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THE PARADOX OF STRUCTURE AND CONTROL IN THE MULTINATIONAL CORPORATION: DO WE HOLD TIGHT OR LET GO?

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ABSTRACT

The 21st century has seen important changes in the strategies of multinational corporations (MNCs), especially as they have become adept at configuring their value chains to extract benefits from their diversified structures. This has raised very important issues relating to the mechanisms by which they can be controlled. The problem of MNC control in the current scenario is intensified by an important paradox: while most empirical research suggests that diversified firms need decentralized control systems, some studies also contend that singular strategies need to be developed to exploit synergies in the homogenizing world market. In this paper, we attempt to resolve this paradox by studying contingencies such as level of centralization, reward systems, transfer pricing, and the geographic and technological contiguities within MNCs.

CONTINGENCIES OF CONTROL IN MNC'S

The issue of structure in multinational corporations (MNCs) has gained resurgence in the current era of globalization as well as global economic crisis (Wilson & Eilertsen, 2010) both in the academic literature (Anken & Beasley, 2012; Huang, Rode & Schroeder, 2011) and in the popular press (Duhigg & Bradsher, 2012). Companies like Apple, Wal-Mart, Proctor & Gamble and Toyota through the clever reconfiguration of their supply chains, are producing structural innovations at a dizzying pace, with theories from academics struggling to keep up with ground realities. As academic researchers, we need to understand as well as critique these arrangements.

Typically, the issue of control in a MNC may be defined in terms of the paradox of having to design newer and tighter control systems in an atmosphere which celebrates decentralization (Simons, 1995). Many studies have posited that as the firm increases in size and diversity, the relationship between the corporate headquarters and the subsidiary needs to be decentralized (Jones & Hill, 1988; Vittorio, 2000). However, it is also true that the increased globalization of firm operations necessitate the development of a coherent, singular corporate strategy treating the world market as a single entity with globally interchangeable production and marketing operations (Drucker, 1986; Hout, Porter & Ridden, 1982). It therefore appears that the MNC is stuck in a paradox of having to *hold tight* and to *let go* at the same time.

In this paper, we attempt to resolve this paradox by discussing four sets of contingencies that need to be taken into account while designing control systems for MNCs. These contingencies include whether or not the subsidiaries of the MNC are interdependent of each other, whether or not they transfer goods from each other on a regular basis, whether or not the headquarters possess the ability to monitor their actions, and whether or not these subsidiaries are geographically and technologically linked to each other. Based on these contingencies, we advance a series of propositions about the control of the MNC.

CENTRALIZED VS. DECENTRALIZED STRUCTURES

There are major disadvantages associated with excessive centralization in an MNC (Egelhoff, 1988). Among these is the overloading of the decision-making capacity of the top management team (Laud & Schepers, 2009). This is compounded by the unavailability of specific information at the top level and time lost in moving information up and down the hierarchical structure. Centralization can also negatively impact SBU-level motivation, responsiveness and local competitiveness.

On the other hand, it has been argued that greater interdependence between national subsidiaries may require greater dependence on the top management team as a coordinator in inter-SBU transactions (Laud, 2009; Govindarajan, 1988). These two arguments have guided MNCs to use innovative approaches, using the logic represented in the following two propositions:

P1 *MNCs characterized by low interdependence among SBUs are likely to perform better when using decentralized control systems than those using centralized control systems.*

P2 *MNCs characterized by high interdependence among SBUs are likely to perform better when using centralized control systems than those using decentralized control systems.*

BEHAVIOR-BASED VERSUS OUTCOME-BASED REWARD SYSTEMS

One of the challenges of multinational firms concerns reward systems. If the subsidiary is distant from the headquarters, or if it is engaged in activities that are unfamiliar to the headquarters, then an outcome-based reward system would be a better choice for the organization. However, if the subsidiary is close to the headquarters, and if it is engaging in tasks that are easily monitored by the headquarters, a behavior-based reward system may be more appropriate.

Based on the above argument, we may derive the following propositions;

P3 *In MNCs characterized by information insufficiency at the HQ level regarding the actions of foreign subsidiaries, outcome-based reward systems are likely to lead to better performance than behavior-based reward systems.*

P4 In MNCs characterized by information availability at the HQ level regarding the actions of foreign subsidiaries, behavior-based reward systems are likely to lead to better performance than outcome-based reward systems.

TRANSFER PRICING

Transfer pricing works as a control system by ensuring that when two or more profit centers participate in the development of the same product, the revenue they generate is fairly shared between them (Cools, Emmanuel & Jorissen, 2008; Eccles, 1985). In MNCs, transfer pricing also defines a pseudo-commercial transaction within the organization, the normative principle of such an exchange being that the price of the product should be similar or comparable to the price that would be charged, were the product to be purchased from or sold to external sources (Anthony & Govindarajan, 1995). It may be proposed that the headquarters of an MNC should mediate the transfer pricing process only when large, multiple or long term orders are being negotiated. For routine and once-off transfers, it would be best to relegate the decision to the SBU level, where they would follow a market-based course. Based on the above reasoning, we propose the following propositions with respect to transfer pricing:

P5 When negotiating inter-subsidiary transfer on a long term basis, corporate mediation is more likely to lead to better performance than market-based transactions.

P6 When negotiating inter-subsidiary transfer on an ad hoc basis, market based transactions are more likely to lead to better performance than corporate mediation.

CONTINGENCIES OF TECHNOLOGIES AND GEOGRAPHIES

The diversified firm exists in the context of two important dimensional heterogeneities. It may operate in markets that are either geographically contiguous or geographically disparate, and in markets that are technologically contiguous or disparate. Consider for example a large diversified organization like General Electric. GE is likely to use different monitoring systems for a plant in Sao Paolo than for a similar plant in Seattle. Similarly, the control systems are going to be different in GE's Medical Imaging division in comparison with NBC. Such differing control arrangements are a result of the geographical and technological distances between various subsidiaries of GE.

Table 1 depicts the geographic and technological issues that an MNC faces.

Table 1 - GEOGRAPHIC AND TECHNICAL ISSUES

	CONTIGUOUS GEOGRAPHICAL MARKETS	DISPARATE GEOGRAPHICAL MARKETS
CONTIGUOUS TECHNOLOGIES	Global Firm (Interdependent SBUs)	"Technoscape" (Shared upstream-know-how)
SEPARATE TECHNOLOGIES	"Supermarket" (Shared downstream know-how)	Conglomerate (Cash-Flow Based Controls)

When an MNC is characterized by the presence of SBUs sharing geographical as well as technological commonalties, it obviously needs to develop highly singular control systems. This is true because the headquarters has the ability to oversee the subsidiaries in a direct manner. In other words, all SBUs in such a firm may be governed by similar and even joint control systems.

However, such contiguities are not always available to the corporation. Sometime, despite operating in a very contiguous technology market (i.e. selling similar products); the MNC may have subsidiaries scattered across the globe. Such an organization may be termed a "technoscape". In a technoscape situation, the firm would be better suited to centralize many of its upstream activities to achieve better economies of scope. For example, Ford Corporation has centralized all its R&D facilities into four global centers, from where all its cars are designed. However, it has decentralized its downstream activities such as marketing, sales and distribution.

The third situation involves a corporation that operates in a geographically limited (contiguous) zone but sells a whole range of products. Such corporations may be referred to as "supermarkets", for different technologies of the SBUs may be seen as products in a store, all awaiting perhaps the same consumer's attention. The supermarket types of MNCs are predominantly seen in the Asia-Pacific region, and sell a whole range of diverse products. Such corporations would be best served by control systems that emphasize *downstream* control. They need to explore common sales outlets, distribution channels and service contracts, and decentralize their upstream activities.

