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CONTENTS

Reputation, Financial Performance, and Industry Competition Yilun Shi	1
Is Voluntary Disclosure Value Relevant? Evidence from Italian Listed Companies Davide Scaltrito	17
Technical Efficiency of Islamic Banks versus Domestic Banks: Evidence from Bangladesh Abdus Samad	31
Long-Run Purchasing Power Parity and Exchange Rates: Evidence from the Middle East Anwar Al-Gasaymeh & John Kasem	41
Determinants of Priority Sector Lending: Evidence from Bank Lending Patterns in India Muneesh Kumar, Neetika Batra & Florent Deisting	55
Illiquidity Exposure of Size and Value in Malaysian Equity Returns Mohamad Jais & Chandana Gunathilaka	81
Professional Education Background and Earnings Management of Chairmen and Senior Managers Hsiang-Tsai Chiang, Shu-Lin Lin, Li-Jen He & Yi-Ting Sung	91

REPUTATION, FINANCIAL PERFORMANCE, AND INDUSTRY COMPETITION

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ABSTRACT

In this study, we re-examine the relationship between reputation and financial performance in a unique setting, namely industry intensity. Using a sample of Most Admired Companies by Fortune magazine from 2006–2008, we show that industry competition partially changes the dynamic between financial performance and corporate reputation. While more reputable firms generate better operating outcomes regardless of industry competition, the effect of prior financial performance on subsequent reputation is moderated as competition intensifies. Specifically, in non-competitive sectors, financial outcome is still a dominating factor in evaluating future corporate reputation. The influence, however, is diluted in competitive sectors as information asymmetry is eased. Our empirical findings advance the understanding of the relationship between reputation and performance as well as its interaction with other institutional features.

JEL: G30

KEYWORDS: Corporate Reputation, Financial Performance

INTRODUCTION

Researchers and practitioners have, for decades, concluded that corporate reputation is a valuable asset owned by a company. Reputation is difficult to imitate and cannot be earned in a quick fashion. Therefore, more reputable firms tend to outperform their peers in both profitability (Roberts and Dowling, 2002) and equity returns (Anderson and Smith, 2006). Moreover, such positive influence is bilateral. As good reputation provides firms with a variety of competitive advantages, strong operating outcomes also further advance firm's future reputation (Koch and Cebula, 1994, Flanagan et al, 2013).

Reputation, as put forward by Formbrun (1996), is "a perceptual representation of a company's past actions and future prospects that describes the firm's overall appeal to all of its key constituents when compared with other leading rivals." Reputation is constantly employed and evaluated by outsiders who identify this institutional feature based on their prior experiences with the company. Such an evaluation process, however, is limited to a certain extent. Outsiders, regardless of their interactions with the firm, cannot access the complete set of information which could be used to identify all reputation driven activities. Therefore, independent or other easily available metrics, such as financial performance, becomes more applicable. Researchers find supportive evidence that cross-sectional variation of reputation score is related to prior operating results (Brown and Perry, 1994). Meanwhile, reputation strengthens subsequent financial performances as well. As a valuable asset, a good reputation is difficult to replicate. It, thus, could provide competitive advantages through a range of channels, such as low labor costs, high productivity, and favorable brand recognition (Gupta, 2002, Rose and Thomsen, 2004, Awang and Jusoff, 2009). Extra economic rents could be extracted through any of these channels. Roberts and Dowling (2002) present evidence that, reputational advantages are sustainable and reputable firms' strong financial performance is persistent over time. Taken together, there exists a virtuous and recursive relationship between corporate reputation and financial performance.

Nevertheless, the performance-reputation relationship has been largely examined in an isolated framework. Evidence of confounding factors, which could alter this relationship unilaterally or bilaterally, is limited. For instance, industry and year effects are only used as control variables in prior studies. Dunbar and Schwalbach (2000) show that, firm reputation varies significantly among different industries when they analyze a sample of German companies. Flanagan et al (2013) confirm the existence of an industry effect but do not show whether such effect *weakens* or *strengthens* the performance-reputation relationship. Only a few studies have addressed this issue. For instance, Sanchez and Sotorrio (2007) argue that the sector of activity, strategy of differentiation, competitive intensity, and the power of stakeholders may, separately or aggregately, moderate the relationship between reputation and financial performance. Using a small sample of 88 Spanish firms, they present evidence that industry intensity weakens the reputation-to-performance relationship. The present study intends to extend such findings. Specifically, using a more recent and comprehensive dataset, we examine *how* industry competitiveness affects the bilateral relationship between reputation and financial performance. We empirically test if such relationship would change as competition intensifies/eases by employing the Herfindahl Index framework to measure industry intensity (Giroud and Mueller, 2011). Different from the existing literature, this study focuses on the dynamic between *other* important institutional features and the reputation-performance relationship, rather the latter itself. To our knowledge, no other studies have provided similar empirical findings using comparable data set.

Our results show that good reputation still positively relates to subsequent firm performance. More reputable firms perform better than their less reputable peers regardless of industry intensity. Both return on asset (ROA) and Tobin's q are higher when previous year's reputation score is higher. One unit increase in reputation score will boost the ROA by 1.1% in the following year. Industry intensity presents no statistically significant impact on either ROA or Tobin's Q. Neither does it change the positive influence of reputation on performance. The interaction term between prior reputation and industry intensity is not economically significant in the multivariate regression, even though the sign is negative as we conjectured. On the other hand, competition alters the performance-to-reputation relationship. Specifically, the effect of financial performance on reputation is more palpable in non-competitive sectors than the competitive ones. Without competition, industry monopoly reinforces the role of prior financial outcomes in evaluating future reputation. However, such effect wanes in competitive sectors. We argue that, as competition increases, information becomes more transparent and easier to extract; therefore, the reputation assessment process becomes more efficient and its reliance on operating results is alleviated.

On the contrary, information asymmetry still prevails when competition is limited. External stakeholders have to depend on conventional or independent benchmarks, such as financial outcomes in particular, to assess a firm's reputation. We use several different approaches to control for endogeneity in our model specifications and our results broadly hold. In sum, industry competition increases the speed of information flow and reduces information asymmetry, which thereby eases the dominant role of operational results in evaluating firm reputation. However, a good reputation still results in favorable financial outcomes regardless of industry intensity. Our findings provide new evidences about *how* institutional features change the bilateral reputation-performance relationship. We also shed light on future research that confounding effects need be taken into account when studying corporate reputation and its influences on firm performance. We review the literature background and develop main hypotheses in Section 2. In Section 3, we summarize our sample and present descriptive statistics. Our findings are reported in Section 4 and followed by conclusion remarks in Section 5.

LITERATURE REVIEW

In the management literature, numerous studies have examined and confirmed the recursive and positive relationship between reputation and financial performance. In the stakeholder theory, Freeman (1984) argues that, firms with better relationships with their stakeholders are more successful over time because transaction costs are reduced as these relationships improve. Similarly, the resourced-based view (RBV)

argues that, favorable reputation or corporate image is considered as a valuable but intangible resource. It helps companies differentiate themselves, in a positive way, from their peers; therefore it provides competitive edges (Surroca, Tribo and Waddock, 2010). Prior studies also confirm, empirically, that a good reputation leads to better future operating results (McGuire et al, 1990, Dunbar and Schwalbach, 2000, Rose and Thomsen, 2004). On the other hand, empirical evidence attests that prior financial performances contribute to subsequent reputation (Fombrun and Shanley, 1990) as well. Koch and Cebula (1994) present evidence that profitability and other firm characteristics can explain about 30% of the variations in future reputation. Brown and Perry (1994) show that 55% of the variations in Forbes Most Admired Companies reputation scores come from previous financial results. Using more recent data, Flanagan et al (2013) reconfirm Brown and Perry (1994)'s findings and show a weaker but still significant relationship between prior returns on asset (ROA) and future reputation scores. Like other capital-intensive assets, reputation demands a significant amount of financial inputs. Firms with better operating outcomes tend to have more spare resources for reputation-building activities. For instance, focusing on a subset of reputation (namely social responsibility), Waddock and Graves (1997) assert that better operating outcome results in a surplus of financial resources. These resources provide firms the ability to consider social issues and to make socially responsible contributions.

In finance/accounting literature, the benefit of obtaining a good reputation is justified by the alleviated agency problem and its related costs. Jensen and Meckling (1976) view a firm as a nexus of contracts. If a firm can minimize the cost of these contracts, its value will be maximized. Reputation helps firms build trust with various vital stakeholders (Wicks, Berman, and Jones, 1999), such as employees, vendors, and customers. As trust improves, the cost of contracting with these external parties will be reduced. Eventually, the company, as well as its owners, can collect financial benefits from these savings. Given the separation between ownership and management among large U.S. corporations, agents' reputation concern and their behaviors could also significantly affect corporate performance. Therefore, instead of focusing on firm reputation itself, early empirical work in finance/accounting primarily examines agents, such as managers or directors, whose reputation seems critical to their own future employment opportunities and compensations. For instance, Fama and Jensen (1983) highlight that outsider directors are often motivated by their reputation in the market of directorship. They tend to align their interests with shareholders rather than managers. Practitioners in financial intermediaries, such as analysts (Jackson, 2005, Fang and Yasuda, 2011) and underwriters (Jo et al, 2007, Ljungqvist et al, 2007), are also found to be concerned about their reputation. Recently, reputation research has been extended to corporate behaviors and the decision-making process. Siegel (2005) addresses how the cost of financing is associated with firm reputation.

Cao et al (2012) indicate that more reputable firms are less likely to misstate their financial statements and more cautious about the quality of their financial reporting. Lastly, favorable reputation seems to lead to better-than-average stock performance as well. Using a portfolio of Forbes Most Admired Companies, Anderson and Smith (2006) show that reputable firms outperform market indices over time. Similarly, Filbeck and Preece (2003) document positive stock market responses when companies are added to Fortune's "100 Best Companies to Work For" list. Taken two strands of literature together, empirical evidence supports the conjecture that, corporations and their managers take reputation into consideration when strategic decisions are made. Reputation is often assessed, externally, based on prior financial performance; in return, good reputation enhances firm operating outcomes subsequently. Such virtuous relationship eventually benefits shareholders by increasing firm values over time.

However, existing empirical research of performance-reputation relationship pays little attention to the effect of contingent factors or institutional features, such as industry characteristics. For instance, Dunbar and Schwalbach (2000) shows that certain industries have better reputation than others in general, but they do not address any specific consequence. When studying the persistence of superior financial performance stemming from good reputation, Roberts and Dowling (2002) only controls market-to-book ratio and firm size. Similarly, Waddock and Graves (1997) ignore the industry feature when analyzing the causation

between social performance and financial outcome. As summarized by Waller (2010), industry feature and other firm characteristics are often used as control variables rather than any focal point in most reputation studies. Even in a more recent study by Flanagan et al (2013), industry is merely controlled by a dummy variable. Related discussion is still very limited. We try to fill this void in the present study.

