loan diversification and risk-return efficiency.	They found that greater loan diversification did not lead to an efficient risk-return trade-off.

Author	Observed Effect	Explanatory Variables	Finding
Schrand & Unal (1998)	Total firm risk was measured by stock return volatility while credit risk was measured by the accounting ratio of commercial loans to total loans.	Are stock institutions more risky than mutual associations?	They found that the stock companies engaged in higher levels of hedging to decrease interest rate risk but this was more than offset by higher credit risk. The authors found a link between higher credit risk and incentives such as stock options given to management after the demutualization.
Smoluk et al (2003)	Standard deviation of return on equity.	Simulated expansions	They found that New England banks that expanded into various other regions of the US exhibited lower levels of risk.
Rosen et al (1989)	Standard deviation of return on assets.	Simulated bank diversification by direct equity investment in real estate.	Found marginal benefits at low levels but higher levels of risk when the investment exceeded fairly low levels of concentration The authors found that a trend toward higher risk emerged when the investment in real estate rose above 4% of total assets.
Kwast (1989)	Standard deviation of return on assets.	Diversification gains from adding dealing and underwriting of securities to traditional bank powers.	He found that some potential gains were possible but that these were limited in size.
Kwan (1997)	Standard deviation of return on equity.	Used portfolio theory to evaluate the potential risk implications of the addition of securities activities to traditional banking organizations.	He found that securities subsidiaries were riskier but not necessarily more profitable than their banking parents. For securities firms that were primary dealers of government securities the higher risk levels were associated with higher leverage while for those that were not the higher risk was correlated with aggressive trading behaviour. The subsidiary securities firms appeared to provide possible diversification benefits overall because of low return correlations between them, regardless of primary dealer status, and the banks.
Reichart & Wall (2000)	The ratio of standard deviation of return on assets to the mean return on assets.	Based on a portfolio approach, combined banking industry results with those of six other related industries such as insurance, real estate and securities.	While diversification gains were possible, the amount possible varied over time. The authors tried to explain this variability by pointing to the influence of changes in the macroeconomic environment or technology.

Author	Observed Effect	Explanatory Variables	Finding
Laderman & Kwan (1999)			In general the studies of diversification that are based on simulations of bank mergers with various types of related non-banking activities have shown mixed results. They indicate that securities activities and insurance agency, and insurance underwriting are riskier than banking but still have the potential to provide diversification benefits to banking organizations because of low levels of correlation between the banking and non-banking businesses and because they are more profitable. While real estate agency, title abstract activities, and real estate operation are also more profitable than banking, real estate development may not be. Real estate activities are riskier than banking activities in general and the literature provides inconsistent evidence about their diversification benefits for banking organizations (Laderman and Kwan, 1999).
DeYoung & Roland (2001)	Earnings volatility	The relationship between diversification and bank risk.	They found that increased levels of non-interest income was linked with higher levels of risk. The increase in risk was at least partially compensated for by increased levels of profits.
Sinkey & Nash (1993)		Compared credit card banks with their more diversified counterparts.	They found that credit card banks were riskier but also generated higher returns. This seems to indicate benefits from diversification.
Rivard & Thomas (1997)	Standard deviation of return on assets and the reciprocal of the risk index	Compare interstate banks with their less diversified counterparts.	They found that this type of geographic diversification was linked to higher profits and lower levels of both insolvency and volatility risk.
Rogers & Sinkey (1999)	They infer the banks' risk levels from capital ratios, levels of liquid assets, exposure to interest rate risk, and the levels of loan loss provisions.	Bank involvement in non-traditional activities	One of the motivations for their study was to determine whether banks were using non-traditional activities to take on more risk to exploit government guarantees. They find that larger banks tend to be relatively more involved in non-traditional activities and appear to be relatively less risky. While Rogers and Sinkey (1999) make the case that banks don't seem to using non-traditional activities to take on more risk, they do not make a direct statement concerning the relative riskiness of non-traditional activities.

Author	Observed Effect	Explanatory Variables	Finding
DeYoung & Rice (2004a) DeYoung & Rice (2004b)	Volatility of earnings	Reliance on fee-based activities	They find that increased reliance on fee-based activities tends to increase the volatility of earnings and that banks with large fee-based net income appear to be more profitable on an ROA basis because of the lack of balance sheet effects associated with the activities. They find the co-existence of high risk-high return and low risk-low return strategies and conclude that there is a range of financially viable business strategies. Interestingly, they find that very small banks operate at a financial disadvantage regardless of their competitive strategy.
DeYoung & Rice (2004c)	Variation in profits	Non-interest income	They find that for U.S. commercial banks**,** increases in non-interest income occur alongside higher profitability and higher variation in profits, and that his leads to a worsened risk-return trade-off. Similar to Rogers and Sinkey (19990, they find that large banks generate relatively more non-interest income.
Stiroh & Rumble (2006)	Risk-return trade-off; volatility of income	Determining if diversified banks outperform more concentrated financial institutions.	While they find that non-traditional income makes financial holding companies relatively more diversified, the benefits to diversification are more than offset by the increased volatility of such income. In other words, financial holding companies are more diversified, but they are diversified in a relatively riskier source of income.
Acharya et al, (2002)	Their risk measures included both accounting measures related to bad and doubtful loans as well as annualized stock return volatility.	Diversification and its relationship with bank risk.	They found that in certain cases there was a positive correlation. They concluded that there are diseconomies of scale of diversification for certain banks. Both industrial and sectoral diversification caused increases in risk while geographic diversification caused decreases. There was no difference between moderately and highly risky banks.
Baele et al (2006)	Risk-return trade-off	Diversification and its relationship with bank risk.	They found that the markets favoured more diversified banks. Diversity of revenue streams was measured in terms of the ratio of non-interest income to total operating income and the loan to asset ratio. They concluded that “the stock market anticipates that functional diversification can improve future bank profits”.

APPENDIX 4

DIMENSIONS OF CAPABILITY; MANIFESTATION OF WEAKNESSES

Dimensions

Board and executive leadership
Branding: brand recognition and reputation
Customer service
Relationship management
Credit analysis
Problem resolution
Screening
Monitoring
Deal origination
Syndication
Cost control
Credit process specification and implementation
Trading rules; monitoring, reporting and intervention
Investor relations
Structuring
Relationships with credit ratings agencies
Specialized skills: real estate, mining, communications, M&A, PPP, etc.
Staff training
Staff remuneration policies and implementation
Composition of portfolio of businesses
Composition of portfolios of assets
Locational choices; regional choices – geographic diversification

Weaknesses manifest as:

Lower returns
Higher costs
Reduced credit quality; variation in credit quality through time; poor risk-return balance; credit losses
Trading losses or poor return on capital devoted to trading
Trading profit variability
Fewer fee opportunities; fees out of line with service provision cost

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THE EFFECT OF NAME CHANGES ON THE EARNINGS MANAGEMEMT IN KOREA

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ABSTRACT

Recently, corporate name changes by loss-reporting firms are increasing among the KOSDAQ market. From a sample of 544 name change firms over the period of 2004 to 2011, there are firms change their names following major structural changes like industry change, CEO change or largest stockholder change. And corporate name changes are followed by bad operating performance. Many of the firms changing their names are plagued by embezzlements or financial fraud by management.

We examine empirically whether name change firms are associated with particular patterns of discretionary accruals. And we divide the reasons for corporate name changes into cosmetic change, industry change, and largest stockholder change to examine whether there are differences in earnings management practices. We find that name changes are negatively related with discretionary accruals, particularly when they change names due to accumulated losses.

Our study adds to the literature in the sense that it is the first attempt to examine the purpose of firms changing their names and to investigate the impact of corporate name changes on discretionary accruals. We expect that our empirical results can play a role for the investors to let them exercise caution to invest firms changing their names frequently who could change names to disguise bad performance or negative image.

INTRODUCTION

Recently, the financial press reports the trend that increasing number of firms change their names. Twenty four KOSDAQ firms have changed their names twice in a year and six firms have changed their names up to five times over the period of 2004 to 2011.

Corporate name is supposed to serve as a signal to convey information about a firm's major business or product lines. Investors will be better served as long as corporate names can be associated with major businesses or product lines. A name change may well cause intangible assets such as trade mark or goodwill to disappear. Firms have accumulated some goodwill in the form of name recognition and company image. Also there are direct costs involved in changing names like legal fees and printings of new packaging and advertising outlays Why do they change their names despite non-trivial cost associated with name changes? The value of a firm would be increased if corporate name change positively conveys the plan of real changes in the firm's business activities, restructuring or reorganization. Otherwise, investors would disorient by the new names.

Facing the rapid increase in corporate name changes, investors are advised to exercise caution when they make investment decisions in the firms which change their names, particularly when they purchase the securities of name change firms to disguise accumulated losses. According to our investigation, there is a big increase in corporate name changes by loss-reporting firms even though it is accompanied by non-trivial costs such as consulting fees and corporate identity costs. Some of firms changing their names are involved in litigations such as fraud or embezzlement. Some of them are administrative issues in the KOSDAQ market.

The KOSDAQ market has some features that can be distinguished from the KSE market. KOSDAQ firms are smaller and younger than KSE firms and the disclosure environment of the KOSDAQ market is inferior to the KSE. As a result, we believe the information asymmetry in the KOSDAQ would be worse than the KSE. Yoon (2005) finds that KOSDAQ firms tend to manage earnings more aggressively than KSE firms. So there is an increasing concern on the reliability and transparency of the financial statements of KOSDAQ firms.

We find that corporate name changes in the KOSDAQ market are more frequent than in the KSE market, particularly there is a big increase in KOSDAQ market. KOSDAQ firms are smaller and younger than KSE firms and they have lower intangible value associated with company names comparing to KSE firms so it would be easier to change their names.

And the announcements of corporate name changes in KOSDAQ have started since 2000 and they have announced reasons of changing definitely since 2007. The KOSDAQ market have enforced that firms changing name frequently should announce the details to prevent investors' confusion whether they had changed corporate name within 2 years since 2007 and it's one part of announcements management consolidation.

The prior literature of corporate name changes is almost about the relationship between corporate name change and stock price but they are scarce and the results in Korea are inconclusive. In this paper, we examine the purpose of the managements who change corporate name, different from the prior study.

This study was motivated by the suspicion that firms who change their names in KOSDAQ market would have intent to use name changing strategically for the change of corporate bad image. We suggest that corporate name change engage in earnings management to upward earnings around the time of their change.

We first examine empirically whether corporate name change firms are associated with discretionary accruals. We further divide the reasons of corporate name change into cosmetic change to hide negative earning, industry change or consolidation and change of the largest stockholders and examine whether there are differences among the corporate name change reasons.

We find that name change firms have negative discretional accrual and especially name change firms with loss-reporting are significantly negatively associated with discretional accruals. The results provide evidence that firms changing their names due to accumulated losses are expected to manage earnings downward to improve performance in the following periods. Firms under serious financial distress may have incentives to change their corporate names as well as to manage earnings as a means to intentionally mislead investors.

Our study adds to the literature in the sense that it is the first attempt to examine the characteristics of firms changing their names and to investigate the impact of corporate name changes on discretionary accruals. We expect that our empirical results can play a role for the investors to let them know about corporate name changes by loss-reporting firms.

BACKGROUND ANS HYPOTHESIS DEVELOPMENT

2. 1. Prior studies

Most of the prior study about corporate name changes are about the relationship between corporate name change and stock price. Previous studies have shown mixed results about corporate name changes and valuations.

Song(1991) studied the stock price reactions to corporate name change announcements of 74 announcements for the period from 1980 to 1990. He found that weak positive stock price reaction to the announcement and he also suggests that findings are sensitive to sample selection.

Some suggests that the valuation effects of name changes are only modest and transitory. Horsky and Swyngedouw(1987) studied the effect of corporate name change on profit performance of firms and the type of firms that have a positive effect. They rightly conclude that the act of name change per se do not enhance the demand for firms' products.

Howe(1982) found that there is no significant share-price reaction was associated with corporate name changes. Also Karpoff and Rankined(1994) find little evidence that corporate name changes corresponded to changes in a firm's stock return covariability with its industry index or with changes in the firm's earnings growth rate.

On the subject of fashions in naming, Cooper, Gulen and Rau(2005) examine whether or not mutual funds change their names to take advantage of currently popular investment styles, and what effects such name changes have on inflows to the funds and on the funds subsequent returns. They report that funds adopting fashionable names experience an average cumulative abnormal inflow of 28%, with no improvement in performance, the year after such a change.

Oh(2004) analyzed the information contents of corporate name changes and to determine the factors that explain. He found that several factors of name changes don't have any association with firms' abnormal stock returns.

Overall, prior studies suggest that corporate name change affects stock prices in short-term, but it has no effects on firms' performance. However, there is little evidence on corporate name changes affect discretionary accruals. We focus on earnings management of discretional accruals of name change firms

2. 2 Hypothesis development

The disclosure environment of the KOSDAQ market is inferior comparing the KSE. So there is an increasing concern on the reliability and transparency of the financial statements of KOSDAQ(Yoon, 2005). According to our research, 65% of corporate name change firms say that the reason for the change is the improvement of corporate image. We find that most of KOSDAQ firms changing their names recently report current loss and highly leveraged. They report bad performance and are involved in litigations such as fraud or embezzlement of managers. Some of them are watch-list companies by the stock market.

Na(1996) finds that loss-reporting firms have incentive to lower accrual, that is big bath. Because most of them are watch-list companies by the stock market or they are highly leveraged so they can't manage earnings upward. Yang et al.(2009) report that managers of loss-reporting firms may take actions to accelerate the collection of receivables, and delay the purchases of inventory and payment of payables so those actions will result in the decrease of accruals.

We hypothesize that corporate name change firms will have incentives to manage earnings to disguise accumulated losses or for the next period' performance after getting new name. Based on the previous study and our investigation, we set our first hypothesis as follow:

H1 There is a relationship between the corporate name change and earnings management.

Second, we examine the reasons for corporate name changes. According to the previous study, the reasons for corporate name changes could be due to show expanded product offerings and strategic direction, to reflect company diversification and expansion, to provide a more universally representative name, and to reflect new identity following a change in ownership. We partition the reasons for corporate name changes into the cosmetic name change of loss reporting firms, industry change due to firms' merger and acquisition and largest stockholders change.

We hypothesize there will be different the patterns of earning managements among the reasons of change. Intuitively the natural change following the largest stockholders or organization change will be different with the strategic change for hiding the accumulated loss.

Nah and Choi(2000) finds that discretional accruals of financial distress firms are negative. They suggest that financial distress firms manage earnings downward to give a definite cash or renegotiate debt contract. Or strict monitoring of regulatory authorities about earnings management could be the reason.

Regarding our investigation, in 260 KOSDAQ firms changing largest stockholders, the executives of 52 percentages of largest stockholders change firms are largest stockholders. It means that when largest stockholders change, the executives change at the same time. That is, most of KOSDAQ firms are management control. DeAngelo(1988) find that the executives change firms intend to manage earnings lower to maximize next earnings when they change executives. Kwak and Choi(2011) find that executives engage in earnings management to bolster self-interests around the time of their change. Lee(2007) finds that there is significant negative relationship between CEO turnover and discretionary accruals

Jeong and Bae(2006) find the acquiring firm manage earnings downward whereas the target firm manage earnings upward. Usually the target firms change their name after mergers and acquisition. According to previous research, we expect corporate name change of largest stockholders change firms and cosmetic change firms would have negative discretionary accruals. On the other hand, name change firms due to organization change may have positive discretionary accruals.

Therefore we set our second hypothesis to investigate the difference among the reasons for corporate name changes.

H2 There are differences of discretionary accruals among the reasons for corporate name changes.

SAMPLE SELECTION AND RESEARCH METHODS

3. 1. Sample

We select our sample firms listed on Korean Securities Dealers Automated Quotations(KOSDAQ) and who change the corporate name from 2004 to 2011. We focus on name change for the KOSDAQ firms because it is more frequent compare to the KSE firms and there are questions about reliability and transparency about financial reporting in the KOSDAQ market. We present the frequency of corporate name change in Korea from 2004 to 2011 in Figure 1.

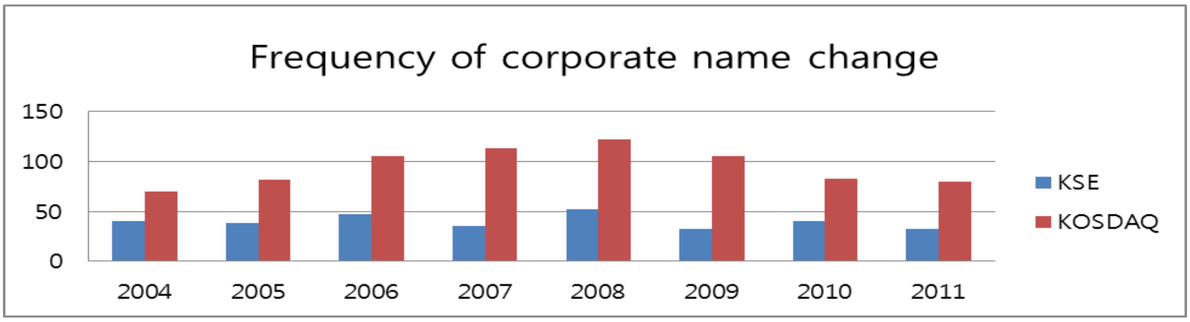

Figure 1

The financial data were retrieved electronically from KIS-VALUE database. The data of corporate name change was on on-hand processing from KIND database in Korea Exchange. The largest stockholders change was retrieved electronically from KIS-VAUE database and the data about consolidation and diversification during the study period was manually collected from KIND. We came up with a final sample of firm-year observations and we selected 544 firm-year observations for the corporate name change firms from 760 firm-year observations who had announced the name change.

Figure 2 reports industry dispersion of corporate name change firms from 2004 to 2011. 122 Electronic-computer Manufacturing companies changed their names and 115 Broadcast and media companies and 81 service companies changed their names. It means name changes happen in those industries especially are susceptible to changes in trend.

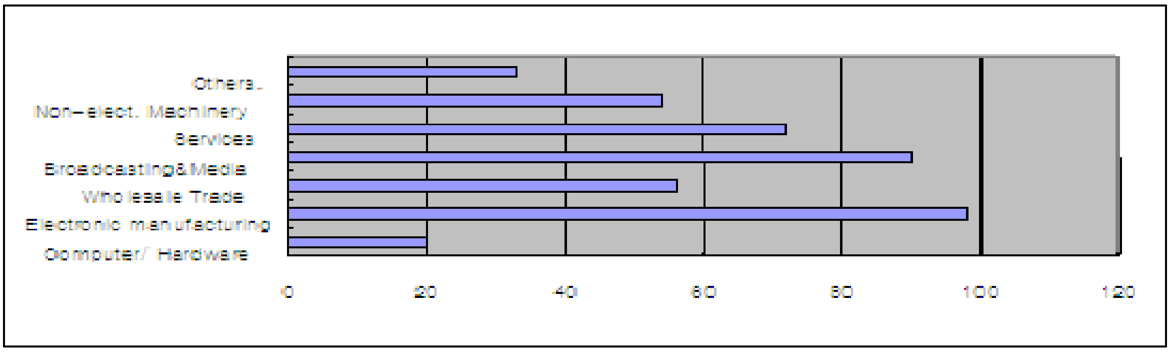

Figure 2

3. 2 Research Methods

3. 2. 1. Estimation of Discretionary Accruals

Estimating discretionary accruals affects the success of earnings management tests. Therefore, the development of a well-fitting model is very important for this part of research. In this research we use discretionary accruals as the proxy of earning management and we use 3 models to minimize errors from the model setting.

First we use the modified Jones model (Dechow et al. 1995). Prior research documents that the modified Jones model is generally effective. Our first model is described as follows:

$$\frac{TA}{BTA} = bo + b1\frac{(\Delta REVi - \Delta RECi)}{BTA} + b2\frac{PPE}{BTA} + ei \qquad (1\text{-}1)$$

Here, TA (total accruals) = NI (net income) – CFO (cash from operations); REV = net sales revenue; REC = trade receivables; PPE = property, plant, and equipment; BTA = beginning total assets; Δ = change operator

The discretionary accruals are obtained by subtracting fitted values of accruals that is, non-discretionary accruals, from the total accruals as follows:

$$DA = \frac{TA}{BTA} - (bo + b1\frac{(\Delta REVi - \Delta RECi)}{BTA} + b2\frac{PPE}{BTA}) + ei \tag{1-2}$$

Yoon and Miller (2002) document that the modified Jones model does not fit well, particularly for Korean firms. Kothari et. al (2005) suggest that it is better to give an additional independent variable to control firms' performance in the modified Jones model when estimating discretionary accruals. Yoon and Miller (2002) find that cash from operations is the major determinant of accruals. So we include cash from operations as an additional independent variable as a control variable of performance. Our second model is described as follows:

$$\frac{TA}{BTA} = bo + b1\frac{(\Delta REVi - \Delta RECi)}{BTA} + b2\frac{PPE}{BTA} + b3\frac{CFO}{BTA} + ei \tag{2}$$

The way to have the discretionary accruals and variables are same with model (1-2).

Lastly Kothari et al. (2005) suggest that discretionary accrual models may be mis-specified when applied to firms with extreme past performance, proposing that a matching procedure based on performance(ROA) is more appropriate for these firms. Return on assets(ROA) is net income deflated by total assets. Consistent with Kothari et al. (2005), we implement the 'performance-matched' discretionary accrual model.

Our third model is described as follows:

$$\frac{TA}{BTA} = bo + b1\frac{(\Delta REVi - \Delta RECi)}{BTA} + b2\frac{PPE}{BTA} + b3\frac{ROA}{BTA} + ei \tag{3}$$

The way to have the discretionary accruals and variables are same with model (1-2).

3. 2. 2. Regression models

The purpose of this study is to examine empirically whether corporate name change associated with earnings management. First we examine the relationship between name change firms and discretionary accruals. And we divide the reasons for corporate name changes into cosmetic change, industry change and largest stockholders change to focus on the purpose of name change. We examine whether there are accrual differences among the reasons.

First we examine whether corporate name changes have an effect on earnings management. NC is the main variable in our model and we add control variables, we regress DA1 (2, 3) on NC and controlling for CFO, LEV, SIZE, GRW, ROA.

$$DA1(DA2,DA3)_{it}=b_o+b_1NC+b_2CFO_{it}+b_3LEV_{it}+b_4SIZE_{it}+b_5GRW_{it}+b6ROAit+e_{it}$$

NC, the main variable is a dummy which has a value 1 when a firm change name. If NC has significant positive(negative) coefficient, it means that name change firms have incentive to manage earnings upward(downward).

The control variables include a set of variables that are likely to influence discretionary accruals. We include cash flow of operating(CFO), debt ratio(LEV),firm size(SIZE), firm's growth(GRW) and return on assets(ROA). Yoon(2005) suggests that CFO is a significant variable to affect accrual. But we exclude CFO(ROA) in model 2(model 3) because we already controlled CFO(ROA) to measure DA2(DA3). Yang et al.(2009) finds debt ratio related with discretionary accrual negatively because firms with high debt firms are subject to be under the regulatory authorities.

Second, we regress of DA 1(2, 3) on LC, IC, OC and controlling for CFO, LEV, SIZE, GRW and ROA to investigate whether there are differences among the reasons for name change firms. LC is a dummy variable which has a value 1 when a firm reports loss before the name change and IC is a dummy which has a value 1 when a firm changes organization from merger and acquisition. OC is a dummy which has a value 1 when largest stockholders are changed. We expect b1 and b2 and b3 have a different magnitude and direction when loss reporting firms have a strong incentive to manage earnings comparing to other firms. Other variables are same with upper model.

$$DA1(DA2,DA3)_{it} = b_o + b_1LC + b_2IC + b_3OC + b_4CFO_{it} + b_5LEV_{it} + b6SIZEit + b7GRWit + b8ROAit + e_{it}$$

EMPIRICAL RESULTS

4. 1 Descriptive statistics and Variables correlation

Table 1 presents the mean, lower quartile, median and upper quartile, standard deviation of dependent and independent variables used in the study. Among the KOSDAQ listed firms from 2004 to 2011, average 8 percent of KOSDAQ firms changed their name.

Table 1
Descriptive Statistics

Panel 1 Treatment Sample (n = 544)					
	mean	min	median	max	sd
LC	0.65	0.00	1.00	1.00	0.47
IC	0.16	0.00	0.00	1.00	0.36
OC	0.45	0.00	1.00	1.00	0.50
DA1	-0.18	-3.13	-0.12	1.58	0.59
DA2	-0.20	-3.31	-0.16	1.53	0.59
DA3	-0.04	-3.14	0.00	1.92	0.53
LEV	0.48	0.00	0.45	1.91	0.30
CFO	-0.12	-2.16	-0.07	0.90	0.38
ROA	-0.37	-4.55	-0.18	0.36	0.79
SIZE	24.20	20.34	24.01	28.78	1.08
GRW	0.20	-0.99	0.06	4.69	0.89
Panel 2 Control Sample (n = 6819)					
	mean	min	median	max	sd
DA1	-0.00	-3.85	-0.00	1.99	0.59
DA2	-0.00	-3.15	0.00	1.63	0.59
DA3	0.01	-3.01	0.01	1.64	0.53

LEV	0.40	0.00	0.39	3.55	0.25
CFO	0.04	-1.89	0.04	1.49	0.18
ROA	-0.03	-5.49	0.03	0.65	0.36
SIZE	24.68	20.25	24.42	28.84	0.87
GRW	0.13	-1.79	0.08	6.81	0.57

<definition of variables> NC= corporate name change firms; LC= loss-reporting firms in corporate name change; IC= industry change through consolidation or diversification in corporate name change; OC= the largest stockholders change in corporate name change; CFO= the ratio of cash from operations to the beginning total assets(BTA); LEV= the ration of debts to total assets; ROA= net income to total assets;; SIZE= natural log of the total assets at the end of the year; GRW= the growth of sales; DA1(2, 3)= discretional accrual through model 1(2, 3).

Among the name change firms, 65 percent of name change firms report current losses. 45 percent and 16 percent of name change firms have changed the largest stockholders and organization respectively, we show that in Panel 1. Cash from operations(CFO), return in assets(ROA) of corporate name change firms is lower and highly leveraged than control firms(non-change firms), it means that firms who report bad performance tend to change their name. And the size of corporate name change firms is smaller than Panel 2, but the growth rate of name change firms are higher, it means that name change firms are smaller and younger than non-change firms so they have lower intangible value associated with company names.

Table 2 shows the correlation coefficients between the pairs of the variables of interest for the sample in Panel 1 (total firms) and Panel 2(name change firms). The result of correlation analysis for Panel 1 indicates that corporate name change firm is significantly negatively correlated with discretionary accrual(DA1, DA2, DA3). It supports our first hypothesis. And corporate name change has significantly negative relationship with cash from operations(CFO) and return on asset(ROA) but, it shows positive relationship with leverage ratio(LEV). It indicates that firms tend to change names when firms are in financial distress. And name change shows negative relationship with firm size.

In Panel 2, it shows that name change by loss-reporting firms is significantly negatively correlated with all discretionary accruals(DA1, DA2, DA3). And name change by largest stockholders change(OC) is significantly negatively correlated with discretionary accruals in panel 2. On the other hand name change following organization change(IC) doesn't show any relationship with discretionary accruals. So, it supports our hypothesis 2 partially.

Table 2
Correlation Coefficients

Panel 1.Total firms (n= 7,363)

	DA1	DA2	DA3	NC	CFO	LEV	SIZE	GRW
DA1	1	0.92**	0.85**	-0.13**	-0.19**	-0.13**	0.05**	0.09**
DA2	0.94**	1	0.76**	-0.15**	-0.07**	-0.14**	0.08**	0.09**
DA3	0.88**	0.80**	1	-0.04*	-0.42**	-0.02	-0.03	0.06**
NC	-0.13**	-0.16**	-0.04*	1	-0.20**	0.07**	-0.17**	-0.02
CFO	-0.25**	-0.08**	-0.40**	-0.20**	1	-0.23**	0.15**	0.20**
LEV	-0.25**	-0.27**	-0.53*	0.10**	-0.15**	1	0.13**	0.01
SIZE	0.09**	0.11**	0.10**	-0.19**	0.21**	0.04**	1	-0.00
GRW	0.02	0.02	0.02	0.03*	0.02	0.00	-0.10**	1

Panel 2. Sample firms (n= 544)

	DA1	DA2	DA3	LC	IC	OC	CFO	LEV	SIZE	GRW
DA1	1	0.93**	0.80**	-0.46**	-0.00	-0.21**	0.04	-0.15**	0.05	0.07

DA2	0.96**	1	0.75**	-0.49**	-0.00	-0.26**	0.12*	-0.17**	0.11**	0.05
DA3	0.90**	0.85**	1	-0.24**	-0.00	-0.07	-0.22**	-0.08	-0.05	-0.00
LC	-0.27**	-0.29**	-0.16**	1	0.03	0.33**	-0.49**	0.10*	-0.16**	-0.25**
IC	-0.00	0.01	-0.00	0.03	1	0.10*	0.00	0.07	0.02	0.07
OC	-0.11*	-0.14**	-0.03	0.33**	0.10*	1	-0.28**	0.03	-0.34**	-0.11*
CFO	-0.37**	-0.26**	-0.45**	-0.21**	0.00	-0.15**	1	-0.05	0.42**	0.22**
LEV	-0.15**	-0.15**	-0.01	0.14**	0.04	0.06	-0.08	1	0.09	0.05
SIZE	0.05	0.05	-0.00	-0.12*	0.01	-0.31**	0.38**	0.02	1	-0.00
GRW	-0.01	-0.01	-0.04	-0.16**	0.06	-0.03	0.05	-0.00	-0.13**	1

1) Pearson(Spearman) correlation coefficients are reported above(below) the diagonal. Statistical significance at 0.05 level(two-tailed).

2) Definition of variables; NC= corporate name change firms; LC= loss-reporting firms in corporate name change; IC= organization change through consolidation or diversification; OC= the largest stockholders change; CFO= the ratio of cash from operations to the beginning total assets(BTA); LEV= the ration of debts to total assets; ROA=return on asset; SIZE= natural log of the total assets at the end of the year; GRW= the growth of sales ; DA1(2, 3)= discretional accrual through model 1(2, 3).

We find that name change by loss-reporting(LC) is positively correlated with largest stockholders change, it indicates that firms who have a financial trouble tend to be changed largest stockholders. And name change by loss-reporting(LC) shows a significant positive relationship with leverage ratios. However, name change following organization change (IC) and name change by largest stockholders change(OC) do not show any relationship with leverage ratios. It supports our idea that firms who change their names despite they report loss have a high debt- ratios so it is not easier to manage earnings upward.

4. 2 Regression Analysis

The regression results for hypothesis 1 are reported in table 3. The results are reported for regression DA1 (2, 3) on NC and controlling for CFO, LEV, SIZE, GRW and ROA. We do not control CFO(ROA) in model 2(model 3) because we already control it during drawing model 2(model 3).

For all model, the coefficients on NC are negative and significant at the .01 level. We expect that corporate name change firms will affect their earnings management. We find that corporate name change firms have negative discretionary accrual and the result is consistent with our expectation. Firms changing their names are expected to manage earnings downward to improve performance in the following periods. They may set a low criterion which future performance is judged by having new names. All of the control variables for the discretionary accruals exhibit coefficients consistent with the previous study and all variables are significant except growth rate.

Table 3

Regression of the effect name change on discretional accruals

DA1(DA2, DA3)= $b_0 + b_1NC + b_2CFOit + b_3LEV_{it} + b4SIZE_{it} + b_5GRW_{it} + b6ROAit + e_{it}$

	DA1	DA2	DA3
Intercept	-1.96 (-10.15)	-1.15 (-6.23)	-1.17 (-6.82)
NC	**-0.25 (-10.49)**	**-0.18 (-8.07)**	**-0.15 (-7.15)**
CFO	-0.55 (-25.50)		-0.64 (-33.36)
LEV	-0.46 (-21.70)	-0.38 (-18.53)	-0.17 (-8.73)
SIZE	0.06 (5.60)	0.05 (7.02)	0.05 (7.38)
GRW	0.00 (1.43)	0.02 (2.51)	0.03 (3.10)

ROA	0.49 (22.43)	0.08 (10.12)	
Adj. R^2	0.24	0.13	0.13
N= 7363			

<Definition of variables> NC= a value 1 when a firm change corporate name; CFO= the ratio of cash from operations to the beginning total assets(BTA); LEV= the ration of debts to total assets; SIZE= natural log of the total assets at the end of the year; GRW= the growth of sales; ROA= return on asset; DA1(2, 3)= discretional accrual through model 1(2, 3).

Next we investigate whether there are differences of discretional accruals depending on the reason of name change for the name change firms. Table 4 shows the result of regression of DA 1(2, 3) on LC, IC, OC and controlling for CFO, LEV, SIZE, GRW, ROA. LC is a dummy variable which has a value 1 when a firm reported loss income and IC is a dummy which has a value 1 when a firm has changed organization through merger and acquisition. OC is a dummy which has a value 1 when the largest stockholders are changed among the name change firms.

We expect there is difference of accruals among the name changes reasons. Corporate name change by loss-reporting firms(LC) have significantly negative discretionary accruals in all models, on the contrary the name change of industry change firms(IC) and largest stockholders change firms(OC) have no significant relationship with discretionary accruals. Therefore, the result supports hypothesis 2 that there are statistically significant differences among the reasons for corporate name changes. We find that loss-reporting firms have a high incentive to manage earnings to disguise bad performance or negative image for future year. Other control variables for the discretionary accruals except LEV in model 3 show consistent result with table 3.