Finally, corporations that are characterized by disparity in both geographical and technological markets may be termed "conglomerates". For conglomerates the best strategy would be one where each SBU can be treated as a local innovator and subjected only to financial control. The advantage of the conglomerate is that by exercising cash-flow based controls, the headquarters can create "internal stock markets' and improve internal allocation efficiency within the organization. Based on these considerations, we advance the following propositions:

P7 *MNCs whose subsidiaries are geographically and technologically contiguous are more likely to benefit from control systems that stress high inter-SBU interaction and common management goals.*

P8 *MNCs whose subsidiaries are geographically disparate but technologically contiguous are more likely to benefit from control systems that emphasize centralized upstream activities.*

P9 *MNCs whose subsidiaries are geographically contiguous but technologically disparate are more likely to benefit from control systems that emphasize centralized downstream activities.*

P10 *MNCs characterized by disparities in technological as well as geographical markets are most likely to benefit from control systems such as cash flow based controls and conglomerate-oriented approaches.*

CONCLUSION

Be it Apple through its innovative relationships with Chinese manufacturers or Wal-Mart through its globally mobile logistics, MNCs have made structural innovations in the recent past that need to be addressed by theorists who seek to remain current in their formulations. In this paper, we have identified the fundamental control issue facing the MNC as a paradox: it has to *hold on* and *let go* at the same time. The issue is, when should it hold on (centralize its control systems) and when should it let go (treat each sub-unit as an autonomous company)?

We addressed this issue first by examining several contingencies faced by the MNC, which in turn suggested a variety of different control arrangements. For example, when the SBUs (subsidiaries) of an MNC are interdependent, control systems need to be centralized, to foster the maximization of overall corporate performance. When the SBUs operate relatively independently, control systems need to be decentralized. Similarly, at the level of incentive and reward systems, we argued that when a subsidiary is engaged in tasks that are not clearly observable by the headquarters, it would be better for the headquarters to reward the subsidiary on the basis of outcomes. However, when the subsidiary is clearly visible to the headquarters, and when its actions have potential implications for other subsidiaries, behavior-based reward systems would be more suitable. We also suggested that the headquarters of a corporation should mediate in transfer pricing issues between subsidiaries only when the transaction between subsidiaries has a longer time horizon. For once-off transactions, it would be best to let the subsidiaries treat it as a market transaction. Finally, we suggested that the control systems devised by an MNC should be a function of whether or not the subsidiaries are geographically and technologically contiguous.

Such control systems are already being implemented across MNCs. Many successful MNCs have begun to move from geocentric control systems towards a more transnational and multidomestic federated structures, which involves greater autonomy within the subsidiaries. In addition, they are also moving from a two- tier control (headquarter-subsidiary) to a more regional system where there is a three-tier hierarchy (corporate headquarter-regional headquarters-subsidiary). It is up to academic researchers to continue to explore these responses, identify contingency factors, empirically examine critical relationships and provide guidelines for adopting different control structures and strategies that resolve the paradoxes.

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INTERNATIONAL BUSINESS CHALLENGE: DOES ADDING SOUTH AFRICA FINALLY MAKE THE BRIC COUNTRIES RELEVANT?

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ABSTRACT

Since 2001 when Jim O'Neill coined the acronym BRIC (Brazil, Russia, India, China) countries and his firm Goldman Sachs put forth a report that argued that based on their economic potential they could become the world's most dominant economies by 2050 they have searched for their place on the world geopolitical scene. Over the past 10 years a great deal has been written about them, their economic potential, and their continuing lack of relevancy in the world for various reasons. In what some call a move to fill a major gap in the group South Africa has now joined the group to form the BRICS. The paper will look at whether or not this addition finally makes the BRICS relevant and more capable of living up to the potential that Goldman Sachs projected in 2001.

DO THE OLYMPICS CREATE SUSTAINED INCREASES IN INTERNATIONAL TOURISM?

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ABSTRACT

The purpose of this study is to examine international tourism as a legacy of the hosting the Olympics. Sustained tourism after the Olympics is hypothesized to be a result of the massive media coverage of the event and the host city. The media exposure is thought to create a positive image of the host city and generate international tourism. The largest media market for the Olympics is the US. In this study air passenger traffic from the US to eight Olympic host cities is analyzed pre and post event. Time series models are used to forecast the trend in US air passengers to each city. Tests for increases in passenger volume during and post Olympics are performed. The results show no sustained increase in international tourism from the US to the host city in the post Olympic period.

AN EMPIRICAL TEST OF PURCHASING POWER PARITY: DOES IT HOLD BETWEEN U.S.A. AND EMERGING ASIAN COUNTRIES

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ABSTRACT

The empirical test shows that Purchasing Power Parity (PPP) does not hold between U.S.A. and emerging Asian countries. Therefore, PPP cannot be used to forecast real exchange rates between U.S.A. and emerging Asian countries.

INTRODUCTION

There are two established theories of exchange rate determination. One is interest rate parity and the other is purchasing power parity (PPP). This paper deals with an empirical test of purchasing power parity. Purchasing power parity states that exchange rates of two currencies will adjust based upon the movement of the consumer price index of the two respective countries. This paper does an empirical test of purchasing power parity between the U.S.A. and some emerging Asian economies which includes India, Korea, Malaysia, Pakistan, Thailand, the Philippines and Singapore. The CPI for each country for the year 2000 was equal to 100 and the CPI for 2007 was chosen to determine if purchasing power parity holds or not. Usually a base year is chosen where the CPI=100 and a future year is chosen and the actual CPI for that year is used to forecast the exchange rate. If the forecasted exchange rate is equal to the actual exchange rate, then we will conclude that purchasing power parity holds between the two countries.

PURPOSE AND METHODOLOGY

There is an abundance of research on purchasing power parity, but very few deal with an empirical test. This study does an empirical test of PPP between the U.S.A. and emerging Asian economies. The countries included are India, Korea, Malaysia, Pakistan, Thailand, the Philippines and Singapore.

HYPOTHESES

H1 Null hypothesis: PPP holds between the U.S.A. and emerging Asian economies.

H2 Alternative hypothesis: PPP does not hold between the U.S.A. and emerging Asian economies. The CPI for 2000 = 100 and the CPI for 2007 was chosen to forecast the exchange rate based on PPP.

Table 1		
	2000 CPI	2007 CPI
India	**100**	**136.8**
Korea	**100**	**123.5**
Malaysia	**100**	**136.3**
Pakistan	**100**	**158.7**
Thailand	**100**	**119.7**
Philippines	**100**	**142.0**
Singapore	**100**	**106.5**
U.S.A.	**100**	**120.4**

Table 2		
	Actual Exchange Rate	Forecasted Exchange Rate Based on PPP
India	**43.349**	**46.09**
Korea	**112.9**	**134.33**
Malaysia	**3.4376**	**4.30**
Pakistan	**60.739**	**70.71**
Thailand	**34.518**	**39.88**

The difference of actual exchange rate and the projected exchange rate were taken and a t-test was done to test the hypothesis.