We argue that, though many of these institutional features are exogenous by nature, they all interact with performance, reputation, or both to a certain extent. In the present study, we investigate the effect of industry competition to the bilateral relationship between reputation and performance. We contend that, since operation and consumer perceptions vary greatly among different sectors, industrial feature could change the dynamic between performance and reputation. For instance, many consumers favor reputable companies over non-reputable ones when they choose products or service. Such preference is particularly evident in the competitive sector, where goods and services tend to be homogenous and customers can easily switch to different providers at minimal or no cost. Therefore, less reputable companies in these sectors may have to use more resources to attract customers and to compete with their reputable counterparts. These extra efforts eventually result in inflated operating costs and low profit margins. Contrarily, such pressure could be muted in non-competitive sectors. Reputation is rarely a concern when customers have few options (Neville et al, 2005). Firm performance becomes less elastic to customers' perceptions of the company *ceteris paribus*. Several studies in finance (Schmidt, 1997, Raith, 2003) provide theoretical grounds for the argument. They show that, industry competition in fact provides monetary incentives to managers. It saves monitoring costs by substituting for other costly mechanisms, such as corporate governance or reputation building. As competition increases, managers tend to work harder and try to produce better financial results regardless. When competition is moderate or low, managers might have to be motivated by other means. Therefore, we conjecture that the reputation-to-performance relationship weakens as industry competitiveness increases (Hypothesis 1). Within the same vein, Giroud and Mueller (2011) examine the relationship between corporate governance and firm value given different levels of competition. They find the relationship varies as industry intensity changes.

In competitive sectors, both firm value and operational results are positively linked to governance practice. Conversely, such correlation becomes insignificant in non-competitive sectors. As highlighted by Musteen et al (2010), corporate governance and reputation are positively correlated. They share many similarities in terms of costs and effects. We, thus, expect comparable industry effects would be found in the reputation-to-performance relationship. In the literature, the understanding of performance-to-reputation has been primarily theoretical. Reputation is developed through the interaction with different external constituents. To certain groups, financial outcome is the primary, if not the only, reliable and available benchmark; to others, additional channels may prevail. Nonetheless, superior financial performance alone does not necessarily guarantee a good reputation. For instance, Walmart is well regarded for its efficient operating style and remarkable stock returns among retailers. It is also infamous for its low employee benefits coverage and substandard workers' compensation.

As emphasized by Fomburn (1996), reputation is the *aggregated* perception of all stakeholders. Financial outcome only represents the interest of a certain group of stakeholders, not all of them. Therefore, Walmart's financial performance and notable stock returns do not necessarily translate into a good overall reputation. Empirically, Brown and Perry (1994) and Flanagan et al (2013) are among the few ones that examine the performance-to-reputation relationship. Both provide supportive evidence. Specifically, Brown and Perry find 55% of the variance of reputation rating can be explained by financial outcomes. Using more recent data, Flanagan et al (2013) confirms Brown and Perry's earlier findings after controlling for industry effects. However, the aim of this study is not to refine the causation between performance and reputation. Rather, we try to understand whether such causation varies given different industry features (Hypothesis 2). Building reputation generally is no different from acquiring other valuable assets. Presumably, strong financial performances lead to adequate capital surplus, which provides more capital for reputation building. However, it is unclear how industry intensity interacts with such causation. In

competitive sectors, firms may be more willing to gain reputation but are subject to limited capital due to low profitability. On the other hand, firms in non-competitive sectors may be less interested in building reputation even when they have sufficient financial means. Their reputation may not directly reflect their financial results.

DATA AND METHODOLOGY

Sample Selection

Walker (2010) posits the difficulty in operationalizing corporate reputation. Following most studies in business literature, we choose the reputation score from Fortune's Most Admired Companies (FMAC hereafter) for the following reasons. First, among a variety of reputation surveys, FMAC has the longest history. Fortune has updated the list each year since its inaugural release in 1983. No other vendor provides comparable data with similar longitude. Second, FMAC takes into account the interest of different stakeholders. FMAC considers eight criteria: innovation, people management, financial soundness, the quality of management, the use of corporate assets, social responsibilities, long-term investment, and the quality of products/services. Many of these factors do not appear to be driven by firms' financial results. Finally, FMAC incorporates opinions from various external assessors including financial analysts, corporate leaders, and industry experts. Since reputation is the collective perception of a company, wider coverage commands better data reliability and fewer unidentified biases. We obtained the FMAC lists from 2006-2008 as our main sample and excluded entries that are non-domestically resided or privately hold. We, then, extracted financial data and monthly stock returns from 2005 to 2009 from the Compustat database and CRSP, respectively. Only cases with available financial information and stock returns are remained. Our final sample includes 333 firm and 614 firm-year observations. Compared to the sample used in a similar study by Sanchez and Sotorio (2007), ours is larger and more recent, which allows us to draw better conclusions.

Summary Statistics

Table 1 summarizes the industry distribution of our sample using Fama-French (FF) 48 specifications. We download Fama-French 48 industry descriptions from Professor Kenneth French's website and then assign each firm's industry code based upon its SIC code extracted from Compustat. No industry dominates the entire sample. Several industries only have one presence, such as food products (FF 1) and aircraft (FF 25). On the other hand, business service sector (FF 34) has 24 firms, the highest among all, but still counts merely 7.21% of the entire sample cases. Trailing the business service sector are wholesale (FF 41) and retail (FF 42) industries, which has 20 cases respectively as shown in Table 1. Overall, our sample represents companies from a broad background.

Sample descriptive statistics of sample cases are presented in Table 2. We first reported each variable's summary statistics by year (2005-2009) and then we show the universal average of the entire sample. Following the literature, we proxy financial performance using return on assets (ROAs) and Tobin's Q. ROA is defined as net income scaled by total assets, while Tobin's q is the sum of the book value of debt and the market value of equity scaled by total assets. As shown in Panel A of Table 2, the average ROA varies from 2005 to 2009. It peaked at 6.87% in 2006 and bottomed out at 2.65% in 2008. Such pattern matches the general economic cycle as the U.S. economy went through a major recession during our measurement period. Similarly, Tobin's q also topped in 2006 at 1.97 and dipped to the lowest point at 1.44 in 2008. Median statistics of both measures are following the same fashion. In untabulated results, we compute operating profitability as an alternative to ROA and Tobin's Q. Similarly, average operating profitability dropped from 18% in the pre-recession period to near 15% in post-recession periods.

Table 1: Summary of Industry Distribution

Fama-French Industry Code	Count	Percentage
0	3	0.90
1	1	0.30
2	9	2.70
4	2	0.60
5	3	0.90
6	2	0.60
7	3	0.90
8	5	1.50
9	3	0.90
10	6	1.80
11	6	1.80
12	6	1.80
13	7	2.10
14	6	1.80
15	3	0.90
17	6	1.80
18	8	2.40
19	8	2.40
21	9	2.70
22	4	1.20
23	10	3.00
24	4	1.20
25	1	0.30
26	1	0.30
27	1	0.30
28	2	0.60
29	1	0.30
30	12	3.60
31	12	3.60
32	12	3.60
33	3	0.90
34	24	7.21
35	13	3.90
36	14	4.20
38	8	2.40
39	4	1.20
40	18	5.41
41	20	6.01
42	20	6.01
43	8	2.40
44	14	4.20
45	17	5.11
46	2	0.60
47	12	3.60
Total	333	100

Table 1 summarizes the industry distribution of our sample using Fama-French 48 industry specification. We obtain each firm's 4 digit industry code from Compustat and assign Fama-French 48 industry code using the algorithm from Professor French's data portal.

Following Giroud and Mueller (2011), we use the Herfindahl Index (HI) to measure the level of competition in each industry, which is defined by Fama-French 48 industry classifications using each firm's SIC code from Compustat. For every industry in each fiscal year, we compute the HI as:

$$HI_{kt} = \sum_{i=1}^{N_k} s_{ikt}^2$$

where s_{ikt} is the market share of company i in industry k in year t . s_{ikt} is calculated as each company's annual sales scaled by the aggregated sales of all companies within the same Fama-French industry. Then, we sum the squared market share of all companies in the same industry to obtain the Herfindahl Index. Summary statistics of the HI is reported in Panel B of Table 2. Industry competitive intensity remains stable

over the 2006-2008 periods with the mean around 0.066 and the median close to 0.055. No visible variation is presented. In our sample, the most concentrated industry is the defense sector, which is dominated by Lockheed Martin Corp. Companies in utility and financial service are facing more competition compared to others. Lastly, we report the descriptive statistics of reputation score in Panel B of Table 2. Similar to the findings in Roberts and Dowling (2002), reputation scores are stable over years. From 2006 to 2008, average score is close to the universal average (6.902). The standard deviation (untabulated) of reputation score is only 0.68 during this time period. In Panel C of Table 2, we supplement the descriptive statistics of two control variables, market capitalization and market adjusted return, which will be employed in the regression analysis. In general, our sample represents a group of large and established companies, which have relatively stable reputation score during 2006-2008 period and cover variety of industries. Their financial performance greatly matches the macroeconomic condition in the United States from 2005 to 2009.