Table 4
Regression of discretionary accruals on the reasons for name changes

$DA1(DA2, DA3)_{it}= b_0 +b_1LC+b_2IC+b_3OC+b_4CFOit+b_5LEV_{it}+b_6SIZE_{it}+b_7GRW_{it}+b8ROAit+e_{it}$

	DA1	DA2	DA3
Intercept	-4.91 (-3.93)	-0.01 (-0.01)	-4.40 (-3.51)
LC	**-0.81 (-7.27)**	**-0.60 (-5.24)**	**-0.63 (-5.75)**
IC	-0.03 (-0.26)	-0.09 (-0.86)	0.06 (0.58)
OC	0.06 (0.47)	0.10 (0.75)	0.02 (0.12)
CFO	-0.90 (-11.57)		-0.94 (-12.19)
LEV	-0.45 (-3.67)	-0.41 (-4.32)	-0.09 (-0.90)
SIZE	0.22 (4.36)	0.12 (3.38)	0.19 (3.78)
GRW	-0.02 (-0.41)	-0.05 (-1.12)	-0.03 (-0.78)
ROA	0.08 (11.21)	0.06 (3.18)	
Adj. R^2	0.29	0.10	0.26
N= 544			

<Definition of variables> LC=a value 1 when a firm report current loss; IC=a value 1 when a firm change industry; OC=a value 1 when a firm change largest stockholders; CFO= the ratio of cash from operations to the beginning total assets(BTA); LEV= the ration of debts to total assets; SIZE= natural log of the total assets at the end of the year; GRW= the growth of sales; ROA= return on assets; DA1(2, 3)= discretional accrual through model 1(2, 3).

4. 3 Robust check

Corporate name would have changed by the interaction of multiple factors, by not just one factor. For example, corporate name change could be happened that the largest stockholders have changed by disposition of shares or the management right abundantly due to current bad performance. Largest stockholders could be changed following the industry consolidation or continued corporate restructuring. So we investigate the effect the interaction of multiple factors on discretionary accruals when corporate name change reasons are interplayed and table 5 reports that the regression result.

Table 5
Regression of discretionary accruals on the reasons for name changes with interaction terms

DA1(DA2, DA3)$_{it}$= b_0 +b_1LC+b_2IC+b_3OC+b_4LCIC+b_5LCOC+b_6ICOC+b_7LCICOC +b_8CFOit+b_9LEV$_{it}$+b_{10}SIZE$_{it}$+b_{11}GRW$_{it}$+b12ROAit+e_{it}

	DA1	DA2	DA3
Intercept	-5.32 (-4.29)	-0.29 (-0.24)	-4.66 (-3.77)
LC	**-0.50 (-3.33)**	**-0.38 (-2.38)**	**-0.40 (-2.63)**
OC	**0.60 (2.90)**	0.38 (1.78)	**0.56 (2.70)**
IC	-0.11 (-0.20)	-0.08 (-0.16)	-0.17 (-0.32)
LCOC	**-0.83 (-3.50)**	**-0.64 (-2.60)**	**-0.66 (-2.77)**
LCIC	0.13 (0.21)	0.12 (0.20)	0.18 (0.30)
ICOC	-0.34 (-0.54)	-0.28 (-0.44)	-0.22 (-0.36)
LCICOC	0.46 (0.66)	0.46 (0.63)	0.28 (0.40)
CFO	-0.91 (-11.80)		-0.95 (-12.33)
LEV	-0.47 (-3.91)	-0.37 (-2.95)	-0.10 (-0.81)
SIZE	0.23 (4.61)	0.02 (0.51)	0.20 (3.96)
GRW	-0.02 (-0.46)	-0.05 (-1.16)	-0.03 (-0.82)
ROA	0.05 (3.14)	0.03 (2.19)	
Adj. R^2	0.32	0.11	0.29

<Definition of variables> LC=a value 1 when a firm report current loss; IC=a value 1 when a firm change industry; OC=a value 1 when a firm change largest stockholders; LCIC= a value 1 when a loss-reporting firm change industry; LCOC= a value 1 when a loss-reporting firm change largest stockholders; ICOC= a value 1 when a firm change industry and largest stockholders; LCICOC= a value 1 when a loss-reporting firm change industry and largest stockholders; other variables are same with Table 4.

We find that name change by loss-reporting firms(LC) have significantly negative discretionary accruals in all models and corporate name change of largest stockholders change firms have significantly positive discretional accruals in model 1 and 3. And corporate name change by loss-reporting and largest stockholders change firms have significantly negative relationship with discretionary accruals. We find that firms who change corporate name and have changed largest stockholders due to accumulated losses are highly motivated to manage earnings to downward for the next period. It also means the relationship between name change by loss-reporting firms and discretionary accruals is strongest among other purpose.

CONCLUSION

According to our investigation, there is a big increase in corporate name changes by loss-reporting firms even though it is accompanied by non-trivial costs such as consulting fees and corporate identity costs. We find that almost 70% of name change firms report accumulated losses or highly leveraged. In this paper, we focus on the purpose of the earnings management who change their name, different from the prior study.

We examine empirically whether name change firms are associated with discretionary accruals. We further divide the reason of corporate name change into cosmetic change to hide negative earning, organization change following M&A and change of the largest stockholders to examine whether there are differences among the name change reasons.

We find that name change firms have negative discretionary accrual and especially name change with loss-reporting firms are significantly negatively associated with discretionary accruals. And we also investigate the effect the interplay of multiple factors on discretionary accruals when corporate name change purpose is interplayed, therefore we find that name change of largest stockholders change firms who reported negative is significantly negatively related with discretional accrual. It means that the relationship between corporate name change with loss-reporting and discretional accruals is strongest among other purposes.

According to our research, 65% of corporate name change firms say that the reason for the change is the improvement of corporate image. Some of firms changing their names are involved in litigations such as fraud or embezzlement and some of them are watch-list companies by the stock market. And we find that name change of loss-reporting firms have a strong incentive to manage earnings. This result calls the validity of financial statements of name change firms who report bad performance in question. And investors should exercise caution to invest firms changing their names frequently because they could change names to disguise bad performance or negative image.

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MEASURING SOCIAL EFFICIENCY: THE CASE OF ITALIAN MUTUAL BANKS

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ABSTRACT

Recent decades have seen lively debate on the definition and measurement of the multiple Corporate Social Performance (CSP) dimension. Within this framework, this study aims to determine a bank-specific Social Efficiency Score (SES) using Data Envelopment Analysis (DEA) on a sample of 82 Italian Mutual Banks (IMBs) in 2010-2011. The comparison between SESs, obtained by DEA (deaSES) and equal weight aggregation (ewSES) highlights a remarkable difference in ranking. With the aggregation method, if banks underperform on some CSP dimensions, they will tend to have low ewSES. Otherwise, DEA, by assigning a weighted variable to each CSP dimension, reduces the weight of the poor performance dimension and increases the weight of the highest one. The distinctive features of DEA are both its endeavour to determine the optimal trade-off between input and social output, and its lower "sensitivity" to weight changes. In order to contribute to the large body of academic literature focused on the relationship between CSP and financial performance, the SES, determined through the input (bank efficiency variable) and output (CSP dimension proxied) DEA framework, is combined with financial performance measures (size, ROA, bank productivity, credit risk, non-performing credit). The degree of SES, affected by financial measures, shows a negative relationship with size, highlighting that the increase in social efficiency is largely due to the relationship between customers and banks, credit policy, creditworthiness assessment and trust among bank members. Positive relationships are instead shown by profitability as a key factor in future sustainability and social efficiency, productivity as better customer satisfaction, and the degree of coverage of the credit risk as greater flexibility in choices and strategies in pursuing specific member interests.

INTRODUCTION

The academic literature has paid close attention to defining and measuring Corporate Social Performance (CSP). Its "integrative nature" (Wartick & Cochran, 1985), composed of the three facets of social responsibility, social responsiveness and social issues (Carroll, 1979), simultaneously reveals its multiple dimensions and its dynamic framework. Although there is "only one social responsibility of business" (Friedman, 1970), in recent decades a lively debate has centred on definition of CSP and the interests pursued by corporate leaders (Madsen & Bingham, 2014). Moreover, the lack of both a univocal definition of CSP and a systematic methodology for measuring it (Ruf, Muralidhar & Paul, 1998) has spurred authors to provide indicators that could be helpful in this task.

The measurement of CSP has been the main focus of many empirical investigations based on: 1) structural principles of corporate social responsibility such as legitimacy (Neubaum & Zahara, 2006; Cox, Brammer & Millington, 2008) and public responsibility (Longo, Mura & Bonoli, 2005); b) CSP outcomes such as disclosure (Freedman & Stagliano, 1991), environmental impacts (Chen & Metcalf, 1980), customer impacts (Rundle-Thiele, Ball & Gillespie, 2008), employees impacts (Jones & Murrel, 2001), and reputation (Griffin & Mahon, 1997). Despite all these studies, there is no consensus on aggregate CSP measures with which to assess the overall corporate social performance of firms.

Within this framework, the aim of this study is to measure the overall CSP dimension using a methodology based on Data Envelopment Analysis (DEA). The CSP measures will focus on a sample of 82 (the only ones with social reports published) Italian Mutual Banks (IMBs) during the time period 2010-2011. Following Chen & Delmas (2010), but differing from their method in the selection of input and output variables, the DEA approach allows determination of a ratio which is interpretable as a social efficiency measure. Moreover, once the social efficiency score (SES) has been estimated, the next step is to analyse the impact on it of certain financial characteristics (size, ROA, bank productivity, credit risk, non-performing credit), contributing to the large body of academic literature focused on the relationship between CSP and financial performance (Cochran & Wodd, 1984; Pava & Krauzs, 1996; Griffin & Mahon, 1997; Preston & O'Bannon, 1997; Roman, Haybor & Agle, 1999; Ruf et al, 2001; Simpson & Kohers, 2002; Orlitzky, Schmidt & Rynes, 2003; Cuesta-Gonzàles, Munoz-Torres & Fernandez-Izquierdo, 2006; Callado-Munoz & Utrero-Gonzales, 2009; Soana, 2011; Andersen & Olsen, 2011; Piatti, 2014a).

Overall, the empirical results emphasise the greater strength and robustness of DEA approach compared with aggregate score measures. The comparison between SESs obtained by DEA (deaSES) and equal weight aggregation (ewSES) highlights a remarkable difference in ranking. In particular, with the aggregation method, if banks underperform on some CSP dimensions, they will tend to have low ewSES. On the other hand, DEA, by assigning a weighted variable to each CSP dimension in order to determine the optimal trade-off between inputs and social outputs, reduces the weight of the poor performance dimension and increases the weight of the highest one. The distinctive features of DEA are its endeavour to determine the optimal trade-off between input and social output, set up at the beginning for each bank, and its lower "sensitivity" to weight changes.

Moreover, the choice of treating IMBs is determined both by their lower integration/greater autonomy with respect to other cooperative banks operating abroad (Gutierrez, 2008) and by their business model, which is strongly rooted in the local community (Bongini, Di Battista & Zavarrone, 2007; Boscia & Di Salvo, 2009; E.A.C.B., 2010; Giagnocavo, Gerez & Sforzi, 2012). Their objective function, which is not reducible simply to profit maximization (Fried, Lovell & Vanden Eeckaut, 1993), seems to accommodate the DEA assumption in terms of technological homogeneity of the units as well.

This paper is organized as follows. The following section provides a literature review. The third section outlines social efficiency and its determinants, followed by data description and descriptive statistics. The empirical results are presented in the fifth section. The final section presents the conclusions and the limitations of the study.

REVIEW OF THE LITERATURE

One of the first definitions of Corporate Social Responsibility (CSR) was proposed by Bowen (1953), according to whom a firm has "to make those policies and decisions that are desirable in terms of the objectives and values of our society'' (Bowen, 1953, p. 6). In 1956, Boulding defined CSR as a complex organization and open system intricately connected with its larger environment. Since then, the literature has provided contradictory definitions of the concept (Davis, 1973; Carroll, 1979; Wartick & Cochran, 1985; Carroll, 1991; Carroll, 1999; Mohr, Webb & Farris, 2001; Garriga & Melé, 2004; Lyon & Maxwell, 2007; Turker, 2009; Wood, 2010).

Because there is no univocal definition of CSP, there is still no systematic methodology for measuring it (Ruf, Muralidhar & Paul, 1998). In this regard, some authors have proposed broad sets of indicators that could be used for this purpose, such as: a) pollution indices (Bragdon & Marlin, 1972; Chen & Metcalf, 1980; Kedia & Kuntz, 1981; Freedman & Jaggi, 1986; Griffin & Mahon, 1997); b) the social disclosure shown in financial reports and assessed by content analysis (Ullmann, 1985; Piatti, 2014b); c) perceptual measurements derived from questionnaire-based surveys (O'Neil, Saunders & McCarthy, 1989; Ruf, Muralidhar & Paul, 1998); d) Corporate Reputation indicators like, for example, the Corporate Reputational Index (CRI) measured by *Fortune Magazine* (Tichy, Mcgrill & St. Clair, 1997; Stanwick & Stanwick, 1998), or the degree of compliance with the Community Reinvestment Act (Simpson & Kohers, 2002); e) the ethical rating agencies (Van De Velde, Vermeir & Corte, 2005; Brammer & Pavelin, 2006; Soana, 2011) or the Domini Social Index 400 issued by Kinder, Lyndenberger, Domini & Co., or sustainability Indexes like the Dow Jones Sustainability World Index (DJSWI) and The Financial Times Stock Exchange Good.

All the methods outlined have made important contributions to research, but each of them has limitations. Several authors have described the challenges of measuring CSP due to its many facets (Graves & Waddock, 1994; Carroll, 1999). This multi-dimensionality is the prime obstacle to measuring CSP. In fact, numerous variables may affect CSP, including community and society, corporate governance, customer, employee, environment, human rights, controversies, business activities (Mahoney & Roberts, 2007).

Moreover, there is disagreement in the literature on how to convert this multi-dimensional vector of values into a one–dimensional vector (Berman, Wicks, Kotha & Jones, 1999; Johnson & Greening, 1999). In this regard, most empirical studies on CSP employ: 1) simple linear aggregations, weighted (Waddock & Graves, 1997; Ruf, Muralidhar & Paul, 1998) or non-weighted (Hillman & Keim, 2001), 2) utility theory and 3) the Analytic Hierarchy Process. Conversely, other empirical studies have treated each of the variables as an independent dimension of CSR, finding that each has a different effect on other corporate outcomes (Berman, Wicks, Kotha & Jones, 1999; Backhaus, Stone & Heiner, 2002).

The aggregated score lacks a simple interpretation, and when a different data source is used, the weights and aggregated scores may lose their applicability and comparability (Mitchell, Agle & Wood, 1997; Rowley & Berman, 2000; Hillman & Keim, 2001; Bird, Hall, Momente & Reggiani, 2007). Moreover, the literature has demonstrated that aggregation methodologies fail to provide an effective measure of CSP.

Both Bendheim, Waddock & Graves (1998) and Chen & Delmas (2010) attempt to overcome this problem by proposing an alternative methodology with which to calculate CSP, based on Data Envelopment Analysis (DEA). In their research, Chen & Delmas (2010) consider CSP concerns as inputs (i.e., factors to be minimized) and CSP strengths as outputs (i.e., factors to be maximized). Thus the DEA score can account for the trade-off between positive and negative CSP indicators. Using DEA, Chen & Delmas (2010) found a ratio which is interpretable as a social efficiency ratio that combines all the CSP dimensions. Following these authors, this paper uses DEA to compute social efficiency, but it differs from their method in its selection of input and output variables. Inputs are chosen according to studies on bank efficiency (Farrel, 1957; Colwell & Davis, 1992; Favero & Papi, 1995; Berger & Metser, 1997; Cavallo & Rossi, 2000; Goddard, Molyneux & Wilson, 2001; Casu & Molyneux, 2003; Girardone, Molyneux & Gardener, 2004; Fethi & Pasiouras, 2005) whereas the outputs are represented by the variables proxying the CSP dimensions. In this context, DEA is an instrument able to deal with the multi-dimensionality of social performance.

SOCIAL EFFICIENCY AND ITS DETERMINANTS

Following Chen & Dalmas (2010), an input-output oriented DEA framework will be used to compute the bank-specific social efficiency scores (henceforth SES). DEA is a mathematical programming method for evaluating the relative efficiencies of firms (Charnes, Cooper & Rhodes, 1978; Cook & Zhu, 2006) that does not require *a priori* weights to aggregate different CSP dimensions. Since DEA does not require explicit specification of the production function, it is particularly suitable for analyzing the efficiency of non-profit institutions (Bagnoli & Megali, 2011) and, more generally, of multi-input, multi-output organizations. In particular, the choice of non-parametric methods appears to be particularly appropriate in the case of mutual banks since: a) they are characterized by an objective function not reducible simply to profit maximization (Fried, Lovell & Vanden Eeckaut, 1993) and b) the assumption of technological homogeneity of the units behind the DEA is more plausible in the case of mutual banks than in that of sets embracing commercial banks of widely different sizes and specialization (Lopez, Appennini & Rossi, 2002).

As a limitation, to be noted is that DEA does not allow random errors to be taken into account, with the risk of confusing random deviations with deviations from the efficient frontier (Coelli, Prasada Rao, O'Donnel & Battese, 2005; Sherman & Zhu, 2006).

DEA can be helpful in assessing meaningful weights or rankings for CSP dimensions since it allows weights to be variable, and the following optimization problem determines the weights (equation 1 and 2 for firm 1):

$$Max \sum_{r=1}^{s} u_r y_{1,r} / \sum_{i=1}^{m} v_i yx_{1,i} \quad (1)$$

subject to

$$\sum_{r=1}^{s} u_r y_{j,r} / \sum_{i=1}^{m} v_i yx_{j,i} \leq 1, \ for\ j=1,\ldots,n,\ u_r \geq 0\ for\ 1,\ldots,s\ v_i \geq 0\ for\ i=1,\ldots,\ m. \quad (2)$$

The DEA score represents the distance between the firm and the efficiency target. Scores can range from 0 (maximum inefficiency) to 1 (maximum efficiency). Specifically, the greater the distance from the efficient frontier, the lower the score.

The choice of inputs and outputs is a key issue in DEA. Following Lopez, Appennini & Rossi (2002), we adopt a model compatible with the user cost theory and the value added approach (Berger, Hunter & Timme, 1993) for the selection of inputs, which accordingly are: number of employees (Seiford & Zhu, 1999; Luo, 2003), number of branches (Resti, 1997) and other administrative costs (operating cost minus personnel costs). Given a set of production inputs, the bank can satisfy the stakeholders' requirements. Accordingly, we select as outputs five variables which proxy five main dimensions of CSP, covering the principal stakeholders (Igalens & Gond, 2005): Environment, Clients and Suppliers, Human Resources, Community and Civil Society and Corporate Governance. Even if there is no consensus in the literature on the dimensions of social responsibility, our selection of dimensions was influenced by the availability of evaluation data and the fact that these dimensions reflect the social issues that have been used in prior research (Rockness & Williams, 1988; Harte, Lewis & Owen, 1991; Kurtz, Lydenberg & Kinder, 1992; Piatti, 2014).

This choice of using social dimensions as outputs distinguishes our analysis from that of Chen & Delmas (2010), who use as input to minimize the CSP concerns and as outputs to maximize the CSP strengths, in order to take account of the trade-off between positive and negative CSP indicators.

Table 1 shows the proxies for the inputs and outputs of our analysis.

Table 1
Set of indicators used to proxy input and output variables in DEA

	Input/Output Variables	**Input/Output Proxy**	**Micro level Indicators**	**Source of data***
Input	Employees	Number of employees	Number of employees	AR
	Branches	Number of branches	Number of branches	AR
	Other administrative	Other administrative	Operating costs – personnel costs	AR

	costs	costs		
Output	Environment	Energy saving	$\left[\frac{1}{\frac{energy\ costs}{number\ of\ branches}}\right]$	AR
	Clients and suppliers	Economic convenience for clients	$\left[\frac{1}{\frac{average\ interest\ rate\ on\ loans+fee\ income}{loans\ to\ customers}}\right]$ (1)	AR
	Human resources	Attention to the personnel training	Training hours per employees (1)	SR
	Community and society	Local community advantage	Donations and sponsorship/total economic value	SR
	Corporate governance	Ability in attracting of members	Number of members/number of branches (1)	SR
* AR stands for annual report (management report, balance sheet, income statement and notes to the financial statements) and SR stands for social report.				

In Table 1, the indicators labelled (1) may assume very high values. Thus, following Gutierrez-Nierto, Serrano-Cinca & Mar Molinero (2009), in order to facilitate the comparison we have standardized their values to the 0,1 range, subtracting for each variable its minimum and dividing by its range (max value - min value of the distribution).

DEA computes an efficient frontier that represents the best performers in a peer group, and the DEA score is easy to interpret. In fact, if the score for the it_h bank is, for example, 0.8, this means that there exists a virtual bank on the frontier able to reach the same social output as the it_h bank using only 80% of the input of the it_h bank.

Once the efficiency score has been obtained, the next step is to analyze its determinants. Extensive research has been undertaken in this area; but in general, studies have focused on the relationship between CSP and financial performance (Cochran & Wodd, 1984; Griffin & Mahon, 1997; Preston & O'Bannon, 1997; Roman, Haybor & Agle, 1999; Simpson & Kohers, 2002; Orlitzky, Schmidt & Rynes, 2003; Cuesta-Gonzàles, Munoz-Torres & Fernandez-Izquierdo, 2006; Callado-Munoz & Utrero-Gonzales, 2009; Andersen & Olsen, 2011; Soana, 2011; Piatti, 2014) ignoring several factors, other than financial performance, that can affect CSP. A prime example of such a study is that by Campbell (2007), who proposes, in a comprehensive institutional theory of CSP, an explanation of such CSP determinants as profitability, size, the degree of competition and the competitive advantage (Porter & Kramer, 2006), the legal environment, the regulation, the business education level and the relationship between employer and employee. Chih, Chih & Chen (2010), in applying Campbell's (2007) studies to financial firms in many countries, find that financial firms in countries with a higher level of legal enforcement and more cooperative employer-employee relationships tend to act in a more socially responsible way, whereas profitability is not related to CSP. On the other hand, Artiach, Lee, Nelson & Walker (2010) investigate the factors driving high levels of CSP for listed non-financial firms. They argue that, beside profitability and size, leverage, free cash flow, innovation and product differentiation can also affect the sustainability performance. Hence, firms with high levels of CSP are expected to be larger, more profitable, with greater cash resources and lower leverage.

In this paper, we test, in particular, the extent to which some financial characteristics can impact on the efficiency score by considering the following equation 3:

$$SES_{i,t+1}=\beta_0+\beta_1 Size_{i,t}+\beta_2 Roa_{i,t}+\beta_3 Prod_{i,t}+\beta_4 Riskcreditcov_{i,t}+\beta_5 Badcredit_{i,t}+\sum_{j=2}^{4} Loc_{i,t}+\varepsilon_{i,t} \qquad (3)$$

where:

$SES_{i,t+1}$ is the social efficiency score obtained by DEA for the it$_h$ bank at time $t+1$; *Roa* is the return on assets for bank i at year t; *Prod* is the productivity of bank i at time t computed by dividing the sum of loans and due to customers by the number of employees; *Riskcreditcov* is the coverage of credit risk of bank i at time t, obtained by dividing individual and collective adjustments by gross exposure (performing and non-performing); *Badcredit* is the gross non-performing credit of bank i at time t to gross exposure (performing + non-performing); *Loc* of the bank i at time t is a categorical variable which takes the value of 1 for banks located in the North-West of Italy, the value of 2 for banks located in the North-East, the value of 3 for banks located in the Centre, and the value of 4 for banks located in the South.

The first two independent variables of equation 3 have been chosen on the basis of the literature (Fombrun & Shanley, 1990; Chih, Chih & Chen, 2010). The other exogenous variables specified in equation 3 are strictly linked to specific characteristics of IMBs (Resti, 1997; Lopez, Appennini & Rossi, 2002; Girardone, Molineux & Gardener, 2004; Battaglia, Farina, Fiordelisi & Ricci, 2010; Stefancic, 2010; Giagnocavo, Gerez & Sforzi, 2012). By contrast, external factors such as indicators related to the macro-economic and financial sector environment, taxation and regulatory variables and education level (Chih, Chih & Chen, 2010) do not depend on the bank and are common across all the IMBs under analysis. Thus, these external variables have not been introduced.

A Tobit model was used to estimate equation 3 to avoid possible distortions due to fact that the dependent variable (SES) is constrained between the values of 0 and 1 (Cameron & Trivedi, 2009).

Data for two consecutive years are needed because a one year lag between social efficiency and its determinant variables is used to control for potential endogeneity. This time lag is also used by Waddocks & Graves (1997) to test the potential relationship between CSP and FP.

DATA AND DESCRIPTIVE STATISTICS

The analysis focused on a sample of 82 IMBs referred to the 2010-2011 period and representing 41.8% of the total assets of IMBs. In particular, only 82 of 398 IMBs were chosen because the other banks did not publish their social reports updated to 2011 on the website. Table 2 shows the geographical distribution of the IMBs.

Table 2
Sample structure of the 82 IMBs on the basis of geographical location

Location	Number of Mutual Banks	Frequency

North-West	14	17.07%
North-East	37	45.12%
Middle	21	25.61%
South	10	12.20%
Italy	82	100.00%

The data for social efficiency were taken from social reports and from the financial statements of banks. Tables 3 and 4 respectively report the descriptive statistics and the correlations of all the variables outlined in the methodology description.

Table 3

Descriptive statistics of the input/output variables and variables affecting social efficiency

Variables	Mean	Median	Std dev	Skewness	Kurtosis	Min	Max
Input=Number of Branches	18.561	14.500	17.139	4.649	32.097	3.000	140.000
Input=Number of Personnel	147.415	106.500	153.308	4.927	34.639	18.000	1255.000
Input=Other Administrative Costs	6500.366	4420.500	7249.582	5.574	41.798	1182.000	61529.000
Output=Environment	0.089	0.089	0.025	-0.009	2.983	0.024	0.147
Output=Customers	0.364	0.368	0.140	-0.026	3.090	0.010	0.718
Output=Employees	0.329	0.328	0.140	0.511	3.331	0.043	0.783
Output=Community	0.030	0.026	0.021	4.234	29.161	0.004	0.175
Output=Governance	0.298	0.263	0.198	1.038	4.086	0.005	0.970
Size = log_total assets	13.322	13.256	0.772	0.222	3.825	11.244	15.857
Roa	0.004	0.004	0.003	-1.560	10.227	-0.010	0.013
Productivity	8463.846	8419.461	1757.090	-0.916	5.647	1011.176	11584.950
Credit risk coverage	0.257	0.247	0.104	1.008	4.143	0.067	0.598
Bad customers	0.066	0.064	0.030	0.575	2.798	0.017	0.147

For output specification refer to Table 2; Roa is return on assets; productivity = (loans + due to customers)/number of employees; credit risk coverage = individual and collective risk adjustment/gross exposure; bad credit = gross non-performing credit/(gross performing and non-performing credit).

Table 4

Correlation structure between input/output variables and variables affecting social efficiency

	N. branch	N. person	OAC	Envir.	Custom	Empl	Comm	Govern	Size	Roa	Prod	Credit Risk	Bad Credit
Input= N. Branch	1												
Input= N. Person	0.9	1											
Input= Other Administrative Costs	0.9	0.9099	1										
Output= Environment	0.2	0.3251	0.3597	1									
Output= Customers	-0.4	-0.413	-0.375	-0.066	1								
Output=	-0.3	-0.347	-0.319	-0.256	0.0906	1							

Employees													
Output= Community	0	0.0695	0.072	-0.058	-0.057	0.0854	1						
Output= Governance	0.2	0.1464	0.1864	0.0875	0.0046	-0.085	0.1225	1					
Size	0.8	0.8793	0.8976	0.3581	-0.504	-0.34	0.1161	0.203	1				
Roa	-0	-0.004	-0.08	-0.002	-0.148	-0.028	0.041	0.0154	0.0399	1			
Productivity	0.2	0.2788	0.4235	0.1883	-0.59	-0.042	0.1727	0.1086	0.577	0.2	1		
Credit Risk	-0.1	-0.085	-0.134	0.0742	0.4307	0.0372	-0.0601	0.0404	-0.176	-0	-0.388	1	
Bad Credit	-0	-0.042	0.0133	0.0509	0.1118	-0.091	-0.0338	-0.1307	-0.068	-0	-0.072	-0	1

EMPIRICAL RESULTS

The social efficiency scores, obtained by applying DEA to the inputs (number of branches, number of employees, other administrative costs) and outputs relating to the social dimensions, are summarized in Table 5 for year 2010 and Table 6 for year 2011. These tables show the descriptive statistics of the SES with reference to the geographical location of the banks. Table 10 (in appendix 1) instead summarizes the SES with reference to each bank. To allow comparison, besides the SES by DEA (deaSES), the table displays the social efficiency scores obtained by simply summing equal weighted output variables (ewSES).

Table 5

Average Social Efficiency Score (SES) obtained by applying DEA and equal weight aggregation (Year 2010)

	deaSES					**ewSES**	
Location	**Mean**	**Median**	**Std Dev**	**Min**	**Max**	**Mean**	**Std Dev**
North-West	0.32463	0.26662	0.24825	0.08032	0.79806	0.2283602	0.052494
North-East	0.39628	0.34454	0.21257	0.10934	1	0.2671385	0.0605346
Middle	0.53365	0.42138	0.26556	0.03459	1	0.2084728	0.0447184
South	0.71087	0.72479	0.28889	0.30061	1	0.1954004	0.0552306
Italy	0.45759	0.37773	0.26618	0.03459	1	0.2367451	0.061286

The table was constructed by using DEA with the following inputs: number of branches, number of employees, other administrative costs and the following outputs: environment, customers, employees, community and governance. SES with equal weights were built by summing each equally weighted output variable.

Table 6 Average Social Efficiency Score (SES) obtained by applying DEA and equal weight aggregation (Year 2011)								
ses with DEA							ses with equal weight	
Location	**Mean**	**Median**	**Std Dev**	**Min**	**Max**	**Variations with respect 2010**	**Mean**	**Std Dev**
North-West	0.38386	0.27084	0.27423	0.12922	0.98479	5.9%	0.21572	0.04401
North-East	0.46888	0.41186	0.22765	0.14449	1	7.3%	0.24625	0.06207
Middle	0.57715	0.53179	0.25314	0.04855	1	4.3%	0.19835	0.03266
South	0.64880	0.59356	0.26180	0.34315	1	-6.2%	0.18973	0.04805
Italy	0.50403	0.44258	0.25607	0.04855	1	4.6%	0.22188	0.05561

The table was constructed by using DEA with the following inputs: number of branches, number of employees, other administrative costs and the following outputs: environment, customers, employees, community and governance. Ses with equal weight were built by summing each output variable equally weighted.

As shown by Table 6, the average deaSES computed, in 2011 as a whole, is rather low (around 50%) even if there is an improvement compared to that observed in 2010. This improvement is evident for all macro-areas with the exception of the South, for which a significant deterioration in the social performance of 2011 is apparent when compared to that of 2010.

The breakdown of SES on the basis of the IMBs' location appears very interesting. In particular, the mutual banks located in the South are the most socially efficient ones (SES equal to 64.9%) followed by those located in the Centre of Italy (SES equal to 57.7%). As corroborated by F-Test, ($F=(3.160)=9,25$ $p<0.001$, the variance among groups is homogeneous by Levine's test), these differences appear to be statistically significant between: a) mutual banks located in the North-West and those located in the Centre and in the South; b) mutual banks in the North-East and in the South.

Next to deaSES, Table 10 (in appendix 1) includes the ewSES computed by aggregating the output value with the same weight for each bank. DeaSES and ewSES are significantly different at 1-percent significance level (Ttest = 6.3764 p=0.0000 and Wilcoxon test z= 5.185, p=0.000). Moreover, there is no significant correlation between the two ranks by Kendal's tau coefficient.

In Table 10, only three of the highest 10 banks with equal weight aggregation are also socially efficient by DEA, and many banks that record a very high deaSES perform poorly with aggregation scores. This means that the aggregation score with equal weight cannot be considered as key information. Even if we used unequal weights, we would not solve the problem because the weights would be subjective. These differences can possibly be explained by considering that, with aggregation methods, banks tend to have low scores if they underperform on some CSP dimensions (Chen & Delmas, 2010). By contrast, the DEA model assigns a weighted variable to each CSP dimension to determine the optimal trade-off between input and social output for the bank evaluated. In order to facilitate understanding of the differences in ranking, it is useful to describe in greater detail the ranking of the five first social efficiency banks reported in Table 7. The first row of the table shows the bank's ranking on the basis of deaSES. The second row displays the bank's ranking on the basis of ewSES. The other rows show the values of the variables used to proxy CSP dimensions and the rank of each stand-alone dimension (in brackets). To be pointed out is that, in Table 7 the values of each CSP dimension are standardized to the 0,1 range, as already defined. As a consequence, the higher the value, the higher the rank for each variable. Note that the higher the rank, the lower the number representing it. On comparing the first two rows of Table 7, one notes that only bank C shows a high ranking (1) in both the DEA and equal weight method. Consideration of the individual scores for each of these banks can help explain the reason. Bank A presents very good performance on the governance and customers dimensions and low performance on environment, employees and community. Then the DEA model will reduce the weight of the poor performance dimensions and increase the weight of the high performance dimensions. In equal weighted aggregation, by contrast, low performance dimensions will tend to reduce the overall scores. For the same reason, bank E, which is efficient for DEA, is placed only in 20th place in the ranking by the equal weight aggregation method. In fact, it shows good performance on environment and employees but very bad performance on governance and customers, therefore penalizing its overall efficiency. The DEA model, by contrast, will try to determine the optimal trade off between input and social output for each bank.