LITERATURE REVIEW

It is determined that non-stationary real exchange rate in the long run between nominal exchange rate and domestic and foreign prices is almost non-existent, and therefore it is concluded that the theory of Purchasing Power Parity is invalid (Su & Chang, 2011). Therefore, it is concluded that exchange rate cannot be predicted using PPP. PPP states that if the price of a basket of goods is the same in two countries then the exchange rate must be at equilibrium. Given any international goods market arbitrage is traded away, then we must expect exchange rate to be at equilibrium. Given any international goods market arbitrage is traded away, then we must expect exchange rate to be at equilibrium. It is true that empirical evidence on the stationarity of real exchange rates is present, but it remains inconclusive.

Numerous studies have found support for a unit root in real exchange rates but critics contended that such a conclusion is probably attributed to the lower power of the conventional unit root test employed. This is because a growing consensus that conventional unit root tests fail to incorporate structural breaks in the model (Lin & Chang, 2010). Lin and Chang employed a stationarity test with a fourier function which has been recently introduced by Beeker (Beeker, et al, 2006). In their study the empirical results of nine post communist economies in Europe, Lin and Chang concluded that PPP does not hold in those nine post-communist transition economies.

There is an abundance of empirical evidence on the stationarity of the real exchange rates; however, there are none conclusive. The reason for that may be explained as because most of the prior studies implicitly assumed that exchange rate behavior is inherently linear in nature. Taylor and Peel (Taylor & Peel, 2000) have proven that the adoption of linear stationarity test is inappropriate for the detection of mean reversion given that the true process of the data generation of the exchange rate is in fact a stationary non-linear process (Taylor & Peel, 2000).

Lee and Zhu used monthly data covering from 1997 to 2009 in order to apply stationary test with a fourier function which has been proposed by Enders and Lee (Enders & Lee, 2004, 2009) which tests the validity of PPP, covering seven major OPEC countries. Lee and Zhu applied nonlinear threshold unit root test in order to assess non-stationary properties of the real exchange rates for seven major OPEC countries. The test has higher power than linear method if the true DGP of exchange rate is really in fact a stationary nonlinear process. The major implication of the study is the validity of PPP from the nonlinear point of view and concluded in the long run PPP exchange rate adjustment is mean reverting towards PPP equilibrium values in a nonlinear way (Liu & Zhu, 2011).

In the recent past many studies have focused on testing the validity of long run PPP. These studies have unveiled important policy implications in international finance. Long run PPP is an indication of a long run relationship between the nominal exchange rate and the domestic and foreign prices of a certain economy. When PPP holds, it can be used to determine the equilibrium exchange rate. Therefore monetary approach requires that PPP must hold. Although many empirical tests have taken place, none of the results are conclusive. The empirical test undertaken by Lu and Pan employed the monthly bilateral nominal exchange rate relative to the U.S. dollar and CPI based on 2000=100 among G-7 countries over the period January 1980 to January 2009.

The study applied the non-parametric rank test of countegration as proposed by Breitung (Breitung, 2001) in order to test the validity of long run PPP for G-7 countries. They concluded that PPP holds true for all G-7 countries. They also concluded that the nominal exchange rate and the domestic and U.S. CPIs are nonlinearly inter-related with the exception of France and Germany (Lee & Pan, 2011).

The majority of the empirical tests of PPP generally conclude that real exchange rates tend to converge towards the levels predicted by PPP over the long run (Taylor & Taylor, 2004.) The Panel based unit coot test that maintains the null of the unit root in all Panel members is not capable of detecting precisely the stationarity of individual real exchange rates. In an article by Baharunshah and Beko, they tackle this issue by using Panel seemingly unrelated regressions Augmented Dicky-Fuller (SURADF) approach (Baharunshah & Beko, 2011). This is the first study that uses SURADF to study the PPP for the real exchange rates of twelve Central and Eastern European economies with respect to the U.S. dollar and the Euro.

The results reported from the SURADF estimates show that the PPP proposition holds for half of the countries in this analyzed panel with respect to the U.S. dollar and the Euro. They conclude that the concept of PPP is corroborated for some but not for all Central and Eastern

European economies. Secondly, the judgment on the validity of parity conditions for individual countries is contingent upon the choice of the numeraire currency (Baharunshah & Beko, 2011).

Several studies have provided empirical evidence on the nonlinear adjustment of exchange rate. This is because of the presence of transaction costs that inhabit international goods arbitrage and also official intervention in the foreign exchange market which may lead to nominal exchange rate movements are asymmetric (Taylor & Peel, 2000; Taylor, 2004). Killian and Taylor (Killian & Taylor, 2003) suggest that nonlinearity may also arise from heterogenecity of opinion in the foreign exchange market pertaining to the equilibrium level of the nominal exchange rate when the nominal exchange rate takes on more extreme values, a degree of consensus develops regarding the appropriate direction of exchange rate moves, and as such trades act accordingly.

Chang, Chang and Su in their empirical study determine whether PPP holds for Germany's real exchange rate relative to a sample of its major trading partner countries and find that the adjustment process towards its equilibrium is nonlinear in a symmetric or asymmetric way, using a simple and powerful nonlinear unit root test. Their study applies a simple and powerful nonlinear unit root test proposed by Sollis in order to test the validity of long run PPP for Germany's real exchange rate vis a vis its five trading partner countries. They conclude that PPP holds for Germany relative to its major trading partners with the exception of Canada and that the adjustment towards PPP is nonlinear and asymmetric (Chang, Chang & Su, 2011).

Chang in his study indicates that a non-stationary real exchange rate is an indication that any long run relationship between the nominal exchange rate and domestic and foreign prices is almost non-existent, suggesting that PPP is not valid. Therefore PPP cannot be used to determine the equilibrium exchange rate. The invalidation of the PPP nullifies its use for monetary approach to determining the exchange rate (Chang, 2011). This study concludes that AESTAR unit root test proposed by Sollis to examine both linearity and stationarity of China's real exchange rate vis a vis her nine trading partner countries over the period January 1980 to October 2009. First, the empirical results uncover that China's real exchange is a nonlinear process. Secondly a unit root in real exchange rate was not found for most of China's trading partner countries (Chang, 2011).

PPP states that exchange rate between currencies are in equilibrium when their purchasing power is the same in each of the two countries. This implies that exchange rate between any two countries should equal the ratio of two currencies price level of a fixed basket of goods and services. A nonstationary real exchange rate indicates that there is no long run relationship between nominal exchange rate and domestic and foreign prices, thereby making PPP invalid. Therefore, PPP cannot be used to determine the equilibrium exchange rate. Lu and Lee applied the ADL test for threshold cointegration to test the validity of long run PPP for a sample of transition countries over January 1995 to December 2008. The empirical results indicate that PPP only holds true for five of the countries undertaken in this study (Lu & Lee, 2011).

Su and Lee in an article indicate that there is a consensus that real exchange rate exhibits nonlinearities and therefore conventional unit root test, such as Augmented Dickey-Fuller (ADF) test, have low power in identifying mean reversion of exchange rate. There is an abundance of empirical evidence on the nonlinear adjustment of exchange rate. This does not imply nonlinear mean reversion. To analyze time series data the exponential smooth transition autoregressive (ESTAR) time series model has proven to be popular. Lu and Lee applied the nonlinear KSS test with a fourier function (capturing the smooth breaks) to test the validity of long run PPP for the G-7 countries over June 1994 to April 2010. They found that PPP holds for all the G-7 countries. This implies that PPP can be used to determine the equilibrium exchange rate for all the G-7 countries (Lu & Lee, 2011).