Table 2: Descriptive Statistics of Our Sample

	Year	N	Mean	Median	Minimum	Maximum
Panel A: Financial Performance						
ROA	2005	294	2.65%	4.97%	-85.26%	27.30%
	2006	320	6.87%	6.04%	-14.09%	50.34%
	2007	312	5.52%	5.54%	-46.14%	40.91%
	2008	294	2.65%	4.97%	-85.26%	27.30%
	2009	290	3.74%	3.77%	-48.33%	76.91%
	All	1,537	5.18%	5.29%	-85.26%	76.91%
Tobin's Q	2005	294	1.44	1.21	0.45	4.73
	2006	320	1.97	1.59	0.86	13.73
	2007	312	1.86	1.51	0.65	8.64
	2008	294	1.44	1.21	0.45	4.73
	2009	290	1.57	1.34	0.59	6.25
	All	1,536	1.77	1.45	0.45	13.73
Panel B: Competition and Reputation Score						
Competition	2005	294	0.066	0.054	0.016	0.726
	2006	320	0.064	0.052	0.013	0.798
	2007	312	0.067	0.053	0.015	0.771
	2008	294	0.066	0.054	0.016	0.726
	2009	290	0.067	0.058	0.020	0.726
	All	1,537	0.066	0.053	0.011	0.804
Reputation	2006	203	6.91	6.91	5.22	8.60
	2007	217	6.86	6.92	4.45	8.53
	2008	216	6.93	6.96	5.25	8.48
	All	636	6.90	6.93	4.45	8.60
Panel C: Market Capitalization and Index-Adjusted Stock Returns						
Market Capitalization	2005	294	20,977	7,987.4	30.054	397,234
	2006	320	30,660	14,189	257.40	439,013
	2007	312	32,023	13,955	0.0156	504,240
	2008	294	20,977	7,987.4	30.054	397,234
	2009	290	24,867	10,271	75.419	322,334
	All	1536	27,349	11,875	0.0156	504,240
Adjusted Returns	2005	294	-0.53%	0.16%	-56.69%	89.31%
	2006	320	2.00%	-0.48%	-72.71%	136.70%
	2007	312	-2.57%	-4.16%	-93.09%	132.87%
	2008	294	-0.53%	0.16%	-56.69%	89.31%
	2009	289	12.56%	5.28%	-119.11%	316.86%
	All	1535	3.44%	-0.15%	-119.11%	316.86%

Table II present the summary statistics of our samples. In Panel A, we present the descriptive statistics of return on asset (ROA) and Tobin's Q from 2005 to 2009. ROA is defined as net income scaled by total assets and Tobin's q is the sum of the book value of debt and the market value of equity scaled by total assets. Panel B reports the average competition index from 2005 to 2009 and the reputation score from 2006 to 2009. Competition index is calculated using the Herfindahl Index framework based on each year's sales. Finally, we compute the average market capitalization and index adjusted annual stock returns from 2005 to 2009. The summary statistics are report in Panel C. All financial information is extracted from CompuStat and stock returns are obtained from CRSP. Reputation score is acquired from Fortune Magazine.

Before we examine how industry competition changes the relationship between reputation and performance in a dynamic framework, we first test the correlation among our key variables, including ROA, reputation

score, and industry intensity along with a set of standard control variables. As mentioned in the prior literature, firm financial performance is autocorrelated. Therefore, we add the lead and lag variation of both ROA and Tobin’s Q and results are summarized in Table 3. As shown in Panel A, reputation is related to ROAs in different time periods with coefficients ranging from 0.199 to 0.2938. All coefficients are statistically significant. Similar pattern, presented in Panel B, holds if we use Tobin’s Q to measure performance instead. Coefficients range from .02073 to 0.2680, which is close to the numbers reported in Panel A of Table 3. Interestingly, competition intensity alone does not correlate with either performance or reputation. None of the coefficient is statistically significant. Only the log transformation of market capitalization appears to negatively relate to competition as large companies are more likely to exist in more competitive sectors. At first glance, industry competition does not seem to directly impact either financial performance or reputation. We further explore how this factor interacts with the relationship between performance and reputation in a multivariate framework.

Table 3: Correlation Analysis

Panel A: Return on Assets, Reputation, and Competition								
	ROA _{t-1}	ROA	ROA _{t+1}	Reputation	Competition	Market Capitalization	Sales Growth	Leverage
ROA _{t-1}	1.0000							
ROA	0.4881 <i>0.0000</i>	1.0000						
ROA _{t+1}	0.4935 <i>0.0000</i>	0.5944 <i>0.0000</i>	1.0000					
Reputation	0.1966 <i>0.0000</i>	0.2399 <i>0.0000</i>	0.2938 <i>0.0000</i>	1.0000				
Competition	0.0372 <i>0.3574</i>	0.0148 <i>0.7097</i>	-0.0179 <i>0.6518</i>	0.0129 <i>0.7453</i>	1.0000			
Market Capitalization	0.3244 <i>0.0000</i>	0.2957 <i>0.0000</i>	0.2286 <i>0.0000</i>	0.3475 <i>0.0000</i>	0.0900 <i>0.0232</i>	1.0000		
Sales Growth	0.1676 <i>0.0000</i>	0.2740 <i>0.0000</i>	0.1640 <i>0.0000</i>	0.1054 <i>0.0078</i>	-0.0420 <i>0.2900</i>	0.1832 <i>0.0000</i>	1.0000	
Leverage	-0.1983 <i>0.0000</i>	-0.3123 <i>0.0000</i>	-0.3092 <i>0.0000</i>	-0.1458 <i>0.0002</i>	0.0547 <i>0.1684</i>	-0.3000 <i>0.0000</i>	-0.0913 <i>0.0213</i>	1.0000
Panel B: Tobin’s Q, Reputation, and Competition								
	Tobin’s Q _{t-1}	Tobin’s Q	Tobin’s Q _{t+1}	Reputation	Competition	Market Capitalization	Sales Growth	Leverage
Tobin’s Q _{t-1}	1.0000							
Tobin’s Q	0.8279 <i>0.0000</i>	1.0000						
Tobin’s Q _{t+1}	0.8154 <i>0.0000</i>	0.8771 <i>0.0000</i>	1.0000					
Reputation	0.2073 <i>0.0000</i>	0.2071 <i>0.0000</i>	0.2680 <i>0.0000</i>	1.0000				
Competition	-0.0101 <i>0.8020</i>	-0.0313 <i>0.4312</i>	-0.0545 <i>0.1705</i>	0.0129 <i>0.7453</i>	1.0000			
Market Capitalization	0.2398 <i>0.0000</i>	0.2676 <i>0.0000</i>	0.2026 <i>0.0000</i>	0.3475 <i>0.0000</i>	0.0900 <i>0.0232</i>	1.0000		
Sales Growth	0.2278 <i>0.0000</i>	0.2605 <i>0.0000</i>	0.2525 <i>0.0000</i>	0.1054 <i>0.0078</i>	-0.0420 <i>0.2900</i>	0.1832 <i>0.0000</i>	1.0000	
Leverage	-0.2746 <i>0.0000</i>	-0.2756 <i>0.0000</i>	-0.2465 <i>0.0000</i>	-0.1458 <i>0.0002</i>	0.0547 <i>0.1684</i>	-0.3000 <i>0.0000</i>	-0.0913 <i>0.0213</i>	1.0000

Table 3 presents the correlation analysis among performance measure, reputation score, competition index, the log transformation of market capitalization, sales growth, and the leverage. Panel A and Panel B use return on assets (ROA) and Tobin’s Q to proxy performance respectively. In addition, we include the lead and lag transformation of ROA and Tobin’s Q to control for autocorrelation. All variables are defined as in Table 2.

RESULTS AND DISCUSSION

Reputation-to-Performance

We, first, test the reputation-to-performance relationship with industry intensity in Model I, II and III. Following McGuire et al (1990) and Roberts and Dowling (2002), in the base model (Model I) we regress financial performances onto reputation score and a set of control variables, including the growth rate of sales, financial leverage, and industry and year dummies. All independent variables are winsorized at 1% to exclude any outlier, and then lagged for one year to control for endogeneity. We also cluster the error terms for robustness. As shown Panel A of Table 4, the coefficient of reputation is 0.011 and highly significant (t-stat = 2.13). Economically, one unit increase in reputation score will boost next year's ROA by 1.1% after controlling for size, sales growth and financial leverage. In addition, sales growth helps improve performance while financial leverage will decrease firm operating results, which is consistently with the findings in prior literature.

$$ROA_{i,t} = \alpha + \beta_1 \times Reputation_{i,t-1} + \beta_2 \times Size_{i,t-1} + \beta_3 \times Sales\ Growth_{i,t-1} + \beta_4 \times Leverage_{i,t-1} + \beta_5 \times Industry\ Dummy_{i,t-1} + \beta_6 \times Year\ Dummy_{i,t-1} + \varepsilon_{i,t} \quad 1$$

In order to test the joint effect of reputation and industry intensity on performance, we add the Herfindahl Index as an additional independent variable in Model II, which is specified as the following,

$$ROA_{i,t} = \alpha + \beta_1 \times Reputation_{i,t-1} + \beta_2 \times Industry\ Intensity_{i,t-1} + \beta_3 \times Size_{i,t-1} + \beta_4 \times Sales\ Growth_{i,t-1} + \beta_5 \times Leverage_{i,t-1} + \beta_6 \times Industry\ Dummy_{i,t-1} + \beta_7 \times Year\ Dummy_{i,t-1} + \varepsilon_{i,t} \quad 2$$

Results are reported in the fourth and fifth columns of Panel A in Table 4. It appears that adding industry intensity makes almost no additional explanatory power as compared to the results from Model I. R-square remains the same at 0.1405 for both models. More importantly, the coefficient of the industry intensity is only 0.003 and statistically insignificant. The coefficients of the remaining independent variables also broadly unchanged compared to Model I. Overall, we do not find that that industry competition show any *direct* impact on firms' financial performance. To further test if industry competition shows any marginal effects onto the reputation-to-performance relationship, we include an interaction term between industry intensity and reputation as shown in Model III. We contend that, if competitiveness increases the importance of reputation, we expect the coefficient, β_3 , of the interaction term to be negative, i.e. higher intensity, will augment the positive influence of reputation toward financial outcomes. Our regression model is specified as:

$$ROA_{i,t} = \alpha + \beta_1 \times Reputation_{i,t-1} + \beta_2 \times Industry\ Intensity_{i,t-1} + \beta_3 \times Industry\ Intensity_{i,t-1} \times Reputation_{i,t-1} + \beta_4 \times Size_{i,t-1} + \beta_5 \times Sales\ Growth_{i,t-1} + \beta_6 \times Leverage_{i,t-1} + \beta_7 \times Industry\ Dummy_{i,t-1} + \beta_8 \times Year\ Dummy_{i,t-1} + \varepsilon_{i,t} \quad 3$$

As shown in the last two columns of Panel A in Table 4, adding the interaction term only marginally improves R-square from 14.05% to 14.11%. Though the coefficient is negative (-0.0656) as we expected, it is not statistically significant (t-Stat = -0.79). All other independent variables remain virtually the same compared numbers in previous two model specifications. Taken together, we find industry competition does not change how reputation contributes to improve firm performance. Firms' operation results still highly depend upon conventional factors, such as growth potential, leverage, and market capitalization.

Consistent with earlier studies, we show that financial performance is positively related to prior corporate reputation score. One unit increase in reputation score will generate more than 1.1% extra return on asset in the following year. Larger companies, firms with high growth potential and lower leverage also deliver better subsequent financial outcomes. Industry competition poses a trivial impact on the reputation-to-performance relationships. We then replicate the three models using Tobin’s Q as an alternative performance measure. Results, reported in Panel B of Table 4, remain comparable to the ones in Panel A. Prior reputation presents a favorable effect onto subsequent Tobin’s Q. One unit increase in reputation score will improve subsequent Tobin’s Q by 0.17 unites as shown in Model I and II, and 0.25 units in Model III, respectively. The coefficients of industry intensity and its interaction with reputation score are both insignificant. Similar to the findings in Panel A, R-square remains virtually the same at 0.16 as we add industry competition in the regression specification.