Table 7
Ranking details for the first five social efficient banks

CSP dimensions	**CRU DI CALDONAZZO BCC (A)**		**ISOLA D'ELBA BCC (B)**		**BCC DI SAN BIAGIO PLATANI (C)**		**BANCA DI UDINE BCC (D)**		**BCC DI PITIGLIANO (E)**	
Rank by DEA	**100.0%**	**(1)**	**100.0%**	**(1)**	**100.0%**	**(1)**	**100.0%**	**(1)**	**100.0%**	**(1)**
Rank by EW	**46.9%**	**(7)**	**38.5%**	**(14)**	**51.0%**	**(1)**	**48.5%**	**(6)**	**36.5%**	**(20)**
Environment	50.3%	(47)	86.5%	(4)	38.5%	(63)	73.5%	(15)	80.9%	(9)
Customer	60.4%	(4)	0.0%	(82)	17.3%	(78)	42.2%	(30)	22.7%	(68)
Employees	23.6%	(59)	18.7%	(73)	26.7%	(53)	78.3%	(1)	49.4%	(10)
Community	18.3%	(26)	11.9%	(44)	100.0%	(1)	12.5%	(42)	19.8%	(19)
Governance	81.7%	(2)	75.2%	(3)	71.5%	(4)	36.2%	(26)	9.8%	(73)

The values of the CSP dimensions are standardized to the 0,1 range by subtracting for each variable its minimum and dividing by its range (max value - min value of the distribution). In parentheses the ranking for each variable.

As already said, the degree of social efficiency may be affected by several determinants. These determinants have been chosen partly by drawing on the literature and partly by considering the specific characteristics of mutual banks. After identifying the correlation among variables (Table 8), we used Tobit regression to estimate their impact on deaSES.

Table 8 Correlation between the deaSES and its determinants						
	DeaSES	**Size**	**Roa**	**Productivity**	**Credit risk coverage**	**Bad credit**
deaSES	1					
Size = log_ta	-0.8192	1				
Roa	-0.016	0.1955	1			
Productivity	-0.3417	0.5517	0.3415	1		
Credit risk coverage	0.1683	-0.1797	-0.1987	-0.3885	1	
Bad credit	0.0694	-0.1452	-0.4231	-0.0902	-0.363	1

Table 9 displays the results of the regression conducted. The estimations are split into two models to allow for the location of the banks.

Table 9 Regression results: dependent variable deaSES		
	DeaSES 2011	**Dea SES 2011**
	Model 1	**Model 2**
Size	-0.299***	-0.305***
	(0.02480)	(0.02880)
Roa	12.08**	12.56**
	(5.93000)	(6.10700)
Productivity	0.0000221**	0.0000215**
	(0.00001)	(0.00001)
Credit risk coverage	0.299	0.457*
	(0.22300)	(0.23700)
Bad credit	0.561	0.914
	(0.83300)	(0.80900)
North-East		0.0468
		(0.03390)
Middle		-0.00223
		(0.04980)
South		-0.0359
		(0.07360)
Constant	4.126***	4.139***
	(0.33100)	(0.38400)
σ Constant	0.137***	0.135***
	(0.01220)	(0.01210)
N. Observations	82	82
Pseudo R^2	12.27	12.578
Loglikelihood	46.6836	47.9596

This table reports Tobit regression estimates. The dependent variable is SES computed by DEA in 2011. The covariates are: size (logarithm of total assets); Roa (return on total assets); productivity (ratio between the sum of loans and customer due to number of employees); credit risk coverage (ration between individual and collective risk adjustment and the gross performing and non-performing exposure); bad credit (non-performing credit to loans); North-East, Centre and South are categorical variables for locations. All statistics are corrected for heteroskedasticity and autocorrelation in the residual. Standard errors are in brackets. *, **, ***, indicate significance levels of 10%, 5% and 1%, respectively.

The size shows a negative and statistically significant coefficient. Even if in most of literature the sign is positive, a negative coefficient is not surprising for mutual banks. It is not surprising for two reasons: 1) in this paper we have not considered technical efficiency, but rather social efficiency, i.e. the way in which the bank answers to its stakeholders; 2) the mutual nature is the main elements characterizing the mutual banks. These characteristics are inherent in every mutual bank irrespective of its size. The negative sign of the coefficient shows that it is not size in itself that generates an increase of social efficiency, but rather the relationship between customers and banks, credit policy and the methods used by banks to assess creditworthiness, and trust among bank members (Manetti & Bagnoli, 2013). Paradoxically, these specific "soft" elements can be reduced if the size of banks increases; and this may explain the sign of the coefficient.

In line with the findings in the literature (Chih, Chih & Chen, 2010), profitability shows a positive and statistically significant coefficient. In this regard, one considers that the only opportunity for IMBs to strengthen their equity is the profits that are not distributed, if not marginally. Profitability is therefore a key element of future sustainability. Moreover, since it allows policies more favorable to the various classes of stakeholders, it impacts on the degree of social efficiency as well.

The productivity variable shows a positive and statistically significant value. In effect, greater productivity makes it possible to satisfy customers' needs better; moreover, it enables banks to expand their range of opportunities. To be noted is that the significance of the coefficient remains unchanged regardless of whether a categorical variable like the bank's location is introduced. Note also that location does not seem to affect the degree of social efficiency.

The degree of coverage of the credit risk, and therefore the garrison against this risk, seems positive and statistically significant only in model 2, with the presence of the location variable. A greater degree of coverage allows greater flexibility in choices and strategies, and enables mutual banks to pursue their members' specific interests.

CONCLUSIONS

Over the years, the challenges of measuring CSP have received considerable attention in the academic literature. In this way, all efforts and attempts to delineate it should take account of the threefold dimensional integration, i.e. corporate social responsibility, corporate social responsiveness, and social issues (Carroll, 1979). However, if the "integrative nature" of CSP is unique (Wartick & Cochran, 1985), the non-univocal definition of CSP leads to a lack of a systematic methodology for measuring it (Ruf, Muralidhar & Paul, 1998).

On a sample of 82 IMBs during the time period 2010-2011, this study has sought to measure the overall CSP dimension using a methodology based on DEA. The latter allows the determination of a ratio interpretable in terms of social efficiency as a combination of the entire CSP dimension. Thereafter, the social ratio is assessed through certain financial characteristics (size, ROA, bank productivity, credit risk, non-performing credit) that may have an impact on it. Following Chen & Dalmas (2010) on the use of DEA approach, this paper has differed from their method in its selection of input and output variables. More specifically, the input factors have been based on several studies conducted on bank efficiency (Farrel, 1957; Colwell & Davis, 1992; Favero & Papi, 1995; Berger & Metser, 1997; Cavallo & Rossi, 2000; Goddard, Molyneux & Wilson, 2001; Casu & Molyneux, 2003; Girardone, Molyneux & Gardener, 2004; Fethi & Pasiouras, 2005) whilst the outputs are represented by the variables proxying the CSP dimensions.

A key aspect concerns the determination of SESs obtained by DEA (deaSES) and by summing equal weighted output variables (ewSES). Their comparison highlights a remarkable difference in ranking. In particular, with the aggregation method, if banks underperform on some CSP dimensions, they tend to have low ewSES. On the other hand, DEA, by assigning a weighted variable to each CSP dimension, in order to determine the optimal trade-off between input and social output, reduces the weight of the poor performance dimension and increases the weight of the highest one.

The distinctive features of DEA are its endeavour to determine the optimal trade-off between input and social output, set up at the beginning for each bank, and its lower “sensitivity” to weight changes. Overall, the main results show that, while the average deaSES (referred to 2011 as a whole) is rather low at around 50%, the subdivision on the basis of IMBs’ locations appears to be very interesting. In particular, the mutual banks located in the South of Italy are the most socially efficient, 64.9%, followed by those located in the Centre of Italy, 57.7%.

Furthermore, the degree of social efficiency is affected by certain financial measures (size, ROA, bank productivity, credit risk, non-performing credit). The negative relationship between size and SES corroborates that the increase in social efficiency is largely due to the relationship between customers and banks, credit policy, creditworthiness assessment, and trust among bank members (Manetti & Bagnoli, 2013). Positive relationships are instead shown by profitability as a key factor in future sustainability and social efficiency, productivity as better customer satisfaction, and the degree of coverage of the credit risk as greater flexibility in choices and strategies in pursuing specific member interests.

As regards limitations, the first concerns the impossibility of distinguishing, in a DEA approach, random errors from deviations from the efficient frontier (Coelli, Prasada Rao, O’Donnel & Battese, 2005; Sherman & Zhu, 2006).

A major limitation, moreover, concerns the small data sample on which the empirical analyses have been conducted. Using only cross-sectional data for 2010-2011 may have led to neglect of some dynamic effects across banks and over the years. The use of longitudinal data could represent a future and more interesting direction for analysis, in a more heterogeneous and dynamic perspective, of the social and financial relationships among banks, stakeholders and environment.

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Appendix 1

Table 10
Social efficiency scores for each bank in the sample for year 2010-2011.
The banks are ranked on the basis of 2011 deaSES

nome_banca	Loc	DEA_SES 2011	Var	ses_ew	Var	Rank DEA	Rank EW
CRU DI CALDONAZZO BCC	NE	100.00%	0.00%	46.87%	2.44%	1	7
ISOLA D'ELBA BCC	MID	100.00%	0.00%	38.46%	2.11%	1	14
BCC DI SAN BIAGIO PLATANI	South	100.00%	0.00%	51.02%	1.54%	1	1
BANCA DI UDINE BCC	NE	100.00%	41.00%	48.53%	7.06%	1	6
BCC DI PITIGLIANO	MID	100.00%	19.69%	36.51%	5.00%	1	20
CRA DI BOVES BCC	NW	98.48%	18.67%	48.55%	4.60%	2	5
BCC DI SALA DI CESENATICO	NE	96.05%	23.04%	32.61%	-2.34%	3	41
BANCA DI ANCONA BCC	MID	94.94%	37.15%	35.33%	3.64%	4	25
BCC DELLA VALLE DEL TRIGNO	South	94.81%	-5.19%	33.52%	-2.90%	5	37
BCC CRA DI SAN GIOVANNI	South	91.41%	-8.59%	34.55%	0.42%	6	30
BCC SANGRO TEATINA	South	87.03%	-12.97%	41.48%	-4.86%	7	11
BCC DI CIVITANOVA MARCHE	MID	83.30%	39.17%	34.53%	2.29%	8	31
BCC DEL TUSCOLO	MID	82.97%	7.96%	30.35%	3.57%	9	56
BCC REGGIANO	NE	82.01%	26.37%	46.58%	2.58%	10	8
CRA DELL'AGRO PONTINO	MID	81.58%	21.89%	27.98%	1.14%	11	67
BANCA COLLI EUGANEI	NE	80.50%	-8.25%	32.07%	-5.65%	12	46
BCC DEL BASSO SEBINO	NW	74.58%	7.71%	31.20%	3.44%	13	49
BCC DI MONTERENZIO	NE	72.67%	-8.01%	29.70%	-2.93%	14	58
BCC DI BORGHETTO LODIGIANO	NW	69.69%	-1.35%	33.72%	-1.47%	15	36
CRU BASSA VALLAGARINA BCC	NE	68.69%	20.39%	50.25%	11.19%	16	2
CRU DI PERGINE BCC	NE	67.31%	10.00%	38.92%	-0.44%	17	12

BANCA DEL CROTONESE	South	65.40%	-22.37%	31.06%	3.24%	18	50
BCC DI MASIANO	MID	63.95%	-9.85%	29.12%	-0.20%	19	64
CRA DI CORTINA D'AMPEZZO	NE	63.76%	10.75%	35.30%	-0.81%	20	26
BCC LAUDENSE	NW	62.91%	8.50%	30.70%	2.21%	21	53
BCC DI PONTASSIEVE	MID	62.50%	-14.25%	34.38%	-1.73%	22	33
BCC DI IMPRUNETA	MID	61.29%	-31.71%	29.27%	-0.99%	23	62
BANCA DI PESCIA BCC	MID	59.86%	27.09%	26.74%	2.34%	24	72
BCC DI PRATOLA PELIGNA	South	53.31%	8.25%	27.43%	2.85%	25	70
BCC DI MONTEPULCIANO	MID	53.18%	-46.82%	35.64%	-8.12%	26	24
BCC DI SAN GIORGIO E MEDUNO	NE	51.90%	6.20%	45.49%	2.48%	27	10
BANCA DI ROMANO	NE	51.45%	7.83%	33.78%	-4.58%	28	35
BCC DI FILOTTRANO	MID	50.02%	10.05%	33.37%	2.47%	29	38
CENTROMARCA BANCA	NE	49.98%	15.31%	27.61%	-1.12%	30	69
BCC DI CASTENASO	NE	49.88%	15.42%	35.18%	3.00%	31	27
BANCA DI MANTIGNANA	MID	47.05%	14.91%	18.39%	0.28%	32	82
ROMAGNA EST BCC	NE	46.97%	22.49%	32.53%	3.11%	33	42
BCC DI BASILIANO	NE	46.78%	-5.02%	37.35%	-0.46%	34	16
BANCA DI VITERBO BCC	MID	45.47%	10.15%	30.56%	3.72%	35	55
BCC DI SAN MARZANO	South	45.19%	-2.95%	19.40%	-0.89%	36	81
BCC DI PIOVE DI SACCO	NE	44.39%	-18.43%	32.13%	-4.38%	37	45
BCC DEL POLESINE	NE	44.12%	10.24%	29.37%	-0.87%	38	61
BCC DI GRADARA	MID	42.48%	0.93%	36.14%	1.69%	39	21
BCC VICENTINO POJANA	NE	41.89%	0.64%	30.93%	-2.97%	40	51
BCC ABRUZZESE	South	41.40%	-1.24%	27.65%	0.25%	41	68
BCC DI STARANZANO	NE	41.19%	12.08%	34.47%	1.75%	42	32
BCC DI FANO	MID	40.32%	1.05%	29.74%	-10.54%	43	57
BCC DI CARTURA	NE	40.27%	14.05%	29.68%	3.14%	44	59
BCC DI CALCIO E DI COVO	NW	40.15%	12.70%	32.03%	-0.64%	45	47
BCC DEL MUGELLO	MID	39.89%	4.36%	25.16%	0.11%	46	76
BCC DI BEDIZZOLE	NW	39.57%	11.25%	24.30%	1.52%	47	77
CRU DI ALDENO E CADINE	NE	39.39%	4.33%	35.94%	-3.91%	48	23
BANCA DI ANGHIARI	MID	38.27%	-3.87%	31.77%	-2.25%	49	48

BCC MARTELLAGO	NE	36.78%	4.76%	25.48%	-2.54%	50	75
CRU DI ROVERETO BCC	NE	36.13%	2.48%	34.91%	0.74%	51	28
DON RIZZO BCC	South	35.94%	5.88%	30.62%	4.63%	52	54
BCC VALMARECCHIA	NE	35.28%	8.30%	21.84%	-0.59%	53	79
BANCA REGGIANA BCC	NE	34.45%	-1.82%	48.67%	-1.88%	54	4
BCC DELLE PREALPI	NE	34.40%	5.37%	38.33%	-0.20%	55	15
BCC MEDIOCRATI	South	34.31%	-22.87%	30.90%	-6.96%	56	52
BANCA CRAS	MID	32.56%	-1.04%	34.18%	-0.29%	57	34
BCC TREVIGIANO	NE	31.31%	12.17%	32.48%	2.14%	58	43
CRU DI TRENTO BCC	NE	30.05%	13.21%	48.68%	4.71%	59	3
BANCA SAN GIORGIO	NE	30.00%	-4.91%	46.50%	-2.64%	60	9
BCC DI SANT'ELENA	NE	29.90%	7.82%	29.17%	-2.86%	61	63
BANCA DI FORLI' BCC	NE	29.27%	4.15%	29.47%	3.52%	62	60
CRA DI BRENDOLA BCC	NE	29.16%	2.71%	32.66%	-2.62%	63	40
BCC DI VIGNOLE	MID	27.52%	3.07%	27.29%	-0.92%	64	71
BANCA DI CARAGLIO	NW	27.35%	1.46%	37.31%	-1.74%	65	17
CRA DI BINASCO BCC	NW	26.82%	-0.62%	23.30%	-3.65%	66	78
BANCA DI CAVOLA	NE	26.56%	-3.96%	28.68%	-0.58%	67	66
B.C.C. DEL GARDA	NW	24.65%	7.44%	36.09%	4.31%	68	22
BANCA MALATESTIANA CC	NE	22.10%	4.64%	32.16%	-2.84%	69	44
BCC DELLA MARCA	NE	19.94%	6.17%	32.79%	-3.10%	70	39
BANCA CENTROPADANA	NW	16.47%	3.47%	37.04%	1.27%	71	18
CREDITO COOP. RAVENNATE IMOLESE	NE	15.86%	3.58%	38.75%	-2.05%	72	13
BCC DI BRESCIA	NW	14.88%	6.85%	26.02%	6.47%	73	74
CRA DI CANTU' BCC	NW	14.76%	2.50%	26.41%	-3.24%	74	73
EMIL BANCA	NE	14.45%	3.51%	34.63%	-5.99%	75	29
BCC DI CARATE BRIANZA	NW	14.18%	1.93%	20.48%	-3.79%	76	80
CRU BCC DI TREVIGLIO	NW	12.92%	2.39%	36.93%	-0.08%	77	19
BCC DI ROMA	MID	4.85%	1.40%	29.08%	1.20%	78	65

FINANCIAL REWARDS OF SOCIAL ACTIONS

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ABSTRACT

Unlike previous studies that examined companies based on their inclusion in indices or funds that featured companies judged to be socially responsible, this study attempts to determine if there is a measurable intrinsic financial value associated with public recognition of being a socially active company. It adopts an internal financial perspective examining several financial ratios of individual publically-traded companies that have been recipients of the Secretary of State's Award for Corporate Excellence (ACE). Comparisons between the company results and the company's industry median on four common financial ratios show no significant difference.

INTRODUCTION

Many companies have chosen to adopt corporate social responsibility (CSR). The pressure to do so may originate from stakeholders, a desire to reap financial benefits from being more socially proactive, or from a genuine belief that social initiatives are the responsibility of the company. With the variety of demands creating conflicting goals of social proactivity and financial rewards arising from stockholders, employees, customers, governments and the public, how a company is to accomplish CSR initiatives and meet financial objectives is seldom clear. Add to this the lack of a consistent measure of CSR activities, and the picture becomes increasingly muddled. However it remains an issue that companies can scarce afford to ignore.

The passage in 1980 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, commonly known as the Superfund Act), made environmental reporting relevant to investors of companies doing business in the US because of the possibility of huge liabilities companies face under this law. Currently the Environmental Protection Agency has identified hundreds of companies as potentially responsible parties for cleanup charges that range as high as $750 billion. (Saudagaran 2009, 4-123). Guidance for financial reporting of these potential liabilities is contained in Statement of Financial Accounting Standards (SFAS) No. 5. It is beyond the scope of this paper to assess the adequacy of this standard. However, the standard requires accrual of a liability only if the company's liability is probable and can be reasonably estimated. Since CERCLA applies only to certain identified sites, and for those identified sites all possible potentially responsible parties are severally and jointly responsible for damage that was identified decades ago (EPA, 1986). Ascertaining with any degree of certainty the amount of the liability to be recorded is inexact at best. This leads to significantly different treatments between companies. These differences affect the comparability and value of financial statement information.

Aside from the requirement to disclose liability arising from legislation, it is largely left to individual companies to determine to what extent and how they choose to report most environmental policies and actions. Energy use, forestry and range management, carbon footprint and many other measures are reported at the discretion of the company. Often companies choose to exceed the requirements of air quality; limits on generation of greenhouse gasses; water quality; and responsible solid waste disposal beyond those required by the Clean Air Act, Federal Water Pollution Control Act, Safe Drinking Water Act, and Resource Conservation and Recovery Act. How they report their endeavors are as individual as the companies. Even among companies that purport to hold themselves to a higher standard, comparisons are often impossible.

The difference in the response of companies to CSR has fueled the debate on the value of CSR to financial performance. Studies addressing the question of whether companies practicing CSR achieve superior financial performance are mixed, (McWilliams, 2001).

KEY LITERATURE

Lopatta and Kaspereit (2014) found that the financial crisis signaled by the filing for Bankruptcy of Lehman Brothers in September 2008, marked a change from negative shareholder perception of CSR to positive shareholder perception of CSR as measured by relative value of the market share of MSCI World index of global firms. They used moderated regression analysis to compare sustainability rating data from MSCI to the market value of a firm’s equity. The MSCI data reports the results of assessment of both environmental and social risks at the industry level and at the firm level. Their analysis found that unlike the relationship shown before the crisis the data after the crisis showed a positive perception of corporate sustainability as measured by the market value of the firm’s equity in industries that are exposed to higher environmental and social risks.

With a few notable exceptions studies on the value of CSR to the firm do so from the perspective of the capital value of the firm (see Hassel et al. 2005; Semenova and Hassel 2008; Semenova et al. 2009; Guenster et al. 2011). Using data on listed companies in China, Zhang et al. (2012) examined the impact of charitable contributions on the reaction of suppliers. They found that there is a positive relationship between the ability to obtain trade credit and the degree of CSR as measured by charitable contributions for state-owned organizations in China only. Although this study on an element other than capital value is significant and interesting, it has little applicability to different economic environments. Particularly in light of the fact that they found the positive relationship to hold only for state-owned organizations.

Another study examined the impact of CSR on investment sensitivity to internal cash flows (Attig, et al., 2014). They proposed that CSR activities that exceeded compliance behavior to reflect the nobler intents of society would decrease market friction and improve the firm’s access to market capital. They examined the sensitivity of external investment availability in response to the availability of internal cash flows. The study found that there was a negative relationship between CSR activities and the sensitivity of investment cash flows. In other words, increased CSR activities decreased the impact of internal cash flows on the availability of market capitalization improving the firm’s access to funds.

Jones, Willness and Madey (2014) chose to examine the impact of CSR on employee relations. Citing research on employee recruitment showing the positive impact of CSR on a firm’s attractiveness as an employer, these researchers proposed that job seekers receive mediating signals from CSR that affect the relationship between CSR and the organization’s attractiveness as an employer. They identify three signal-based mechanisms that ultimately affect organizational attractiveness: job seekers’ anticipated pride from being affiliated with the organization, their perceived value fit with the organization, and their expectations about how the organization treats its employees. They hypothesized that these signal-based mechanisms mediate the relationships between CSR and organizational attractiveness, focusing on two aspects of CSP: an organization's community involvement and pro-environmental practices. They support this signal based mechanism in two experiments, one manipulating a company's web pages and another in a field study of the recruitment materials used by organizations at a job fair.

Demetriades and AuretIn (2014) used regression analysis to examine the association between CSR and firm performance in South Africa comparing the performance of firms identified as members of the Socially Responsible Index (SRI) by the Johannesburg Stock Exchange in comparison with their non-SRI competitor listed on the same exchange that was closest in size. They found no significant short-term price effects on the SRI shares, but the returns of SRI companies outperformed those of the control group of conventional firms over the entire sample period. During the fifteen year sample period, only in the model examining return on equity was SRI constituent performance significantly superior to that of conventional firms and during that same period the coefficient for return on assets of SRI companies compared to conventional ones was actually negative. However, when the period was restricted to 2004-2009 (the most recent five years of the sample period) it was found that social performance was positively, and sometimes significantly, correlated with return on equity. These results were of particular interest because significance was shown only when the measure of interest was return on capital (Demetriades & AuretIn, 2014).

RESEARCH APPROACH

Previous studies examined companies based on their inclusion in indices or funds that feature companies judged to be socially responsible. For the most part, these studies have been limited to shareholder perception, capitalization, supplier relations, employee relations, or some other narrowly defined relationship. The results vary widely as to whether CSR impacts these relationships.

This study proposes to examine whether there is any long-term measurable financial impact of positive public opinion associated with being publicly recognized as an exemplary socially responsible organization. The specific contribution of this study is that the measure of CSR is more holistic and highly public. Thus, public opinion rather than that of investors or other stakeholders is the independent variable of interest. This study examines the internal financial impact on four common financial ratios as the dependent variable.

Annually, since 1999, the United States Secretary of State has presented The Secretary of State's Award for Corporate Excellence (ACE). It recognizes the important role U.S. businesses play abroad as good corporate citizens, and is intended to send a strong signal of the US Department of State's commitment to further corporate social responsibility, innovation, exemplary practices, and democratic values throughout the world (Department of State, 2014). This award is presented at a highly visible annual gala in Washington and is accompanied with a press release that is widely distributed to the popular press through the wire services. Recipients of this award were chosen as subjects of this study because of the broad criteria upon which the award is based and the wide publicity associated with presentation of the award. The underlying question of interest was whether favorable public opinion is correlated with higher than average financial indicators.

Because financial information on privately held companies was unavailable, the study included only publicly traded companies which have been recipients of the ACE award. Table 1 shows a complete list of award winners (Secretary of State, 2014)
.

Table 1 **PUBLIC COMPANY ACE AWARD WINNERS**
2013 - Plantronics
2012 - Intel Corporation
2011 - Procter & Gamble
2010 - Cisco Systems
2007 - GE
2006 - General Motors; Goldman Sachs
2005 - Cisco Systems
2004 – Motorola
2003 - Chevron/Texaco; U.S. Steel Corporation
2002 - Coca-Cola; Chindex International
2001 - Ford Motor Company
2000 - Motorola; Rayonier
1999 – Xerox

HYPOTHESES

Four common financial measures were chosen. All are ratios that would minimize differences that were the result only of differences in the size of the individual companies. Net profit margin, return on equity, return on assets, and return on invested capital were chosen as four of the most commonly cited financial ratios that fit this criteria. Thus the four hypotheses stated in the null are:and Kaspereit (2014) found that the financial crisis signaled by the filing for Bankruptcy of Lehman Brothers in September 2008, marked a change from negative shareholder perception of CSR to positive shareholder

H_1 *There is no difference between the net profit margin of an ACE Award winner and the median net profit margin of all companies competing in the same industry.s my first hypothesis. Maybe it will be found to be true. If it is, then all of us will really be extremely pleased!*

H_2 *There is no difference between the return on equity of an ACE Award winner and the median return on equity of all companies competing in the same industry..*

H_3 *There is no difference between the return on assets of an ACE Award winner and the median return on assets of all companies competing in the same industry.*

H_4 *There is no difference between the return on invested capital of an ACE Award winner and the median return on invested capital of all companies competing in the same industry.*

So, that is what an average hypothesis statement looks like. If you would like to put the numbers in subscript, you may do so. If you would like to spell out the word hypothesis, you may do so.

METHODOLOGY

Data on the pertinent ratios for each of the companies in this study and the median data for their respective industry as determined by the North American Industry Classification System (NAICS) code to which they are assigned was retrieved from Hoovers (6/20/2014). Paired t-tests were conducted comparing the ACE award winners with the median of all companies in their respective NAICS classification. The results of this analysis is reported in tables two through five.

Table 2
Paired T-Test Results for Net Profit Margin

	ACE Winners	Industry Median
Mean	0.096566667	0.0707733
Variance	0.00782598	0.0014067
Observations	15	15
Pearson Correlation	0.808666502	
df	14	
t Stat	1.606567992	
P(T<=t) one-tail	0.065230849	

Table 3
Paired T-Test Results for Return on Equity

	ACE Winners	Industry Median
Mean	0.112666667	0.13682
Variance	0.032070011	0.007428332
Observations	15	15
Pearson Correlation	0.438257918	
df	14	
t Stat	-0.5804829	
P(T<=t) one-tail	0.285407567	

Table 4
Paired T-Test Results for Return on Assets

	ACE Winners	Industry Median
Mean	0.047513333	0.049253333
Variance	0.003994417	0.000927046
Observations	15	15
Pearson Correlation	0.602738398	
df	14	
t Stat	-0.132118293	
P(T<=t) one-tail	0.448385371	

Table 5 Paired T-Test Results for Return on Invested Capital		
	ACE Winners	Industry Median
Mean	0.076166667	0.10112
Variance	0.008566192	0.002692392
Observations	15	15
Pearson Correlation	0.615712406	
df	14	
t Stat	-1.321939239	
P(T<=t) one-tail	0.103691035	

CONCLUSIONS

At a significance level of 0.05 none of the null hypotheses could be rejected. In three cases, return on equity, return on assets, and return on invested capital, the industry mean was actually greater than that of the ACE Award winners. Only in net profit margin did the ACE Award winners outperform their industry averages.

LIMITATIONS AND SUGGESTIONS FOR FURTHER STUDY

Although none of the results were significant, the direction of the differences between the ACE Award winners and their industry averages show possible evidence of a phenomena of interest. When one considers the nature of net profit margin versus the nature of the other three measures which were all returns based on net income.

Net profit margin is based on revenue less the cost of sales. On this measure, on average, the ACE Award winners performed better than their respective industries. However, once sales and administrative expenses are deducted from the profit margin to arrive at net income, the ACE Award winners perform more poorly than their respective industries on measures based on net income. This indicates that on average the ACE Award winners have higher sales and administrative expenses than the average of other companies in their industries. One possible explanation for this result is that the ACE Award companies spend a disproportionately larger amount on social programs than do their peer organizations. It might also indicate that this larger expenditure did not lead to high enough increase in revenues to compensate for the cost of these programs. This explanation is conjecture. Testing the hypothesis suggested would require significantly more detailed examination of the income statement relationships of the companies and their industry cohorts. However, if this conjecture is accurate, it suggest that companies should not adopt CSR initiatives expecting that increased participation in socially conscious activities will increase financial rewards.

Although none of the null hypothesis tested were rejected, the results of this study should be interpreted with caution. The results may be affected by several limiting weaknesses. First, the sample size is not large. Although, it is not meaningless for such a simple analysis, having a larger sample would be helpful. Second, the NAICS code as a surrogate measure for comparable companies is common, but not ideal. There are wide variations in the environment of companies who share the same code designation. Third, the ACE Award nominations are often based on the activities of a business unit within a larger corporation. As evidenced by multiple awards to business units within the same corporation, one would hope that receipt of an ACE Award by one business unit offered insight into the culture of the entire organization, but there is no assurance of this. Forth, commonly only three ACE Awards are presented annually, and because they are often presented to privately held companies, the entire history of the ACE Awards not only provides a small sample, this sample is spread over more than a decade. This offers both limitations and advantages. Positive public opinion may be slow to respond to news and can build over time providing a better measure. However, it is also possible that an intervening negative event affecting a company would reverse the positive effect of the ACE Award.

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Validity of Altmans Z-Score Model in Predicting Bankruptcy in Recent Years

ABSTRACT

Over the years, many models have been suggested and tested for predicting bankruptcy. These include ratio analysis models such as Beaver (1966, 2005), discriminant analysis models such as Altman (1968, 2006), regression models such as Ohlson (1980) and others. The Altman model (1968, 2006) is one of the most influential models in the area of bankruptcy prediction. However, the Altman model is not successful in predicting bankruptcy all of the time. The Z-Score predictive model, introduced by Altman in 1968, is a widely used and cited model for predicting bankruptcy, and uses a combination of several financial ratios to calculate the "Z-score", which value indicates the likelihood of future bankruptcy of the company under examination. Altman estimated the model using multiple discriminant analysis to derive a linear equation that discriminates between bankrupt and non-bankrupt companies. Multiple empirical studies have been done by Altman and others to evaluate the model. In this study, the Z-Score model will be evaluated using financial data from public companies that started reorganization proceedings under Chapter 11 of the bankruptcy code from 2000 to 2005.

The purpose of this study is to test the accuracy of Edward Altman's Z-Score model in a more recent time period from 2000 to 2005 including more recent years than in which it was developed and previously tested.

The question is whether the Z-score model is an as accurate indicator for bankruptcy in a more recent period as it was in the 1960's and with a sample of companies from different industries. There have been several critiques of Altman's Z-score model. Grice (2001) addressed and questioned the generalizability of the model to industries and period outside of those in the original sample. When a model is applied to periods other than those used to develop and test the model; researchers assume the model is stable across economic conditions that change over time, such as inflation, interest rates, and credit availability.

The study took a large sample of companies that had declared bankruptcy during the period from 2000 to 2005. This sample of companies included companies from many different industries. Further the time period of the study was more recent from 2000 to 2005. The results from the study indicate that the Altman model predicted bankruptcy in a significant majority of the companies that subsequently declared bankruptcy. Thus it is still a viable predictor of bankruptcy.

INTRODUCTION

Companies have been going bankrupt throughout history. Bankruptcies result in financial harm to investors and creditors and to the economy in general. Thus they have been a subject of study by accountants, in particular the topic of predicting bankruptcies. Accountants have come up with many models for predicting bankruptcies. Beaver (2005, 1966) used ratio analysis models while Altman (1968 2006) used discriminant analysis models and Ohlson (1980) used regression models among others. These models use various techniques to try to predict bankruptcy. They use financial statements and stock market data as variables in the models. Many of these models have been shown to be successful in predicting bankruptcy in many cases though none do it with complete accuracy.

One of the oldest and most successful models of bankruptcy prediction is that of Altman (1968). His model is a multivariate model which combines financial statement and market value measures to calculate a “Z score” for a company. The Z-score may be used for bankruptcy prediction. The variables used in Altman’s model are working capital, total assets, retained earnings, earnings before interest and taxes, market value of equity, and sales. Altman empirically tested his model by taking a sample of companies that had gone bankrupt and applying his model to their financial statements prior to bankruptcy to see if his model would have predicted their going bankrupt.