Little consensus exists on the validity of PPP in the literature because the results are contingent upon several factors, such as the econometric methodologies used, the assumption on the market structure, the length of data span, numeraire currencies and the coverage of fixed exchange rate periods. For example, Augmented Dickey-Fuller (ADF) unit root test rejects the PPP hypothesis, whereas the Panel unit root test supports the PPP hypothesis (Choi & Kim, 2011).

Choi and Kim conclude that PPP has a special meaning to Southeast Asian countries because the validity of PPP can be employed as a very useful tool to select the optimal common currency for the currency union among Southeast Asian countries. The validity of the PPP of Southeast Asian currencies in terms of U.S. dollar and Japanese yen gave mixed results (Choi & Kim, 2011).

In a market based economic management, the market forces are allowed to prevail based on the principle that most economic variables are self adjusting and outcomes are not influenced by government economic intervention. Most nations have adopted a freely floating exchange rate system that relies upon market mechanism to adjust the value of the currencies. Pinfold and Rose in their study established how freely floating currencies adjust to long term deviations from the values which are predicted by PPP. The deviations and corrections for the 28 possible currency pairings of eight currencies have been analyzed using OLS degressions of monthly data. The results of their study show that PPP has a significant influence in determining exchange rates (Pinfold & Rose, 2010).

Chang and Lee in their study indicate that nonstationary real exchange rate signals that there is no long run relationship between nominal exchange rate and domestic and foreign prices, thereby nullifying the PPP. Therefore, PPP cannot be used to determine the equilibrium exchange rate. Therefore PPP is invalid to be used for monetary approach to determine exchange rate. Empirical evidence of stationarity of real exchange rate are present, but inconclusive.

The empirical results applies the TAR unit root test proposed by Caner and Hansen to test the validity of long-run PPP for mainland China and Taiwan over the period of January 1986 to October 2009. The empirical results indicate that PPP holds true for the two areas studied, and the adjustment toward PPP is nonlinear (Chang & Lee, 2011).

Chang and Su in their empirical study of the Middle Eastern countries using monthly data over January 1980 to August 2008 period using the AESTAR unit root test found that PPP holds true for most of the Middle Eastern countries and that the adjustment towards PPP is nonlinear and in an asymmetric way. This implies that PPP can be used to determine the equilibrium exchange rate for most of the seven Middle Eastern countries under study except Bahrain (Chang & Su, 2011).

There is a growing consensus that real exchange rate exhibits nonlinearities and therefore conventional unit root test such as the ADF test have low power in detecting the mean reversion of exchange rate. Although a number of empirical studies found evidence of nonlinear adjustment of exchange rate this does not necessarily imply mean reversion.

Chang and Liu in their study applied a simple and powerful nonlinear TAR unit root test to test the validity of long-run PPP in a sample of nine East Asian countries over the period January 1986 to October 2009. The results show that PPP holds true for more than half of the East Asian countries studied. They also conclude that adjustment towards PPP is nonlinear (Chang & Liu, 2011).

In a study Doganter (Doganter, et al, 2009) applied cointegration techniques to test the validity of PPP for ten emerging market economies and found that nominal exchange rate and price series are cointegrated only in the cases of Mexico and Peru consistent with the PPP. In their study Guney and Hasanov extended the works of Doganger (Doganter, et al, 2009) and Chang (Chang, et al, 2010) by applying recently developed nonlinear unit root test. Their findings suggest allowing for nonlinearities and structural breaks results in more rejection the null hypothesis unit root which is consistent with PPP proposition (Guney & Hasanov, 2011).

Goluglu and Okat in a study tested the validity of the quasi PPP hypothesis. They used a long span of data, eighteen exchange rate series and a panel unit root test that allows for structural breaks and cross section dependence. Their result supported the validity of PPP (Goluglu & Okat, 2011).

RESULTS

The t-test gives a P-value of .032726 which is relatively low. Therefore, we reject the null hypothesis and accept the alternative.

CONCLUSION

Because of the relatively low P-value we conclude that there is a significant difference between the actual real exchange rates and the real exchange rate projected by PPP. We therefore conclude that Purchasing Power Parity does not hold between U.S.A. and emerging Asian economies. These countries are India, Korea, Malaysia, Pakistan, Thailand, Philippines and Singapore.

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MICROFINANCE IN EMERGING MARKETS: SUCCESSES, FAILURES AND FUTURE DIRECTIONS

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ABSTRACT

Microfinance was initially seen as a powerful tool to lift individuals and families out of a lifetime of poverty in developing countries. Muhammad Yunus, through the Grameen Bank in Bangladesh, was one of the first to actively encourage microfinance to poor women so that they could start their own businesses. Due to his success in lifting families out of poverty, he was awarded the Nobel Peace Prize. Large multinational corporations, such as Unilever, also successfully employed microfinance to women to create distribution channels in previously inaccessible markets.

Attracted by very low default rates and, what appeared to be, high interest rates, a number of financial organizations subsequently entered the microfinance market. The primary motive of these new entrants was economic, not social. While interest rates, even from respected lenders such as the Grameen Bank, are high due to the high costs of servicing large numbers of small loans, many new entrants charged even higher rates to desperate customers looking for a pathway out of poverty. Many of these new market entrants were, justifiably, accused of usury. Also, they did not understand the nature of microfinance and the support necessary for successful repayment of the loans. The result has been a surge in microloan defaults. This has had a devastating effect on the communities that microfinance was designed to help and has perpetuated the indebtedness that microfinance was designed to end. In India there have been a large number of suicides tied to microloans. Due to the much higher than anticipated default rates, a number of lending institutions in India are on the verge of collapse. Oxfam in India has moved away entirely from microfinance in favor of other forms of economic development.

This paper will look at microfinance in emerging markets, the reasons for both its success and failures, and suggest future directions for the effective use of microfinance in the economic development of these markets.

FOREIGN DIRECT INVESTMENT AND GROWTH: THEORY, EVIDENCE AND LESSONS FOR EGYPT

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ABSTRACT

This paper revisits the relationship between FDI and Economic growth. It reviews recent theoretical and empirical findings on the nature of this relationship and on the determinants of FDI flows to developing nations. It also reviews the current and difficult Egyptian FDI situation in light of the Egyptian revolution that took place on the 25th of January 2011. Findings reassert the fact that FDI enhances growth, and that market size, openness, human capital, infrastructure, exchange rate, efficient financial sectors, government debt, growth rates, good governance, institutional quality, democracy and political stability are main determinants in attracting FDI. In addition, the Egyptian economy is found to be in a serious deteriorating situation with negative FDI flows mainly due to the political situation, however, even if stability is achieved, the rising public debt, falling reserves and halt of economic reforms and openness can limit further FDI inflows.

AN EXAMINATION OF INVENTORY COSTING CONVERGENCE UNDER GENERALLY ACCEPTED ACCOUNTING PRINCIPLES AND INTERNATIONAL FINANCIAL REPORTING STANDARDS

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ABSTRACT

Accounting principles in the United States are converging toward international standards. If convergence continues, and there are proponents and detractors, then the U.S. system of accounting, called Generally Accepted Accounting Principles (GAAP), will eventually be replaced by International Financial Reporting Standards (IFRS). Convergence has profound implications for publicly traded companies and their many stakeholders such as investors, lenders, government agencies, and employees. A key issue facing accounting standard-setters is the treatment of inventory costing, an area in which GAAP and IFRS differ. This study addresses three research questions: What is the past and current usage of different inventory costing methods?, How important is inventory on corporate financial reports?, and What will be the impact on corporate financial reporting, specifically regarding inventory costing, if IFRS replaces GAAP? Findings show that a change from GAAP to IFRS will have a major impact on inventory costing and, as a result, on corporate financial reporting overall.