Table 4: Regression Analysis of Reputation-to-Performance

	Model I		Model II		Model III	
	Coefficient	T-Stat	Coefficient	T-Stat	Coefficient	T-Stat
Panel A: Regression Analysis of Reputation to Return on Assets						
Reputation	0.0109**	2.13	0.0109**	2.13	0.0152**	2.08
Log of Market Capitalization	0.0145***	4.59	0.0145***	4.58	0.0146***	4.59
Competition Index			0.0029	0.09	0.4552	0.81
Interaction Term					-0.0657	-0.79
Sales Growth	0.0584**	2.29	0.0584**	2.27	0.0577**	2.23
Leverage	-0.0790***	-3.66	-0.0790***	-3.64	-0.0790***	-3.65
Fama French Industry Dummy	-0.0005**	-2.22	-0.0005**	-2.13	-0.0005**	-2.19
Year Dummy	-0.0029	-0.70	-0.0029	-0.69	-0.0029	-0.68
Intercept	-0.1377***	-3.37	-0.1379***	-3.36	-0.1681***	-2.96
Number of obs		614		614		614
F(6, 607)		17.57		15.04		13.32
Prob > F		0		0		0
R-squared		0.1405		0.1405		0.1411
Root MSE		0.0851		0.0851		0.0851
Panel B: Regression Analysis of Reputation to Tobin’s Q						
Reputation	0.1716***	3.18	0.1714***	3.17	0.2587***	2.72
Log of Market Capitalization	0.0480*	1.93	0.0495*	1.98	0.0518**	2.07
Competition Index			-0.4461	-1.13	8.754	1.13
Interaction Term					-1.3363	-1.17
Sales Growth	0.9270***	2.85	0.9198***	2.83	0.9047***	2.80
Leverage	-1.421***	-5.44	-1.412***	-5.41	-1.412***	-5.43
Fama French Industry Dummy	-0.0057***	-2.59	-0.0065***	-2.89	-0.0068***	-3.07
Year Dummy	-0.0917**	-2.21	-0.0921**	-2.21	-0.0910**	-2.19
Intercept	0.6594	1.41	0.6974	1.50	0.0836	0.12
Number of obs		614		614		614
F(6, 607)		13.07		11.32		10.07
Prob > F		0		0		0
R-squared		0.1632		0.1641		0.1664
Root MSE		0.8264		0.8266		0.8262

Table 4 presents the regression analysis of the reputation-to-performance relationship. Panel A uses ROA to proxy performance while Panel B uses Tobin’s instead. All variables are defined the same way as in Table 2, except the interaction term which is reputation score multiplied by performance. Model I, II and III are specified as in equation (1), (2), and (3) and we cluster errors terms for robustness. All independent variables are lagged by one year to control for endogeneity. ***, ** and * represents the significance level at 10%, 5%, and 1% respectively.

Robustness Check

For robustness check, we re-run the three models, Model I through Model III, by adding one more control variable in Model I, II and III and findings are presented in Table 5. Prior studies have shown that firm performance and reputation could be co-dependent. The causation is not well defined which could cast doubts on our earlier findings. In addition to using lagged independent variable, we add industry median ROA or Tobin’s Q as an additional control in all three regressions. All other variables are defined the same as in earlier discussions. As shown in Panel A and Panel B of Table 5, results are quantitatively compared to the findings presented in Table 4. Reputation still shows a positive effect on future performance. The

coefficients in all three models are very close to the corresponding ones in Table 4. R-square also remains virtually constant in all regressions

Table 5: Regression Analysis of Reputation-to-Performance with Industry Median

	Model I		Model II		Model III	
	Coefficient	T-Stat	Coefficient	T-Stat	Coefficient	T-Stat
Panel A: Regression Analysis of Reputation To Return on Assets						
Industry Median ROA	-0.0083	-0.25	-0.0086	-0.25	-0.0079	-0.23
Reputation	0.0109**	2.13	0.0109**	2.13	0.0152**	2.08
Log of Market Capitalization	0.0144***	4.43	0.0143***	4.42	0.0145***	4.43
Competition Index			0.0038	0.12	0.4528	0.80
Interaction Term					-0.0652	-0.78
Sales Growth	0.0584***	2.28	0.0585***	2.27	0.0578**	2.23
Leverage	-0.0785***	-3.62	-0.0786***	-3.60	-0.0786***	-3.61
Fama French Industry Dummy	-0.0005**	-2.20	-0.0005**	-2.09	-0.0005**	-2.15
Year Dummy	-0.0030	-0.71	-0.0030	-0.71	-0.0029	-0.70
Intercept	-0.1364***	-3.31	-0.1367***	-3.30	-0.1667***	-2.91
Number of obs		614		614		614
F(6, 607)		15.34		13.41		12.1
Prob > F		0		0		0
R-squared		0.1406		0.1406		0.1411
Root MSE		0.0851		0.0852		0.0852
Panel B: Regression Analysis of Tobin's Q						
Industry Median Tobin's Q	0.7702***	7.83	0.7724***	7.86	0.7744***	7.89
Reputation	0.1542***	3.07	0.1539***	3.06	0.2484***	2.94
Log of Market Capitalization	0.0269	1.14	0.0286	1.21	0.0310	1.31
Competition Index			-0.5335	-1.64	9.422	1.42
Interaction Term					-1.446	-1.48
Sales Growth	0.8175***	2.68	0.8086***	2.66	0.7919***	2.62
Leverage	-1.247***	-4.97	-1.236***	-4.92	-1.235***	-4.93
Fama French Industry Dummy	0.0015	0.69	0.0007	0.31	0.0003	0.14
Year Dummy	0.0912**	2.19	0.0913**	2.20	0.0930**	2.23
Intercept	-0.9397*	-1.90	-0.8989*	-1.83	-1.567**	-2.22
Number of obs		614		614		614
F(6, 607)		18.63		16.29		14.48
Prob > F		0		0		0
R-squared		0.2418		0.2432		0.2459
Root MSE		0.7873		0.7872		0.7864

Table 5 presents the regression results using models as specified in Table 4 after controlling for industry average. Panel A uses ROA to measure financial performance while Panel B uses Tobin's Q. Industry average ROA or Tobin's Q is computed based upon firms within the same Fama-French 48 industry specification in each fiscal year. All other variables and model specifications remain the same as in Table 4. ***, ** and * represents the significance level at 10%, 5%, and 1% respectively.

Performance-to-Reputation

Next, we examine how industry intensity interacts with the performance-to-reputation relationship. We first run the base model, Model IV, following Flanagan et al (2013); then we add the industry intensity effect in Model V, and include the interaction between competitiveness and reputation score in Model VI, respectively. We specify our Model IV – VI in the following:

$$Reputation_{i,t} = \alpha + \beta_1 \times ROA_{i,t-1} + \beta_2 \times Size_{i,t-1} + \beta_3 \times Sales\ Growth_{i,t-1} + \beta_4 \times Leverage_{i,t-1} + \beta_5 \times Industry\ Dummy_{i,t-1} + \beta_6 \times Year\ Dummy_{i,t-1} + \varepsilon_{i,t} \quad (4)$$

$$Reputation_{i,t} = \alpha + \beta_1 \times ROA_{i,t-1} + \beta_2 \times Industry\ Intensity_{i,t-1} + \beta_3 \times Size_{i,t-1} + \beta_4 \times Sales\ Growth_{i,t-1} + \beta_5 \times Leverage_{i,t-1} + \beta_6 \times Industry\ Dummy_{i,t-1} + \beta_7 \times Year\ Dummy_{i,t-1} + \varepsilon_{i,t} \quad (5)$$

$$\begin{aligned}
\text{Reputation}_{i,t} = & \alpha + \beta_1 \times \text{ROA}_{i,t-1} + \beta_2 \times \text{Industry Intensity}_{i,t-1} + \beta_3 \times \text{Industry Intensity}_{t-1} \times \\
& \text{ROA}_{t-1} + \beta_4 \times \text{Size}_{i,t-1} + \beta_5 \times \text{Sales Growth}_{i,t-1} + \beta_6 \times \text{Leverage}_{i,t-1} + \beta_7 \times \\
& \text{Industry Dummy}_{i,t-1} + \beta_8 \times \text{Year Dummy}_{i,t-1} + \varepsilon_{i,t}
\end{aligned}
\tag{6}$$

We, again, lag all independent variables for one year to control for endogeneity. Regression results are reported in Table 6. Panel A uses ROA to measure performance while Panel B employs Tobin's Q instead. Consistent with Brown and Perry (1994) and Flanagan et al (2010), reputation score is highly correlated with prior financial performance. 1% increase in ROA improves the next year's reputation score by 0.0246 and the coefficient is significant at the 1% level (t-stat = 5.73) as shown in Table 6. Firm size is also significant. Large companies are more reputable given more name recognition and capital supply. As we add industry intensity as an additional independent variable in Model V, R-square remains unchanged at 20.26%. The coefficient of industry intensity is not significant even though the positive sign is in line with our expectation that high market concentration is related to higher profit margin. Other independent variables are close to the ones in Model V. It appears that competition itself does not explain any variation of reputation score. Finally, Model VI adds the interaction term between ROA and industry competition.

While all other variables remain comparable as in Model IV and V, industry intensity becomes highly significant with a coefficient of -1.29 and t-statistics of 2.00, which results indicate that as the Herfindahl Index decreases by one unit, reputation score will improve by 1.06 units in the following year. As we discussed earlier, competition could function as an additional channel of monitoring. As competition intensifies, firms are forced to perform regardless of other firm characteristics. Higher competition is like to support better company performance if everything else holds constant. Such institutional feature assists outsiders, who do not have the access to the complete information set, to evaluate company reputation. Moreover, as shown in Panel A of Table 6, the interaction term is highly significant with a coefficient of 17.32 and t-statistics of 2.27. It highlights that influence of firm performance on reputation varies significantly according to the level of industry intensity.

For non-competitive sectors, ROA is still critical in determining subsequent reputation. However, for competitive sectors, the impact of ROA on reputation is moderated. Two reasons may explain such difference. First, competitive sectors general tend to have lower profitability, which may make ROA less reliable for any assessment. Second, competition also increases information transparency, which makes it easier for outsiders to assess reputation through other channels and become less reliant on financial outcomes. Such effect matches with the negative coefficient of industry intensity in the model. For robustness check, we re-run three models using Tobin's Q instead of ROA and results are summarized in Panel B of Table 6. Even though both coefficients and statistical power become weaker, our findings are still consistent with the ones based on ROA. In Model VI, the reputation effect is diluted and it only poses positive influence as competition is reduced. Taken together, our regression results show that performance-to-reputation relationships do vary in accordance with competition. Companies operating in high competition sectors tend to have better reputation. Their financial outcomes are less important in explaining future reputation score. On the other hand, firms operating in concentrated business still rely on their operational results when their reputation is assessed.