Some later studies have shown the Altman model to be less successful in predicting bankruptcy and there has been criticism of the Z-score model. Grice (2001) has critiqued the Altman model and questioned its generizability to periods outside the test period and to industries outside the original sample. Economic conditions such as inflation, interest rates and credit availability may change over time thus making the Altman model less efficient in predicting bankruptcy.

The purpose of the study will be to test the accuracy of Edward Altman's Z-Score model in a more recent period than in which it was developed and previously tested. Using data from companies that filed bankruptcy in the period from 200 – 2005, Z-scores will be calculated to test the accuracy of the model in predicting bankruptcies.

The question is whether the Z-score model is an as accurate indicator for bankruptcy in a more recent period as it was in the 1960's.

The Z-score Model

The Altman Z-Score model from Altman (1968) is shown below:

$$Z=1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 0.999X_5$$

$$X1 = \frac{\text{Current Assets – Current Liabilities}}{\text{Total Assets}}$$

$$X4 = \frac{\text{Market Value of Equity}}{\text{Total Liabilities}}$$

$$X2 = \frac{\text{Retained Earnings}}{\text{Total Assets}}$$

$$X5 = \frac{\text{Sales}}{\text{Total Assets}}$$

$$X3 = \frac{\text{Earnings before Interest and Taxes}}{\text{Total Assets}}$$

Z = Overall Index or Score

The Z-Score Model has Zones of Discrimination that classify whether a company is in danger of going bankrupt or not. Companies classified in the “Safe” zone generally demonstrate a minimal chance of bankruptcy, while those in the “Distress” zone are in danger of falling into bankruptcy. Companies in the “Grey” zone have a moderate chance of going bankrupt but are not in as much danger as firms in the “Distress” zone. The Zones of Discrimination for the Z-Score Model are listed below:

Zones of Discrimination:
Original Z-Score Model (1968**)**

Z > 2.99 “Safe” Zone
1.8 < Z < 2.99 “Grey Zone
Z < 1.80 “Distress” Zone

METHODOLOGY, DATA AND RESULTS

The methodology consisted of taking a sample of bankrupt firms from Altman (2006) which had filed for bankruptcy between 2000 and 2005. The data needed to calculate Altman’s Z-score were gathered from the Compustat database. Many companies in the original sample were deleted because of non-availability of data. The final sample consisted of 89 companies. A compilation of the companies used in the study as well as the date they filed for bankruptcy and the amount of their liabilities at the date of bankruptcy are shown in Table 1 below.

Table 1
Altman z-score for Bankrupt companies
with fraud 1-3 years before bankruptcy (2000 – 2005)

			Altman Z-Score		
			Years before bankruptcy		
Company	Liabilities ($MM)	Date	1	2	3
360Networks, Inc.	2,806.00	Jun-01	2.1991069		
Acterna Corporation	1,451.30	May-03	-7.250317	-0.44578	0.67596
Adelphia Business Solutions, Inc.	1,654.30	Mar-02	-0.6825315	1.706849	0.755235
Adelphia Communications Corp.	17,349.10	Jun-02	-2.71226	0.153127	0.191469
Allegiance Telecom. Inc.	1,397.49	May-03	-2.2019417	-0.56315	1.533644
Alterra Healthcare Corporation	1,300.00	Jan-03	-2.3498399	-1.35269	0.064757
Ames Department Stores (II)	1,687.57	Aug-01	1.6229123	2.457117	2.250732
AMF Bowling Worldwide, Inc.	1,265.61	Jul-01	-1.0825088	0.159055	0.404426
Asia Global Crossing Ltd.	1,868.80	Nov-02	1.4331617		

At Home Corp.	1,468.20	Sep-01	-3.7015196	8.870649	18.9976
Atlas Air Worldwide Holdings, Inc.	1,467.83	Jan-04	-0.0390839	1.036472	1.600128
Aurora Foods, Inc.	1,211.00	Dec-03	-0.57899	0.271175	0.086837
Canadian Airlines Corp.	1,931.80	Mar-00		0.991175	1.321705
Century Communications Corp.	2,229.60	Jun-02	1.608549	0.329581	0.068462
Chiquita Brands International, Inc.	1,823.00	Nov-01	0.8448	1.163294	1.519736
Choice One Communication	1,100.00	Oct-04	-3.5214189	-3.27379	-1.41551
CHS Electronics, Inc.	2,723.63	Apr-00	2.8506722	3.132418	2.479023
Conseco Inc.	56,639.30	Dec-02	0.588252	0.59801	0.612685
Covad Communications Group, Inc.	1,652.53	Aug-01	-2.4715368	7.072087	
Covanta Energy Corp.	3,031.40	Apr-02	0.3005919	0.630794	0.753991
Dade Behring Holdings, Inc.	1,808.60	Aug-02	1.1064975		
DVI Inc.	1,438.99	Aug-03	1.269492	1.353849	1.35793
e.spire Communications, Inc.	1,111.18	Mar-01	-1.8530524	-1.26598	-0.1108
Encompass Services Corporation	1,725.30	Nov-02	2.0070013	2.197218	2.441736
Enron Corp.	31,237.00	Dec-01	2.440444	2.341442	1.895543
Exide Technologies, Inc.	2,524.20	Apr-02	-0.172172	0.81316	1.176205
Exodus Communications, Inc	4,446.00	Sep-01	6.7942628	6.210499	2.652672
Federal Mogul Corp	8,232.70	Oct-01	0.7025157	1.036978	0.942669
Flag Telecom Holdings, Ltd.	3,046.74	Apr-02	-0.4225743	0.437597	
Fleming	3,156.00	Apr-03	4.743472	4.60588	4.469561
Genesis Health Ventures	2,254.00	Jun-00	1.0138669	1.066686	2.385302
Gentek	1,307.03	Oct-02	1.0254568	1.802487	1.328359
Genuity Inc.	3,102.00	Nov-02	-3.4484701	-0.50125	
Global Crossing, Ltd.	14,639.00	Jan-02	0.354235	3.031977	4.423578
Global Telesystems, Inc.	2,760.20	Nov-01	-1.6575617	1.040894	1.294916
GST Telecommunications, Inc.	1,326.30	May-00	-0.4338366	-0.39252	-0.12894
Hayes Lemmerz International, Inc.	2,655.70	Dec-01	1.126595	1.324339	1.198839
ICG Communications Corp.	2,345.16	Nov-00	-0.8602285	-0.53675	-0.42321
Impsat Fiber Networks, Inc.	1,216.00	Jun-02	-3.7761766	0.103561	
Intergrated Health Services, Inc	4,061.16	Feb-00	-0.9752362	1.209162	0.838982
Interstate Bakeries	1,322.00	Sep-04	2.148065	2.886493	3.423941
Kaiser Aluminum Corp.	3,129.40	Feb-02	0.4627361	0.664698	0.663367
Kmart Corp	10,263.00	Jan-02	3.380216	3.533194	3.699346
Laidlaw, Inc.	4,377.10	Jun-01	-0.7486312	1.010847	2.119876
Leap Wireless International, Inc.	2,469.00	Apr-03	-2.4709776	-0.59024	0.267838
Loews Cineplex Entertainment Corp.	1,505.65	Feb-01	-0.4659627	0.510538	0.777423
Loral Space & Communications Ltd.	3,047.03	Jul-03	-1.6861992	-0.26856	-1.17416
LTV Corp. (II)	4,669.00	Dec-00	0.9291313	1.388081	1.524242
Magellan Health Services	1,506.00	Mar-03	-0.5604791	1.218248	1.097614
Mariner Post-Acute Network, Inc.	2,634.64	Jan-00	-3.382768	0.774938	3.025571

McLeodUSA, Inc.	4,419.20	Jan-02	-0.0250989	3.418892	3.196088
Metromedia Fiber Network, Inc.	4,007.00	May-02	-3.1316698	-0.03992	-0.32411
Mirant Corp.	16,460.00	Jul-03	0.0532315	1.714379	0.904682
National Steel Corp.	2,118.90	Mar-02	-0.11113	1.230374	1.464404
Northwestern Corp.	2,748.41	Sep-03	-0.42581	1.587861	2.73237
NRG Energy, Inc	11,579.89	May-03	0.4425923	0.503974	1.315832
Owens Corning	7,375.00	Oct-00	0.6571321	0.829968	1.005341
Paging Network, Inc.	2,212.39	Jul-00	-2.1864474	0.254138	0.534854
Pegasus Communications Corp.	1,929.42	Jun-04	-1860.48	-7.71175	-6.37224
Petroleum Geo-Services ASA	2,777.90	Jul-03	0.0973683	0.521497	0.657776
Pillowtex Corp.	1,402.10	Nov-00	1.4094259	1.752946	1.140868
Polaroid	1,634.40	Oct-01	2.1407978	2.471891	2.06282
PSInet, Inc.	4,599.30	May-01	-3.7178154	0.968918	0.145354
RCN Corp.	3,668.24	May-04	-5.2987127	-3.03928	-0.72423
Safety-Kleen Corp.	3,141.32	Jun-00	0.88641	0.530683	0.794698
Solutia, Inc.	3,591.00	Dec-03	1.030812	1.045651	1.391657
Spectrasite Holdings, Inc.	2,482.20	Nov-02	-0.1977271	0.801201	0.088374
Spiegel Inc.	1,675.00	Mar-03	0.91898	2.646437	2.680273
Stelco, Inc. (Canada)	2,027.00	Jan-04	0.852438	1.403341	1.003069
Sterling Chemicals Holdings, Inc.	1,228.92	Jul-01	2.148844	1.264506	1.802
Sunbeam Corp.	3,201.51	Feb-01	0.434935	0.081622	5.519258
Teligent, Inc.	1,649.40	May-01	-3.2627319	-0.28646	-0.15308
The IT Group, Inc.	1,086.55	Jan-02	1.4900053	1.152988	0.742833
Tower Automotive Inc.	2,621.00	Feb-05	0.8259896	0.93253	1.136131
Trans World Airlines, Inc. (II)	2,384.47	Jan-01	0.4578796	0.830815	0.930375
Trump Hotels & Casino Resorts, Inc.	2,026.00	Nov-04	0.4819717	0.67828	0.58396
UAL Corporation	22,164.00	Dec-02	0.1788944	0.984641	1.246394
US Airways Group (I)	10,640.00	Aug-02	-0.1092416	0.989834	1.184692
US Office Products Co.	1,352.00	Mar-01	1.2672356	1.538224	2.546
USG Corp. (II)	2,700.00	Jun-01	2.1310402	3.37423	3.266505
Viatel, Inc.	2,683.00	May-01	-2.8338324	0.558939	0.405723
W.R. Grace & Co.	2,574.89	Apr-01	0.52462	0.974429	0.806303
Warnaco Group, Inc.	3,078.35	Jun-01	0.065493	1.311252	2.049448
Washington Group International, Inc.	2,914.50	May-01	0.6768562	2.820588	3.775831
Weirton Steel Corp.	1,361.00	May-03	-1.5646886	-1.72062	0.695294
West Point Stevens, Inc.	2,174.20	Jun-03	-0.2891106	1.078534	1.375743
Winstar Communications, Inc	4,379.20	Apr-01	-0.02433	-0.11988	-0.32751
WorldCom Inc.	45,984.00	Jul-02	1.125134	1.225604	3.021371
XO Communications, Inc	5,851.06	Jun-02	-1.8993647	0.281468	1.601577
Zonic Corp.	1,327.03	Jun-01	-22.331785	-18.5338	-17.3209

Z-scores were calculated for the companies listed in the sample in Table 1. These scores were calculated for one, two and three years prior to the date of the bankruptcy using financial statement data from one, two and three years prior to the date of bankruptcy.

Table 2 below shows the prediction of bankruptcy by the Altman model for the companies in Table 1. If the Z-score is below 1.8 it indicates that there is a high probablilty that the company will go bankrupt.

Table 2
Prediction of companies 1-3 years before bankruptcy

	< 1.80	**> 1.80**	**Total**
Prediction of companies 1 year before bankruptcy	78	11	89
	87.67%	12%	100.00%
Prediction of companies 2 years before bankruptcy	70	17	87
	80.4%	19.6%	100%
Prediction of companies 3 years before bankruptcy	59	25	84
	70.2%	29.8%	100%

The data in Table 2 indicate that the Altman model predicted bankruptcy in 87.6 % of the companies one year prior to the date of bankruptcy. The model predicted 80.4 % of the bankruptcies two years prior to the date of bankruptcy. The model predicted bankruptcy for 70.2 % of the companies three years prior to bankruptcy. The prediction accuracy of the model decreased as we went back to earlier years before the date of bankruptcy. This is to be expected given that there is greater uncertainty about whether a company will go bankrupt the earlier we go before the date of bankruptcy.

Conclusion

The model overall still seems to be effective in predicting bankruptcy for companies. The average prediction accuracy over the three years prior to bankruptcy is 79.4%. This is about the same as the level of accuracy in previous studies such as Hanson (2003). Thus the Altman model seems to be robust but not 100% accurate in predicting bankruptcy. The financial ratios used in the calculation of the model and the Z-score still provide useful information about the solvency of a company and its chances of going bankrupt.

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FASB AND IASB CONVERGENCE: ASYMPTOTIC RELATIONSHIP OR TRANSMOGRIFICATION?

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ABSTRACT

Much work has been done and many papers and articles written about the possibility of U.S. GAAP converging with the international financial reporting standards (IFRS) or at least of the U.S. firms adopting IFRS as an alternate reporting format for listed firms. This paper reexamines the discussion in light of the recent issue of ASC 606 (revenue recognition) and revisits several reasons that neither convergence nor adoption may be achieved. These reasons include the belief that U.S. GAAP is the gold standard for reporting, that too many groups and people are involved in the rule-making process, that there are too many choices for a resolution to the convergence issue, and that the innate belief that principles based and rules based statements are irreconcilable. The conclusion of this paper is that pure convergence will never be achieved, and that IFRS and GAAP will tend to grow closer as time passes, but asymptotically.

INTRODUCTION

For almost the past sixty years various accounting entities have been discussing and working toward the possibility of a single global set of accounting principles, and much has been written over the years regarding the attempts at both convergence with and adoption of international standards by various countries. The movement toward these international standards accelerated in 2001 when the International Accounting Standards Board (IASB) was formed, and further in 2002 when IASB and the Financial Accounting Standards Board (FASB) decided to work together. According to the AICPA IFRS Resources (AICPA 2014) at this point there are 90 countries that have fully adopted the international standards with another 30 permitting their use for listed companies, and others such as Japan discussing their own convergence plans. However, the United States is still working on, and hopeful for, convergence rather than adoption. This paper discusses some reasons that neither convergence nor adoption of the international accounting standards by the United States have been attained.

THE CHRONICLES OF CONVERGENCE

Well before 1973, in the 1950s, accounting entities from various countries were considering and discussing a possible uniform set of international accounting standards as commerce became more global and more cross-border transactions and consolidations were taking place. Interestingly, the first textbook on international accounting, *International Accounting* by Gerhard Mueller, was published in 1967, six years before the formal creation of the International Accounting Standards Committee (IASC.)

In 1973 nine countries, including the United States, formed the International Accounting Standards Committee. Their plan was to create international accounting standards (IAS) that could be used by firms in different countries to make their reporting more comparable across nations and across borders. In 2000 they decided to reorganize to make the standard setting body more formal, and so in 2001 they were replaced by the International Accounting Standards Board (IASB.)

Many countries other than the United States, including Fiji, Moldova, and Tajikistan, to name a few, have directly adopted the International Financial Reporting Standards (IFRS) created by IASC and IASB for their public companies. The European Union countries adopted IFRS with some modifications, called carve-outs. However, the United States Financial Accounting Standards Board (FASB) chose in 2002 to work on a convergence project with IASB (Norwalk Agreement) rather than a full adoption of the IFRS, although the latter has remained a possibility as well.

To aid the convergence of FASB and IASB standards, the two bodies issued a Memorandum of Understanding in 2006 to lay out a plan for this convergence as a series of projects revising both FASB and IASB standards on similar topics so the treatment for both IFRS and GAAP would essentially be the same. They modified the document in 2008, revised the work plan in 2010, and have made some progress by issuing a variety of new standards including the most recent, detailing new revenue recognition rules.

In 2007 the Securities and Exchange Commission (SEC) decided to consider allowing United States firms listed on U. S. exchanges to use IRFS as an alternate reporting form to U.S. generally accepted accounting principles (GAAP). However, the Financial Accounting Foundation (FAF) and FASB both felt that allowing a dual system of reporting would be too complex and costly to the firms, and possibly confusing to users of financial information. More recently, in 2010, the SEC reiterated the appeal of a single global set of accounting standards, and in 2012 reported on "specific issues relevant to the Commission's determination as to where, when and how the current financial reporting system for U.S. issuers should be transitioned to a system incorporating IFRS." (Financial Accounting Standards Board 2013). This study analyzed the effects of using IFRS for U.S. firms, but made no recommendations. To date there is not a definitive answer as to whether the SEC will allow U.S. listed firms to use IFRS as an alternate reporting method.

SO, WHAT'S HAPPENING!!

As the AICPA (2014) so succinctly puts it:

> Despite a belief by some of the inevitability of the global acceptance of IFRS, others believe that U.S. GAAP is the gold standard, and that a certain level of quality will be lost with full acceptance of IFRS. Further, certain U.S. issuers without significant customers or operations outside the United States may resist

IFRS because they may not have a market incentive to prepare IFRS financial statements. They may believe that the significant costs associated with adopting IFRS outweigh the benefits.

Gold Standard or Brass Ring?

In 2010 Marie Leone wrote, "[I]n the United States, … many preparers believe U.S. GAAP is the gold standard of accounting rules and should remain intact." In 2011, in an article discussing delays in the U.S. convergence project, Dena Auben pointed out that some feel that U.S. rules are more relevant to U.S. firms than are the international standards. Moreover, the article quotes Andy Bishop, chief financial officer at Hallador Energy Co as calling U.S. GAAP "the gold standard of the world" and Bishop asks, "If it's not broken, why fix it?"

This sentiment seems to be pervasive in the new FASB statements (those issued after the Norwalk Agreement in 2002) as well as the older rules. For example, while the treatment of accounting for inventory is basically the same both internationally and in the U.S., many U.S. firms still prefer to use Last In First Out (LIFO) for financial reporting although IFRS does not allow the use of LIFO. U.S. firms choose LIFO for a variety of reasons. Some claim that LIFO yields a more realistic view of cost of sales, since the most recently purchased (or manufactured) goods are expensed first and thus are expensed at close to current cost. Others enjoy the tax benefits LIFO provides when prices are rising, and cite tremendous book losses if they were required to switch to another cost flow method, because their LIFO reserves would be depleted. And, of course, the LIFO conformity rule requires that firms using LIFO for tax reporting must use LIFO for financial reporting as well.

In May 2014, IASB and FASB released Accounting Standards Codification (ASC) 606, the new converged statement on accounting for revenue recognition, and still after years of working together on this project there are subtle differences between the IASB and FASB applications that could not be resolved. One difference concerns the "explicit collectability threshold [that is] one of the criteria that a contract must meet before an entity can recognize revenue. For a contract to meet that criterion, an entity must conclude that it is probable that it will collect the consideration to which it will be entitled" for that sale. (Financial Accounting Standards Board 2014). IASB defines "probable" as more likely than not, while FASB refuses to give up its definition of probable as almost certain.

The treatment of impairment losses in ASC 606 is another difference between IFRS and GAAP. Consistent with IAS 36, *Impairment of Assets,* the international standard requires impairment losses be reversed if values increase, while the U.S. standards do not allow reversal of impairment losses. Why is the FASB so adamant about this? Perhaps because this is consistent with their other rules on asset impairment, even though it is not consistent with either IASB impairment rules in general or the new converged international standard. This attitude underscores the idea that at least some rule makers feel the GAAP is more valuable or at least more useful for U.S. firms than the international standards.

Not everyone agrees that the U.S. standards are superior. For example, a 2008 article in the *Economist* states, "GAAP was the beancounter's gold standard for decades, but it is now widely seen as cumbersome." (Author unknown). A reader identified as GA_Chris responded to the 2011 Auben article with "U.S. GAAP is full of 'bright line' rules that enable companies to legally present their books in a favorable light. Lots of progress has been made since Enron, but the fact remains that the system is too dependent on input from large companies that oppose anything that provides too much transparency. IFRS is not yet ready to be the gold standard, but it's closer to being so than U.S. GAAP."

Despite their differences, both subtle and blatant, FASB and IASB continue working toward convergence. The SEC is continuing to approve the work of convergence, is allowing foreign firms to list on U.S. exchanges while reporting using IFRS rather than restating their financials using GAAP, and is considering allowing U.S. firms to report under IFRS. This indicates that at least some rulemaking bodies, both private and governmental, feel that the international standards are as relevant to, useful for, and equal if not superior to GAAP for financial reporting for listed U.S. firms. However, as long as some details in the two sets of standards remain different, complete convergence will not be achieved.

Too Many Cooks Spoil the Broth

Who are the players in the U.S.GAAP/IFRS convergence/adoption game? Obviously the FASB and IASB are key. Also involved are the SEC, the AICPA, FAF, and most recently (since 2013) the Accounting Standards Advisory Forum (ASAF) whose function is to "improve cooperation among worldwide standard setters and advise the IASB as it develops International Financial Reporting Standards (IFRS)." (Financial Accounting Standards Board 2013). FASB is one of the members of this new committee.

It is believed that the more members a committee has, the more difficult it is to get anything done. The convergence project has many committee members: seven on FASB and 14 on IASB, requiring a majority out of 21 people to agree on each issue. Look, for example, at the new rules on accounting for financial instruments, on which FASB and IASB have been working**.** IFRS 9, *Financial Instruments*, is the IASB response to the financial crisis of 2008. Note that the crisis occurred six years ago, and IASB and FASB have been working on a statement that would address this issue, but even after six years they could not agree on certain terms – the accounting for credit losses. According to Elliott Welton, "Due to fundamental disagreements on how impairments should be modeled, the two bodies diverged and set out to issue their own standards relating to the calculation of the ALLL [Allowance for Loan and Lease Losses]. "(Welton 2014). IASB issued IFRS 9 on July 24, 2014, and FASB is still working on their version of the standard. Critics believe that since the two Boards cannot come to a consensus, this will adversely affect international banks which will now have to keep records using two different sets of rules, which is what the convergence project was supposed to eliminate.

The original MOU had an expectation that convergence (or at least significant progress toward it) would be achieved by 2011. It is now 2014 and the project is nowhere near completion. Yes, many new FASB statements and IFRS have been proposed and issued, but there are still more on the agenda. ASC 606, the new converged statement on revenue recognition, has just been issued, but it took 12 years since the MOU just to resolve the treatment of this topic, which has been on the conversion timeline since 2002.

The main focus of this new standard is to break sales contracts with customers into individual performance obligations such that revenue is recognized when a performance obligation is fulfilled. FASB believes this standard is better than the myriad of industry specific standards that it will be replacing under GAAP. Also, the disclosure requirements are more stringent and straightforward. However, not everyone is happy with the new standard as academicians, particularly in the area of auditing, argue that this will make auditing revenue recognition much more difficult. Moreover, lest one believe that FASB was 100% in favor of the new standard, the Financial Accounting Foundation reports that "the amendments … were adopted by the affirmative vote of five members of the Financial Accounting Standards Board. Mr. Schroeder dissented and Mr. Kroeker abstained." (Financial Accounting Foundation, 2014).

The SEC, as mentioned above, is another important player in this conversion/adoption debate. Even if FASB and IASB agree on an issue, the SEC must still approve the new standards for listed firms. Aside from conversion, the SEC is still wavering on whether, when and how to allow U.S. listed firms to adopt IFRS for their external reporting. The advantage, according to Auben (2011) is, "Big multinational firms like Ford and IBM, which use IFRS for their businesses overseas, would no longer have to keep separate books to report in the United States." However, one may briefly forget that the firms themselves as well as investors are stakeholders and thus players, providing input to the SEC, FASB and IASB on their opinions.

While outright adoption of IFRS would benefit the large multinational firms, the smaller listed firms who do little or no business outside the United States would find the switch to IFRS very costly with probably little benefit. For these firms, conversion may be a better approach to the international standards issue in the U.S. since they may adopt new accounting principles as they are issued rather than having to make one large major overhaul of their reporting systems all at once. Some may argue that these small firms may still continue to use U.S. GAAP if the SEC provides a choice between the two sets of standards rather than dictating that all listed firms use IFRS. However, that opens up the whole discussion of comparability, particularly for investors who would then need to reconcile the differences themselves when comparing, for example, IBM with a smaller local technology firm. Comparability is a very important characteristic in both the old and new conceptual frameworks for financial accounting, since it facilitates choice.

The consequence of having so much input into the controversy over international standards in the U.S. is that even if convergence or adoption moves forward, the pace will be very slow and not everyone will be satisfied. Perhaps, given that sometimes rule makers must make compromises, no one will be satisfied.

Too Many Choices

Another problem with the move toward conversion is that this is not the only choice. The United States (meaning the SEC and FASB) may adopt IFRS as is for the listed U.S firms as did approximately 90 other countries, may adopt IFRS with carve-outs as did the European Union and a few other countries, may instead (or as well) converge completely with new international standards, or may converge with carve-outs as they seem to be doing. Each of these possibilities has advantages and disadvantages, but the biggest problem is that the SEC and FASB have not picked one goal toward which to work.

There are two arguments for unconditional voluntary adoption of IFRS by U.S. firms. First, in late 2007 the SEC voted unanimously to allow “certain foreign entities listed on U.S. exchanges to employ either U.S. GAAP or the Englishlanguage version of IFRS.” (McEnroe and Sullivan 2014). Allowing U.S. firms to follow suit would enhance comparability. The second reason is, as mentioned in the previous section, that large multinational U.S. based listed firms would no longer have to spend time and money reconciling their foreign subsidiaries that already use IFRS for their own financial reports.

On the other hand there are drawbacks to this approach. If the adoption is voluntary for each firm, the U.S. would now have a dual system of reporting which would be counterproductive to the desire for consistency. If adoption of IFRS is mandatory, this will create much additional work and much money spent on the conversion for smaller firms who have little or no stake in aligning their accounting and reporting with that of foreign corporations.

A similar choice is the adoption by the U.S. of IFRS, but with carve-outs. The European Union chose this strategy, and adopted an EU version of IFRS in 2002 as a requirement for all consolidated financial statements of the firms from EU countries that trade on regulated European securities markets. The main carve-out of the EU version concerns the treatment of fair value hedge accounting in IAS 39.

The advantages and disadvantages of adoption with carve-outs are similar to those for adopting IFRS in total as is, but with a more blatant disregard for consistency since now different countries are using different versions of the same set of rules. Although this metaphor is overly dramatic and exaggerated, it would be like comparing your game of checkers to your neighbor’s game of chess. The boards look the same, but the pieces and the rules are different.

The alternative to adoption of IFRS is convergence, but again there is the question of carve-outs. As Shakespeare might have said, convergence is not convergence which alters when it alteration finds. Is convergence with carve-outs really going to fulfil the purpose of creating a single uniform set of international accounting standards to make reporting across firms and borders more comparable?

The United States is not the only country working on convergence with IFRS. Canada, China and Japan also have convergence projects. The ideal resolution to these endeavors is that IFRS remain a steady and stable set of international standards, and that the GAAP of various countries grow closer and closer to this unwavering line. The reality is that for each convergence project there are exceptions and that in some cases, particularly within the U.S., the international standards are not a constant, which would then require more iterations of the convergence projects of other countries in order to achieve convergence. In the worst case, each country’s convergence project would create slightly different versions of IFRS. This then simply transforms convergence into the “adopt IFRS with carve-outs” choice.

At this point one must also remember that we are only talking about listed firms. What will happen to the U.S. firms that are not listed? Will there be a local set of GAAP that is similar to the old standards and not similar to IFRS? Will these unlisted firms have to translate financial statements into IFRS statements? Leone(2010) also points out that many firms believe that, if the U.S. does not adopt IFRS, “American companies can return to the old ways of accounting,” forgetting that these old ways are already rapidly changing due to the convergence project. For example, since 2002 FASB has issued over 20 new statements (SFAS,) the purpose of many of which is to bring GAAP closer to IFRS. These include in 2005 SFAS 154 *Accounting Changes and Error Corrections*, in 2007 SFAS 141R *Business Combinations (Acquisition Method,)* and also in 2007 SFAS 159 The *Fair Value Option for Financial Assets and Financial Liabilities.*

The question of conversion to or convergence with IFRS is almost like a game of whack a mole. As one concern is addressed, another pops up. As one choice is accepted or rejected, another pops up. It will be very difficult for the U.S. to come to a resolution about how to deal with international standards unless the focus of the conversion project is clear.

Too Many Carve-Outs

At issue here is not so much the number of carve-outs, but the number of countries taking carve-outs. One example is the European Union's adoption of IFRS in which they "decided to 'carve-out' a portion of the international standard for financial instruments, producing a European version of IFRS." (FASB 2013). Although one may consider this a small exception to IFRS, it does affect 28 countries.

According to a 2013 publication by PWC, there are several non-European Union and non-U.S. countries with a variety of carve-outs. One example is Brazil, which does not allow revaluation of fixed assets, and does not allow early adoption of new standards. Another example is Chile, which requires that banks treat bad debts according to local GAAP rather than IFRS. Uruguay and Israel also make exceptions for banks, Pakistan for banks and insurance companies, the Philippines for banks and mining companies. Saudi Arabia requires IFRS for banks and insurance companies, but not for other firms. Algeria has, among other things, the odd exception that the primary users of financial information are not identified as the stockholders. Tunisia does not allow the use of IFRS, but their domestic GAAP is modeled on the IFRS that existed in 1995, so their GAAP is similar to, but not the same as, current international standards. Australia's reporting is mostly consistent with IFRS although they require some additional disclosures, and have some standards for topics that the IFRS do not address such as the Petroleum Resource Rent Tax.

India probably has the most prevalent set of carve-outs. Attra (2014) reports that the Indian version of IFRS, referred to and Ind AS and which is more of an attempt to converge with rather than directly adopt international standards, has 13 carve-outs. Citing vast differences in their economic conditions as the motivation, one of these exceptions is the inclusion of amortized exchange differences from monetary translation in the equity section, rather than posting these gains or losses directly to income. Another carve-out is that investment properties may only be measured at cost rather than cost or fair value. A third involves real estate construction. IFRS treats this as an ordinary sale of goods, but Ind AS requires revenue on these sales to be recognized using percentage of completion. Given all these carve-outs, Attra (2014) concludes, "As it is evident, some companies may be benefited by applying the existing Ind AS, over the IFRS. However, this benefit will result in them not being comparable with their International peers, which will, in turn, impact their fund-raising abilities."

Going beyond carve-outs, not all countries allow the use of international standards in any form. For example, the following countries fully prohibit the use of IFRS and must use only local

GAAP: Cameroon, Chad, Columbia, Egypt, Indonesia, Paraguay, and Senegal. This definitely precludes the spirit of a single uniform international set of accounting standards.

Since there are about 196 countries in the world, and as listed above approximately 38 (the European Union countries and ten others, excluding the United States) have some sort of carve-out and another seven listed above are not allowed to use IFRS at all, that means approximately 23% of the countries in the world are not following the current IFRS as written by IASB. This is a significant number, and does not bode well for a single uniform set of global standards. Since all these other countries are allowed exceptions, why not the United States? And so, it is unlikely that U. S. GAAP and IFRS will ever truly converge.

Principles vs Rules, or Where's the Beef?

Accounting students are routinely taught that a big difference between IFRS and U.S. GAAP is in their underlying philosophies, that IFRS are principles based while GAAP are rules based, but the difference is not always explained clearly. Principles look toward the outcome, while rules describe the conduct necessary to arrive at an outcome. Using a non-accounting example, a principle might be to treat your children well and make sure they have food and shelter. The rules based version might be: do not hit your children; make sure you have housing for your children; make sure your children get three balanced meals per day; make sure they have clean clothes to wear; do not leave your children unattended. Violating any of these rules will have legal consequences. Both the principles and rules above have the same outcome, but the principles assume that one knows how to achieve the result and the rules lay out a specific path under the assumption that people must be guided to the desired outcome.

The first question to ask is whether it is true that IFRS are principles based and GAAP are rules based. Leone (2010) alleges that this is a myth, and that both IFRS and GAAP are based on a combination of principles and rules. However, Shortridge and Myring (2004) point out that, while each FASB statement begins with a principle, rules are then created to meet the objectives of the principle. To illustrate this they focus on the treatment of accounting for leases, for which they highlight the fact that IASB (prior to the convergence project with FASB) addresses this accounting issue in "six IASB pronouncements and one interpretation. In contrast, U.S. GAAP related to lease accounting is addressed in 20 Statements, nine FASB Interpretations, 10 Technical Bulletins, and 39 EITF Abstracts. The depth of GAAP coverage of leases is characteristic of the rules-based accounting system in the U.S."

Leone (2010) further reports that the President and CEO of Leveraged Logic, Bruce Pounder, has stated that since GAAP has existed for much longer than IFRS, it has simply amassed more rules than IFRS, but they are both principles based and rules driven. Contrarily Shortridge and Myring (2004) contend that U.S. GAAP is indeed more rules driven than IFRS, and explain, again in the context of leasing, "FASB hoped that by providing explicit rules, individual judgment would be eliminated and the standards would be consistently applied."