ENVIRONMENTAL INNOVATION AMONG SMALL BUSINESSES IN GERMANY

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ABSTRACT

Environmental innovation can be instrumental to business growth (Dangelico & Pujari, 2010). In addition to the "feel good" rewards that come from creating environmentally sustainable products, the financial rewards that "going green" can provide also contribute to a successful business strategy (Gibbs, 2009; Harvey, 1996; Millard, 2011; Revell & Blackburn, 2007; Schick et al., 2002; Tilley, 1999; von Weltzien Høivik, & Shankar, 2010). Small businesses, which often face challenges in competing with larger businesses, may find environmental innovation to be an effective and sustainable way to provide consumers with products they value. This study examines environmental innovation among SMEs through analysis of data from Eurostat (2011) regarding nine types of environmental innovations. Over 70 000 small businesses in Germany participated in a study regarding their efforts in environmental innovation. The results show that the two most commonly cited types of environmental innovation were reduced energy use by the company and reduced energy use as a benefit for the end-user.

INTRODUCTION

Green technologies can have a double benefit for business—the "feel good" rewards that come from creating environmentally sustainable products and the practical financial benefits that can contribute to improved competitiveness and overall business success (Day & Schoemaker, 2011; Gibbs, 2009; Harvey, 1996; Isaak, 2002; Millard, 2011; Revell & Blackburn, 2007; Schick, Marxen & Freimann, 2002; Tilley, 1999; von Weltzien Høivik & Shankar, 2010). As stated by Volery (2002, p. 110), "Never before has there been such an opportunity and need for innovation that meets the needs of consumers without damaging the planet's natural resource base." This is an important issue to all of Earth's inhabitants who wish to breath clean air, drink clean water and live in a sustainable way that will benefit future generations.

IT'S NOT ALWAYS EASY BEING GREEN

"Green" is one of the most important adjectives of the 21st century. Walley and Taylor (2002, p. 36) describe the term 'greening' as meaning "moving towards environmental or ecological sustainability." This can refer to a business that has made efforts to become more environmentally friendly, or a business that is started as a green company. Green technologies, which can pertain to products and/or processes, are used to protect the natural environment by minimizing waste, pollution, and carbon emissions (Day & Schoemaker, 2011; Lober, 1998; Zee, Fok & Hartman, 2011). Reduced energy use, alternative energy sources and products that allow consumers to reduce their own carbon footprints also fall under the green umbrella.

Many SMEs are reluctant to engage in eco-efficiency. One reason for this may be that ”green” is often equated with “expensive.” There are, however, cost benefits that can be reaped from environmental improvements (Gibbs, 2009; Harvey, 1996; Isaak, 2002; Millard, 2011; Revell & Blackburn, 2007; Schick et al.2002; Tilley, 1999; von Weltzien Høivik & Shankar, 2010). On the other hand, gains may be more difficult for SMEs to realize given their smaller size and scale (Millard, 2011). In a study of businesses with more than 500 employees (large) or fewer than 50 (small), Zee and associates (2011) found that the large businesses were more likely to produce green products and services.

Many believe that “green-green” firms--start-up businesses that are founded with the goal of being environmentally friendly as well as profitable, are more likely to develop a corporate culture that truly supports green initiatives than companies that attempt to overlay environmental awareness onto an established culture (Anderson & Leal, 1997; Schick et al., 2001). Small businesses in the study by Zee and associates (2011) were more likely to believe that going green was important. This belief in the green movement was also seen in a study of “ecopreneurs”—entrepreneurs or intrapreneurs who included environmental progress in their core values (Cato, Arthur, Keenoy & Smith, 2008; Linnanen, 2002; Schaltegger, 2002; Schaper, 2002). Among ecopreneurs studied by Cato and associates (2008), independence from the National Grid (electric) and sustainability were more important motivators than financial achievement. Similarly, Kirkwood and Walton (2010) found that green values were a common motivator for ecopreneurs, but monetary motives were also mentioned by some participants. Entrepreneurs starting their own firms can instill their own personal values into their businesses (Tilley & Young, 2009; von Weltzien Høivik & Shankar, 2010). Large businesses, especially publicly traded ones, are less likely to be able to pursue ideals over profits (von Weltzien Høivik & Shankar, 2010).

Networks that provide additional knowledge and resources to SMEs with limited internal resources can be very important to environmental innovation (Petts, 2000; Ramus, 2002; Tomer, 1999). In his study of pharmacies in Western Australia, Schaper (2002) concluded that time and environmental information were the two most significant variables showing a relationship with environmental performance. According to Day & Schoemaker (2011, p. 39), “Considering the scale, scope and complexity of most green technology markets, experience shows that collaboration can be key to capturing the market opportunity.” However, small businesses have been found to be less likely than larger firms to collaborate with partners for innovation purposes (Robinson & Stubberud 2011a; 2011b). This can put small businesses at a disadvantage given that networks can help “keep an eye on the periphery of the market, detecting early signs of potential problems or opportunities before their competitors recognize them” (Day & Schoemaker, 2011, p. 43).

SMEs face challenges in competing with larger businesses, but may find that green innovations can be an effective way to provide consumers with products they value. This study further explores the greening of businesses by examining the types of green products and processes engaged in or offered by small businesses in Germany. The following section presents the methodology and results of the study and analysis of the data.

METHODOLOGY, RESULTS AND ANALYSIS

Data regarding nine types of environmental innovations were obtained from Eurostat’s (2011) Community Innovation Survey, which covered innovation activities carried out between

2006 and 2008. The businesses included in this study were (on-going) or had been (abandoned project) involved in some type of innovation activity, whether it was marketing, organizational, product or process innovation. A total of 73,694 small businesses in Germany participated in this study. The number of businesses and relative percentage of businesses (out of all participating small businesses) reporting engagement in each of the nine listed types of environmental innovation are shown in Table 1.

Table 1
INNOVATIONS WITH ENVIRONMENAL BENEFITS: GERMANY

Type	10-49 employees (%)
Reduced energy use per unit of output	31 576 (42.8%)
End-user benefits: reduced energy use	30 498 (41.4%)
Reduced soil, water, noise or air pollution	28 702 (38.9%)
Recycled water or materials	28 609 (38.8%)
Reduced CO2 footprint by your enterprise	26 838 (36.4%)
Reduced material use per unit of output	26 064 (35.4%)
End-user benefits: reduced air, water, soil or noise pollution	24 547 (33.3%)
End-user benefits: improved recycling of product after use	22 209 (30.1%)
Replaced materials with less polluting or less hazardous substitutes	17 162 (23.3%)

Environmental innovations that provide practical benefits, namely energy savings, were the most common type cited, with 42.8% of all small businesses in this study reporting this innovation. This is logical given that reduced energy use per unit of output would lead to cost savings for the firm, and reduced energy use for the consumer would provide a selling point in marketing the product. It is also consistent with previous research showing that eco-friendly products are a popular way for small businesses to differentiate themselves from competitors (Isaak, 2002; Morsing & Perrini, 2009; Schick et al., 2001; von Weltzien Høivik & Shankar, 2010). A lower percentage of small businesses (35.4%) were involved in innovation that reduced material use per unit of output, although this still represented more than a third of small businesses in the study. Reduced materials and energy both could easily contribute to the bottom line through decreased costs.