Table 6: Regression Analysis of Performance-to-Reputation

	Model IV		Model V		Model VI	
	Coefficient	T-Stat	Coefficient	T-Stat	Coefficient	T-Stat
Panel A: Return on Assets and Reputation						
Reputation	2.460***	5.73	2.463***	5.73	1.546***	2.77
Log of Market Capitalization	0.1761***	9.01	0.1759***	8.97	0.1751***	8.91
Competition Index			0.0592	0.24	-1.056**	-2.00
Interaction Term					17.322**	2.27
Sales Growth	-0.0251	-0.14	-0.0248***	-0.13	-0.0204	-0.11
Leverage	0.0103	0.05	0.0094***	0.05	0.0214 *	0.11
Fama French Industry Dummy	0.0032*	1.70	0.0033*	1.7	0.0032	1.60
Year Dummy	-0.0020	-0.07	-0.0020	-0.07	-0.0019	-0.07
Intercept	4.947***	23.06	4.942***	22.91	5.012***	22.94
Number of obs		634		634		634
F(6, 607)		27.53		23.56		22.52
Prob > F		0		0		0
R-squared		0.2026		0.2026		0.2065
Root MSE		0.60983		0.61031		0.60929
Panel B: Tobin's Q and Reputation						
Reputation	0.0985***	4.74	0.0989***	4.72	0.0501*	1.66
Log of Market Capitalization	0.1780***	8.97	0.1776***	8.91	0.1758***	8.66
Competition Index			0.1047	0.39	-1.916	-1.63
Interaction Term					1.142*	1.72
Sales Growth	-0.0765	-0.38	-0.0764	-0.38	-0.0600	-0.3
Leverage	-0.1073	-0.54	-0.1087	-0.55	-0.1023	-0.52
Fama French Industry Dummy	0.0028	1.44	0.0029	1.49	0.0029	1.48
Year Dummy	0.0010	0.03	0.0011	0.04	0.0000	0.00
Intercept	4.937***	23.13	4.928***	22.96	5.030***	22.02
Number of obs		634		634		634
F(6, 607)		26.88		23.01		21.66
Prob > F		0		0		0
R-squared		0.1935		0.1936		0.1974
Root MSE		0.6133		0.6137		0.6128

Table 6 presents the results of regression analysis of performance-to-reputation relationship. Panel A uses ROA to proxy performance and Panel B employs Tobin's Q. All other variables are defined in the same way as in Table 4 and 5. Model IV, V and VI are specified as in equation (4)-(6). ***, ** and * represents the significance level at 10%, 5%, and 1% respectively.

CONCLUDING COMMENTS

In the last few decades, reputation has become increasingly critical in the decision-making process for modern corporations. Not only does it reflect a corporation's public image, it also helps boost profitability and enhance shareholders value. Prior research has confirmed a virtuous relationship between financial performance and corporate reputation. As stated in these studies, a good reputation leads to strong financial outcomes (Gupta, 2002, Rose and Thomsen, 2004) meanwhile, better financial performance enhances firms' subsequent reputation (Koch and Cebula, 1994, Flanagan et al, 2013). This bilateral relationship is sustainable over time (Roberts and Dowling, 2002). However, reputation is difficult to measure given its implicit nature and, more importantly, there is the lack of universal consensus of reputation proxy. Walker (2010) posits that reputation is an aggregated concept among various external constituents. Operationalizing reputation is challenged by how to incorporate different views from various outsiders who tend to focus only on a subset of reputation determinants.

Practically, most existing reputation surveys only contain certain aspects of reputation. The most commonly-used measure is Fortune's Most Admired Company (FMAC) list, which has eight different criteria and is based upon a variety of experts' opinions. Using FMAC, the virtuous relationship between reputation and financial outcomes has been verified by multiple studies. Nevertheless, many confounding factors are largely unidentified in prior research. In the present study, we re-examine the recursive relationship between reputation and firm financial performance along with industry intensity. Similar to earlier findings, such as McGuire et al (1990), we show a positive correlation between prior reputation and financial performance. We find that industry intensity does *not* change this dynamic. R-squares virtually

unchanged (R-square=14%) when we add the industry competition proxy, the Herfindahl Index, into our regressions. The coefficient of firm reputation remains at 0.011 in all three specifications, which indicates that one unit increase in reputation score can improve future ROA by 1.1% regardless of competition status. On the other hand, we find that previous financial outcomes affect corporate reputation differently given different industry intensity. In non-competitive sectors, ROA still plays a dominant role in determining firms' reputations. Such effect, however, is moderated in competitive sectors. More competitive sectors generally have firms with better reputation, and prior financial performance becomes less important in the reputation assessment. As to non-competitive sectors, ROA or Tobin's Q is still critical in subsequent reputation assessment. We argue that competition helps to improve a firm's reputation as a supplementary monitoring channel and reduces the explaining power of prior financial outcomes on future reputation scores. Our results advance our understanding of the dynamic between reputation and performance.

Our results, though, should be interpreted with caution. Fryxell and Wang (1994) explain the limitation of using FMAC as a measure of reputation. They argue that FMAC relies on financial metrics and is less representative of the view of other stakeholders. Also, it is possible that the link between financial performance and reputation is driven by unidentified variables. Moreover, endogeneity problem also casts doubts on our findings. A better statistical approach with valid instrument variable could strengthen our findings. In reputation research, more work needs to address these issues and to refine the causation between reputation and performance as well as their interactions with other confounding factors. These efforts will help practitioners greatly in their decision-making process.

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IS VOLUNTARY DISCLOSURE VALUE RELEVANT? EVIDENCE FROM ITALIAN LISTED COMPANIES

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ABSTRACT

The paper aims to assess the level of voluntary disclosure in companies listed on the Italian Stock Exchange and understand the relationship between the quality of voluntary disclosure and market value of Italian listed companies. Voluntary disclosure refers to the discretionary release of financial and non-financial information, which companies are not obliged to disclose by accounting standard setting bodies. In particular, this paper analyzes the effect that disclosure of voluntary information could have on the stock market value of Italian listed companies. To do this, 203 annual reports of Italian listed companies for the year 2012 were analyzed. A voluntary disclosure index is created to measure the extent of disclosure. The index is used in an ordinary least squares model, as a dependent variable, to understand relationships between the above-mentioned determinants. The disclosure score is composed mainly of 38 items per firm. A total of 7,714 items were collected and analyzed. Results show the level of voluntary disclosure provided by Italian listed companies in their 2012 annual reports positively and significantly affect the value relevance of Italian listed companies.

JEL: M41

KEYWORDS: Voluntary Disclosure, Value Relevance

INTRODUCTION

Voluntary disclosure refers to the discretionary release of financial and non-financial information, which companies are not obliged to disclose by accounting standard setting bodies. The provision of additional information, not specifically required by law, is becoming increasingly important. This practice can make a firm more competitive and provides significant transparency to stakeholders. Meek (1995) defines voluntary disclosure as “free choices on the part of company managements to provide accounting and other information deemed relevant to the decision needs of users of their annual reports.”

In Italy, the disclosure of financial and nonfinancial information, for listed companies, is regulated by different legislative sources (IAS/IFRS; Legislative Decree no. 58/1998; Legislative Decree no. 127/1991; Legislative Decree no. 231/2001; Legislative Decree no. 38/2005, 262/2005; Legislative Decree 32/2007; Consob Regulations and Italian Stock Exchange regulations). All elements required by laws are classified as mandatory disclosure. It is possible to classify mandatory disclosure tools on the basis of recurrence time for which they are used (Zambon, 2011) in three main categories: initial information tools, periodic reporting tools and episodic information tools.

The first category includes the listing admission’s prospectuses (Consob resolution no. 19971 of 14 May 1999). The mandatory reporting disclosure is aimed at fulfilling legislative needs and protecting some categories of stakeholders. This reporting is realized through the preparation of certain mandatory documents (separate and consolidated financial statements, management reports, interim reports, statutory auditor reports, external auditor reports, corporate governance and ownership reports, letters to shareholders, and minutes of meetings). Episodic information tools are documents that disclose qualitative

and quantitative information, in a mandatory way, following the occurrence of extraordinary corporate transactions (mergers, demergers and disposals; increases and reductions in capital; conversions of operation shares; treasury share transactions; related party transactions; issuances of bonds; amendments to certificates of incorporation; and other relevant facts). All other instruments that a company adopts discretionarily, in order to convey more information, can be considered voluntary disclosure tools.

The need for information disclosure, in voluntary ways, is explored by the accounting literature through different theories. Researchers and scholars argue, “disclosure is a complex phenomenon that cannot be explained by only one theory” (Adrem, 1999; Cormier et al., 2005, Bazine and Viral, 2011).

One of these accounting theories that can help us in understanding the role of voluntary disclosure in accounting and capital market-related research is signaling theory. This theory explains the reason why firms have an incentive to report information in a voluntary way to capital markets. Voluntary disclosure is required to compete successfully in risk capital markets. Insiders know more about the firm’s situation and future plans than investors. Investors, in order to protect themselves, offer a lower price. The firm’s value can be increased when the company reports a high level of voluntary information that increase the credibility perceived by investors. This in turn reduces the uncertainty for potential investors.

According to signaling theory, management can provide additional information to reduce information asymmetry (Spence, 1973; Alvarez et al. 2008) and signal to outsiders that the company is achieving better performance than competitors (Miller, 2002). Investors make decisions based on information provided by firms (Abhayawansa and Abeyssekera, 2009), which underscores how the credibility of information spread is essential to reduce information asymmetry (Hughes, 1986).

Firms with higher performance (economical, financial, and social) are more inclined to provide higher information to signal to external environments their excellence and differentiate themselves from other competitors (Akerlof, 1970). By that reasoning, we infer that lower-performance companies will be more inclined to silence even if this alternative cannot be the ideal solution. The market could interpret this silence as a negative signal (Ross, 1979; Milgrom, 1981). Firms may be affected by bad reputation by not also communicating (to different stakeholders) unfavorable news in an acceptable timeframe (Skinner, 1994).

Disclosing information in a voluntary way can provide benefits, such as the decrease of information asymmetry and the related cost of capital (Jensen and Meckling, 1976) or reduction of investor uncertainty, but it may also involve incurring direct costs (for example, legal costs, audit costs, data collections and disclosure costs etc.) and indirect costs (property costs or expenses arising from competitive disadvantages that are created if the information is used by competitors) (Maulz and May, 1978; Grey et al., 1984; Cooke, 1989; Lev, 1992). For this reason, management must choose whether to provide additional information, not required in a mandatory way, and the level of details to provide. With regard to listed companies, as we will see, the disclosure of voluntary information can affect the stock market, thereby influencing stock values. To understand this phenomenon, in the present research, a value relevance approach will be used.