On the topic of leases, FASB found that the explicit rules actually gave firms greater rather than less ability to manipulate reporting, because of the "bright line" rules involving differentiating capital from operating leases. Moving forward to 2013, FASB, after working with IASB on a joint lease reporting project since 2006, issued a revised exposure draft that basically classifies most leases as capital leases, requiring the lessee to report both the liability (present value of lease payments) and the leased asset on the Balance Sheet. This would disallow the "bright line" distinctions that permitted off balance sheet financing for leases. By the end of the comment period in September 2013, FASB had received over 600 letters, many of them unfavorable. Even the members of FASB themselves only voted 4-3 to release the exposure draft. (Williams, 2014). After as long as seven years, FASB and IASB have still not been able to agree on how to expense the type B leases for lessees. The type B lease is what used to be an operating lease; IASB wants to amortize the expense and FASB wants to use a "single, straight-line lease expense" for these leases (Tysiac 2014). Moreover, although agreeing on most points for the treatment of lessor accounting, FASB and IASB did not agree completely there, either.

Returning to the comment above that GAAP has existed much longer than IFRS and so has generated more rules, we have two arguments against this logic. First, if Mr. Pounder wishes to compare numbers, let us look back again at history. The Committee on Accounting Procedures (CAP) was created in 1939, and over its 20 years issued 51 Accounting Research Bulletins. The Accounting Principles Board then replaced CAP and issued about 31 opinions before being replaced by FASB. FASB has issued to date over 150 statements, while the IASC and IASB combined, which sequentially have existed as long as FASB, have issued 41 International Accounting Standards and 15 International Financial Reporting Standards, the last two of which, IFRS 15 and IFRS 9, were just issued this year. In just the 40 years since FASB and IASC were originally established, FASB has issued almost three times as many standards as the two international accounting bodies. Also, as Leone (2010) points out, "The IASB … touts the brevity of the 2,500 page IFRS rulebook versus GAAP's 12,000 pages." Although Leone is trying to make the point that this is irrelevant in the principles vs rules debate, it is certainly difficult to ignore.

Given this evidence, we agree that IFRS and GAAP each contain a principles and rules component, but that GAAP is much more rules-oriented. Further, the United States is considered a very litigious society, which tends to produce a number of new rules to meet new issues, and it is natural that this philosophy carries over into accounting, where accounting manipulations have caused such serious problems as the Enron or WorldCom scandals. In an effort to prevent fraud, even more rules are proposed, and as firms find ways around these rules or ways to use the rules to their advantage, more rules are recommended. Perhaps this will also eventually happen to IFRS, but the philosophy is different—managers and accountants should think for themselves rather than following a boilerplate of rules that may cause vastly different accounting treatments for similar economic transactions, and leases are a perfect example of this.

Having argued that IFRS are certainly more principles based than are GAAP, the other question to address is whether principles or rules are preferable in measuring and reporting financial accounting transactions. The arguments against a principles based system are that it is not precise enough, and thus too easy to manipulate. Shortridge and Myring (2004) also point out that, again given the litigious society of the United States, "accountants seem to prefer rules-based standards, possibly because of their concerns about the potential of litigation over their exercise of judgment in the absence of bright-line rules." Several researchers, including Agoglia, Doupnik and Tsakumis (2010) have studied the relationship between financial standards rigor and management's manipulation of the accounting. They use the term "aggressive" reporting rather than manipulation, but they find that managers report less aggressively under a principles based system than a rules based one. Why might this be so? According to Deloitte partner D.J. Gannon, "not only do companies have to adhere to the principles of IFRS, they are pushed to reach accounting outcomes that are more reflective of economic reality. That requires judgment and thoughtfully written disclosures to support the accounting treatment."(Leone, 2010). The focus is on the outcome rather than the process to reach the outcome, which may be a maze of specific rules for a variety of industries. It is a matter of, "Where's the beef?" rather than of, "How do you prepare the beef? "

Different perspectives make convergence of IFRS and GAAP challenging. While principles are sometimes considered difficult to enforce because they are vague, rules may become so complicated that similar economic transactions yield different accounting treatments. We feel that the international standards are simpler, easier to follow and more outcome driven which makes them superior to rules based standards, but as long as others disagree, we do not see FASB either completely converging with or the U.S. completely adopting IFRS.

The Transmogrification of IFRS

In 1973 when IASC was formed, the idea was to create a single set of global financial accounting standards that most nations would adopt as is. In 2002 when FASB and IASB agreed to work on convergence, the latter already had a number of international standards in place, and probably imagined a scenario similar to the last line of George Orwell's novel *Animal Farm*, "The creatures outside looked from pig to man, and from man to pig, and from pig to man again; but already it was impossible to say which was which", in which GAAP replaces pig, and IFRS replaces man. That is, GAAP would evolve into IFRS, either through convergence or simple adoption as is, of the international standards buy U.S. firms.

As the convergence project moves forward, it grows clear that the U.S. standards are changing, but so are the international standards. While this is not necessarily a bad thing, since as time, the economy, and the world are all changing constantly, it does make IFRS a moving target. That is, every country that has adopted the international standards has at least cursorily examined them to make sure they meet their users, preparers and auditors' needs, which is why there are so many carve-outs. But as IFRS change, many of these countries will have to re-evaluate their own versions of IFRS every time IASB changes a rule. At some point this will become too cumbersome, and as IFRS change the divergence between the IASB international standards and various countries' versions of those standards may grow farther apart as countries ask for more carve-outs.

How does this affect the FASB/IASB convergence project? IASB changes their standards to meet economic needs, and works with FASB to create new and similar standards. However, as IASB works toward a consensus with FASB on various issues, FASB is adamant about not changing certain rules or restrictions, such as the timing of impairment losses in IFRS 9 *Financial Instruments* issued in July 2014, or definition of "probable" when dealing with collectability issues in IFRS 15 *Revenue Recognition*, issued only in May 2014. As the two sets of standards have changed and moved toward each other, but without total agreement on some of the points even after IASB was ready to issue the statements, this indicates that convergence will never fully be achieved.

CONCLUSION

The Vice Chair of IASB, Ian Mackintosh, is reported to have said as recently as this year that a single set of international accounting standards is "desirable, achievable, and … inevitable" (Amato 2014). We feel that U.S. GAAP and IFRS will never achieve full convergence for a variety of reasons. First, too many believe that GAAP is superior and thus resist change either in the form of adoption of or convergence with IFRS. Remember that neither FASB nor IASB operate in a vacuum, which means they not only solicit but welcome comments on each new principle from anyone wishing to provide these comments, and FASB does tend to listen. Also, note that the members of FASB are not always in alignment, that is, they do not vote unanimously, with each suggested new statement or revision proposed.

Second, since both the number of people and of organizations with input into the process is large, it is difficult to reach consensus on any new idea. Third, FASB also has too many paths it may take: full adoption of IFRS, adoption with carve-outs, full conversion, or conversion with carve-outs. If FASB has no clear destination, then it has no clear path either.

Fourth, because so many countries are allowed carve-outs, this signals the United States that they may also have carve-outs and that precludes true adoption of or convergence with the international standards. Finally, too many people believe that a principles based system is not detailed enough, and that firms need more guidance in both recording and reporting accounting transactions. Since GAAP is more rules oriented, many find it preferable to IFRS even if research indicates this is false, but this belief will impede convergence nonetheless. Thus, rather than true convergence, we will have an asymptotic relationship between IFRS and U.S. GAAP in which the two sets of standards grow closer and closer to infinity and beyond, but never meet.

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THE VALUE RELEVANCE OF FOREIGN TRANSLATION ADJUSTMENT: CASE OF INDONESIA

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ABSTRACT

This study examines the effect of foreign translation adjustments on firm value. Specifically, this study wants to test the opposite effect of the accounting treatment with economic conditions on foreign translation adjustments. Our sample consist of manufacturing firms listed in Indonesia Stock Exchange year 2006-2011. Multiple regression is used for hypotheses testing. The result shows foreign translation adjustment has value relevance and is negatively associated with stock returns. The negative association between foreign translation adjustment and change in firm value confirms the opposite effect between accounting and economic effect. Appreciation of the local currency and the decrease in operating margins because of high competition with other foreign companies lowers the value of the firms. This negative association between foreign translation adjustment and change in firm value is due mainly to the high-labor-intensive firms. Foreign translation adjustment are significantly negative for high labor intensive firms and insignificant for the low labor intensive firms where labor intensity measured by total employee number. This result implies that wage rigidity in high labor intensive firms is more evident than in the companies with lower labor intensity.

Keywords: value relevance, foreign translation adjustments, exchange rates changes

INTRODUCTION

As a consequence of globalization, the increasing number of multinational companies has had an impact on financial reporting that will be the basis by which investors evaluate a company's performance. Multinational companies with significant overseas operations are exposed to exchange rate changes as the financial statements of foreign subsidiaries denominated in foreign currency are translated to the reporting currency of the parent company. Given the recent emphasis on valuation and economic interpretability of the statement of financial position, foreign currency translation has become a topic of interest for many users of financial statements. The concern regarding this issue, however, is exaggerated as the degree of internationalization of many firms continues to increase. Internationalization and the need for sound foreign currency translation method are expected to increase as additional foreign markets open to corporations throughout the world (Ziebart & Choi, 1998).

According to the Indonesia Financial Accounting Standards (PSAK 10 (1994) *Transactions in Foreign Currencies* and PSAK 11 (1994) *Translation of Financial Statements in*

Foreign Currencies), if the business activities abroad are considered as a foreign entity and the functional currency differs from the reporting currency, the firm should employ a translation method. From an accounting perspective, the positive translation effect due to currency appreciation of a subsidiary will add the comprehensive income in the equity, thus have a positive impact on increasing the company's value. However, Louis (2003) proves the opposite effect between an accounting perspective and an economic perspective. According to the economic perspective, the appreciation causes the price of domestic products to become relatively more expensive than foreign products. Accordingly, in order to sustain, the domestic firm must lower its price. The decrease in the selling price cannot necessarily be followed by a decline in the prices of inputs, especially labor costs, as the company is bound by employment contracts and labor unions. Overall, from an economic perspective, wage rigidity and lower selling prices will reduce corporate profit margins, thus resulting in a decrease in the value of the company.

This study examines the effect of foreign translation adjustments on firm value. Specifically, this study tests the opposite effect of the accounting treatment with economic conditions on foreign translation adjustments as found by Louis (2003). Similar study in Indonesia has been conducted by Purba (2009) but she does not limit her samples to manufacturing firms due to limited observations during her study period. Our research employs a sample of manufacturing firms listed on the Indonesia Stock Exchange that are assumed to be most affected by the exposure of foreign assets and liabilities. The manufacturing sector was also selected for this study because the total cost of production inputs is rigid, especially the labor costs, which comprise a significant amount of the total production costs.

The results of our study confirm Louis (2003) finding that the foreign translation adjustment has value relevance and is negatively associated with stock returns using both raw return and market adjusted return. This negative association is mainly caused by the rigidity of wages, especially in firms that are high labor intensive. Accordingly, this implies that although positive translation adjustment increase comprehensive income and equity, it causes a decrease in the value of the company. Foreign translation adjustment is a balancing effect because of the differences in recording based on the subsidiary's functional currency and reporting based on the currency of the parent company. Standard setters should consider appropriate treatment in the recording of foreign currency translation that better reflects the actual economic conditions.

THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

The Accounting Standards of Foreign Currency Translation

Firms can undertake activities related to foreign activities in two ways. They can conduct transactions in a foreign currency or participate in foreign operations. To prepare consolidated financial statements, financial statements of foreign operations must be translated into the reporting currency of the company. In the United States, the accounting standards of foreign currency translation have evolved over the years. In October 1975, the Financial Accounting Standards Board (FASB) issued its first foreign currency translation accounting standard, the Statement of Financial Accounting Standards (SFAS) No. 8 *Accounting for the Translation of*

Foreign Currency Transactions and Foreign Currency Financial Statements. SFAS No. 8 prescribed the use of the temporal rate method, and the translation adjustment is included in the determination of the consolidated net income. SFAS No. 8 was heavily criticized for treating the foreign currency translation gain or loss as a component of the consolidated net income (Louis, 2003). Responding to this, in 1981, the FASB issued SFAS No. 52 *Accounting for Foreign Currency Translation*, which supersedes SFAS No. 8. The new standard prescribes the use of the current rate method and the exclusion of foreign currency translation adjustments from net income, when a foreign subsidiary uses a foreign currency as its functional currency. SFAS 52 still requires the temporal method, in the case where the US dollar is deemed the functional currency of the subsidiary and in the case where the subsidiary is located in a hyperinflationary economy.

The IASB also issued accounting standards related to foreign currency translation. The IAS 21 *The Effects of Changes in Foreign Exchange Rates* outlines how to account for foreign currency transactions and operations in financial statements and how to translate financial statements into a presentation currency. The IAS 21 titled *Accounting for the Effects of Changes in Foreign Exchange Rates* was first issued in July 1983 and then later revised in 1993 as part of the comparability of financial statements project. In 2003, it was revised again as part of the convergence project. The translation procedure of IAS 21 is similar to that of SFAS 52. Similar to SFAS 52, IAS 21 requires an entity to measure its assets, liabilities, revenues and expenses in its functional currency. However, the indicators used to determine the functional currency in SFAS 52 differ in some respects from IAS 21 (KPMG, 2009). IAS 21 requirements pertaining to hyperinflationary economies are also substantially different from SFAS 52.

Indonesia has three related accounting standards, namely, PSAK 10 (1994) *Transactions in Foreign Currencies*, PSAK 11 (1994) *Translation of Financial Statements in Foreign Currencies*, and PSAK 52 (1998) *Accounting for Reporting Currencies*. PSAKs 10 and 11 were developed based on IAS 21 (Revised 1993), whereas PSAK 52 used SFAS 52 *Foreign Currency Translation* as a reference. These standards, along with ISAK 4 (1997) *Interpretation of Paragraph 20 PSAK 10 regarding the Allowed Alternative Treatment for Foreign Exchange Difference*, have been revoked in conjunction with the issuance of PSAK 10 (2010 revision) *Effect of Changes in Foreign Exchange Rates* in March 2010, effective for financial statement reporting periods beginning on or after 1 January 2012. PSAK 10 (2010 revision) is the adoption of IAS 21 *The Effect of Changes in Foreign Exchange Rates*[1]. The accounting treatment for foreign translation adjustments is substantially the same with old standards, and this item now is included in other comprehensive income. One of the main differences between the revised standard and the old standards is that the revised standard requires each entity to assess its functional currency. The default presumption of having Indonesian Rupiah as the functional currency per PSAK 52 is no longer available. Once the functional currency is identified, this forms the basis for translating foreign currency transactions. Under this revised standard, an

[1] IAS 21 adoption is part of the IFRS convergence process in Indonesia. One of the benefits of the IFRS convergence is increasing financial statements comparability, which will facilitate inter-country transactions and investments and promote international capital market development (Rotenberg, 1998).

entity can present its financial statements in any currency it chooses. However, a publicly listed entity subject to capital market regulations must present its financial statements either in Indonesian Rupiah or another currency that is the functional currency of that entity (PwC, 2012). There is no difference in the translation procedure.

According to PSAKs 10 (1994) and 11 (1994), if the business activities abroad are considered as a foreign entity and the functional currency different from the reporting currency, then the financial statements of the foreign subsidiary must be translated into the reporting currency of the parent company using the current rate method. Exchange differences are shown as foreign exchange differences arising from the translation of financial statements and presented as part of the equity until the disposal of the related net investment[2].

From an economic perspective, fluctuations in exchange rates affect the value of foreign subsidiaries due to the effect of exchange rates on production costs. If the local currency depreciates, the cost of production will decrease. On the contrary, if there is appreciation in the local currency, the cost of production will increase. Furthermore, the impact of exchange rates on production costs can be differentiated according to the type of overseas operations of the company. If foreign operations are an integral part of the reporting enterprise, the cost of production typically occurs in subsidiaries abroad, and the revenue is earned in the parent company. Thus, if the local currency depreciates, the parent company will benefit because the cost of production becomes cheaper due to the increased purchasing power of the currency of the parent company. Depreciation of the local currency adjustment implies net loss for financial assets revalued at a lower rate. In such cases, adjustment due to re-measurement is not a source of value added because it is only related to exchange rate fluctuations.

For a foreign entity, which is characterized by (1) operating activities abroad financed mainly from its own operations or local loans rather than from parent company, (2) the cost of labor, raw materials, and other components of the product or service foreign operations are primarily paid or settled in local currency rather than in the reporting currency, and (3) sales of foreign operations are primarily in a different currency than the reporting currency. Accordingly, if the local currency of the subsidiaries depreciates, then not only does it lower production costs, but it also lowers income if the currencies are translated at the parent company. In other words, the appreciation of the local currency makes it more difficult for the company to sell its products in the market because as products become more expensive, domestic or foreign products become relatively cheaper.

To remain competitive, companies must lower prices. However, lowering selling prices is not necessarily accompanied by a reduction in labor costs because input prices are likely to be stiff (sticky), particularly labor costs, due to contracts with workers and labor unions. As a result, the appreciation of the local currency and the reduction in operating margins causes high competition with other foreign companies, which, in turn, lowers the value of the firm. On the other hand, the depreciation of the local currency can improve operating margins and reduce competition with foreign companies, which, in turn, increases shareholder value. However, it is

[2] Under new accounting standards (PSAK 10 revised in 2010), foreign translation adjustments is part of other comprehensive income.

important to note that when depreciation occurs, the company cannot increase wages because the company must maintain stable wages. Therefore, companies that are high labor intensive find it more difficult to maintain stable margins than do non-labor intensive companies. This wage rigidity is caused by several factors, especially the employment contract, which is usually agreed upon in advance. Conversely, the flexibility of product prices works in the opposite direction. That is, the price of the product tends to move flexibly according to the trend of economic conditions such as inflation, exchange rates and raw material prices. Therefore, the low price production items reduce the benefits that should be achieved by the companies.

Previous Studies and Hypotheses Development

Research related to the value relevance of foreign translation adjustment in the United States initially focused on market reaction to the adoption of SFAS No. 52, which replaced SFAS No.8[3]. Previous studies have shown mixed results. Gilbert (1989) finds foreign currency translation adjustments have no value relevance since the adoption of SFAS 52. Soo and Soo (1994) also find that there is no significant change in the market valuation of foreign translation adjustments between the two standards (SFAS No. 52 and SFAS No. 8). Soo and Soo (1994) argue net income is much greater than the foreign translation adjustment and that by adding the translation adjustment to net income, the market effect associated with the adjustment may be overshadowed by fluctuations in net income. Dhaliwal et al. (1999) examine whether the addition of foreign translation adjustments to net income increases earnings association with return, but they do not find evidence that the addition of foreign translation adjustments on net income affects the association of earnings and return.

However, other previous studies find that foreign currency translation adjustments have value relevance. Griffin and Castanias (1987) find significant improvement in analyst earnings forecast accuracy after SFAS 52, which suggests that SFAS 52 enhances earnings quality. Collins and Salatka (1993) find that perceived noise generated due to the inclusion of foreign translation adjustments in net income negatively affects earnings. Bartov (1997) examines the association between stock price changes and alternative foreign currency translation adjustments (under the temporal and current rate methods) and finds that foreign currency translation adjustments are valuation-relevant. Pinto (2001) examines the value relevance of translation adjustment. By using a more direct test of value relevance, which does not use market price to examine value relevance, she finds that the lagged value of foreign currency translation adjustments have predictive value.

Despite the extant studies that implicitly postulate a positive association between foreign translation adjustment and change in firm value, Louis (2003) argues that the analysis of the accounting and economic effects of foreign currency fluctuations led him to hypothesize that there is an inverse association between foreign translation adjustment and change in firm value.

[3]Similar to IAS 21, SFAS 52 requires the entity to measure its assets, liabilities, revenues and expenses in its functional currency. However, the indicators used to determine the functional currency differ in some respects from IAS 21 (KPMG, 2009). IAS 21 requirements pertaining to hyperinflationary economies also are substantially different from SFAS 52. The translation procedure is similar in both standards.

He examines the valuation-relevance of foreign currency translation adjustments for manufacturing firms and finds that translation adjustments have a negative association with stock returns. This finding is consistent with the premise of economic effects of rigidity of wages. Appreciation of local currencies makes it more difficult for the company to sell its products in the market because, as products become more expensive, domestic or foreign products become relatively cheaper. Therefore, to remain competitive, companies must lower prices. However, this is not necessarily accompanied by a reduction in labor costs because input prices are likely to be stiff, particularly labor costs, due to contracts with workers and labor unions. As a result, the appreciation of the local currency and the decrease in operating margins together decrease firm value. In his research, Louis (2003) uses a sample of manufacturing firms because manufacturing companies are the most affected by changes in exchange rates on input costs, especially labor costs. Firms with high labor intensity, as measured by the total salaries and number of employees, are shown to have a negative and significant coefficient, which confirms the opposite effect between the accounting and economic perspectives due to the rigidity of wages.

Pinto (2005) confirms the results of Louis (2003) and finds evidence of a negative association between the foreign translation adjustments with return of manufacturing firms. Radakhrisnan and Tang (2006) extend Louis (2003) study by incorporating the effect of a barrier to entry. According to Radakhrisnan and Tang (2006), the economic impact associated with the adjustment of wages is a short-term impact. In contrast, a long-term affect is evidenced from the economic growth and innovation strategies. Firms that have an innovation strategy consider obtaining copyright or patent rights that can protect them from competition in business in the short term. Thus, the company is under more pressure to lower prices. Firms that operate in an environment without barriers to entry are more affected by the rigidity of the effects of workers than firms operating in environments with high entry barriers (as measured by a firm's R&D leader in the industry), as the latter are not significantly affected by the wage rigidity. The results show a positive association between abnormal stock returns and foreign translation adjustments in the company that is the R&D leader and also for the R&D follower with high asset intensity and low labor intensity. Consistent with Louis (2003), Radakhrisnan and Tang (2006) find a negative association between abnormal stock returns and foreign currency translation adjustments in the company identified as the R&D follower with low asset intensity and high labor intensity.

There are additional studies on foreign translation in countries other than the US. For example, Ferraro and Feltri (2012) examine whether foreign currency translation adjustments are incrementally value-relevant for investors with respect to net income (NI). Their samples include 108 firms listed on the Italian Stock Exchange. The main finding of their study is that foreign currency translation adjustments are significantly and incrementally value-relevant. Huang and Vlady (2012) examine a group of Australian multinational firms from the oil and gas sub-industry in the manufacturing sector and find that foreign translation adjustments are negatively associated with firm value under AASB 1012 (old standard) and positively associated with firm value under AASB 121 (new standard). They argue that the result is possibly because the new standard, AASB 121, provides firms with greater flexibility in translation accounting practice, and thus the new standard has the potential to improve the quality of the translation accounting information.

H1 Foreign translation adjustment negatively affects firm value

To examine whether the opposite effect is caused by the rigidity of prices of inputs, especially labor costs, as hypothesized by Louis (2003), we examine whether, in the companies that are high labor intensive, the effect of foreign translation adjustment becomes more negative. As labor cost is the main link between the translation adjustment and the change in firm value, the association between the translation adjustment and the change in firm value should be stronger (more negative) in labor-intensive firms.

H2 Foreign translation adjustments in companies with high labor intensity have a more negative effect on firm value than do firms with low labor intensity

To control other factors that may affect the association with the return of foreign currency translation adjustments, this study included a control variable used in Louis (2003). The first control variable is net income minus transaction gain (loss). Net income is perceived by investors to be an important indicator of profitability. The more profitable the company, the higher the rate of return to shareholders. Furthermore, earnings stability indicates a company's ability to maintain continuity of operations and avoid bankruptcy (Van Horne, 2002). Thus, we expect a positive association between earnings and stock returns.

Transaction gain (loss) is the second control variable in this research. Transaction gain/loss can arise because of the company's foreign exchange transaction and also because the company uses a temporal rate when the functional currency of the subsidiary is the same as the parent reporting currency. Louis (2003) argues that this measure is noisy as it can reflect the influence of foreign exposure and choice of companies using a temporal rate method. Finally, the association between foreign translation adjustments and stock returns may not be caused by the effects of the economy as predicted, but rather, it may be influenced by the size of foreign subsidiaries. Therefore, in this study, total assets in foreign subsidiaries are used to control the presence of foreign exposure. This measurement is different in Louis (2003) as he used foreign tax as foreign income exposure. Louis (2003) recognized that foreign income tax is too noisy because there are different tax rates, regulations related to the transfer price and hedging strategies. Therefore, our study used total assets of foreign subsidiaries as an alternative measurement of foreign exposure.

Table 1 **VARIABLES DEFINITION**			
Variables		Variable Measurement	Expected Sign
NI_ADJ	Net Income	Net Income minus transaction gain (loss)	(+)
ADJ	Translation Adjustment	Translation adjustment reported on statement of stockholders' equity or statement of other comprehensive income	(-)
TADJ	Transaction gain (loss)	Transaction gain (loss) reported on income statement	+/-
FASSET	Foreign Assets	Foreign assets subsidiaries reported on segment reporting.	+/-

RESEARCH DESIGN

Research Model

To test the hypotheses, we use the following research model:

$$RET_{it} = \alpha_0 + \alpha_1\ NI\_ADJ_{it} + \alpha_2\ ADJ_{it} + \alpha_3\ TADJ_{it} + \alpha_4\ FASSET_{it} + \varepsilon_{it}$$

The expected sign for H1 is $\alpha_1 < 0$

The dependent variable is the stock return. We use two measures for the stock return, raw return and abnormal return. Following Louis (2003), we use raw return because even though we can estimate unexpected return, there is no reliable way to adjust the translation adjustment for the market effect. Raw returns are calculated as the buy and hold return for 12 months ending 31 March of the next period. However, we also use abnormal returns to address concerns that translation adjustment maybe related to some unknown risk factors for which we have not controlled (Louis, 2003). We use market adjusted return to measure abnormal returns (the buy and hold return minus the market return for the same period). Measurements of the independent variables and control variables, along with the expected signs, are presented in Table 1.

Sample Selection

Samples are selected from listed firms on the Indonesia Stock Exchange (IDX) based on the following criteria. The firm 1) is in the manufacturing sector, 2) has at least one foreign subsidiary, 3) recognizes 31 December as its year-end and 4) has complete data for all variables in the study. Based on these criteria, 30 manufacturing firms are selected for a total of 134 firm-years between 2006 and 2011. If we classify our samples based on the manufacturing sub-industry, we find that the textile and garment industry has the highest sample of observations at 18.66%, followed by the plastics and packaging industry and chemical industry, each at 14.18%.

RESULTS AND DISCUSSION

Descriptive Statistics

Descriptive statistics of all variables are presented in Table 2. The average (median) raw return is 0.09 (12:11). The value of raw returns is quite varied. Furthermore, the raw negative return is not concentrated only in the year 2008, which allegedly occurred because of the global crisis, which resulted in the lowest raw return occurring in 2009. The market adjusted return is higher than the raw return with an average (median) of 0.31 (0.20). The positive market value adjusted return shows that the company's stock returns are greater than the market return, a finding that may be due to the decline in the composite stock price index, which was caused by the global crisis in 2008. Net income also shows variations from year-to-year. The average (median) net income is -0.03 (0.09). This negative result implies that, on average, our samples incur losses.

The average value of the foreign translation adjustment for six years reveals positive numbers, thus suggesting the appreciation of the subsidiary relative to the parent company currency (rupiah). Subsidiary currency appreciation leads to positive translation adjustment values when translated into the parent company financial statement. Furthermore, the average value of the transaction gain/loss takes a positive value. The transaction gain/loss is an accumulation of foreign currency transaction that may or may not be realized. Subsidiaries might using more than one foreign currency in transactions, and these may appreciate or depreciate compared to subsidiary reporting currency. Consequently, despite the appreciation of the subsidiary currency, that should result in a re-measurement loss, our samples, on average, experience transaction gains. Finally, the average foreign assets were Rp1.7 trillion or 29% of the average assets of the company as a whole. The magnitude of this value indicates that it is necessary to control for foreign exposure as the association between foreign translation adjustments and stock returns may not be caused by the effects of the economy as predicted but may instead be influenced by the size of overseas subsidiaries.

Table 2
DESCRIPTIVE STATISTICS

Variable	RAWRET	MKTRET	NI_ADJ	ADJ	TADJ	FASSET
Mean	0.0902	0.3065	-0.0268	0.0034	0.0169	1.6798
Median	0.1067	0.2015	0.0874	0.0000	0.0000	0.3453
Maximum	1.8470	2.1156	4.7559	0.6337	1.7702	18.1886
Minimum	-1.6520	-1.1611	-4.6897	-0.5090	-1.6884	0.0000
Std. Dev.	0.5454	0.5768	0.8777	0.1005	0.3085	3.7877

RAWRET = raw return, MKTRET = market adjusted return, NI_ADJ = net income minus transaction gain (loss), ADJ = translation adjustment, TADJ = transaction gain (loss), FASSET = foreign assets

Main Results

Regression testing is run using a panel data method. Although the purpose of this study is to examine value relevance of foreign translation adjustments, the effects are assumed to be different for each period and for each company. Therefore, the fixed effect method is used both in the cross section and the period. The results of the regression to test hypothesis 1 are reported in Table 3.

As expected, the value of α_2 negative and significant for both models (p-value $<\alpha = 0.01$). Thus, hypothesis 1 is accepted. This result is consistent with Louis (2003), Radakhrisnan and

Tsang (2006), and Purba (2009), who also find that foreign translation adjustment is negatively associated with firm value. This result also confirms the opposite effect between accounting and economic effect. Appreciation of local currencies makes it more difficult for the company to sell its products in the market, as the products become more expensive and domestic or foreign products become relatively cheaper. To remain competitive, companies must lower prices. However, lowering prices is not necessarily accompanied by a reduction in labor costs because input prices are likely to be stiff (sticky), particularly labor costs, due to contracts with workers and labor unions. As a result, the appreciation of the local currency and the decrease in operating margins together with high competition with other foreign companies lowers the value of the firms.

Table 3
REGRESSION RESULT
$$\mathbf{RET_{it} = \alpha_0 + \alpha_1\ NI\_ADJ_{it} + \alpha_2\ ADJ_{it} + \alpha_3\ TADJ_{it} + \alpha_4\ FASSET_{it} + \varepsilon_{it}}$$

Variable	Expected Sign	Model 1				Model 2			
C		0.0990		0.0129		0.3158		0.2276	
		0.0000	***	0.7314		0.0000	***	0.0000	***
NI_ADJ	+	0.2044		0.2039		0.2180		0.2176	
		0.0000	***	0.0000	***	0.0000	***	0.0000	***
ADJ	-	-0.9799		-1.1328		-1.0098		-1.1671	
		0.0051	***	0.0079	***	0.0089	***	0.0119	**
TADJ	+/-			-0.1126				-0.1119	
				0.1604				0.1673	
FASSET	+/-			0.0527				0.0539	
				0.0212	**			0.0190	**
Adjusted R-squared		0.1777		0.1927		0.2610		0.2755	
F-statistic		1.7986		1.8356		2.3050		2.3310	
Prob(F-statistic)		0.0124	**	0.0093	***	0.0006	***	0.0005	***

Model 1 uses raw return as dependent variable, while model 2 uses market adjusted return as dependent variable. All variables are scaled with beginning market value. The first column shows result without control variable, while the second column shows result for full model
RAWRET = raw return, MKTRET = market adjusted return, NI_ADJ = net income minus transaction gain (loss), ADJ = translation adjustment, TADJ = transaction gain (loss), FASSET = foreign assets
*** Significant at 1%; ** Significant at 5%; * Significant at 10%

Net income has a significant positive effect on return for both models. These results are similar to Louis. Different from Louis (2003), however, transaction gain (loss) in our study is not significantly associated with stock returns. Transaction gain (loss) is included to control the use of the temporal rate method. However, as noted in the descriptive statistics, the component of transaction gain (loss) also contains the accumulation of foreign transactions in multiple currencies, which may demonstrate different movement toward the currency of subsidiaries. Louis (2003) also recognized that this measurement is noisy. Foreign assets as a proxy of foreign exposure suggest a significant positive effect on stock returns (p-value < 0.01). This result, consistent with Louis (2003), implies that the size of foreign subsidiaries increase firm value.

To determine whether the opposite effect on the first hypothesis is caused by the rigidity of the prices of inputs, especially labor costs, we further examine whether, for firms with high labor intensity, the effect of foreign currency translation adjustments is stronger (more negative) on firm value. Therefore, we classify firms based on their labor intensity using two measures:

1) Number of employees/total market capitalization.
2) Labor cost/total expense. Labor costs include direct and indirect wages in costs of goods sold (COGS) plus the salaries, wages, and other benefits in the operating cost component. Total expense is net sales minus net income minus income tax expense.

If a firm's labor intensity is above the median, then the firm is classified as high labor intensive, and if the firm's labor intensity is below the median, the firm is classified as low labor intensive. Regression results with sub-samples are reported in Table 4. Based on the sub-sample test of labor intensity using number of employees divided by total assets, we note that in both models, translation adjustment is negatively associated with returns for sub-sample firms with high labor intensity, and total adjustment is not significant for firms with low labor intensity. This finding supports Louis (2003), who finds that a stronger negative association between firm value and firms with high labor intensity because wage rigidity is more evident in high labor intensive firms than in the companies with lower labor intensity. Thus, hypothesis 2 is accepted.

The test results using labor cost divided by total expense to measure labor intensity are presented in Table 5. The results are somewhat different from the results in Table 4. The coefficients for both low and high labor intensity are negative and significant. This inconsistent result maybe because labor cost, as used in our study, consists of labor costs for both the domestic and the overseas operations. Based on the analysis of the data, 120 samples show an inconsistent grouping of low and high labor intensity compared to the first labor cost proxy (i.e., number of employees). The labor costs have more variable cost components, such as bonuses, commissions and other benefits based on performance, compared with the number of employees that tend not to vary. Therefore, the grouping of low and high labor intensity based on the cost of labor to be less precise and we believe that the result based on the number of employees more accurately describe the intensity of labor.