Almost 39% of small businesses were involved with the reduction of pollution, which could lead to decreased disposal costs (Lober, 1998). The same could be said of recycled water or materials, which was reported by 38.8%. Recycled materials may be cheaper to purchase, while simultaneously providing a benefit to consumers who value green products. A considerably lower proportion of small businesses reported innovations regarding end-used benefits for reduced air, water, soil or noise pollution (33.3%) and improved recycling of product after use (30.1%). The least popular innovation (23.3%) involved replacing materials with less polluting or less hazardous substitutes. These changes are perhaps less easily marketed or less valued by end consumers and therefore do not lead to marketing advantages. Such changes are also like to increase, rather than decrease, costs.

CONCLUSIONS

Small business owners may be more likely to be ecopreneurs, given the control entrepreneurs have over their businesses and the values with which they can guide their firms (Anderson & Leal, 1997; Jenkins, 2009; Schick et al., 2001; von Høivik & Shankar, 2010). Even the least popular innovation included in this study was cited by almost one-quarter of respondents, suggesting environmental innovation and the green concept has at least somewhat of a foot hold among small businesses that are involved in innovation.

While this study did not examine the specific reasons for the innovations that were selected, policy-makers wishing to promote the greening of modern society might find such information about why and how companies go green and the incentive and motives that guide their actions to be useful (Walley & Taylor, 2002). Isaak (2002, p. 89) suggests that that "stimulation of networking for the sake of sustainability" is an area in which people and organizations wishing to promote environmental innovation could contribute to green practices. Ideas and techniques could be shared and spread, leading to enhanced absorptive capacity. Future research should continue to examine these issues in order to promote green and sustainable activities.

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SMALL BUSINESS OR ENTREPRENEUR?: NEW ZEALAND BUSINESS

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ABSTRACT

The purpose of this paper is to discuss the current trends in internationalization among small businesses. The purpose is to discover how different small enterprises begin to become internationalized. We would also like to discover whether or not "going global" as a small business is easier if the business is originally located in the United States or elsewhere. We have discovered that networking in an important source necessary for small enterprises to expand in developing countries. We also researched the importance of the virtual world in relation to the globalization of small businesses. Using the model of Carland et al (1984) we examine the business markets in New Zealand and argue that the GEM studies are wrong with respect to New Zealand – that the country has many individuals involved in small businesses but that they are not very entrepreneurial.

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DIMENSIONS OF ECONOMIC ADVANCEMENT

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ABSTRACT

Despite high levels of international aid, many countries have failed to develop ample economic growth. An extensive body of literature has recognized that entrepreneurship, innovation, entrepreneurial culture, an effective governmental structure, and education are necessary to economically advance a nation. Since a deficiency in one area hampers the growth of the economy, we propose that these dimensions must act together in order to stimulate substantial economic advancement.

THEORETICAL PERSPECTIVES

Entrepreneurship

Entrepreneurship is the exploitation of an opportunity without regard for resources. It is the channel through which economic growth occurs (Anokhin, Grichnik, & Hisrich, 2008; Acs, Desai & Hessels, 2008), and there is abundant evidence that positively links entrepreneurship to economic growth. Because entrepreneurs create new ideas and markets they are often viewed as catalysts of economic growth (Minniti, 1999; Holcombe, 1998). Several research studies have shown that entrepreneurship contributes to economic growth; ~~but~~ however most of the studies have focused on already developed economies. Notable contributors, such as Acs, Audretsch, Baumol, Schumpeter and Thurik, have been cited in these entrepreneurship research studies; yet, not a single reference from the development economics literature was cited (Naudé, 2009) necessitating more inquiry on the impact of entrepreneurship in developing countries (Shane, 1997).

Interest in microlending activities has recently been stimulated since such institutions are now perceived to present unique opportunities for renewing economic growth in poor countries (Rahman, 2004, p. 27). This paper purports that the munificence of microloans for small business start-ups cannot bring about real economic advancement unless those start-ups are innovative. Without innovation, entrepreneurship cannot uplift a country from its economic woes and drive the structural transformation of an economy. Only innovative enterprises can, for example, transform a rural/agricultural-based sector into an urban/manufacturing-based and high-growth entrepreneurship sector, even in some of the least-developed countries of Sub-Saharan Africa (Naudé, 2009).

Innovation

Innovation is defined as the process of intentionally creating and introducing new or improved offerings to the marketplace. Innovation need not be technological; it can also be venture model, as long as a product, service, or process that holds some market value is created. It is the job of every entrepreneur to innovate. Unfortunately, in most poor communities, many entrepreneurs do not innovate; they simply start a business and compete against existing businesses without any differentiation. In other words, they simply introduce an existing product or service in an established market. This is mainly because people in those communities are poor and are primarily concerned with satisfying their very basic needs (e.g. food and water); therefore, "stopping" to innovate is a luxury. However, innovation is not only good for the innovator. It was reported that innovation developed within local inter-firm networks supports existing firms and presents opportunities for starting new businesses in the region (Malecki, 2004). In fact, the performance of economies is related to how well the potential from innovation is expressed within the economy; therefore, policies that encourage innovation should be tailored to the specific needs of the locale (Storey, 2003; Jacobides, Knudsen, & Augier, 2006; Langley, Pals, & Ortt, 2005). In Korea, for example, a comprehensive strategy in the information and communications technology lifted the economy from a financial crisis – a GDP growth increase by over a factor of 10, from 4.5% in 1990 to 50.5% in 2000 (Hanna, 2003). This highlights the potential impact of innovation in an economy and supports the argument that if advancement is a matter of self transformation, then a national innovation capacity (NIC) must play a central role in the process (Metcalfe & Ramlogan, 2008).

Countries must have the capacity to innovate, to begin with, in order to launch new offerings in the marketplace. NIC, or a country's economic and political potential to produce commercially viable innovations, is a function of a country's technological sophistication, high quality human capital, and policies and investments by both government and the private sector. According to Stern Porter, & Furman, innovative capacity is acquired through education. For example, in the U.S., most innovations emanate from universities; in Germany, it is mainly from technical or vocational schools. But, it is clear that an underpinning strategy for acquiring the capacity to innovate is through various types of formal training (Stern et al, 2002).

Education

The modern theory of economic growth maintains at its core that growth of per capita income is a function of investment in human resources to accumulate human capital, which is the stock of skills and talents that manifests itself in the educated and skilled workforce in a region (Grossman & Helpman, 1993). An educated and skilled workforce is required to perform research and development (R&D) activities, which is positively related to growth (Griliches & Lichtenberg, 1984; Lichtenberg & Siegal, 1991). The role of education in driving economic growth and the prominent role of universities in a national innovation system (NIS) has also been recognized by other scholars (Niosi, Saviotti, Bellon, & Crow, 1993). According to Niosi et al:

the NIS is a "system of interacting private and public firms (either large or small), universities and government agencies, aiming at the production of science and technology within national borders. Interaction among those units may be technical, commercial, legal, social and financial, in as much as the goal of the interaction is the development, protection, financing or regulation of new science and technology" (1993, p. 212).