Value relevance is a term used in accounting studies to identify research that analyzes the impact of accounting measures on the market value of certain firms. These models are based on the use of market value predictive models. In the accounting literature, there are many definitions of value relevance that reflect the different aspects and different perspectives analyzed. For example, Hellström (2006) defined value relevance as “the ability of financial statement information to capture or summarize information that affects share values.” This definition underlines a perspective of the analysis that assumes the efficient market hypothesis (Fama, 1970) and a related capacity of market value to react to accounting performance information.

Many studies use the value relevance approach to understand the ability of accounting value to predict market values. There are different classification of these studies (see, for example, the classification provided by Hellström, 2006; Holthausen and Watts, 2001; Beaver, 2002; Beisland, 2009) and also different econometrical models used (for example, Price Model and Returns Model [Ohlson, 1995; Easton and Harris, 1991]).

Unlike the majority of the studies conducted on this topic, the aim of this paper is not to understand the value relevance of book value, but the additional value relevance realized by companies that provide additional voluntary disclosure. There are few studies in the international literature that provide this evidence worldwide. In the next section, a few experimental studies on this topic are explored. The remainder of the paper is organized as follows. The next section discusses the literature and hypotheses. The data and sample construction are then discussed, followed by a discussion of the results. The last section provides some concluding remarks.

LITERATURE REVIEW

Most value-relevance studies are focused the potential of accounting data to influence stock returns. Over the past decade researchers' attention has begun to focus on the potential impact that the degree of additional disclosures provided in the annual report could have on financial markets. In fact, based on efficient markets assumptions (Fama, 1970), as well as other accounting theories (in particular signaling theory), several studies in reference to this topic were conducted.

The increase of information in annual reports can create value for different stakeholders that can evaluate their choices, even for investment, with a higher degree of accuracy (Lang et al., 2003).

Although the issue of value relevance of voluntary disclosure has not been analyzed by scholars with the same intensity of the value relevance of accounting information, below we summarize the main existing studies on the subject.

In 2002, some research regarding the value relevance of voluntary disclosure was conducted by authors such as Lundholm and Myers (2002) and Gelb and Zarowin (2002). Both focused their attention on U.S. companies using statistical techniques of univariate and multivariate analysis in a period between 1980 and 1994. To detect the level of voluntary disclosure, they did not use ad hoc indexes. Instead they used the voluntary disclosure score provided by the Association for Investment Management and Research (AIMR), and they provided evidence that the level of voluntary disclosure can positively impact stock exchange values.

Lang et al. (2003) analyzed a sample of 4,859 listed companies (belonging to 28 different countries), some of which are listed on a single market and others in more than one regulated markets (cross-listed). They examined data for the year 1996 using a disclosure score, which indicated the disclosure of voluntary information, obtained from the I/B/E/S database. They note that companies listed on more than one market are subject to better and more accurate assessments by financial analysts than those listed on a single market. Since the quality of analysis of information related to the environment positively impacts the values of equity, the authors argue that cross-listed companies, convey a greater level of information, and are thus able to increase the value of their shares.

Silva and Alves (2004) investigated the value relevance of voluntary disclosure transmitted via the websites of 150 listed companies in 2002 listed in Argentina, Brazil and Mexico. They emphasize a link to positive and significant correlation between the level of disclosure and the values market. Studies point out that this relationship also depends on the sector and the size of companies analyzed and that country of origin does not affect the level of value relevance observed.

Abdolmohammadi (2005) examined a sample of 58 U.S. Fortune 500 firms to understand how information related to intellectual capital in annual reports impacts market prices. The investigation, emphasized how the disclosure of intellectual capital is higher in companies operating in sectors classified as belonging to the “new economy” (such as information technology, services, etc.). He used multivariate analyses and found a significant positive association between the level of disclosure of intellectual capital and market values.

This evidence is not supported by Murray et al. (2006), who conducted a similar study on a sample of 660 listed companies covering the years 1988-1997 in the United Kingdom. The present research aims to identify and understand possible correlation between the level of social and environmental disclosure and market values of the companies analyzed. The analysis of 152 listed companies (in the period between 1996 and 2000) on the Copenhagen Stock Exchange conducted by Banghoj and Plenborg (2008) indicated that the level of voluntary disclosure of information is not value relevant.

Different conclusions are drawn from the research of Hassan et al. (2009). The research sample consisted of 272 listed Egyptian companies over the period 1995 to 2002. The authors, using univariate and multivariate statistical tools for analysis, found evidence that voluntary disclosure is value relevant, even if the statistical tests do not confirm the significance of the values obtained. The authors point out that the latter supports the view that there are complex interactions of several factors in determining the correlation between voluntary disclosure and firm value.

Gordon et al. (2010) analyzed the role of information regarding the security company used in determining stock values. They examine a sample of 1,641 U.S. companies. The research shows how this type of information provided voluntarily by companies has a positive impact on market values.

The information related to environmental aspects and Corporate Social Responsibility (CSR) of Canadian companies is the object of a study by Cormier et al. (2011). The authors, making use of multivariate 2SLS and using a sample of 137 Canadian companies listed in 2005, emphasized that disclosure of information related to the environment and CSR play an important role in reducing information asymmetry in financial markets. This finding confirms the capacity of the same to be value relevant. Anam et al. (2011) confirmed the value relevance of intellectual capital information by providing empirical evidence from a sample of 186 Malaysian listed companies between 2002 and 2006. In Kuwait, the level of value relevance of voluntary disclosure has been analyzed by Alfaraih and Alanezi (2011). They use the Returns Price Model, to study the phenomenon of 117 listed companies in 2007, highlighting the inability of voluntary disclosure to explain market values.

Unlike the study mentioned above, other authors (Uyar and Kilic, 2011; Al-Akra and Ali, 2012) used methods derived from the Ohlson Model to confirm the value relevance of voluntary disclosure of listed companies in Turkey (129 listed companies analyzed in 2010) and in Jordan (243 listed companies analyzed between 1996 and 2004).

To provide an overview of the main studies on the value relevance of voluntary disclosure, Table 1 summarizes the literature from the main studies conducted on this topic. Column (1) reports the author(s) name and year of publication, column (2) the country context, column (3) the sample period, column (4) the number of firms analyzed, column (5) the methodology adopted in order to conduct the analysis, and finally column (6) features the main findings provided by the authors.

Table 1: Value Relevance of Voluntary Disclosure: The Extant Literature

Authors	Country	Period	Number of Firms	Methodology	Results
Lundholmand Myers (2002)	USA	1980-1994	4,478	Univariate and multivariate analysis (disclosure score provided by AIMR)	The voluntary disclosure level is value relevant
Gelb and Zarowin (2002)	USA	1980-1993	821	Univariate and multivariate analysis (disclosure score provided by AIMR)	The voluntary disclosure level is value relevant
Lang et al. (2003)	28 Countries	1996	4,859	Univariate and multivariate analysis (disclosure score provided by IBES)	Cross-listed companies obtain better evaluation from analyst and higher market values on the related Stock Exchange
Silva and Alves (2004)	Argentina, Brazil and Mexico	2002	150	Multivariate analysis	Size and sectors affect the level of value relevance of voluntary disclosure information. Countries doesn't affect the value relevance level
Abdolmohammadi (2005)	USA	1993-1997	58	Univariate and multivariate analysis	The voluntary disclosure level of intellectual capital information is value relevant
Murray et al. (2006)	U.K.	1988-1997	660	Univariate and multivariate analysis	There are no significant evidences of the impact of environmental disclosure on the value relevance level
BanghojandPlenborg (2008)	Denmark	1996-2000	152	Univariate and multivariate analysis (Collins model)	The voluntary disclosure level is value relevant
Hassan et al. (2009)	Egypt	1995-2002	272	Univariate and multivariate analysis	The voluntary disclosure level is value relevant (not significance)
Gordon et al. (2010)	USA	n.a.	1,641	Ohlson Model	The voluntary disclosure level is value relevant
Cormier et al. (2011)	Canada	2005	137	Multivariate analysis 2SLS	The voluntary environmental and CSR disclosure level reduce information asymmetries with financial markets
Anam et al. (2011)	Malaysia	2002-2006	186	Ohlson Model	The voluntary disclosure level of intellectual capital is value relevant
AlfaraihandAlanezi (2011)	Kuwait	2007	117	Price Model (Ohlson Model) and Returns Model	The voluntary disclosure level is value relevant
Uyar and Kilic (2011)	Turkey	2010	129	Ohlson Model	The voluntary disclosure level is value relevant
Al-Akra and Ali (2012)	Giordan	1996-2004	243	Ohlson Model	The voluntary disclosure level is value relevant

This table summarizes the literature review of the main studies conducted on the value relevance of voluntary disclosure

HYPOTHESIS DEVELOPMENT

The aim of this research is to identify the capacity of voluntary disclosure to increase the value relevance of Italian listed companies. To conduct this study, the following hypothesis was developed:

H1: Value relevance is positively affected by the amount of voluntary information provided by listed companies.

The increase of voluntary disclosure in the annual report can create value for different stakeholders. With a greater degree of information, stakeholders can evaluate their choices with a higher degree of accuracy (Lang et al., 2003). The higher amount of information withheld may therefore provide greater confidence in investors that are reflected in equity market values, as demonstrated by empirical evidence emerging from previous studies (Lundholm and Myers, 2002; Gelb and Zarowin, 2002; Abdolmohammadi, 2005; Al-Akra and Ali, 2012; Uyar and Kilic, 2011; Anam et al., 2011; Cormier et al., 2011; Gordon et al., 2010).

DATA AND METHODOLOGY

To assess the relationship between voluntary disclosure and firm value, in this study 203 annual reports of Italian listed companies were analyzed. This research includes the main companies listed on the Italian Stock Exchange as of December 31, 2012. The annual reports are available on the Italian Stock Exchange website. Annual reports are usually considered the main source of information as well as the key channel of communication with external users of information. The research is limited to a single year (2012), because, according to Botosan (1997), firms keep a quite stable strategy of disclosure over time.

The sample composition is shown in Table 2, which reports the number of annual reports analyzed, the number of voluntary disclosure item observed (per firm) and the total of the voluntary disclosure items collected.

Table 2: Number of Annual Reports and Items Analyzed

Stock Index	Number of Firms Analyzed	Voluntary Disclosure Items Observed Per Firm	Voluntary Disclosure Items Observed
FTSE MIB	40	38	1,520
FTSE Mid Cap	50	38	1,900
FTSE Small Cap	94	38	3,572
FTSE Micro Cap	19	38	722
Total	203		7,714

This table shows the number of annual reports analyzed, the number of voluntary disclosure item observed and the total of the voluntary disclosure items collected

This paper analyzes the level of value relevance of voluntary disclosures provided by Italian listed companies in the annual report and examines if the level of voluntary disclosure is able to influence the stock prices of the companies analyzed. To do this, we made use of certain multivariate linear regression models based on the OLS model of Ohlson (Ohlson, 1995). The model generally adopted for this type of analysis is the Price Regression Model (PRM) defined as follows:

$$MV_{it} = \alpha_0 + \beta_1 BV_{it} + \beta_2 NI_{it} + \varepsilon_{it} \quad (1)$$

where:

MV_{it} is the market value of the equity collected on the 4th month after closing year date;

BV_{it} is the book value of the equity; and

NI_{it} is the net income of equity.