Additional Test

In 2008, the global financial crisis that began with the issue of default mortgages (subprime mortgage defaults) in the United States (U.S.). The bubbled damaging crisis in banking system is not only in the U.S., but it has also spread to Europe and then to Asia. Successive causing a domino effect on the solvency and liquidity of financial institutions in those countries, which among other things led to the bankruptcy of hundreds of banks, securities firms, mutual funds, pension funds and insurance. This affected the other countries in the world, whether in Europe, Asia, Australia and the Middle East. Index of stock prices in the global market indices also followed the downturn in the U.S. stock market, even in Asia, including Indonesia, the stock price index plummeted more than the decline in the U.S. stock indexes themselves. This resulted in an incredible panic for investors. Thus, the negative sentiment continued to grow, resulting in numerous stock prices with good fundamentals that eroded sharply.

The impact of the financial crisis is clearly visible on the rupiah as it weakened against the U.S. dollar, reachingRp10.000/USD in the second week of October 2008 (www.bi.go.id). This weakening was more due to the outflow of foreign capital due to panic over the global financial crisis. A similar impact on inflation will also occur due to the weakening dollar against the U.S. dollar, and the price of goods will also be affected. This condition certainly impacts the financial statements of multinational companies. Therefore, to observe the impact of the global crisis on the value translation adjustments, a sub-sample of firms is created and the results for the non-crisis period (2006-2007) is compared with the results of the crisis period (2008-2011). The anticipated impact of the crisis period on the relative depreciation of the rupiah against the U.S. dollar results in the value of the negative translation adjustment. Table 6 reports the regression results for the crisis and non-crisis periods.

The results show that by using either raw returns or market-adjusted returns, the coefficient of translation adjustment ($\alpha 2$) is negatively significant during the crisis period. These results are consistent with the notion that a period of global crisis causes foreign translation adjustments to become more negative because of the effect of the weakening of the Rupiah against foreign currencies. In a non-crisis period, the test indicates that the model was not significant, a finding that could be due the limited number of observations (only 38).

Conclusions

This study examines the effect of foreign translation adjustments on firm value. Specifically, this study tests the opposite effect of the accounting treatment with economic conditions on foreign translation adjustments. Using a sample of manufacturing firms in Indonesia from 2006 to 2011, the results reveal a negative significant association between foreign translation adjustment and change in firm value. The appreciation of local currencies make it more difficult for a company to sell its products in the market, and as products become more expensive, domestic or foreign products become relatively cheaper. To remain competitive, companies must lower prices. However, this is not necessarily accompanied by a reduction in labor costs because input prices are likely to be stiff (sticky), particularly labor costs, due to contracts with workers and labor unions. As a result, the appreciation of the local currency and the decrease in operating margins lowers the value of the firms.

To test whether this negative association is caused by wage rigidity theory, we perform a further test that classifies the sample according to labor intensity. The test results show a more negative translation adjustment value in the group of high labor intensity companies compared with the low labor intensity companies where intensity is measured by the number of working employees. However, if labor intensity is measured using the proportion of labor costs to total expense, the results are less consistent. These less consistent results may due to the presence of measurement error as the labor cost component from the domestic and overseas operations is not separated. Therefore, the grouping of low and high labor intensive companies based on the cost of labor is less precise, and we believe the results based on the number of employees more accurately describe the intensity of labor.

This study finds that foreign currency translation adjustments have value relevance, but in the opposite direction. Despite the positive translation adjustment in accounting that could increase comprehensive income and equity, the adjustment causes a decrease in the value of the company. The foreign currency translation adjustment is actually just a balancing effect because of the differences in the recording of the subsidiary's functional currency and the reporting currency of the parent company. Accordingly, this transaction is not considered a value creation activity. Standard setters should consider a more appropriate treatment in the recording of foreign currency translation that better reflects the actual economic conditions. Louis (2003) proposes that a more appropriate accounting treatment for the foreign currency translation adjustment is to subtract it from the value of assets that are more consistent with economic reality.

There are several limitations of our study. One limitation is that our study covers only the years 2006 to 2011. It is suggested that a future study examine a longer window, as in Louis (2003). To accurately measure labor intensity, future study could combine the number of employees with the salaries. Future studies may also consider the effect of the barrier to entry, as examined by Radakhrisnan and Tsang (2006). The economic impact related to the adjustment of wages is a short-term impact. In contrast, a long-term affect results from economic growth and innovation strategies. Firms that operate in an environment without barriers to entry are more affected by the rigidity of the effects of workers than are companies operating in environments with high barriers to entry that are not significantly affected by wage rigidity.

Table 4.
REGRESSION RESULT WITH LABOR INTENSITY SUB SAMPLE: NUMBER OF EMPLOYEES/TOTAL MARKET CAPITALIZATION

$$RET_{it} = \alpha_0 + \alpha_1 NI\_ADJ_{it} + \alpha_2 ADJ_{it} + \alpha_3 TADJ_{it} + \alpha_4 FASSET_{it} + \varepsilon_{it}$$

Variable	Expected Sign	Model 1				Model 2			
		Low Labor Intensity		High Labor Intensity		Low Labor Intensity		High Labor Intensity	
C		-0.1762		-0.4062		0.0289		-0.1840	
	+	0.0011	***	0.0251	**	0.5571		0.3094	
NI_ADJ		0.9880		0.1543		0.9786		0.1675	
	-	0.0000	***	0.0005	***	0.0000	***	0.0003	***
ADJ		-4.0783		-1.7663		-4.1406		-1.7619	
	+/-	0.0076	***	0.0088	***	0.0055	***	0.0103	***
TADJ		0.1131		-0.1885		0.1198		-0.2019	
	+/-	0.5326		0.5286		0.5021		0.5033	
FASSET		0.1006		0.4080		0.1000		0.4145	
		0.0001	***	0.0051	***	0.0000	***	0.0055	***
Adjusted R-squared		0.3512		0.2814		0.3918		0.3996	
F-statistic		2.3742		1.9230		2.6356		2.5686	
Prob(F-statistic)		0.0067	***	0.0304	**0	0.0028	***	0.0036	***

Model 1 uses raw return as dependent variable, while model 2 uses market adjusted return as dependent variable. All variables are scaled with beginning market value. The first column shows result without control variable, while the second column shows result for full model

RAWRET = raw return, MKTRET = market adjusted return, NI_ADJ = net income minus transaction gain (loss), ADJ = translation adjustment, TADJ = transaction gain (loss), FASSET = foreign assets

*** Significant at 1%; ** Significant at 5%; * Significant at 10%

Table 5.
REGRESSION RESULT WITH LABOR INTENSITY SUB SAMPLE: LABOR COST/TOTAL EXPENSE
$$\mathbf{RET_{it} = \alpha_0 + \alpha_1\, NI\_ADJ_{it} + \alpha_2\, ADJ_{it} + \alpha_3\, TADJ_{it} + \alpha_4\, FASSET_{it} + \varepsilon_{it}}$$

Variable	Expected Sign	Model 1				Model 2			
		Low Labor Intensity		High Labor Intensity		Low Labor Intensity		High Labor Intensity	
C		0.0903		-0.2383		0.3273		-0.0379	
	+	0.0061	***	0.0113	**	0.0000	***	0.6741	
NI_ADJ		0.4694		0.1778		0.4554		0.1914	
	-	0.1453		0.0000	***	0.1661		0.0000	***
ADJ		0.4659		-2.2603		0.4549		-2.4144	
	+/-	0.6690		0.0020	***	0.6892		0.0015	***
TADJ		0.0401		-0.0581		0.1375		-0.0524	
	+/-	0.9613		0.6057		0.8663		0.6425	
FASSET		0.0053		0.1360		0.0037		0.1365	
		0.8204		0.0010	***	0.8763		0.0009	***
Adjusted R-squared		0.1816		0.3714		0.3875		0.3686	
F-statistic		1.5634		2.3929		2.6058		2.3762	
Prob(F-statistic)		0.0994	*	0.0064	***	0.0031	***	0.0067	***

Model 1 uses raw return as dependent variable, while model 2 uses market adjusted return as dependent variable. All variables are scaled with beginning market value. The first column shows result without control variable, while the second column shows result for full model

RAWRET = raw return, MKTRET = market adjusted return, NI_ADJ = net income minus transaction gain (loss), ADJ = translation adjustment, TADJ = transaction gain (loss), FASSET = foreign assets

*** Significant at 1%; ** Significant at 5%; * Significant at 10%

Table 6.
REGRESSION RESULT WITH CRISIS AND NON-CRISIS PERIOD

Variable	Expected Sign	Model 1			Model 2		
		Non crisis	Crisis		Non crisis	Crisis	
C		0.0786	-0.0248		0.4044	0.1407	
	+	0.7503	0.8390		0.1256	0.2510	
NI_ADJ		2.2561	0.1746		2.2561	0.1885	
	-	0.1366	0.0001	***	0.1366	0.0001	***
ADJ		2.2501	-1.4509		2.2501	-1.4882	
	+/-	0.7505	0.0005	***	0.7505	0.0008	***
TADJ		-0.7350	-0.2399		-0.7350	-0.2386	
	+/-	0.2455	0.1701		0.2455	0.1769	
FASSET		-0.0719	0.1060		-0.0719	0.1102	
		0.6345	0.1066		0.6345	0.0930	*
Adjusted R-squared		0.3999	0.2045		0.4074	0.3161	
F-statistic		1.8807	1.7181		1.9086	2.2914	
Prob(F-statistic)		0.1611	0.0327	**	0.1554	0.0024	***

Model 1 uses raw return as dependent variable, while model 2 uses market adjusted return as dependent variable. All variables are scaled with beginning market value. The first column shows result without control variable, while the second column shows result for full model

RAWRET = raw return, MKTRET = market adjusted return, NI_ADJ = net income minus transaction gain (loss), ADJ = translation adjustment, TADJ = transaction gain (loss), FASSET = foreign assets

*** Significant at 1%; ** Significant at 5%; * Significant at 10%

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DISCLOSURE DYNAMICS ALONG THE SUPPLY CHAIN

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ABSTRACT

We examine suppliers' disclosure decisions in responses to disclosures made by major customers. We find that the propensity of suppliers to respond with their own disclosures increases in the magnitude of their stock price drop from negative customer disclosures and these disclosures tend to be bad news. Furthermore, the stock price of suppliers who keep silent following negative customer disclosures subsequently underperforms forthcoming suppliers. However, we do not find a relationship between the magnitude of supplier stock price increases from positive customer disclosures and the propensity for suppliers to disclose or the disclosure content. While prior research has investigated disclosure dynamics between intra-industry firms, our results suggest that there exists interplay in the disclosure decisions of firms along the supply chain.

Key Words*: Voluntary Disclosure, Disclosure Dynamics, Supply Chain, Management Earnings Forecasts, Information Externality, Disclosure Threshold, Investor Belief, Stock Price*

INTRODUCTION

A growing stream of research investigates intra-firm disclosure dynamics (e.g., Dye & Sridhar, 1995; Sletten, 2012; Tse & Tucker, 2010). However, these studies primarily focus on how a firm's voluntary disclosure can be affected by other firms within the same industry. This paper examines the disclosure dynamics of firms in a supply chain relationship. We study the impact of major customers' voluntary disclosures on the subsequent disclosure decisions of their suppliers. We also investigate the relation between suppliers' subsequent disclosure decisions and their future stock market performance.

Theoretical studies suggest that a firm's value-maximizing voluntary disclosure decision can be influenced by the disclosures of other firms (Dye & Sridhar, 1995; Acharya, DeMarzo & Kremer, 2011). Dye and Sridhar (1995) analyze the disclosure decisions of firms in the same industry when there is a positive correlation in the timing of the receipt of information by intra-industry firms. In Dye and Sridhar (1995), investors revise upward their beliefs of a firm's receipt of information if they observe the disclosures of other intra-industry firms. With the fear of being considered as the firm with the worst possible news, firms with news that is above the disclosure threshold (news that are better than the worst) disclose their information following the disclosures of other firms in the industry. Assuming that firms receive positively correlated news content, Acharya, DeMarzo and Kremer (2011) show that when bad news from related firms lowers investors' estimate of a firm's value, disclosure threshold drops and previously withheld bad news are disclosed. However, good news from related firms leads investors to revise upwards a firm’s value, which increases the disclosure threshold and thus reduces a firms’ propensity to disclose.

The unique features of a supply chain relationship make it an interesting test ground to investigate the disclosure dynamics of related firms. Suppliers and customers have a strong positive correlation between their cash flows because of their business tie (Cohen & Frazzini, 2008). The close link of supplier and customer cash flows suggests that the timing and the content of information received by suppliers and customers are likely to be positively correlated. This strong positive correlation satisfies the assumptions of disclosure dynamics models (Dye & Sridhar, 1995; Acharya et al., 2011) and makes the supply chain relationship an ideal setting to test predictions of theories. In contrast, the timing and content of information received by firms within the same industries can be positively or negatively related depending on whether the information is about the overall industry or just pertains to competition among a few intra-industry firms (Kim, Lacina & Park, 2008; Pandit, Wasley & Zach, 2011). This ambiguous correlation of information can potentially weaken the power of tests using the intra-industry setting.

We study the impact of major customers’ disclosure on their suppliers’ disclosure decisions. Previous literature shows that suppliers are usually smaller than their major customers and receive a substantial portion of their sales from their major customers (Cohen & Frazzini, 2008; Pandit et al., 2011). These findings suggest that major customers have a greater impact on the business of suppliers than vice versa. Thus, investors can reliably infer the timing and content of information received by suppliers and revise their beliefs of the suppliers’ value based on the disclosures of their major customers. Based on the predictions of Dye and Sridhar (1995) and Acharya et al. (2011), we expect that disclosures from major customers can significantly impact suppliers’ disclosure decisions.

Our primary measure of voluntary disclosure is management earnings forecasts (MEFs). We use MEFs because these disclosures can greatly influence investors' belief of firm value (Beyer, Cohen, Lys & Walther, 2010; Ball & Shivakumar, 2008). We examine a supplier’s decision to provide MEFs in a two-week window following its customer’s MEFs announcement. We define supplier MEFs as good (bad) news if supplier MEFs exceed (fall short of) analysts’ expectations. Following Pandit et al. (2011), we use supplier stock price reaction to customer MEFs to measure the impact of customer MEFs on investors’ belief of supplier value. We classify customer MEFs as a positive (negative) information externality to the supplier if supplier three-day cumulative abnormal return surrounding their customers’ MEFs is positive (negative). If the supplier’s cumulative abnormal return is positive (negative), we interpret that the customer's MEFs represents good (bad) news for the supplier.

We examine the effects of positive and negative customer information externality on supplier disclosures separately because these effects can be asymmetric (Acharya et al., 2011). We find that suppliers are more likely to provide MEFs when they experience a greater stock price drop from customer MEFs and those supplier MEFs tend to be bad news. We also find that the subsequent stock returns of suppliers remaining silent underperform those of suppliers that disclose in response to negative customer MEFs. However, when suppliers experience a positive stock price reaction from customer MEFs, we don’t find a relation between these price increases and the supplier's propensity to disclose nor do we find a relation with the content of the disclosure. We also show that the subsequent stock price performance of suppliers that disclose and those that remain silent to positive customer MEFs is not statistically different. Overall, these results suggest that customer disclosures influence supplier disclosure decisions when customer disclosures create a negative information externality on their suppliers.

Our paper contributes to the literature in the following aspects. First, this paper extends our knowledge of disclosure dynamics across related firms. While prior research has focused on the interplay in the disclosure decisions between intra-industry firms, this paper sheds light on the disclosure dynamics within a supply chain relationship. Our paper also adds to the growing accounting literature on supply chain relationships. Empirical studies find that supply chain relationships are associated with important economic consequences such as equity mispricing (Cohen & Frazzini 2008), earnings management (Raman & Shahrur, 2008), and firm performance (Lanier, Wempe & Zacharia, 2010; Gosman & Kohlbeck, 2009). Our results suggest that supply chain relationships can also impact firms' decision to provide voluntary disclosure.

HYPOTHESES

We develop our hypotheses based on the theoretical predictions of dynamics disclosure models. Since Dye and Sridhar (1995) predict more disclosures when peer firms disclose either good or bad news, while Acharya et al. (2011) predict more disclosures only when peer firms disclose bad news, we develop our hypotheses separately when customer MEFs create a positive or negative information externality on the supplier.

Using different assumptions, Dye and Sridhar (1995) and Acharya et al. (2011) generate the same predictions when related firms disclose bad news. Dye and Sridhar (1995) assume that there is a positive correlation among the timing when related firms receive new information. Based on the argument of Dye and Sridhar (1995), greater supplier stock price drop in response to major customer MEFs leads investors to revise upwards the probability that the supplier receives some information. Therefore, there is less ability for suppliers with bad news to hide, resulting in more supplier disclosures, particularly bad news disclosures. Silent suppliers are firms with the worst news and thus subsequently underperform those that disclose with better than the worst news. On the other hand, Acharya et al. (2011) assume that the content of information received by related firms are positively correlated and generate similar predictions. According to Acharya et al. (2011), a greater supplier stock price drop in response to major customer MEFs indicates that investors are more likely to expect bad news from the supplier and thus lower their posterior estimate of supplier value. In return, the disclosure threshold is reduced, resulting in more disclosure of previously held bad news. Silent suppliers are firms with the worst news and thus subsequently underperform those that disclose with better news. Therefore, we form the following hypotheses when customer MEFs result in a negative information externality to suppliers.

H1 *Suppliers are more likely to provide MEFs when they experience greater stock price decline in response to customer MEFs.*

H2 *Suppliers are more likely to disclose negative MEFs when they experience greater stock price decline in response to customer MEFs.*

H3 *When suppliers experience a negative information externality from customer MEFs, the subsequent stock returns of suppliers remaining silent underperforms the returns of suppliers that disclose.*

However, when related firms disclose good news, Dye and Sridhar (1995) and Acharya et al. (2011) give different predictions. The model in Dye and Sridhar (1995) suggests that a greater supplier stock price increase in response to major customer MEFs signals a greater probability of suppliers' receipt of information to investors, making it harder for suppliers to hide their bad news. This in turn reduces the disclosure threshold and results in more disclosure, and in particular bad news disclosure, which is driven by investors' demand for information. In contrary, the model by Acharya et al. (2011) suggests that a greater supplier stock price increase in response to major customer MEFs leads investors to believe that suppliers have good news and raise their expected value of suppliers. This increases the disclosure threshold and leads to fewer supplier disclosures, particularly bad news disclosure. Therefore, whether positive information externalities from major customer MEFs trigger more supplier disclosure and what information suppliers are prompted to release are empirical issues. Yet, both theories predict that silent suppliers with the worst news underperform those suppliers that disclose their better news. Given the competing predictions, we form the following hypotheses when customer MEFs create a positive information externality on suppliers (in the null form):

H4 *There is no association between a supplier's propensity to provide MEFs and the magnitude of stock price increases from customers MEFs.*

H5 *There is no association between the content of supplier MEFs and the magnitude of stock price increases from customer MEFs.*

H6 *There is no association between the subsequent stock returns of silent suppliers and the magnitude of stock price increases from customer MEFs.*

DATA

We collect supplier-major customer relationships data from the Compustat segment database between August 2000 and December 2010. The start month corresponds with the enactment of Regulation Fair Disclosure (Reg FD). Prior to Reg FD, Management may privately provide forecasts to a select group of analysts. Thus, these forecasts would not be captured in any database. We identify major customer MEFs from the First Call Company Issued Guidance (CIG) database and use the supplier-major customer relationship data to trace subsequent supplier MEFs. We match the data with annual Compustat financial statement data, CRSP for stock prices, and IBES for analyst forecasts. Our final sample contains 34,595 customer-supplier disclosure events.

PROXIES

Our primary measure of voluntary disclosure is MEFs. MEFs have been used extensively in the accounting literature as proxies for voluntary disclosure (Hirst et al., 2008). Forecasts reflect managements' belief of firm future cash flows and can greatly influence the expectations of investors and analysts (e.g., Hirst, Koonce & Venkataraman, 2008).

We define a supplier voluntary disclosure event as the announcement of MEFs by the supplier in a two-week window following a customer's MEFs announcement. We choose a two-week window because a long window may capture other events that drive the supplier to provide forecasts and a window that is too short may not give enough time for the supplier to formulate a response. Specifically, we code an indicator variable (*SupDisclose*) that is set to one if the supplier provides MEFs within two weeks following MEFs provided by a major customer, and zero otherwise.

We further measure the content of supplier disclosure. We consider supplier MEFs as good (bad) news if the forecasted earnings exceed (fall short of) analysts' expectations. When supplier MEFs are given as a range, we use the midpoint of the range for determining the disclosure content following the previous literature (e.g., Tse & Tucker, 2010; Goodman, Neamtiu, Shroff & White, 2014). The supplier MEFs content (*SupDiscloseCont*) is a trichotomous variable that equals 1 if the supplier provides good news; -1 if the supplier provides a bad news forecast; and 0 if the supplier provides no forecast within a two-week period following customer MEFs.

We measure the information externality experienced by the supplier as the supplier's stock price reaction to a major customer's MEFs (|*SupCAR*|) following Pandit et al. (2011) and Tse and Tucker (2010). We classify a major customer's MEFs as a positive (negative) information externality to the supplier if the supplier's three- day cumulative abnormal return surrounding the customer's MEFs is positive (negative). If the supplier's cumulative abnormal returns are positive (negative), we interpret that the major customer's MEFs represent good (bad) news for the supplier.

SUMMARY STATISTICS

Table 1 provides summary statistics of the characteristics of the suppliers and their major customers in the overall sample. On average, suppliers are smaller than their major customers. This is reflected in terms of total sales (1,914.16 vs. 17,263.01), net income (73.86 vs. 954.02), total assets (1,973.22 vs. 26,046.65), and market capitalization (2,860.52 vs. 24,680.35). These results are consistent with customer disclosure requirements set forth by the Securities and Exchange Commission (SEC) in Regulation S-K and the Financial Accounting Standards Board (FASB) Accounting Standards Codification (ASC) 280-10-50-42, which states that firms are required to disclose both the identities of and revenues from their major customers. Suppliers also have poorer performance compared to their major customers with an average return on assets of -0.07 compared with 0.04. However, suppliers have more growth opportunities as measured by the market-to-book ratio (2.74 versus 0.33). The average percentage of sales that a supplier derives from its disclosed customers is 20.94%, indicating that suppliers obtain a significant portion of their revenue from major customers. The table also shows that suppliers have 1.39 disclosed customers while customers have 3.35 suppliers. While customers have multiple suppliers, fewer major customers are disclosed by suppliers.

Table 1: Supplier and Customer Firm Characteristics	
Panel A: Supplier	
	Mean
Annual Sales (in millions)	1,914.16
Net income (in millions)	73.86
Total assets(in millions)	1,973.22
Market capitalization (in millions)	2,860.52
Return on assets	-0.07
Market-to-book ratio	2.74
Average percentage of sales derived from each major customer	20.94
Average number of major customers listed per year	1.39
Panel B: Customers	
	Mean
Annual Sales (in millions)	17,263.01
Net income (in millions)	954.02
Total assets(in millions)	26,046.65
Market capitalization (in millions)	24,680.35
Return on assets	0.04
Market-to-book ratio	0.33
Number of suppliers	3.35

Table 2 details the industry composition of suppliers and customers in the sample using the Fama-French 48 industry classification scheme. The industries with the greatest concentration of suppliers are pharmaceutical products (16.9%), business services (11.26%), and electronic equipment (10.66%). No other industry accounts for more than 7% of the supplier sample. As for the set of major customers, retailers (30.24%) and wholesalers (16.30%) dominate the list of disclosed customers. Overall, this table shows that customers and suppliers in our sample concentrate in certain industries, necessitating the need to control for industry effects in our multivariate analyses.

Table 2: Supplier and Customer Industry Composition		
Industry	Supplier (%)	Customer (%)
1. Agriculture	0.42	0.14
2. Food Products	4.14	0.70
3. Candy and Soda	0.56	0.11
4. Beer and Liquor	0.16	0.39
5. Tobacco Products	0.05	0.43
6. Recreation	2.40	0.15
7. Entertainment	0.36	0.06
8. Printing and Publishing	0.27	0.11
9. Consumer Goods	2.71	2.01
10. Apparel	6.74	0.30
11. Healthcare	1.29	0.40
12. Medical Equipment	2.91	1.42
13. Pharmaceutical Products	16.90	7.38
14. Chemicals	1.33	0.55
15. Rubber and Plastic Products	1.19	0.03

Table 2: Supplier and Customer Industry Composition Cont.		
Industry	Supplier (%)	Customer (%)
16. Textiles	0.66	0.01
17. Construction Materials	2.58	0.04
18. Construction	0.47	0.10
19. Steel Works Etc.	0.58	0.09
20. Fabricated Products	0.23	0.00
21. Machinery	3.08	1.48
22. Electrical Equipment	2.23	0.08
23. Automobiles and Trucks	1.76	3.48
24. Aircraft	2.01	3.39
25. Shipbuilding and Railroad Equipment	0.18	0.03
26. Defense	0.58	1.13
27. Precious Metals	0.00	0.00
28. Non-Metallic and Industrial Metal Mining	0.10	0.01
29. Coal	0.50	0.01
30. Petroleum and Natural Gas	2.47	0.39
31. Utilities	0.00	2.04
32. Communication	0.62	1.99
33. Personal Services	0.08	0.04
34. Business Services	11.26	3.93
35. Computers	8.13	6.46
36. Electronic Equipment	10.66	5.51
37. Measuring and Control Equipment	2.87	0.64
38. Business Supplies	1.33	0.40
39. Shipping Containers	0.49	0.01
40. Transportation	0.96	0.42
41. Wholesale	3.36	16.30
42. Retail	0.67	30.24
43. Restaurants, Hotels, Motels	0.00	0.50
44. Banking	0.00	0.32
45. Insurance	0.00	1.81
46. Real Estate	0.00	0.00
47. Trading	0.00	0.10
48. Other	0.71	4.87
Total	100.00	100.00

Table 3 Panel A presents descriptive statistics of various supplier and customer characteristics divided between suppliers that disclose and those that remain silent. Among the 34,595 customer-supplier disclosure events, suppliers provide a subsequent disclosure in 2,874 events (8.4%) and remain silent in 31,721 events (91.6%) following customer MEFs. The descriptive statistics in Panel A show that performance (*ROA*), firm size (*Size*), litigation risk (*Lit*), institutional investor holdings (*InstInvst*), and analysts following (*AFolw*) are higher for suppliers who provide subsequent MEFs following customer MEFs compared to those that remain silent. They also issue equity more frequently (*EqtyIss*), are more likely to regularly provide MEFs (*RegCast*) that are of a longer horizon (*CustFH*), and are more likely to issue forecasts with their earnings announcements (*SupEA*). Furthermore, suppliers who disclose subsequently have lower stock return volatility (*RetVol*) and the investor reaction to customer MEFs is lower (|*SupCAR*|). These suppliers are also more likely to have other customers concurrently providing MEFs (*OCD*).

Table 3: Descriptive Statistics					
Panel A					
	Suppliers that disclose		Suppliers that are silent		2-Sided T-Test
	Mean	Std. Dev.	Mean	Std. Dev.	Difference in Means
|SupCAR|	0.037	0.0008	0.042	0.0003	-0.005***
ROA	0.024	0.0031	-0.059	0.0015	0.083***
Size	7.211	0.0326	5.697	0.0116	1.514***
Lit	0.046	0.0008	0.030	0.0002	0.016***
InstInvst	0.542	0.0071	0.389	0.0020	0.153***
AFolw	1.165	0.0129	0.970	0.0042	0.195***
EqtyIss	0.922	0.0050	0.850	0.0020	0.072***
RetVol	0.137	0.0017	0.168	0.0006	-0.031***
OCD	0.253	0.0081	0.197	0.0022	0.056***
RegCast	0.061	0.0044	0.001	0.0001	0.060***
CustFH	139.70	2.3261	130.18	0.7039	9.519***
SupEA	0.743	0.0082	0.005	0.0004	0.738***
N	2,874		31,721		
Panel B					
	Negative Supplier Stock Price Reaction to Customer Disclosure		Positive Supplier Stock Price Reaction to Customer Disclosure		2-Sided T-Test
	Mean	Std. Dev.	Mean	Std. Dev.	Difference in Means
|SupCAR|	0.040	0.0003	0.043	0.0004	-0.003***
ROA	-0.056	0.0020	-0.047	0.0020	-0.009***
Size	5.814	0.0155	5.831	0.0162	-0.017
Lit	0.032	0.0003	0.031	0.0003	0.001*
InstInvst	0.398	0.0027	0.407	0.0028	-0.009**
AFolw	0.991	0.0057	0.981	0.0057	0.010
EqtyIss	0.856	0.0026	0.856	0.0027	0.000
RetVol	0.168	0.0008	0.164	0.0008	0.004***
OCD	0.202	0.0030	0.202	0.0031	0.000
RegCast	0.005	0.0005	0.006	0.0006	-0.0011**
CustFH	131.02	0.9304	130.92	0.9773	0.09
SupEA	0.063	0.0018	0.070	0.0020	-0.007***
N	18,086		16,509		

*/**/*** represent statistical significance at the 10%/5%/1% level, respectively.

When we divide the sample between suppliers who experience a negative stock price reaction to customer MEFs and those that receive a positive reaction in Panel B of Table 3, we also see systematic differences in various customer and supplier characteristics, namely *|SupCAR|*, *ROA*, *Lit*, *InstInvst*, *RetVol*, *RegCast*, and *SupEA*. These significant differences indicate the importance of controlling for these factors.

SUPPLIERS' PROPENSITY TO PROVIDE MEFS FOLLOWING CUSTOMER MEFS

Model

We use the following logistic regression model to analyze a supplier's decision to provide MEFs following a stock price drop (increase) due to negative (positive) customer MEFs (hypotheses H1 and H4):

$$\Pr(\text{SupDisclose} = 1) = \alpha + \beta_1|\text{SuppCAR}| + \gamma_1\text{ROA} + \gamma_2\text{Size} + \gamma_3\text{Lit} + \gamma_4\text{InstInvst} + \gamma_5\text{Analyst} + \gamma_6\text{EqtyIss} + \gamma_7\text{RetVol} + \gamma_8\text{OCD} + \gamma_9\text{RegCast} + \gamma_{10}\text{CustFH} + \gamma_{11}\text{SupEA} + \sum \text{Industry fixed effects} + \varepsilon \quad (1)$$

where the dependent variable, *SupplierDisclose*, is an indicator variable that equals one if the supplier provides MEFs in a two-week interval following customer MEFs and zero otherwise. |*SupCAR*| measures the magnitude of a supplier's three-day cumulative abnormal return surrounding a customer MEFs announcement and is our main variable of interest. According to H1, we predict that the estimated coefficient on |*SupCAR*| is positive when the supplier experiences a negative stock price reaction from customer MEFs. As for H4, we have competing arguments for how suppliers will respond following positive customer MEFs and thus have an ambiguous prediction of the coefficient's sign for |*SupCAR*|.

Following the previous literature (e.g., Miller 2002; Chen et al. 2011; Houston et al. 2010; Skinner 1994; Sletten 2012), we control for a number of covariates that can affect a supplier's propensity to provide MEFs. These variables include supplier return on assets (*ROA*), market cap (*Size*), litigation risk (*Lit*), institutional investor holdings (*InstInvst*), analysts following (*AFolw*), equity issues in the current year (*EqtyIss*), and stock return volatility (*RetVol*). We further control for forecasting characteristics of the customer and the supplier. These controls are indicator variables for whether another customer provides concurrent disclosures (*OCD*), for whether the supplier regularly provides management forecasts (*RegCast*) and for whether the forecast is bundled with an earnings announcement (*SupEA*). We further control for the horizon of the customer forecast (*CustFH*). Detailed variable definitions are provided in Appendix A.

Results

Table 4 presents the logistic regression results of the supplier's propensity to provide MEFs following customer MEFs. The model includes industry fixed effects based on the Fama-French 48 industry classification. Standard errors are clustered at the supplier firm level to take into account the correlation of residuals related to MEFs issued by the same supplier.

Consistent with hypothesis H1, the coefficient on |*SupCAR*| is positive and statistically significant in column (1), indicating that the propensity for suppliers to disclose increases in the magnitude of the supplier's stock price drop to customer MEFs. The magnitude on the coefficient is also large (6.22) relative to other factors in the model indicating that |*SupCAR*| is a significant determinant of suppliers' propensity to provide MEFs following negative customer MEFs disclosure. Coefficients on the control variables are broadly consistent with prior literature (e.g., Chen et al. 2011 and Houston et al. 2010).

Column (2) of Table 4 displays results of the propensity for suppliers to provide MEFs following positive customer MEFs. The coefficient on |*SupCAR*| is not statistically significant. This result suggests that the predictions of both Dye and Sridhar (1995) and Acharya et al. (2011) may both at play resulting in the statistical insignificance. Our results suggest that suppliers only respond with subsequent MEFs when customer MEFs create a negative information externality on their suppliers.