National innovation systems are observed in developed countries. In poor countries, most citizen participation processes include only a few constituents due to socioeconomic, linguistic, or educational class barriers (Richards & Dalbey, 2006,); therefore, one way to ensure a successful long-term strategy for economic advancement is for a country to develop their human capital through education in order to stimulate growth and development (Mathur, 2000). Improved education systems are critical to stimulate economic development. Cross cultural research indicates that improving educational levels among citizens stimulates economic growth (Psacharopoulos, 2006). The lower a country's per capita GDP, the higher both the economic and social returns on investment in education (Psacharopoulos, 2006).Therefore, the nature and effectiveness of the education people receive will affect their personal development as well as their contribution to society. The coincidence of recent substantial growth of the economies of India and China with improvements in their educational markers illustrates the importance of education on economic growth. In 1990 only 77.8% of people over the age of 15 were literate in China (UNESCO Institute for Statistics, 2009a). This rate had increased to 94% by 2009 (UNESCO Institute for Statistics, 2009a). Concurrently, the Chinese GDP had a six fold increase from 525.69 billion US dollars in 1990 to 3,476.47 billion dollars by 2009 (World Trade Organization, 2012). Similarly, in India the adult literacy rates rose from 48.2% in 1990 to 62.8% in 2009 (UNESCO Institute for Statistics, 2009b). Simultaneously India's GDP rate rose from 345.7 billion in 1990 to 1,131.6 billion US dollars by 2009 (World Trade Organization, 2012). These results support the notion that poor countries need to creating effective and extensive educational systems in order to achieve substantial economic development. While education alone cannot drive economic growth, without an educated populace is critical if countries are to cultivate a workforce capable of innovating in order to exploit opportunities within the economy to create economic growth.

Entrepreneurial Culture

Culture is a set of shared attitudes, values, goals, and practices that characterizes a group of people. So, a culture of entrepreneurship is a culture in which entrepreneurship is embraced by most, if not all, of the members or units within a group. Based on the definition, values pertaining to entrepreneurship must be shared by members of the community or by the people at different levels of an organization's hierarchy because a culture of entrepreneurship is needed to catalyze innovation and entrepreneurial activities. The influence of entrepreneurial culture (EC) on entrepreneurship has not been sufficiently addressed in literature. EC can be observed at national, regional, and organizational levels. A culture of entrepreneurship has been shown to positively impact performance at the organization level. For example, organizational culture has been linked to the development of flexible manufacturing (Gupta & Cawthon, 1996). The U.S.

has an EC, which provides protection of ideas through patenting and, through bankruptcy law, permission to fail with limited penalty and to try again until success is achieved (Merrifield, 1987). This EC is thought to have led to a U.S. national economy driven by innovation, and in particular, "innovation districts" not seen anywhere else in the world.

Factors that contribute to shaping a national culture of entrepreneurship is beyond the scope of this paper; however, it is worth noting that technological opportunities are most likely to be exploited by those countries that have created a conducive environment for the development and commercializing innovation (Stern et all 2000). Further, Mathur noted that "the prime determinants of entrepreneurial behavior at any time and place are the prevailing "rules of the game" that govern the payoffs for one entrepreneurial activity relative to another" (Mathur, 2000). Policy choices and the legal environment that make up the "rules of the game," greatly shape the entrepreneurial culture.

POLICIES AND LAWS

Government is known to influence entrepreneurship through its policies, but the outcome of its polices has been mixed - productive, unproductive, and destructive entrepreneurship (Baumol, 1990; North, 1990; Mises, 1949; Brown & De Clercq, 2008; Boettke & Coyne, 2007). Policies are a set of rules and guidelines that represent government intentions whereas laws are a system of rules and guidelines that are enforced by social institutions. The policy environment established by the government induces entrepreneurial action by providing incentives to encourage some activities while discouraging others. Together, policies and laws shape the social and legal environment where business is conducted. Better maintenance of rule of law enhances GDP growth rate (Barro, 1991; Barro 1996), so it's not enough to have the rules – they should be upheld or enforced for there to be any real impact.

Policies and laws should reflect and carter to the needs of the citizens. Pesso made three key observations pertaining to policy making (Pessoa, 2004, p. 14):

> First, successful reforms are based on sound economic principles and consider local capabilities, constraints and opportunities. Second, economic growth is not the natural order of things, and setting up a fair and leveled ground may not be enough to stimulate productive dynamism. Third, institutional innovation requires a pragmatic approach that avoids ideological lock-in.

Taking together, this suggests that poor countries acting through governmental bodies must take proactive measures in developing practical rules for "the game of entrepreneurship," in the communities. In this pragmatic approach, government policies and laws must be strategic and should include meaningful stakeholder (private and public) participation (Richards & Dalbey, 2006). This strongly implies that policies and laws should be adapted to local contexts (Wagner & Sternberg, 2004), especially since one country in sub-Saharan Africa, for example, can be comprised of many ethnic groups. While government must play a major role in creating the legal and policy environment, the goal, however, must not be to prevent entrepreneurs from failing but to foster innovation and entrepreneurship (Holtz-Eakin, 2000; Minniti, 2008).

CONCLUDING THOUGHTS

This paper supports the theory that democracy does not lead to economic advancement but that economic activities do, and as such, poor countries should focus on pursuing the economic freedoms of their citizens. How to pursue this "economic freedom" remains a question. While some researchers have acknowledged the importance of developing human capital in an economy through formal training, the relationship between education and economic advancement has not been thoroughly explored. This paper sheds light to that relationship. In addition, the case for education as the first step to economic freedoms is made. Educational programs must focus on developing innovators with an entrepreneurial mindset in order to stimulate economic growth. Lastly, entrepreneurs working together and with other entities are ultimately responsible for creating a culture of entrepreneurship in a climate where the rule of law is maintained and where policy choices are not made to prevent business failures but to promote new venture creation. When a country adopts such a multifaceted approach to renovating the culture it will enable citizens to innovate and create an atmosphere where entrepreneurship thrives and the economy will proliferate. A model that suggests how these dimensions interact with each other is underway.

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ASSESSING NIGERIAN BANKS' TECHNICAL EFFICIENCY USING DATA ENVELOPMENT ANALYSIS

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ABSTRACT

Banks' productivity levels as seen by regulatory authorities are crucial measures of stability not only for individual banks but for the banking industry as a whole. This study examines the productivity and efficiency levels of Nigerian banks in the light of the drastic measures taken by the Central Bank of Nigeria following the result of the 2009 special audit of Nigerian banks. By employing Data Envelopment Analysis (DEA) using six variables, our result reveals that all the banks in our study group maintained respectable levels of productivity and technical efficiency. Our results also shows that productivity and technical efficiency measures were not considered in the determination of the health of the banks in Nigeria. Otherwise, all the banks in our study group could have retained their ratings and could have avoided the CBN hammer. This result is consistent with earlier studies on the subject.

Keywords: Banking, Central Bank of Nigeria**,** Data Envelopment Analysis (DEA), Technical Efficiency, Productivity Efficiency.

INTRODUCTION

A number of financial reforms have taken place in Nigeria during the past decade; the most significant in terms of overall impact on the economy being the Soludo-induced recapitalization program of 2005. This reform agenda which reduced the number of banks operating in Nigeria from 89 to 24, gave the surviving banks the opportunity to consolidate via mergers and acquisitions and facilitate their strategic realignment. It was assumed then that the exercise would ease the lingering liquidity problems for the 24 banks. But as soon as Sanusi Lamido Sanusi took over the leadership of the Central Bank of Nigeria in 2009, Nigeria was confronted yet again with a major banking reform agenda. This time the reform was designed to enhance good credit risk management, and to strengthen corporate governance.