In the present study, I used multiple linear regression models, which, starting from the reference method generally adopted (PRM) put emphasis on the differences between the model as formulated above, as well as a second model that also considers the level of voluntary disclosure provided by the company being analyzed. In doing so, the model assumes the following formulation:

$$MV_{it} = \alpha_0 + \beta_1 BV_{it} + \beta_2 NI_{it} + \beta_3 VDI_{it} + \varepsilon_{it} \quad (2)$$

where, as previously described, a third independent variable is added to the multivariate model representing the level of voluntary disclosure (VDI). The composition of the variable will be explained in the next paragraph.

The main problem with the two OLS models described above is they are affected by the scale effects problem that emerges after the analysis of a sample dimensionally heterogeneous (Easton and Sommers, 2003; Wu and Xu, 2008). This problem can be mitigated by scaling all variables by the value of the prior

year capitalization as suggested by some authors (Easton, 1998; Brown et al., 1999; Cahan, 2000; Aboody et al., 2002; Lang et al., 2006; Barth et al, 2008). This operation was performed on all variables, both dependent and independent, to take into account the problem of heteroskedasticity (Ali and Hwang, 2000). For this reason, the models explained before were transformed from (M1) and (M2) to (M3) and (M4) as specified below:

$$\frac{MV_{it}}{MV_{i(t-1)}} = \alpha_0 \frac{1}{MV_{i(t-1)}} + \beta_1 \frac{BV_{it}}{MV_{i(t-1)}} + \beta_2 \frac{NI_{it}}{MV_{i(t-1)}} + \varepsilon_{it} \quad (3)$$

$$\frac{MV_{it}}{MV_{i(t-1)}} = \alpha_0 \frac{1}{MV_{i(t-1)}} + \beta_1 \frac{BV_{it}}{MV_{i(t-1)}} + \beta_2 \frac{NI_{it}}{MV_{i(t-1)}} + \beta_3 \frac{VDI_{it}}{MV_{i(t-1)}} + \varepsilon_{it} \quad (4)$$

To compare the two models and understand whether the addition of a third explanatory variable (VDI) significantly impacts the explained variance of the model, R2, it was necessary to conduct the Wald test and F-test, as was a nested model approach. The incremental F-test is used to test the null hypothesis, that $H_0: \beta_3 = 0$. The nested model is superior, in terms of explained variance, to the full model. The F-test is specified as follows (Stock and Watson, 2007):

$$F = \frac{(RSS_1 - RSS_2)/(k_2 - k_1)}{RSS_2/(n - k_2 - 1)} \quad (5)$$

Where:

- RSS1 = residual sum of squares of the nested model,
- RSS2 = residual sum of squares of the full model,
- k1 = number of estimated coefficients (including constant) for the restricted model,
- k2 = number of estimated coefficients (including constant) for the unrestricted model,
- n = total number of observations.

The methodology used to assess the level of disclosure is content analysis is based on the qualitative study of vocabulary used in company documents to understand the content and the standardization of the documents. It is a methodology that is spreading dramatically in studies of Financial Accounting (Beattie, 2005). In particular, Krippendorff (1980) defines content analysis as "a set of procedures to collect and organize information in a standardized format that allows the analyst to undertake inferential analysis on the characteristics and meaning of the recorded information".

Content Analysis is a preparatory step to assess a disclosure index, that is a measure representing the level of information provided by the company (voluntary or mandatory). The measure is calculated on the basis of specific elements observed based on one or more specific sources of information. The first issue, therefore, in order to define the disclosure index which will represent disclosure quality, is found in elements to be considered for creating the index.

To create an index that represents the level of voluntary information disclosed by companies, items were observed in accordance with the most-used items observed in voluntary disclosure research (Meek et al., 1995; Botosan, 1997; Haniffa and Cooke, 2001; Chau and Gray, 2002; Eng and Mak, 2003; Huafang and Jianguo, 2007). The data below represents the main aspect of voluntary disclosure information observed, to create the voluntary disclosure index. The items selected and included in the index are reported in Table 3.

Table 3: Items Analyzed in Voluntary Disclosure Index (VDI)

Category	Items
A. PERFORMANCE INDICATORS	A.1. ROE A.2. ROA A.3. ROS A.4. DPS A.5. Debt Sustainability A.6. PTBV
B. FIRM BACKGROUND	B.1. History B.2. Organisational Structure B.3. Business B.4. Main products/services B.5. Main markets B.6. Competitive environment
C. FORWARD-LOOKING INFORMATION	C.1. Expected Market Share C.2. Expected Cash flow C.3. Expected Investment C.4. Expected Net Income C.5. Expected Revenues
D. HUMAN RESOURCE	D.1. Number of Employees D.2. Training D.3. Recruitment Policies D.4. HR functions D.5. HR geographic distribution D.6. HR Welfare policies
E. RESEARCH & DEVELOPMENT	E.1. R&D Projects E.2. R&D Resources E.3. R&D Policies E.4. R&D Activities Deployment E.5. Patents
F. STOCK EXCHANGE INFORMATION	F.1. Share volume F.2. Share Value F.3. Share distribution F.4. Share FLI
G. SEGMENTAL REPORTING	G.1. Sectorial Market share G.2. Business line Production G.3. Business line Costs
H. OTHERS	H.1. Social impact of economic performance H.2. Environmental policies H.3. ISO Certification

This table shows the number the items selected and included in the disclosure score

The index includes 8 categories of voluntary disclosure elements (performance indicators, firm background, forward-looking information, human resource information, research and development elements, stock exchange information, segment reporting and others).

To differentiate the information presented in annual reports, a different score was assigned to arrange the index: 2 points if an item was reported in qualitative and quantitative terms, 1 point if the item was reported in qualitative terms, 0 point if the item was absent. The model is unweighted because all items are important in the same way and information repeated is considered as information presented only one time (consistently with other authors such as Giner, 1997; Oliveira et al., 2006; Raffournier, 1995). The items are hand-collected because software-based searches are not robust and are not able to capture accurately narrative disclosure such as manual analysis (Beattie and Thomson, 2007).

The Voluntary Disclosure Index (VDI) is expressed as:

$$VDI = \frac{\sum_{i=1}^n di}{m} \tag{6}$$

Where:

d_i is a variable that could assume the following values according to the following circumstances: $d_i = 0$ if the item is not disclosed, $d_i = 1$ if the item is disclosed in qualitative terms. $d_i = 2$ if the item is disclosed in qualitative and quantitative terms

m is the maximum number of elements that a firm may disclose in reference to a voluntary disclosure framework provided in Table 6. This variable is important in order to consider what a firm can effectively disclose in its report (i.e., a firm without ISO certification could not give information about this kind of element).

RESULTS AND DISCUSSION

Table 4 reports descriptive statistics for the variables included in the regression model. Means, medians, standard deviation, variance and 95% confidence interval are provided.

Table 4: Descriptive Statistics

	Stock Index	N	Mean	Std. Dev.	95% Confidence Interval		Median	Variance
Voluntary disclosure	FTSE MIB	40	0.39	0.13	0.35	0.43	0.35	0.02
	FTSE Italia Mid Cap	50	0.38	0.11	0.35	0.41	0.36	0.01
Index (VDI)	FTSE Italia Small Cap	94	0.32	0.12	0.29	0.34	0.32	0.01
	FTSE Italia Micro Cap	19	0.23	0.06	0.20	0.26	0.22	0.00
Equity	FTSE MIB	40	8,095,543	14,355,981	3,504,278	12,686,809	3,225,300	206,094,000,000
	FTSE Italia Mid Cap	50	2,530,547	9,902,350	-283,670	5,344,376	150,373	98,056,000,000
	FTSE Italia Small Cap	94	388,982	817,908	221,458	556,506	119,739	668,000,000
	FTSE Italia Micro Cap	19	144,576	181,764	56,969	232,184	70,810	33,000,000
Net Income	FTSE MIB	40	276,665	1,231,283	-117,118	670,449	139,719	1,516,000,000
	FTSE Italia Mid Cap	50	15,089	296,559	-69,192	99,370	790	87,947,000,000
	FTSE Italia Small Cap	94	-27,916	146,338	-57,889	2,057	115	21,415,000,000
	FTSE Italia Micro Cap	19	-19,320	79012	-57,403	18,763	-2,251	6,242,000,000
Capitalization	FTSE MIB	40	7.753.576	11.431.174	4.097.709	11.409.443	3.356.264	130.672,000,000
	FTSE Italia Mid Cap	50	742.809	465.811	610.427	875.191	686.888	217,000,000
	FTSE Italia Small Cap	94	63.247	50.514	52.900	73.593	52.625	2,551,000,000
	FTSE Italia Micro Cap	19	95.826	113.814	40.969	150.682	40.442	12,953,000,000

This table reports descriptive statistics for the variables included in the regression model

As we notice from Table 5, there is a positive and significant correlation Pearson correlation coefficients between the market value variable and the VDI using the univariate approach.

To better understand the value relevance of voluntary disclosure, M3 and M4 (as described in the previous paragraph) were run., The researchers tried to compare them through the nested model (M3 nested in M4).

The results of the analysis are summarized in Table 6), which shows not only the evidence found by the analysis of two distinct models, but also by a third, nested, model. The purpose of the model, expressed in the table as M3 nested in M4, is to shed light on the increase or decrease in goodness of fit of variance explained and significance of model M4 from model M3. In other words, with the nested template, we can understand if the OLS regression that incorporates the variable inherent in the level of voluntary disclosure (M4) is better in explaining the phenomenon of value relevance than the model which considers only equity and profit of the year as independent variable (M3).