Table 4: Determinants of Suppliers' Propensity to Provide MEFs Following Customer MEFs (Logit Model)				
	Negative Supplier Stock Price Reaction to Customer Disclosure		Positive Supplier Stock Price Reaction to Customer Disclosure	
	Supplier Provides Forecast (1)		Supplier Provides Forecast (2)	
	Coefficient	Z-Statistic	Coefficient	Z-Statistic
|SupCAR|	6.22***	(4.49)	0.46	(0.30)
ROA	0.72*	(1.93)	0.32	(0.67)
Size	0.44***	(8.85)	0.46***	(7.24)
Lit	-2.43	(-1.24)	-1.99	(-0.81)
InstInvst	0.00	(0.01)	0.28	(1.47)
AFolw	0.15***	(2.60)	0.15	(1.58)
EqtyIss	0.35	(1.62)	0.34	(1.37)
RetVol	0.14	(0.18)	0.63	(0.80)
OCD	0.20	(1.12)	0.22	(1.24)
RegCast	2.80***	(3.64)	3.45***	(5.88)
CustFH	-0.00	(-0.87)	0.00	(1.37)
SupEA	6.44***	(33.66)	6.49***	(33.10)
Intercept	-6.33***	(-13.38)	-6.95***	(-12.85)
Observations	18,086		16,509	
Industry FE	Yes		Yes	
Pseudo R^2	0.613		0.656	

*/**/*** represent statistical significance at the 10%/5%/1% level, respectively.

CONTENT OF SUPPLIER MEFS FOLLOWING CUSTOMER MEFS

Model

We next analyze the content of supplier MEFs to test hypotheses H2 and H5. Specifically, we investigate the determinants of the propensity for suppliers to provide specific type of news (either bad or good news) in their forecasts following positive and negative customer MEFs. The model for testing H2 and H5 is similar to the model for testing hypotheses H1 and H4 except that the dependent variable is now a trichotomous variable (*SupDiscloseCont*) with three levels: no disclosure, bad news supplier disclosure, and good news supplier disclosure. Therefore, we run a multinomial logistic regression with no disclosure as the base level.

Results

Results of the multinomial logistic regression are shown in Table 5. Column (1) of Panel A in Table 4 provides results for the propensity of suppliers to provide bad news disclosures following negative stock price reaction to customer MEFs. As Column (1) shows, |*SupCAR*| is positive and statistically significant with a coefficient of 6.87. This result is consistent with hypothesis H2 which states that suppliers disclose more bad news following negative customer MEFs. Looking at the controls, the variables of *ROA*, *Size*, *Lit*, *AFolw*, *RegCast*, *CustFH*, and *SupEA* are all significant and carry the predicted sign. Column (2) of the same panel presents results for the propensity of suppliers to provide good news disclosures following negative stock price reaction to customer disclosures. The column shows that the coefficient of |*SupCAR*| is negative but not significant. Significant control variables include *Size*, *AFolw*, *OCD*, *RegCast*, and *SupEA*.

Taken together, the results of column (1) and column (2) in Panel A confirm hypothesis H2. Suppliers are more likely to disclose bad news following negative spillover effects from customer disclosure. Investors infer a noisy signal of the information that suppliers possess when major customers disclose bad news. As a result, when suppliers provide a disclosure following customer disclosure, they are more likely to disclose bad news. Suppliers disclose bad news in order to separate themselves from other types who may have worse.

Table 5: Determinants of Supplier MEFs Content Following Customer MEFs (Multinomial Logit Model)

Panel A				
	Negative Supplier Stock Price Reaction to Customer Disclosure			
	Supplier Provides Bad News Forecast (1)		Supplier Provides Good News Forecast (2)	
	Coefficient	Z-Statistic	Coefficient	Z-Statistic
|SupCAR|	6.87***	(5.68)	-1.60	(-0.92)
ROA	1.03***	(2.98)	-0.26	(-0.83)
Size	0.44***	(9.48)	0.36***	(6.79)
Lit	-4.94***	(-2.61)	-1.23	(-0.58)
InstInvst	0.11	(0.79)	0.01	(0.08)
AFolw	0.18***	(2.76)	0.19**	(2.55)
EqtyIss	0.17	(0.93)	0.28	(1.28)
RetVol	0.68	(1.03)	0.48	(0.60)
OCD	-0.03	(-0.24)	0.30**	(2.01)
RegCast	1.89***	(3.60)	1.61***	(2.88)
CustFH	-0.00*	(-1.85)	0.00	(0.83)
SupEA	5.24***	(44.11)	5.56***	(40.61)
Intercept	-6.28***	(-10.59)	-7.26***	(-9.08)
Observations	18,086			
Industry FE	Yes			
Pseudo R^2	0.489			

*/**/*** represent statistical significance at the 10%/5%/1% level, respectively.

In Panel B, we investigate the news content of supplier disclosures following positive customer MEFs. As the panel shows, the coefficient of |*SupCAR*| is not statistically significant at conventional levels across both columns (1) and (2). These results suggest that there is no differential impact of customer disclosure on supplier disclosure content when the customer releases good news. The results of Panel B answer hypothesis H5. When a customer provides a good news disclosure, suppliers are neither more likely to provide good news nor bad news in the forecasts that they provide. These results suggest that predictions of both Dye and Sridhar (1995) and Acharya et al. (2011) may be at play leading to no statistically significant effect.

Table 5: Determinants of Supplier MEFs Content Following Customer MEFs (Multinomial Logit Model)

Panel B

	Positive Supplier Stock Price Reaction to Customer Disclosure			
	Supplier Provides Bad News Forecast (1)		Supplier Provides Good News Forecast (2)	
	Coefficient	Z-Statistic	Coefficient	Z-Statistic
|SupCAR|	-2.17	(-1.38)	1.83	(1.18)
ROA	0.30	(0.77)	0.64	(1.52)
Size	0.37***	(7.23)	0.36***	(6.55)
Lit	0.17	(0.08)	-0.25	(-0.12)
InstInvst	0.14	(0.84)	0.27	(1.55)
AFolw	0.15*	(1.91)	0.09	(1.07)
EqtyIss	0.03	(0.14)	0.16	(0.75)
RetVol	-0.55	(-0.68)	1.35*	(1.67)
OCD	0.07	(0.46)	0.11	(0.69)
RegCast	2.14***	(5.00)	2.36***	(5.53)
CustFH	0.00	(0.24)	0.00**	(2.40)
SupEA	5.54***	(42.30)	5.86***	(41.27)
Intercept	-6.21***	(-7.97)	-9.03***	(-7.31)
Observations	16,509			
Industry FE	Yes			
Pseudo R^2	0.527			

*/**/*** represent statistical significance at the 10%/5%/1% level, respectively.

Overall, our results suggest that suppliers more readily disclose after negative stock price reaction from major customer MEFs and that these disclosures tend to be bad news. A natural question then is what happens to suppliers who remain silent. We investigate this issue in the next section.

STOCK PRICE REACTION TO SILENCE

Model

Suppliers who stay silent following customer MEFs are predicted to underperform relative to suppliers who disclose (H3 and H6). Since managers self-select to keep quiet or to disclose, we use a two stage least squares model to test the association between supplier silence and subsequent stock returns following positive or negative reaction to customer disclosure. Following Wooldridge (2002), we first instrument the *Silent* dummy by running the first-stage regression (2).

$$\text{Silent} = \alpha + \beta_1|\text{SuppCAR}| + \gamma_1\text{ROA} + \gamma_2\text{Size} + \gamma_3\text{Lit} + \gamma_4\text{InstInvst} + \gamma_5\text{Analys} + \gamma_6\text{EqtyIss} + \gamma_7\text{RetVol} + \gamma_8\text{OCD} + \gamma_9\text{RegCast} + \gamma_{10}\text{CustFH} + \gamma_{11}\text{SupEA} + \sum \text{Industry fixed effects} + \varepsilon \qquad (2)$$

where the dependent variable *Silent* is an indicator for whether a supplier stays silent or provides forecasts following customer MEFs. Other control variables are the same as those in regression model (1).

We then use the instrumented variable (*Silent**) in the following the second-stage regression (3):

$$\text{Sup1yrCAR} = \alpha + \beta_1\text{Silent}^* + \gamma_1|\text{SupCAR}| + \gamma_2\text{ROA} + \gamma_3\text{MB} + \gamma_4\text{Size} + \sum \text{Industry fixed effects} + \varepsilon \qquad (3)$$

where the dependent variable, *Sup1yrCAR*, is the one-year cumulative abnormal return of the supplier following the date of customer disclosure. *Silent** is the predicted values from the first-stage regression. In addition to |*SupCAR*| and *ROA*, we control for future growth (*MTB*), firm size (*Size*), and industry fixed effects following Fama and French (1992).

Results

Table 6 presents the second-stage results of the subsequent supplier stock price performance. In Column (1), the instrumented variable *Silent**, is negative and statistically significant at the 10% level. This result provides some support of H3 that silent suppliers are associated with lower stock returns following negative customer forecasts. |*SupCAR*| is positively associated with cumulative annual returns following customer disclosure suggesting that there may be an under reaction to the initial customer disclosure. Size and MTB also have statistically significant coefficients at conventional levels. Column (2) presents results examining annual returns following a positive customer disclosure and answers hypothesis H6. *Silent* is not significant at conventional levels, suggesting that good news customer disclosures have no discernible impact on long-term supplier stock returns.

Overall, the results in this table suggest that the stock price of silent suppliers underperforms that of forthcoming suppliers following negative customer disclosure. However, when a customer provides positive disclosure, there is no difference in subsequent stock returns between suppliers who provide subsequent disclosure and those that remain silent.

Table 6: Subsequent Supplier Stock Price Performance Following Supplier Disclosure Decision				
	Negative Supplier Stock Price Reaction to Customer Disclosure		Positive Supplier Stock Price Reaction to Customer Disclosure	
	Supplier CAR Over the Following Year (1)		Supplier CAR Over the Following Year (2)	
	Coefficient	T-Statistic	Coefficient	T-Statistic
Silent	-0.03*	(-1.68)	-0.01	(-0.29)
|SupCAR|	0.41***	(2.71)	-1.41***	(-9.33)
ROA	0.03	(0.67)	0.01	(0.16)
MTB	-0.17***	(-6.89)	-0.15***	(-6.26)
Size	0.01*	(1.73)	0.01***	(2.67)
Intercept	0.11	(0.79)	0.13	(1.19)
Observations	18,086		16,509	
Industry FE	Yes		Yes	
Adjusted R^2	0.041		0.052	

*/**/*** represent statistical significance at the 10%/5%/1% level, respectively.

CONCLUSIONS

In this study, we extend the finance and accounting literature by documenting the impact of customer disclosures on subsequent supplier disclosures and stock prices. Specifically, we examine the determinants of supplier disclosure propensity and content in response to news from customer disclosures. We also investigate the subsequent stock price performance of suppliers that provide a disclosure following customer disclosure versus those that remain silent.

We find that suppliers are more likely to disclose when they suffer a negative information externality from customer disclosures and that the supplier disclosures are more likely to contain bad news. In terms of subsequent stock returns, we find that suppliers who disclose following negative reaction to customer disclosure perform better than those that remain silent. When suppliers experience a positive externality from customer disclosures, there appears to be no association between the externality and the propensity for suppliers to disclose. Furthermore, good news from customer disclosures does not appear to impact the content of subsequent supplier disclosures. In addition, the stock price performance of suppliers that disclose following positive reaction to customer disclosures is not significantly different from those that remain silent.

While prior research has primarily focused on disclosure decisions between horizontal (intra-industry) firms, our findings suggest that firms take into account vertical (supply chain) relationships as part of their overall disclosure strategy. Future research can examine the interplay between vertical and horizontal relationships in a firm’s voluntary disclosure decisions. For example, it may be interesting to investigate under what conditions voluntary disclosures act as a complement or a substitute to disclosures provided by supply chain partners and those made by industry peers.

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Appendix A: Variable Definitions

Supplier Characteristics	
SupDisclose	An indicator that equals 1if the supplier provides MEFs within a two-week period following customer MEFs, and 0 otherwise.
SupDiscloseCont	A trichotomous variable with that equals 1 if the supplier provides positive MEFs; -1 if the supplier provides negative MEFs; and 0 if the supplier provides no MEFs within a two-week period following customer MEFs.
|SupCAR|	The magnitude of the supplier's three-day cumulative abnormal return around customer MEFs with the announcement date centered at day 0. Daily abnormal return is computed as the raw return minus the value-weighted market return.
ROA	Net income divided by total assets in the previous year.
Size	Natural logarithm of the market value of equity in the previous year.
Lit	The probability of a lawsuit over the previous year based on the modified model of Rogers and Stocken (2005).
InstInvst	Average percentage of shares held by institutional investors divided by total shares outstanding over the previous year.
AFolw	Number of analysts which provided at least one forecast of the supplier over the previous year.
EqtyIss	An indicator that equals 1 if the firm issued equity in the current year, and 0 otherwise.
RetVol	Standard deviation of daily stock returns over the past year.
OCD	An indicator that equals 1 if another major customer of the supplier provides MEFs within a two-week period from the customer guidance announcement, and 0 otherwise.
RegCast	An indicator that equals 1 if the supplier has provided forecasts in three out of the four quarters over the previous year, and 0 otherwise.
SupEA	An indicator that equals 1 if the supplier had an earnings announcement in the two-week period after a major customer provides MEFs and 0 otherwise.
MTB	Natural logarithm of the market value of equity to the book value of equity in the previous year.
Silent	An indicator that equals 1 if the supplier stays silent, and 0 otherwise.
Customer Characteristics	
CustFH	Number of days between customer forecast announcement and the end of the forecast period.

SHARE PRICES AND PRICE/EARNINGS RATIOS AS PREDICTORS OF FRAUD PRIOR TO A FRAUD ANNOUNCEMENT

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ABSTRACT

The purpose of this quantitative study was to test the efficient market hypothesis by determining the extent to which changes in share price and price/earnings (P/E) ratios prior to a public announcement of fraud predicted whether a company was prosecuted for fraud. Companies listed with the SEC and traded on an American stock exchange between 2000 and 2004 (N = 139) convicted of fraud were matched with companies of similar size within the same industry that were not convicted of fraud over the same time period. Results from a logistic regression revealed a significant relationship between companies prosecuted for fraud and the coefficient of variation (Wald[1] = 4.6, p = .03). However, the relationship between the price/earnings ratio and companies prosecuted for fraud was insignificant (Wald[1] = 0.99, p = .32). Results from this study support the use of quantitative measures that can help detect fraud early to minimize costs.

INTRODUCTION

At the end of the 20th century, some corporate representatives throughout all industries manipulated financial statements (Giroux, 2008). Several representatives of well-known companies, including Enron, WorldCom, and AIG were found guilty of financial scandals resulting from widespread collusion (Rockness & Rockness, 2005). Although the exact amount of loss from fraudulent activities is unknown, the average loss from fraudulent activity is estimated to be 5% of all corporate earnings (Association of Certified Fraud Examiners, 2010).

Financial fraud is incredibly problematic and has many negative consequences including that it negatively affects the share price of a company, creating losses for stockholders, employees, vendors, and customers, and results in an inability to increase corporate capital (Lord, 2010; Murphy & Tibbs, 2010; Rezaee & Riley, 2010). Because fraud is prevalent, laws and oversight committees have been created to curb fraudulent activity (Pinto, 2010) and after major fraudulent episodes, the U.S. Congress enacted laws such as the Securities Act of 1933 and the Security and Exchange act of 1934 to curb specific types of fraud (Buell, 2011). Despite this legislation, financial fraud goes largely undetected, as evidenced by the litigation against 101 companies conducted by the Securities and Exchange Commission (SEC) in the first quarter of 2012 (U.S. Securities and Exchange Commission, 2012). Fraud is primarily detected through the use of quantitative or qualitative indictors (Hogan, Rezzaee, Riley, & Velury, 2008).

White-collar crime encompasses a range of criminal acts including fraud committed by members of the business community (Johnstone, 1998). White-collar crime involves a transition from fraudulent actions damaging a few select individuals to actions damaging a broad range of stakeholders (Agnew, Piquero, & Cullen, 2009). It includes theft by deception and misconduct, negligence, and questionable business practices (Johnstone, 1998). In response to the presence of white-collar crime (and the observed increase), the forensic accounting field has both come into existence as its own branch of accounting and has grown substantially (Agnew et al., 2009).

Stakeholders use fraud indicators to make informed investment and business decisions (Kolman, 2007). Hegazy and Kassem (2010) found that fraud indicators were based on elements of fraudulent financial statements that increased the likelihood of detecting fraud. Members of the public could then use these indicators to monitor and identify potentially fraudulent situations early on to minimize personal financial damage. In addition to law enforcement agencies and organizations, financial professionals also continually develop techniques to identify fraud and potentially fraudulent situations (Kolman, 2007). Fraud indictors include financial ratios and trends, management characteristics, industry changes and characteristics, and linguistic variables (Lundstrom, 2009). Consumers need indicators to educate themselves about fraud and to perform further analyses of corporate information as a basis for making sound decisions (Hogan et al., 2010) prompting a need to examine the relationship between share prices and accounting fraud. Corporate share prices are publicly available and can be easily accessed and evaluated by consumers to identify potential problems when deciding on investments or employment.

Researchers have focused primarily on internal corporate factors to identify fraud (Kaiser & Hogan, 2010; Kranacher, Riley, & Wells., 2011; Maguire, 2010). Fraud indicators based on internal corporate information include efficiency and productivity statistics (Brazel, Jones, & Zimbelman, 2009; Kranacher et al., 2011), performance guidelines linked to management incentives (Anderson &Tirrell, 2004), and personal characteristics of the executive management team (Kaiser & Hogan, 2010; Kranacher et al., 2011). Annual reports contain information used by stakeholders to perform financial analysis as a way of determining financial irregularities and corporate efficiency. Representatives of public companies are required to include, in financial statements, earnings per share of stock and ratios of earnings to fixed charges for debt (Cohen, Polk, & Voulteenaho, 2009). The inclusion of these data is seen as a means of ensuring accurate reporting of key financial metrics.

Companies are not required to include nonfinancial measures in the annual report (Cohen et al., 2009). Nonfinancial measures are included only on a voluntary basis, and the quality of the volunteered measures is not consistent or reliable (Bescos, Cauvin, Decock-Good, & Westlund, 2007). As stakeholders do not have access to internal corporate information, some opportunities for fraud analysis do not exist for external parties. As a result, stakeholders cannot evaluate management ethics or the corporate culture, both of which are factors in fraud detection, except through external earnings releases and news articles. Voluntary disclosures of management performance information vary based on the implications of the disclosures regarding perceived corporate performance (Bagnoli & Watts, 2007).

Another concern with information in annual reports is the lack of timely data for analysis. A time lag exists between the end of a reporting period and earnings releases. Currently, SEC registrants are allowed 90 days after the fiscal year end to file the report: accelerated registrants are allowed 60 or 75 days, depending on the timing of the fiscal year end (Notification of inability to timely file all or any required portion of a form 10-K, 20-F, 11-K, N-SAR, N-CSR, 10-Q, or 10-D, 1934). As a result, data are not available to stakeholders for the close of each fiscal period until the following quarter.

Stakeholders use fraud indicators to make informed decisions (Hegazy & Kassem, 2010; Kolman, 2007; Skousen & Twedt, 2010). A number of fraud indicators must exist to increase the likelihood of detecting and preventing fraudulent financial statements. Members of the public then use these indicators to monitor and identify potentially fraudulent situations early, as a way of minimizing damage to the company and the stakeholders. In addition to education on fraud, consumers need indicators to trigger further analysis of corporate information to make sound decisions. Identifying a timely external indicator of fraud based on public information related to share price and P/E ratios can help stockholders make informed decisions and identify problems before fraud results in financial damage to a company.

PURPOSE OF THE STUDY

The efficient market hypothesis (EMH) can help predict fraud as the focus of the efficient market hypothesis is on current share price, which reflects both public and private corporate information (Ball, 2009). In turn, the stock price of a given company should reflect the fraud prior to a public announcement. To provide stakeholders with possible external indicators of fraud, it was useful to confirm or disconfirm the efficient market hypothesis by examining whether changes in share prices prior to a fraud announcement predicted financial fraud for a broader range of companies listed with the SEC. Thus, the purpose of this quantitative study was to test the strong-form version of the efficient market hypothesis (which is the most stringent application of the theory and assumes that all information is always discounted into a company’s stock prices) by investigating the extent to which changes in share price and price/earnings (P/E) ratios prior to a public announcement of fraud predicted whether a company was subsequently prosecuted for corporate fraud.

The efficient market hypothesis is an application of rational expectations to securities prices in the public markets and is controversial among economists (Ullah & Giles, 2011). Some researchers have found that insider traders could profit from non-public information (Ilg, 2010). In addition to research identifying day-of-the-week trading differences in stock markets, researchers have demonstrated the possibility of abnormal share returns, thereby showing evidence to the contrary of the efficient market hypothesis (Muhammad & Rahman, 2010). Other studies have shown that some classes of shares are predictable (Ilg, 2010). Financial statement fraud helps explain some of the abnormal share price fluctuations and is therefore a factor in the debate surrounding the efficient market hypothesis (Ullah & Giles, 2011).

Because evidence regarding the use of the efficient market hypothesis as a means for explaining and predicting fraud is inconclusive, this proposed study helped to fill that evidentiary void. A study of share prices prior to the announcement of fraud was useful to test the efficient market hypothesis. Thus, if fraud was reflected in the share price, the share price would be shown to be reliable, and the strong-form efficient market hypothesis would be confirmed. If fraud was not reflected in the share price, the evidence can be used to dispute the efficient market hypothesis.

RESEARCH QUESTIONS AND HYPOTHESES

The purpose of this quantitative study was to test the strong-form version of the efficient market hypothesis (which is the most stringent application of the theory and assumes that all information is always discounted into a company's stock prices) by investigating the extent to which changes in share price and price/earnings (P/E) ratios prior to a public announcement of fraud predicted whether a company was subsequently prosecuted for corporate fraud. A quantitative method was ideal for this study because corporate share price data must be evaluated to determine if share price data could be used as an indicator of fraud. Furthermore, in order to determine if measures using corporate share prices could predict fraudulent companies, a causal comparative design was necessary. The development of methods to identify and prevent fraud depends on an understanding of the factors that contribute to fraud (Kranacher et al., 2011; Simon, 2012). In addition, external stakeholders can use indicators to make better decisions and to provide information to create an awareness of potential problems, thereby discouraging fraud (Agnew et al., 2009; Omar & Abu Baker, 2012). According to the efficient market hypothesis, share prices are based on the most recent public and nonpublic information (Dunbar & Heller, 2006; Glen & Hornung, 2005). The following research questions and hypotheses guided the proposed study:

Q1. *What is the relationship (if any) between the coefficient of variation of share price (calculated as the standard deviation of the share price of the company divided by the company's average share price) computed over 1 year and the probability of a company being prosecuted for fraud?*

$H1_0$. *There is no statistically significant relationship between the coefficient of variation of share price computed over 1 year and the probability of a company being prosecuted for fraud.*

$H1_a$. *There is a statistically significant relationship between the coefficient of variation of share price computed over 1 year and the probability of a company being prosecuted for fraud.*

Q2. *What is the relationship (if any) between the P/E ratio computed over 1 year and the probability that a company was prosecuted for fraud?*

$H2_0$. *There is no statistically significant relationship between the price to earnings ratio computed over 1 year and the probability of a company being prosecuted for fraud.*

$H2_a$. *There is a statistically significant relationship between the price to earnings ratio computed over 1 year and the probability of a company being prosecuted for fraud.*

METHODS

Population and Sample

The population from which data was drawn included American companies traded in public stock markets, including the New York Stock Exchange (NYSE), the National Association of Securities Dealers Automated Quotations (NASDAQ), and the American Stock Exchange (ASE). All data were based on records in the SEC database and the COMPUSTAT database. Both of these databases are maintained and updated at least weekly with reliable and accurate data (McQuarrie, 2009). The SEC database contains financial filings for all publicly traded companies and any litigation against the companies (Debreceny, Farewell, Piechocki, Gräning, & d'Eri, 2011). The COMPUSTAT database contains financial data for select companies, including share prices and financial ratios (McQuarrie, 2009). The COMPUSTAT database was used to obtain daily share returns adjusted for dividends and share splits for all shares for the selected companies. Total assets, net earnings and sales growth were also gathered for each company along with the P/E ratio.

The breakdown of the data from 2000 to 2004 is as follows. Between 2000 and 2004, SEC representatives conducted 1,344 administrative proceedings, 1,401 civil actions, and 157 contempt proceedings (U.S. Securities and Exchange Commission, 2012). Of these actions and proceedings, SEC representatives identified and prosecuted 70 US companies for financial or insider trading fraud. Included in this sample were well-known companies whose representatives were proven to have committed fraud, including Enron, WorldCom, AIG, and Lehman Brothers. Excluded from the sample were companies using a foreign currency in the annual report and companies that did not have share price data available due to business closure prior to the fraud prosecution.

Data was collected from www.sec.gov. The SEC Litigations Releases Reports from 2000 – 2004 were utilized. A convenience sample of all companies listed in these reports that were prosecuted by the SEC for financial fraud or insider trading and that have data available was used. For cases of insider trading, the company was used rather than the individual because it was the company stock that might have been affected. To control for company differences, rather than searching for control companies (similar companies in terms of income), the variables for percent change in income and sales growth rates were included in the analysis. The percentage change in income was defined as the annual percentage change in income from the previous year and sales growth rates were the annual percentage change in sales. As a result, the same number of companies not prosecuted for fraud was selected based on company size (using total assets). Because of large differences in company size, the regression used control variables (percent change in income and sales growth rate).

The sample size for the study was 139 companies (70 prosecuted for fraud, 69 not prosecuted for fraud). A single company (Manahagar Tel Nigam) that was not prosecuted for fraud was omitted from the analyses due to missing data. Therefore, of the 16 companies in the analysis within the same SIC code, Compuware was duplicated in the analysis as the alternate "match" since it most closely matched the time frame of the company pair. A power analysis was conducted using G*Power software (Faul, Erdfelder, Buchner, & Lang, 2009) to determine the power of the test, assuming a multiple logistic regression analysis with a medium effect size $f = 0.15$ and an alpha significance level of 0.05. With 139 companies and two predictor variables, the computed power of the test was 98.81%.

Materials/Instruments

The variables required for the analysis all came from previously constructed datasets and included: whether a company was prosecuted for fraud (criterion variable), the coefficient of variation of share price (predictor variable), the P/E ratio (predictor variable), annual net income (control variable), and sales growth rate (control variable). Data used in the study was extracted in the process detailed above from the COMPUSTAT database and then uploaded into SPSS. All data used in the research study were public domain and permission was not needed to conduct the study.

Data was used from companies on file with the SEC between 2000 and 2004. This time period was selected because numerous cases of fraud were discovered during and after the economic period ending in 2001, in which many corporate share prices were considerably higher than the intrinsic value (Gottschalk & Solli-Sæther, 2011). For this period, 70 financial fraud and insider trading cases were identified. An equal number of companies not prosecuted for fraud were selected (however, one company had missing data, resulting in 69 companies not prosecuted for fraud), the total sample size was 139, giving a 98.81% power to the study using G*Power software (Faul et al., 2009). For companies prosecuted for fraud, data was examined for a period of one year prior to the fraud announcement. The one year time frame was selected because the average fraud lasts 18 months prior to detection, and it is the end of this time period (the last six to 12 months) that individuals within the organization or outsiders close to the organization suspect or have knowledge of the fraud and leak the fraud externally (Association of Certified Fraud Examiners, 2012). The 12 months prior to the fraud included an annual report with earnings announced during the fraud and include enough time for the effect of any information leaks to be reflected in the share price. Each company prosecuted for fraud was matched with one company not prosecuted for fraud. Data from the same time period was used for the company prosecuted for fraud and the comparable company not prosecuted for fraud. The match was based on size and SIC code. Matching was based on fraud prosecution as well as total assets, sales growth rate and income levels. Following data collection, a descriptive analysis of the companies was included in the results section for the purpose of assessing whether any statistically significant differences between the prosecuted and not prosecuted companies with respect to these variables existed.

According to the National Association of Securities Dealers Automated Quotation (NASDAQ) system, the population of US companies listed on the NASDAQ (2,365), NYSE (2,141), and AMEX (387) exchanges equal a total population of 4,893 US publicly traded companies (NASDAQ, 2012). Prices during the same time period were examined for each set of two companies. The outcome of the study provided a means of testing the efficient market hypothesis and confirmed whether stock prices reflect private corporate information.

The data was entered into SPSS (version 18) statistical software for analysis. The following values were calculated: (a) the coefficient of variation of share price, (b) the price/earnings ratio for each company, (c) the percent change in income, and (d) the growth rate. The criterion variable was coded as a categorical variable and given a code of one where a company was prosecuted for fraud and a zero where the company was not prosecuted for fraud.

The coefficient of variation of share price was calculated as follows: the one-year average daily share price for the company was calculated. The standard deviation of the company's share price over that period was also calculated. Finally, the standard deviation of the company's share price was divided by the average daily share price.

The price/earnings (P/E) ratio for each company was calculated by dividing the average share price for the year prior to the fraud announcement by the most recently published company income. The most recent income was obtained from the annual report published within the year of the share price study for each company. The price to earnings ratio was also limited to the years of the study.

OPERATIONAL DEFINITION OF VARIABLES

In this study, two independent predictor variables were used along with two control variables: coefficient of variation of share price (predictor variable), the P/E ratio (predictor variable), average net income (control variable), and sales growth rate (control variable). These variables were used to determine whether a predictive model could be constructed with statistical significance. A definition for the independent predictor variables, the criterion variable, and the control variables follow.

Coefficient of variation.

For the purposes of this study, and for clarity, the coefficient of variation was used in place of the Sharpe Ratio (Scholz, 2007). Typically, the coefficient of variation is the standard deviation of a distribution divided by the mean; however, because in this study the researcher sought to use the purpose of the coefficient, calculated similarly to the Sharpe Ratio, the coefficient of variation as the terminology for the following calculation was used: the coefficient of variation was defined as the standard deviation of the share price of that company divided by average share price of the given company over the one year period prior to the company being prosecuted for fraud (Scholz, 2007).

Price/earnings (P/E) ratio.

Price/earnings (P/E) ratio (X_3) was a ratio level predictor variable. The price/earnings (P/E) ratio was already in a standard ratio form and therefore did not need to be computed in terms of the S&P 500 value. To compute the P/E ratio, the average share price over the evaluation period of the year prior to the prosecution for fraud was divided by the average of the company's earnings from the same previous 10K annual reports immediately prior to the fraud announcement date. In other words, the average share price was divided by the average corporate earnings over the same period.

Fraud status.

Fraud status was used as a dichotomous outcome variable (Y) categorized as *not prosecuted for fraud* (0) and *prosecuted for fraud* (1). The source of this information was the SEC fraud database. Companies prosecuted for fraud were listed in the SEC Significant Enforcement Actions section of each SEC annual report. Furthermore, the SEC must have prosecuted the company for financial statement fraud or insider trading fraud. Fraud status was the outcome variable for all research questions.

Percent change in income.

Percent change in income was used as a control variable to standardize the companies of different sizes (Spector & Brannick, 2011). The percent change in income was calculated by dividing the difference in the current and prior year income amounts by the prior year income (Aras, Aybars, & Kutlu, 2010).

Sales growth rate.

The sales growth rate was used as a control variable to standardize the companies of different sizes (Spector & Brannick, 2011). The sales growth rate was calculated by dividing the difference of the current annualized sales and the prior period annualized sales by the prior period annualized sales (Ishikawa, 2010). The model (equation) included this control variable to standardize each selected company for size.

RESULTS

Descriptive statistics analysis of study variables

Descriptive statistics are necessary in statistical research to explain and summarize the data and to describe the sample characteristics (Marshall & Jonker, 2010). Descriptive analyses were conducted to make comparisons of the percentile change in income, sales growth rate, coefficient of variation of share price, and P/E ratio between the companies that were prosecuted for fraud and companies that were not prosecuted for fraud. Table 1 summarizes the descriptive statistics (mean and standard deviations) of the predictor and criterion variables and also shows the average price and standard deviation of the company's stock.

Table 1
DESCRIPTIVE STATISTICS OF PERCENTILE CHANGE IN INCOME, SALES GROWTH RATE, COEFFICIENT OF VARIATION, AND P/E RATIO BY COMPANIES' PROSECUTION FOR FRAUD

		Percent change in income	Sales Growth Rate	Average Price	SD	CV	P/E ratio
Not Prosecuted for fraud	M	32.77%	13.92%	112.74	9.16	21.26%	1.33
	N	69	69	69	69	69	69

	SD	365.09	29.01	769.00	42.72	18.25%	8.43
Prosecuted for fraud	M	25.79%	14.06%	56.37	16.17	31.37%	-8.82
	N	70	70	70	70	70	70
	SD	489.94	33.24	161.38	75.03	35.89%	68.81
Total	M	29.23	13.99	84.15	12.71	26.38%	-3.78
	N	139	139	139	139	139	139
	SD	431.39	31.12	550.65	61.16	28.94%	49.28

Mean comparisons were conducted to determine whether or not the companies prosecuted for fraud or the companies not prosecuted for fraud had better performance in each of the study variables (percentile change in income, sales growth rate, coefficient of variation of share price, and P/E ratio). While mean differences were observed in change in income, sales growth rate, average share price, standard deviation, coefficient of variation, and P/E ratio between companies prosecuted versus those not prosecuted for fraud, a series of t-tests demonstrated that there was not a significant difference between change in income for companies prosecuted for fraud and companies not prosecuted for fraud $t(130) = .10$, $p > .05$; between the sales growth rate for companies prosecuted for fraud and companies not prosecuted for fraud $t(136) = -.03$, $p > .05$; between the mean share prices for companies prosecuted for fraud and not prosecuted for fraud $t(74) = .60$, $p>.05$; between the means of standard deviation for companies prosecuted for fraud and those not prosecuted for fraud $t(112) = 0.68$, $p > .05$; between the means of coefficient of variation for companies prosecuted for fraud and the companies not prosecuted for fraud $t(123) = .98$, $p > .05$; and the difference between the means of P/E ratio for companies prosecuted for fraud and the companies not prosecuted for fraud $t(72) = 1.23$, $p > .05$. Because each variable was not significantly independent for companies prosecuted for fraud and companies not prosecuted for fraud, it was important to identify whether or not the variables in combination resulted in significant differences.