The 2009 reform was anchored on a special audit carried out by a combined team of the Central Bank of Nigeria (CBN) and the Nigerian Deposit Insurance Corporation (NDIC) officials between February and September 2009. Ordinarily this reform agenda may have passed like any other but for the crisis of confidence that was generated by the reactions of the apex bank, namely, the sacking of top management, and the injection of fresh funds to the tune of N610b into some of the banks that were considered by the CBN to be unstable. The outcome of that audit and the controversy generated by the actions of the Central Bank of Nigeria forms the basis of this present research effort.

In the first instance, there are trade-offs that banks must make as they attempt to balance profitability against safety given the fact that banks can only increase profits by taking on more risks (credit, liquidity, and interest rate). According to Kidwell, Peterson and Blackwell (2000:458), "the central problem for bank management is reconciling the conflicting goals of solvency and liquidity on the one hand and profitability on the other". Secondly, banks are always concerned too about the actions of three stakeholders, namely, the shareholders, the depositors and the regulators. Shareholders will frown if profit is low, depositors will frown if safety is seen to be compromised, and regulators may intervene if they believe that management is imprudent. The CBN's intervention in some of the Nigerian banks in 2009, suggests impropriety in some banks while at the same time accepting the quality of management of the other banks. This study seeks to use uniform performance criteria for all the banks in Nigeria in order to rank them.

Against the background that productivity and profitability are the two most dependable measures of performance and efficiency, we decided to examine the performance of Nigerian banks over a three year period (2006 – 2008) following the recapitalization exercise, using six indicators. Also, recognizing the limitations of the use of standard financial ratios in isolation as measures of efficiency, we decided to have a blend of five accounting measures of efficiency, namely, profit margin, utilization of assets, and ratio of operating expenses to spread and other income, return on assets, and return on equity, and one non-conventional economic performance measure, namely, economic value added (EVA). The section following this introduction describes the use of DEA in banking and financial research. In section three we present the data set and methodology, while section four presents the results. Sections five and six contain the discussion and conclusion, and references respectively.

THEORETICAL UNDERPINNINGS

In order to place productivity and profitability in their proper perspective, we define profitability as "the capacity to make profits" (Pramodh, Ravi and Nagabhushanam, 2008:46), and define productivity as the capacity to maximize shareholders' wealth. Hence, profitability and productivity form the nucleus of a bank's performance index. Banks' credit risk and liquidity management as well as good corporate governance structure are designed to enhance both productive efficiency and technical efficiency. From the CBN's handling of issues relating to non-performing loans, illiquidity, and poor corporate governance at some Nigerian banks, it is obvious that the apex bank was concerned about both productive efficiency and technical efficiency. However, this article limits itself to Technical Efficiency (TE) which is a good measure of Relative Efficiency (RE). The Technical efficiency of a bank is a comparative measure of how well the bank processes inputs to achieve its outputs, as compared to the bank's maximum potential for doing so (represented by its production possibility frontier). That explains why Wheelock and Wilson (1995) declared that "the less technically efficient a bank is, the greater its likelihood of failure".

Data Envelopment Analysis (DEA) is a well established technique for measuring Relative Efficiency (RE) of homogenous entities (Charnes, Cooper, and Rhodes {1978}). According to Pramodh, Ravi, and Nagabhushanam (2008), the DEA is a data-driven approach used primarily to elicit membership functions of financial ratios. Barros (2007:42) describes Data Envelopment Analysis as “a non-parametric, multifactor, productivity analysis tool, which effectively considers multiple input and output measures in evaluating relative efficiencies”. The technique which was first introduced by Farrell (1957), and extended by Charnes, Cooper, and Rhodes (1978), has two main models, namely, the CCR model (Charnes, Cooper, and Rhodes, 1978), and the BCC model (Banker, Charnes, and Cooper, 1984). In addition, the CCR model has two variants; the multiplicative model of 1982, and the additive model of 1985.

In an attempt to determine the efficacy of the DEA technique, Oberholzera and Westhuizen (2004) did a comparison between the use of the DEA and the traditional financial ratios in measuring bank performance. Other researchers such as Saha and Ravishankar (2000), Galagadera and Piyadasa, (2002), Chakrabarti and Chawla (2005), and Pramodh, Ravi, and Nagabhushanam (2008) used the DEA technique to measure the relative efficiency of Indian banks. While Schaffnit, Rosen and Paradi (1997) employed the DEA technique to measure branch performance of a Canadian bank, Sevcovic, Halieka and Brunovsky (2001) applied the DEA method for the assessment of the efficiency of branches of a top performing bank in Slovakia. Similarly, Camanho and Dyson (2005) used the DEA technique to measure cost efficiency of banks in Turkey.

In all these studies, the conclusions were that it was easier to determine efficiency levels using the DEA method than other measurement approaches. These conclusions validate the flexibility and robustness of the DEA as an efficiency measurement technique; hence the wide usage by a good number of researchers. And the list of researchers applying this method for analysis of efficiency is growing. For example, Chen, Skully and Brown (2005) employed the DEA technique to measure the cost, technical, and allocative efficiency of 43 Chinese banks over a period of eight years. The main thrust of that investigation was the determination of any changes in Chinese banks’ efficiency following the deregulation of the industry in 1995. Also, Avkiran’s (2006) application of the DEA technique for the evaluation of the efficiency of all foreign banks operating in Australia, and Mostafa’s (2007) use of the methodology in combination with probabilistic neural network for the investigation of the efficiency of Arab banks attest to the popularity and extensive adoption of the DEA in the measurement of relative efficiency of banks. Also, Barros (2007) employed the same technique in the analysis of technical and allocative efficiency of tax offices in Portugal.

More recently, Debnath and Shankar (2008) attempted to estimate and compare the efficiency of 50 Indian banks using the Data Envelopment Analysis method. From the foregoing therefore, it is obvious that Data Envelopment Analysis (DEA) is a very robust technique for measuring both Productivity Efficiency (PE) and Technical Efficiency (TE) which is a measure of Relative Efficiency. Its successful application in banking research across the globe attests to its strength and accuracy, and permits reasonable generalization of observed results. This is the premise upon which we anchor our choice of the DEA technique in this present study.

DATA-SET AND METHODOLOGY

Traditionally, Data Envelopment Analysis uses the linear programming format to determine the Relative Efficiency score (RE) for each decision making unit. The efficiency of an organization is measured relative to the best practice observed in industry. For a bank, efficiency is calculated in terms of the ratio of output to input provided the aggregated output and aggregated input values are determined. That explains why the careful selection of output and input is paramount. TE is thus expressed as:

$$\text{Technical Efficiency} = \frac{\text{(Aggregated Output)}}{\text{(Aggregated Input)}}$$

For purposes of our calculations, we selected six variables based on our knowledge of the banking industry and inferences drawn from other studies on DEA. They include; profit margin, utilization of assets, operating expenses ratio, return on assets, return on equity, and economic value added. The first five ratios are fairly familiar in the literature, thus requiring no detail explanation in a study of this nature. We however present the EVA in detail to capture its essence in Data Envelopment Analysis.

RESULT

The primary consideration in carrying-out this study was to determine if technical efficiency was considered in deciding the productivity level and relative strength of each of the 24 banks in our study group. Our results indicate that all the banks maintained a TE of between 0.67 and 0.89, an obvious indication that all the banks in our study group were relatively healthy. It is our contention therefore that the decision to declare that some of the Nigerian banks were fragile was based in other considerations and not on the technical efficiency of such banks. Further research is does required to identify the measures used by the Central Bank of Nigeria to determine the relative health of the banks in our study group.

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