PEARSON'S CORRELATION TEST RESULTS

A Pearson's correlation coefficient was calculated to determine the correlation between the predictor variables coefficient of variation of share price and P/E ratio to investigate the possibility of unfavorable multicollinearity or high degree of correlation between the independent (or predictor) variables (Menard, 2011). Unfavorable multicollinearity should not exist between predictor variables when conducting a logistic regression as this would suggest that the two predictor variables will be redundant in predicting the criterion variable (Bickman & Rog, 2009). The Pearson product-moment correlation test is used when both variables are at least interval and the data is parametric (Field, 2009). Such statistical testing was needed to determine whether or not a low or non-existent correlation existed between the predictor variables before a logistic regression can be used.

The results from the Pearson's correlation coefficient calculations indicate that the coefficient of variation and P/E ratio were not significantly correlated (r [139] = 0.05, p = .53). The p-value of statistical significance of the Pearson's correlation value exceeds that $p < .05$

which means that there is no sufficient statistical evidence to ascertain that a significant correlation exists between the two variables (Bickman & Rog, 2009). Thus, unfavorable multicollinearity between the two predictor variables of coefficient of variation of share price and P/E ratio was not present. With such results, the logistic regression can be conducted, since the required assumption was not violated by the study variables (Menard, 2011).

Logistic regression results and analysis

A series of three logistical regression models were created to determine the extent to which the coefficient of variation and price/earnings (P/E) ratios prior to a public announcement of fraud predicted whether a company was subsequently prosecuted for corporate fraud. Specifically, a hierarchical method was used in which control variables of percentile change in income and sales growth rate were entered in the analysis before the predictors of the effects, which are of primary concern (van der Heijden, 2012). Multiple models were created in order to first test the individual effects of the control variables to the criterion variable and then to test the predictive relationship that existed between the predictor variables and the probability of whether a company was prosecuted for fraud over the selected period while controlling the impact of the control variables to the relationship between the predictor variables and criterion variable (Farraway, 2002). Again, the control variables were included in order to account for company size and to control its influence on the relationship that existed between the predictor variables and the probability of whether a company was prosecuted for fraud over the selected period.

The generated logistic regression model had 139 valid cases and four predictor variables (two predictor; two control variables). The ratio of cases to the predictor variables was 34.75 to 1. The minimum ratio of valid cases (*n*) to predictor variables for logistic regression should be 10 to one, and the preferred ratio should be 20 to one (McCormick, Raftery, Madigan, & Burd, 2012).

The first model generated was a null model, which did not include predictors or the control or predictor variables. This model was generated to provide a baseline to compare predictor models (Hilbe, 2009). The statistics for the equations of the logistic regression for the null model only included the constant of the regression model and showed that the constant was insignificant (Wald [1] = 0.01, $p = .93$). This means that the Wald chi-square test did not result in rejection of the null hypothesis for the null model that the constant equals zero. This model was used to determine whether or not the predictor variables could improve the null model. Because the null model was zero, this shows that the prediction of fraud within the model does not exceed the accuracy rate of a random guess. Thus, further models including the predictor variables were run to improve the model to become a more accurate predictor of companies prosecuted for fraud. These models are summarized below.

The statistics for the equations of the variables not included in the null model were the control variables of percentile change in income (Score [1] = 0.01, $p = .93$) and sales growth rate (Score [1] = 0.004, $p = .95$). The probability value of the overall statistics of the regression model, not including the two control variables, was insignificant (Score[(1] = 0.014, $p = .99$), implying that the control variables did not have any significance to the criterion variable once they were included in the model. Thus, the final model was run both with and without the control variables to ensure a difference between the two models did not exist, thus confirming the insignificance of the control variables.

The second model generated was the block one logistic regression model and included the entry of control variables. The predictor variables were not yet included in the second model. The purpose of the second model was to determine whether any of the control variables of percentile change in income and sales growth rate significantly influenced the criterion variable when included in the model. The chi-square test was conducted to test the model to determine the existence of a significant relationship between the control variables and the criterion variable. The probability value of the chi-square test (χ^2 [2] = 0.14, p = .99) was greater than .05 indicating that the model was insignificant. The results suggested that neither of the two control variables had any significant influence or association to the criterion variable.

The third model generated was the block two logistic regression model, where both the control variables and predictor variables were included in the regression model to determine whether the model supported the null hypothesis that there was no difference between the model without predictor variables and the model with predictor variables. Statistical significance would mean the existence of a relationship between the predictor variables and the criterion variable. The presence of a relationship between the criterion variable and combination of predictor variables entered after the control variables was investigated.

The first statistic investigated for the full logistic regression was the overall test of the model fit. The overall model fit of the full logistic regression was tested through the investigation of the block chi-square for the second block of variables in which the predictor independent variables were included (van der Heijden, 2012). The probability value of the block chi-square test (χ^2 [2] = 9.19, p = .01) had a value less than the level of significance value of 0.05. The null hypothesis stating that there is no difference between the model with only a constant and the control variables versus the model with the predictor independent variables was rejected (Farraway, 2002). This indicated a significant relationship between the predictor independent variables and the criterion variable (Ando & Tsay, 2011).

The overall percentage of the classification accuracy rate should be 25% or higher than the proportional by chance accuracy rate. The accuracy rate computed by SPSS was 59.7%. On the other hand, the proportional by chance accuracy rate was computed by calculating the proportion of cases for each group, based on the number of cases in each group. This was computed by squaring and summing the proportion of cases in each group ($49.6\%^2 + 50.4\%^2 = 50.00\%$). The accuracy rate computed of 59.7% was greater than or equal to the proportional by chance accuracy criteria of 50%. Thus, the criterion for classification accuracy was satisfied.

The analysis of this statistic determined the influence of the predictor variables of coefficient of variation of share price and P/E ratio to the criterion variable of prosecution for fraud, while controlling the impact of the two control variables. The results, displayed in table 2, showed that the Wald statistic for the two control variables of percentile change in income (Wald [1] = 0.02, p = .89) and sales growth rate (Wald [1] = 0.65, p = .42) were insignificant, since the probability values were greater than 0.05. This suggests that the influence of both control variables was controlled in the model, since the control variables were not significantly related to the dependent, or criterion variable (van der Heijden, 2012). Also, the Wald statistic of the constant (Wald [1] = 0.01, *p* = .93) of the logistic regression was insignificant. For the predictor variables, the statistics showed that the predictor variable of coefficient of variation (Wald [1] = 4.6, *p* = .03) significantly influenced the criterion variable of prosecution for fraud, as the Wald statistic was less than the level of significance value. The statistic resulted in the rejection of null hypothesis for research question one. Alternatively, it supported the alternative hypothesis, which stated that there is a statistically significant relationship between the coefficient of variation of share price, computed over one year, and the probability of a company being prosecuted for fraud using a controlled logistic regression. However, it was determined that the P/E ratio (Wald [1] = 0.99, *p* = .32) did not significantly influence the criterion variable of prosecution for fraud, as the Wald statistic was greater than the level of significance value. The statistics did not result in the rejection of the null hypothesis for research question two. The results showed that there was no statistically significant relationship between the P/E ratio, computed over one year, and the probability of a company being prosecuted for fraud using a controlled logistic regression (Farraway, 2002). As a result, the insignificance of the P/E ratio further supports the idea that share prices accurately reflect the intrinsic value in the daily closing price. Thus, it was only determined that fraud was reflected in the coefficient of variation. The coefficient of variation of share price was a reliable indicator of fraud. The strong-form efficient market hypothesis was confirmed, based on the coefficient of variation.

Table 2
VARIABLES IN THE EQUATION FOR CONTROLLED LOGISTIC REGRESION WITH PREDICTOR VARIABLES

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Percentile change in income	.00	.00	.02	1	.89	1.00
	Sales Growth Rate	-.01	.01	.65	1	.42	1.0
	Coefficient of variation	.02	.01	4.65	1	.03	1.02
	P/E ratio	-.03	.03	.99	1	.32	.98
	Constant	-.41	.27	2.32	1	.13	.67

[a]Variable(s) entered on step 1: Coefficient of variation, P/E ratio.

The coefficient of the odd ratio statistic of Exp(B) of the significant predictor variable of coefficient of variation of share price was investigated to determine change in the log odds of the criterion variable for a one unit increase in the coefficient of variation (McCullagh & Nelder, 1989). The Exp(B) coefficient was 1.02, which implies that a one unit increase in coefficient of variation increased the odds for companies being prosecuted for fraud (versus not prosecuted for fraud) by 0.02 or 2.0% (Black, 1999). This significant finding means that the companies prosecuted for fraud had lower coefficient of variation as compared to the companies not prosecuted for fraud because the Exp(B) coefficient was a positive value indicating that the probability a company was prosecuted for corporate fraud increased when the coefficient of variation increased. The same observation was determined in the mean comparison.

Lastly, multicollinearity in the logistic regression solution is detected by examining the standard errors for the b coefficients (S.E.). A standard error larger than 2.0 indicates multicollinearity among the predictor variables. All S.E. coefficients in table 2 were less than 2.0. Thus, multicollinearity did not exist between the predictor variables.

DISCUSSION

Research question 1 examined the relationship between the coefficient of variation of share price (calculated as the standard deviation of the company's share price divided by the average share price), computed over one year and the probability of a company being prosecuted for fraud. The statistical result of logistic regression showed that the coefficient of variation of share price, computed over one year, predicted the probability that a company would be prosecuted for fraud. This finding suggested that the coefficient of variation of share price reflects share price differences in companies prosecuted for fraud and companies not prosecuted for fraud, thus supporting the strong-form version of the efficient market hypothesis. As a result, the coefficient of variation could potentially be used as an indicator of fraud. This finding is consistent with results from other researchers (Boettke, 2010; Gavious, 2009; Hegazy & Kassem, 2010; Himmelmann, Schiereck, Simpson, & Zschoche, 2012; Murcia & Borba, 2007; Rao, 2009). As a result, the study was able to uphold the efficient market hypothesis by determining that share prices reflect all available information, and thus, cannot be predicted. Additionally, Boettke (2010) performed research that supported Dunbar and Heller's research in that a model to predict share prices could not be created. Like the findings with the coefficient of variation, prediction of share prices is not possible because all available information is already incorporated into the share price, thus upholding the efficient market hypothesis.

On the other hand, this finding is inconsistent with other studies that have tested the efficient market hypothesis. For example, Yen and Lee (2008) found that a perfectly efficient market does not exist, and as a result, share prices do not always reflect the market value. Inconsistencies between this study and the research by Yen and Lee exist because Yen and Lee focused only on the Indian stock market, which carries a different level of efficiency than the American stock markets. Additionally, noise factors were not accounted for in Yen and Lee's study, and thus may result in inconsistent results based on economic and industry factors within the market.

Research question 2 examined the relationship between the price/earnings ratio computed over 1 year and the probability of a company being prosecuted for fraud. The price/earnings ratio was not effective at predicting whether or not a company was subsequently prosecuted for fraud. Thus, the price/earnings ratio did not appear to be an indicator of fraudulent activity and thus, supports the semi-strong version of the efficient market hypothesis. The semi-strong version of the efficient market hypothesis is less stringent than the strong-form in that the assumption of the semi-strong form is that a share market is not perfectly efficient, and as such, some private information may not be reflected in the share price (Westfall, 2010). As a result, the finding that the price/earnings ratio is not a significant indicator of fraud could result from share prices that have not yet incorporated private, fraudulent information. This result supports the study conducted by Louhichi (2008) that found positive abnormal share returns are restored to the normal share price within 15 minutes and that negative abnormal share returns are restored to the normal share price within 30 minutes. This finding is also consistent with findings from other studies (Dunbar & Heller, 2006; Glen & Hornung, 2005, Yen & Lee, 2008). Furthermore, contrary to research supporting the efficient market hypothesis, researchers have identified results that contradict the efficient market hypothesis (Ilg, 2010; Muhammad & Rahman, 2010). In fact, Ilg (2010) found that inside traders can and do profit from private corporate information. This contradicts the efficient market hypothesis, as the ability to profit from information in this theory is impossible because share prices always reflect the market value. Thus, the results of research question 2 further supported the research above that indicated the efficient market hypothesis is not an accurate theory in the strong-form because proof exists that investors can profit from private information and that in some cases, share prices can be predicted.

The evaluation of the means and Exp(B) coefficient of the coefficient of variation of share price in the logistic regression showed that the companies prosecuted for fraud had higher coefficient of variation as compared to the companies not prosecuted for fraud. Lower coefficient of variation indicates that the share price had a lower dispersion around the mean price, while higher coefficient of variation means that the share price had a greater dispersion around the mean, indicating a more volatile share price (Ratner, 2009). This suggested that the companies prosecuted for fraud had share prices that had greater dispersion around the mean price, while companies not prosecuted for fraud had a less volatile share price. The strong-form efficient market hypothesis was confirmed by the results since the fraud was reflected in the share price in terms of the coefficient of variation measure.

The first implication of this study's results is the ability of stakeholders to use a simple corporate measure consisting of available public information that can aid in identifying companies currently in a potentially fraudulent environment. Fraud literature identifies various personnel within an organization that can engage or participate in fraud and the different types of fraud including financial-statement fraud, occupational fraud, and other non-financial types of fraud (Lord, 2010; Murphy & Tibbs, 2010; Rezaee & Riley, 2010). There are instances where financial fraud remains undetected for a long time, which causes dispute in the organization once it is detected. According to Hogan et al. (2008), fraud is primarily detected through the use of quantitative or qualitative indicators such as the coefficient of variation of share price. Such indicators can be used to monitor and identify potentially fraudulent situations early on to minimize personal financial damage. The coefficient of variation uses share price, a readily available metric, to identify potentially fraudulent situations. Thus, this study adds to the body of evidence that exists to help stakeholders make informed decisions using the efficient market hypothesis and simple metrics to identify potentially fraudulent situations.

Another implication of a fraud indicator such as the coefficient of variation is the potential to limit or minimize the cost of fraud. Lenard, Moenske, and Alam (2009) purported that the current high level of fraud is believed to be a result of ineffective legislation and a lack of easily identifiable fraud indicators. Hence, the identification of accurate models and indicators are important in order to minimize the high costs associated with fraud. This research study identified an additional metric, coefficient of variation of share price, which can be incorporated into the current models to improve the accuracy rate of the fraud detection models.

Implications of using fraud indicators exist because knowing what predictor is significant does not necessarily mean that an organization is already equipped in knowing whether there is existing fraudulent activity in their organization. Reliable and up-to-date data should allow researchers to develop financial fraud indicators in order to give stakeholders the ability to make accurate decisions. Identifying new indicators such as the coefficient of variation of share price in this study adds to the research that is conducted to develop models using indicators to prevent and detect fraud.

The results of the study may have implications to stakeholders or the management of an organization regarding the development of strategies to safeguard their financials and develop ways to prevent fraudulent activities within the organization. Much of the focus is sometimes directed at the employees and how they can contribute to a company's growth, but the influence of leaders in affecting the organization's culture should also be taken into consideration. Kranacher et al. (2011) asserted that methodologies should exist in identifying warning factors that point to a need to review a company further to determine if fraud is present. This study adds to the existing research to identify methodologies using metrics to create warning factors that point to a need for stakeholders to evaluate a company for fraud

Limitations

One limitation of using the P/E ratio is that selecting a share price to use in a ratio can be problematic because corporate share prices fluctuate continually. Wide fluctuations of share prices in opposite directions over the course of the year can cancel out the appearance of the fluctuations. Regardless, selection of a share price measure can prove to be difficult and inconsistent based on the current share market conditions and the economic environment. Another limitation existed in using the P/E ratio because when financial statement fraud is committed, both the share price and the earnings per share reflect the fraud. As a result, the relationship of the two variables comprising the ratio potentially remains constant whether fraud is committed or is not committed and thus, was not an effective predictor of fraud.

Because the P/E ratio was not significantly different between companies prosecuted for fraud and companies not prosecuted for fraud, the results did not support the strong-version of the efficient market hypothesis; the share price of companies prosecuted for fraud should have included the information regarding the fraud in the share price, thus lowering the share price of companies prosecuted for fraud in comparison to the companies not prosecuted for fraud. The lack of significance of the P/E ratio suggests that understanding the benefits of fraud-proof strategies does not necessarily translate into practice. The results of the study indicated that managers may choose indicators that are not significant predictors of a company's fraud status and thus must be cautioned about. A strategic plan may be needed for managers to effectively select financial fraud indicators to safeguard their own companies. Based on the results of this research, several recommendations exist for further research and refinement of the existing study.

Future Directions

The purpose of this study was to test the strong-form version of the efficient market hypothesis (which is the most stringent application of the theory and assumes that all information is always discounted into a company's stock prices) by investigating the extent to which changes in share price and price/earnings (P/E) ratios prior to a public announcement of fraud predicted whether a company was subsequently prosecuted for corporate fraud. The result of the controlled logistic regression revealed that the coefficient of variation of share price is a significant predictor for a company's fraud status and not the P/E ratio. Although the P/E ratio was insignificant in predicting a company's fraud status, it is still concluded that financial indicators are important since most stakeholders use them for decision making.

Future research should evaluate the relationship of outside factors to fraud indicators. One factor that can be looked at is the often changing business and economic conditions where an organization resides. Stewart (2006) identified factors associated with economic growth as a potential opportunity for fraud. These factors included market complexity, increased computer automation, business globalization, and changing government regulations. These so-called economic factors provide both incentives and opportunities from changing economic conditions. The relationship of share price to specific economic conditions and industry specific conditions can further extend this research study to evaluate additional variables affecting share price.

Further research should also be performed to evaluate relationships between qualitative and quantitative fraud indicators. A more robust model should be evaluated using indicators that are easy to identify by stakeholders. Such a model should aid in evaluating company performance as it relates to fraud. Finally, additional research could be undertaken to extend this study using more recent data to determine if the coefficient of variation still provides a significant indicator of fraud.

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WHAT DISTINGUISHES AUDIT COMMITTEE FINANCIAL EXPERTS FROM OTHER AUDIT COMMITTEE MEMBERS?

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ABSTRACT

Since 2003, public companies have been required to disclose whether any "financial experts" serve on their audit committees. Almost immediately after the implementation of this requirement, researchers have investigated the characteristics of those designated as financial expert. A limitation of much of this research has been its focus on financial experts only, to the exclusion of other audit committee members. Although the characteristics of audit committee financial experts may be better known, the extent to which they differ from non-experts has been largely unaddressed.

This study extends prior research by investigating which factors distinguish financial experts from others on the audit committee. The backgrounds of 766 audit committee members of 200 public companies are examined. A logistic regression model reveals that experience as a CEO or CFO, professional certification such as a CPA, and service on the audit committees of other boards all significantly increase the probability of being designated a financial expert. Although small and large sample firms appear to value different attributes in selecting audit committee members, the only difference observed in their naming of financial experts was experience as CEO, which was not significant for small firms.

INTRODUCTION

The Sarbanes-Oxley Act of 2002 (SOX) greatly altered the landscape of corporate governance. In addition to more familiar sections of the Act dealing with issues such as internal control, Section 407 of SOX required the Securities and Exchange Commission (SEC) to implement a rule requiring firms to disclose whether their audit committees included at least one "financial expert." Although there was no explicit requirement that firms have such an expert, any public company lacking one would be required to explain the reasons why.

Researchers have since documented the importance of financial experts in the financial reporting process. Krishnan (2005) found fewer internal control problems among firms whose audit committees had more financial expertise. Similar findings were reported by Mustafa and Youssef (2010), who discovered a negative correlation between asset misappropriation and audit committee financial expertise. Bedard, Chtourou, and Courteau (2004) found that the presence of a financial expert on the audit committee reduced aggressive earnings management by firms. Barua, Rama, and Sharma (2010) observed that firms with an expert on the audit committee tended to spend less on their internal audit function, suggesting the existence of substitution effects between audit committee financial expertise and investment in internal auditing.

Given the important role played by financial experts, an understanding of the characteristics of those audit committee members selected to serve as experts is critical. Most prior research (e.g. Williams, 2005) into this issue has examined the background of those designated as financial experts by their firms. Although yielding valuable insights, this approach overlooks audit committee members *not* designated as experts. This leaves largely unaddressed the important question of which director attributes are significant in the decision to name an audit committee member as an expert. What characteristics distinguish experts from non-experts? This study seeks to address this concern and extends prior research by examining both financial experts *and* audit committee members who are not so designated. Only by including both experts and non-experts in the analysis can distinctions between the two be drawn. Sample subsets of large and small firms are also analyzed separately to ascertain the impact of firm size on the financial expert designation.

The remainder of the paper is divided into four sections. The first section discusses the SEC rule regarding audit committee financial experts and reviews some selected research into the characteristics of those selected as experts. The second section discusses factors that might affect the financial expert designation decision and presents a logistic regression model to test them. Data selection and results are described in the third section. The paper closes with a summary and discussion of the results.

THE SEC RULES AND PRIOR RESEARCH

In their Final Rules, the SEC (2003) defined the attributes of an audit committee financial expert and described the experiences that might enable a person to attain those attributes:

- *An understanding of generally accepted accounting principles and financial statements;*
- *The ability to assess the general application of such principles in connection with the accounting for estimates, accruals and reserves;*
- *Experience preparing, auditing, analyzing or evaluating financial statements that present a breadth and level of complexity of accounting issues that are generally comparable to the breadth and complexity of issues that can reasonably be expected to be raised by the registrant's financial statements, or experience actively supervising one or more persons engaged in such activities;*
- *An understanding of internal controls and procedures for financial reporting; and*
- *An understanding of audit committee functions.*

Under the final rules, a person must have acquired such attributes through any one or more of the following:

(1) Education and experience as a principal financial officer, principal accounting officer, controller, public accountant or auditor or experience in one or more positions that involve the performance of similar functions;

(2) Experience actively supervising a principal financial officer, principal accounting officer, controller, public accountant, auditor or person performing similar functions;

(3) Experience overseeing or assessing the performance of companies or public accountants with

respect to the preparation, auditing or evaluation of financial statements; or

(4) Other relevant experience.

Shortly after the implementation of these rules, researchers began investigating the characteristics of audit committee financial experts. Williams (2005) found that the most common (47.9%) expert characteristic was experience as a CEO. Explicitly financial backgrounds such as CFO experience (13.3%) and CPA certification (16.4%) were much less common. She also found differences between large and small firms in the backgrounds of their financial experts.

Carcello, Hollingsworth, and Neal (2006) also examined financial expert characteristics. They found that 69% of audit committee financial experts had CEO experience, while CFO experience was noted for only 20% of their sample. Another 12% had auditing experience.

A limitation of these lines of research is their exclusive focus on those already designated as financial experts. Other members of the audit committee may have CEO experience or be CPAs, yet are not named financial experts. One of the few studies to investigate the characteristics distinguishing those designated as financial experts from those not so named is Iyer, Bamber, and Griffin (2013). They found that accounting certification and service on other audit committees were positively associated with being named a financial expert, while prior CEO experience was negatively associated with such a designation.

Iyer et al. (2013) based their findings on the self-reported characteristics of 167 survey respondents. They did not address the effects of firm size on their results. This study extends their research in two ways. First, the analysis is based on the publicly available information of 766 audit committee members of 200 public companies. Second, the data are examined separately for both the large and small firms in the sample.

FACTORS AFFECTING THE FINANCIAL EXPERT DESIGNATION

The SEC rules delineating the qualities and experiences needed to be an audit committee financial expert provide some guidance about the factors that would increase the likelihood of a director being named an expert. Prior or current experience as a company CEO should meet the criterion regarding “experience overseeing . . . the performance of companies.” Surprisingly, however, Iyer et al. (2013) found that CEO experience *reduced* the chances of being designated an expert.

“(E)xperience overseeing . . . the performance of companies” could be extended to other attributes. Directors actively serving on more than one board committee may gain a more in-depth knowledge of their firm’s operations that would enhance their value as financial experts. Similarly, directors serving on the boards of other firms might be able to bring that experience to a company and so qualify as financial experts. This rationale would be even stronger if a director also served on the audit committee of another firm.

The SEC also states that “education and experience as a principal financial officer, . . . public accountant or auditor” would be a qualification for serving as a financial expert. Thus audit committee members with experience as CFOs would be strong candidates to serve as financial experts. Also, CPAs and holders of other professional certifications would appear to easily meet this criterion.

Finally, The SEC cites having "other relevant experience" as a path to qualify as a financial expert. Rather than speculate about the potential backgrounds that might satisfy this criterion, it may be assumed that older directors would have had more opportunities to gain such experience. Similarly, directors with more years of experience serving on the board might use that background to qualify as an expert.

Based on the above, the following logistic regression model was formulated:

Expert = *f*(CEO, CFO, Certification, Other Comm, Other Boards, Other AC, Age, Tenure)

where:

Expert	= 1 if the audit committee member has been designated as an financial expert, else 0.
CEO	= 1 if the audit committee member has current or prior experience as a CEO of a company, else 0.
CFO	= 1 if the audit committee member has current or prior experience as a CFO of a company, else 0.
Certification	= 1 if the audit committee member has a CPA/CIA/CMA certification, else 0.
Other Comm	= 1 if the audit committee member serves on other committees of the firm's board, else 0.
Other Board	= 1 if the audit committee member serves on the boards of any other publicly held firms, else 0.
Other AC	= 1 if the audit committee member serves on the audit committees of any other publicly held firms, else 0.
Age	= the age of the audit committee member.
Tenure	= the number of years the audit committee member has served on the firm's board.

A random sample of 100 firms was drawn from companies included in the S&P 500 Index. To provide a comparison with smaller firms, another 100 companies were randomly selected from the Russell Microcap Index, an index designed to track the smallest publicly traded companies in the United States. Information regarding each firm's audit committee members was obtained each firm's most recent proxy statement available as of January 2014. Where necessary, additional data about audit committee member backgrounds were obtained from publicly available online sources, such as *Businessweek* or *Forbes*. Data were obtained for 766 audit committee members. Of this number, 412 had been designated as financial experts by their firms.

Selected descriptive information about the sample's audit committees and number of experts is provided in Table 1. The average audit committee has 3.90 members. Audit committees of S&P 500 firms were somewhat larger (4.45 members) than were those of Microcap firms (3.35 members). The larger size of S&P audit committees appears to provide them the opportunity to designate more financial experts (2.73) than their Microcap counterparts (1.43). As Table 1 indicates, S&P firms are also more likely to name multiple financial experts – 72 of the 100 sample S&P companies have more than one financial expert, while 72 of the 100 sample Microcap firms have only one designated expert. Only two firms, both Microcap companies, did not designate any of their audit committee members as financial experts.

Table 1
AUDIT COMMITTEES AND FINANCIAL EXPERTS

	Total	S&P 500	Microcap
Audit Committee Size:			
Mean	3.90	4.45	3.35
Max	9	9	6
Min	1	3	1
Financial Experts:			
Mean # of Experts	2.08	2.73	1.43
firms with 0 experts	2	0	2
firms with 1 expert	100	28	72
firms with 2 expert	31	20	11
firms with 3 expert	30	19	11
firms with >3 experts	37	33	4

Table 2 provides a summary of the frequency with which the model variables appear in the sample. As the Table indicates, approximately 42% of audit committee members have experience as a CEO. Interestingly, S&P 500 firms are significantly more likely to utilize audit committee members with CEO experience than are Microcap firms.

For the sample as a whole, 24% of audit committee members had experience as CFOs. Approximately 18% of sample directors had CPA/CMA/CIA certification. Audit committee members of Microcap firms were significantly more likely to be certified than were those of S&P 500 companies. Table 2 makes clear that service on multiple board committees is the norm for corporate directors, as over 88% were on at least one other committee in addition to their audit committee service. A significant disparity was observed in the percentage of audit committee members serving on other corporate boards – 62.4% of S&P 500 directors were currently serving on at least one other board, compared to only 27.8% of Microcap directors. This difference extended to service on other audit committees, with S&P 500 audit committee members reporting significantly more such activity than their Microcap counterparts. Finally, S&P 500 audit committee members were slightly but significantly older than Microcap directors, although there was no significant difference in years of service on the board. In total, Table 2 provides evidence that audit committee members of large firms have significantly different characteristics than do those of smaller firms.

Table 2
MODEL VARIABLES

		Total (n=766)	S&P 500 (n=431)	Microcap (n=335)
CEO	#	323	212	111
	%	42.2%	49.2%	33.1%***
CFO	#	184	102	82
	%	24.0%	23.7%	24.5%
Certification	#	135	57	78
	%	17.6%	13.2%	23.3%***
Other Comm	#	675	391	284
	%	88.1%	90.7%	84.8%**
Other Board	#	362	269	93
	%	47.3%	62.4%	27.8%***
Other AC	#	247	179	68
	%	32.2%	41.5%	20.3%***
Age (years)	Mean	62.4	63.1	61.5**
	Min	30.0	30.0	34.0
	Max	86.0	84.0	86.0
Tenure (years)	Mean	8.2	8.29	8.09
	Min	1.0	1.0	1.0
	Max	43.0	42.0	43.0

***Difference between S&P 500 and Microcap firms significant at *p <.01*

**Difference between S&P 500 and Microcap firms significant at *p <.05*

Results of the logistic regression model are presented in Table 3. The regression model was estimated for the sample as a whole and then separately for S&P 500 and Microcap firms. For all three model estimations, the models were significant (p=.000) with classification accuracy ranging from 68.4% to 74.6%.

For the sample as a whole, experience as a CEO was significantly associated with the probability of being named a financial expert. This result appears to be driven entirely by S&P 500 firms, as the variable was not close to significance (p=.693) among Microcap companies.

Consistent with prior research, audit committee members with CPA/CMA/CIA certification or with experience as a CFO were significantly more likely to be designated as financial experts, while service on other board committees appeared to play no significant role.

Table 3
LOGISTIC REGRESSION RESULTS

Expert = f(CEO, CFO, Certification, Other Comm, Other Board, Other AC, Age, Tenure)

	Full Sample			S&P 500 Firms			Microcap Firms		
	Coeff.	Wald	Sig	Coeff.	Wald	Sig	Coeff.	Wald	Sig
Intercept	16.807	0.37	.543	60.194	2.23	.135	-37.828	0.77	.378
CEO	0.446	7.14	***.008***	0.674	9.32	***.002***	-0.110	0.15	.693
CFO	1.333	37.31	***.000***	1.409	20.85	***.000***	1.169	13.17	***.000***
Certification	1.858	44.56	***.000***	1.585	12.89	***.000***	2.202	37.40	***.000***
Other Comm	-0.271	1.00	.317	-0.433	1.11	.291	-0.117	0.09	.759
Other Board	0.411	3.06	.080	0.261	0.77	.380	-0.218	0.17	.676
Other AC	0.723	8.65	***.003***	0.681	5.70	***.017***	1.304	5.30	***.021***
Age	0.007	0.45	.501	-0.001	0.00	.972	0.008	0.28	.595
Tenure	0.009	0.43	.509	0.030	2.32	.128	-0.018	0.77	.378
Model χ^2		164.92	***.000***		71.74	***.000***		100.19	***.000***
Nagelkerke R^2		0.26			0.21			0.35	
Classification accuracy		69.3%			68.4%			74.6%	

Audit committee members serving on more than one board of directors were no more or less likely to be considered financial experts. However service on the audit committees of other boards was significantly and positively associated with the probability of being named a financial expert. Finally, director age and tenure were not significant variables in the models. The results from Table 3 indicate that, although the audit committee members of S&P 500 and Microcap firms may have different characteristics, there is a great deal of similarity in the factors leading to designation as a financial expert.

SUMMARY AND CONCLUSIONS

This study identified characteristics of audit committee members that would lead their boards of directors to designate them as financial experts. A logistic regression model was estimated, using a sample of 200 firms, half drawn from the S&P 500 and half from the Russell Microcap Index.

The results revealed that some factors play an insignificant role in the decision to name someone a financial expert. Characteristics such as age and tenure were not significant in the model. A director's service on other committees or on other boards also did not influence the financial expert decision. However, service on other audit committees did positively increase the chances of being named a financial expert.

The two factors that were most significant in determining if someone were named a financial expert were certification as a CPA/CMA/CIA and experience as a CFO. The results also indicated that experience as a CEO significantly increased the probability of being designated a financial expert. This result runs counter to the finding reported by Iyer et al. (2013), and, surprisingly, held for only the S&P 500 firms in the sample. Service as a CEO appeared to play no role in naming financial experts for Microcap firms.

Although several prior studies have profiled the characteristics of audit committee financial experts, their focus has been primarily on only the experts themselves. The characteristics of audit committee non-experts have not been included in the analyses, leaving any distinctions between the two groups unaddressed. This study contributes to the literature and extends prior research by examining all audit committee members, both expert and non-expert. This allows identification of the characteristics distinguishing financial experts from other audit committee members.

The results of this study provide evidence that the factors significantly associated with financial expert designation (Certification, CFO or CEO experience, service on other audit committees) track with the qualities and experiences established by the SEC when the rules regarding financial experts were issued in 2003. Other characteristics less directly linked to SEC guidance (Age, Tenure) did not play a significant role. In making the decision to designate a financial expert, firms appear to be closely following the criteria established by the SEC.

Potential areas for further research include identification of additional factors driving the financial expert designation decision. Also, the differing profiles of audit committee members between S&P 500 and Microcap firms suggest that further analyses take size and other firm specific variables into account when investigating this issue.

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