Table 5: Correlation Coefficients (Pearson)

PearsonCoefficients (r)	VDI	Net Income	Market Value	Equity
VDI	1	0.064	0.248**	0.090
Net Income	0.064	1	-0.008	0.537**
Market Value	0.248**	-0.008	1	0.113
Equity	0.090	0.537**	0.113	1

*This table reports the correlation coefficients between the market value variable and the VDI. *significant at 0.01 level (2-tails), ** significant at 0.05 level (2-tails)*

The nested OLS model above shows how by inserting a third variable, the significance of the model increases in all the indexes observed, with the exception of companies included in the FTSE Micro Cap. For these firms it is not possible to reject the null hypothesis of the coefficient object of observation ($H_0: \beta_3 = 0$). For the other companies, the incremental F-test and its p-value, point out how the rejection of the null hypothesis is equal to 0.01 level for FTSE MIB and FTSE Mid companies and is equal to 0.1 for Small Cap. This denotes a high degree of significance of the model M4 that includes the voluntary disclosure variable as a proxy of value relevance). It is also possible to notice how, after the inclusion of the variable concerning the level of disclosure, the variance explained (R^2) increases, emphasizing a higher goodness of fit for model M4 than M3. The statistical observations that emerge underline that the level of voluntary disclosure impacts, in a positive and significant way, determination of the phenomenon of value relevance in Italian listed companies.

Table 6: Results of OLS Regression Models (M3, M4 and M3 Nested in M4)

	Model	β_1	β_2	β_3	N	R^2	F ($H_0: \beta_i = 0$)	F	Pr>F	ΔR^2	$H_0: \beta_3 = 0$
	M3	0.0249	-0.0183	-	40	0.0046	1.089				
FTSE MIB	M4	0.0017	0.0243	0.1972***	40	0.2143	4.545***				
	M3 nested in M4							10.875***	0.0022	0.2097	Rejected at 0.01 level
	M3	0.0092	0.01247	-	50	0.0013	0.9664				
FTSE Mid Cap	M4	0.0069	0.3464	3.857***	50	0.1361	3.573**				
	M3 nested in M4							8.479***	0.0055	0.1348	Rejected at 0.01 level
	M3	0.0081***	0.0710	-	94	0.0920	5.711***				
FTSE Small Cap	M4	0.0068***	0.061	9.171*	94	0.1161	5.073***				
	M3 nested in M4							3.485*	0.0652	0.0241	Rejected at 0.1 level
	M3	0.0233**	-0.0193	-	19	0.2832	4.556**				
FTSE Micro Cap	M4	0.0250*	-0.0278	-0.0094	19	0.2623	3.133*				
	M3 nested in M4							0.5469	0.471	-0.0209	Accepted

*The table reports the M3 and M4 OLS nested models that underscore that the level of voluntary disclosure impacts in a positive and significant way the determination of the value relevance in Italian listed companies. *** p-value < 0.01 ** p-value < 0.05 * p-value < 0.1*

CONCLUSIONS

The discretionary release of financial and non-financial information that companies are not obliged to disclose by accounting standard setting bodies is a spotlight topic in accounting literature. Many empirical studies have been conducted to assess the level of voluntary disclosure worldwide and to understand the effect that certain firm-specific determinants could have on it. The majority of them use weighted and unweighted disclosure scores to explain disclosure quality. These are ad-hoc created indexes, created by researchers to observe some specific disclosure aspects.

In the research presented here, the quality of voluntary disclosure is assessed in reference to Italian listed companies in 2012. To do this, annual reports of Italian listed companies were analyzed, and 7,714 voluntary disclosure items were observed to create the DScore. This DScore was used in an OLS regression model, derived from the Ohlson Model, as an independent variable to understand the value relevance of voluntary disclosure. The results show that a higher level of voluntary disclosure impacts the stock market value in a positive and significant way. This evidence is consistent with the signaling theory, according to which voluntary disclosure is necessary to compete successfully in the market for venture capital. Insiders have more knowledge of the actual situation of the company and their future plans relative to investors, so the latter protect themselves by offering a lower price for the shares, having a lower level of information.

The value of the company increases, however, in cases where the company voluntarily provides additional information. This further information enhances the credibility of firms, and reduces the uncertainty for potential investors. As shown in the empirical analysis, and in accordance with the signaling theory, management can provide more information to reduce information asymmetry and reassure markets (Spence, 1973; Alvarez et al., 2008). Some previous studies confirm the findings shown in this research in reference to the Italian context (Lundholm and Myers, 2002; Gelb and Zarowin, 2002; Abdolmohammadi, 2005; Al-Akra and Ali, 2012; Uyar and Kilic, 2011; Anam et al., 2011; Cormier et al., 2011; Gordon et al., 2010).

The research presented here could be extended to other countries or examined at a different time point to address the limitation of this study. This topic, particularly over the last decade, has been of great interest to accounting researchers. The quality of information, however, is not always easily and immediately understood. Different methods are used with a view to measuring information quality. Future research on this topic could use different methodologies in different legislative contexts.

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TECHNICAL EFFICIENCY OF ISLAMIC BANKS VERSUS DOMESTIC BANKS: EVIDENCE FROM BANGLADESH

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ABSTRACT

This paper empirically estimates the technical efficiencies (TE) of Islamic banks compared to conventional banks in deposit mobilizations and loans production for 2010. This analysis uses the stochastic frontier production function. Estimates of the mean TE of Islamic banks and conventional banks for loans are 59.6 percent and 62.8 percent respectively, and for deposits are 0.61 and 0.60 respectively. Parametric tests, test, Satterthwaite-Welch t-test, Anova F-test, and Walch F-test, indicate no statistical evidence of significant differences between the TE of Islamic and conventional banks. The competitive market structure for loans and deposits markets, evidenced by the Herfindahl-Hirschman Index of less than 400, provides an explanation for the equality of mean TE between Islamic and conventional banks.

JEL: G20, G21, C33

KEYWORDS: Efficiency, Foreign Bank, Domestic Bank, Stochastic Frontier

INTRODUCTION

Since the liberation in Bangladesh in 1971, there has been a rapid development of banking as well as of deposit mobilizations and financing bank loans. At the time of liberation, Bangladesh had only five domestic banks (Sonal Bank, Rupali Bank, Janata Bank, Agrani Bank, and Pubali Bank). All were nationalized by the then-government. When the privatization policy was introduced in 1982, one of the five banks, Pubali Bank, was sold to the private sector.

Currently, there are forty-seven banks operating in Bangladesh with a total of 8,375 branches. Of these forty-seven banks, forty are conventional (i.e., interest-based banks), and seven are Islamic banks. Among the forty conventional banks, eight are foreign banks. All banks operate side by side and compete for deposit and loan markets. During the period 2012-2013, total deposit mobilizations of banks were TK 5388.39 billion and loan financings totaled TK 5547.99 billion. These numbers were significant improvements over the past.

The operation of Islamic banks is a new phenomenon compared to that of conventional banks. Conventional banks are centuries old and therefore have significant experience in portfolio management, deposit mobilization, and loan financing compared to Islamic banks. Even though Islamic banks are new, however; they compete with conventional banks and operating side by side with them. So, the study of comparative technical efficiency (TE) between conventional banks and Islamic banks in deposit mobilizations and financing loans is important. The comparative study of TE has not been explored in Bangladesh. The study of comparative efficiency in Bangladesh is important to several agents, including bank customers, depositors, and lenders. Bank customers may decide whether they should approach conventional banks or Islamic banks and which may be the better choice for them.

The study of TE is also helpful for bank management, who can improve their efficiency level if they determine their comparative efficiency level in the banking market. Bank management must know whether they are performing below the average or above the average level of efficiency of their rival banks (foreign banks) before making any reallocation of resources for output optimization or cost minimization. Thus, bank management can improve and maintain their competitive skill and efficiency in a competitive market for their survival only when they know current level of efficiency.

As Islamic banks enter into the banking sector, competition in the banking market is increasing and demanding the determination of efficiency for determining comparative efficiencies. A current literature survey shows no record of comparative efficiency studies between conventional banks and Islamic banks. The absence of comparative efficiency studies between Islamic banks and conventional banks in Bangladesh in particular provides a key motivating factor for this study. This study thus makes an important contribution to the banking literature by providing the comparative status of efficiency. It is not only important for bank management and bank regulators but also for bank customers. Relative efficiency information might also provide valuable information to bank customers their decision to choose banks.

The study is organized as a brief survey of literature, discussion of data, methodology and the description of model, and a final section that provides empirical results and conclusions.

LITERATURE REVIEW

The literature on bank efficiency studies is plentiful. However, the number of bank efficiency studies covering less developed countries is limited. For the banking systems of Southeast Asian countries, including Bangladesh, such studies are almost non-existent. El-gamal and Inanoglu (2004) estimated the comparative cost efficiency of Turkish banks for the period 1990-2000 using the data envelopment analysis (DEA) method. They found that Islamic banks were more efficient due to their asset-based financing.

Samad (2004) compared the performance of Islamic banks and conventional commercial banks of Bahrain with respect to (a) profitability, (b) liquidity, and (c) capital management. A comparison of eleven financial ratios for the period 1991-2001 found no difference in profitability and liquidity performance between Islamic and conventional banks for that period.

Sufian and Majid (2006) investigated the comparative efficiency of foreign and domestic banks of Malaysia during 2001-2005. They found that banks' scale inefficiency dominated pure technical efficiency during the period. They also found that the foreign banks had higher technical efficiency than the domestic banks.

There has been some analysis of bank efficiency in India. For the most part, these analyses have used financial indicators for measuring bank efficiency as in the articles by Rammohan and Roy (2004) and Sarkar et al. (1998). Rammohan and Roy found that public sector banks are more efficient than private sector banks in India. In another study, Kumbhakar and Sarkar (2003) used a cost efficiency approach for measuring bank efficiency and also concluded that private sector banks had higher levels of efficiency in contrast to public sector banks in that country.

Another group of Indian scholars used the DEA approach in measuring bank efficiency, including Saha and Ravishankar (2000), Bhattacharyya et al. (1997) and Sanjeev (2006). Bhattacharyya et al. (1997) determined that public sector banks were the best performing banks in India during the late 1980s and early 1990s. Shanmugam and Das (2004) used a stochastic frontier analysis (SFA) process for measuring technical efficiencies of Indian commercial banks and found that a group of state banks were more efficient than a comparable group of foreign banks during a period from 1992-1999.

Andries and Cocris (2010) analyzed the comparative efficiency of banks in several southern European countries during the period of 2000-2006 using both DEA and SFA analytic processes. They found that banks in Romania, the Czech Republic, and Hungary all operated at relatively low levels of technical efficiency.

Samad has done several evaluations of the Bangladesh banking system. Samad’s (2009) review of technical efficiency using data for 2000 found the average efficiency of those banks was 69.6. Samad (2007) also examined the comparative performance of foreign banks versus domestic banks in Bangladesh using various financial ratios of bank performance and found no difference in profit performance between domestic banks and foreign banks in the period 2000-2001. In yet another analysis, Samad (2010) estimated the technical efficiency of Grameen bank micro-financing activities in Bangladesh as developed by Nobel Laureate, Dr. Muhammad Yunus.

Samad (2009) has also previously examined the TE of Bangladesh banking industry, but the current analysis is different from the previous studies in several ways. First, there was no comparison in the previous study. Second, unlike the 2009 study, this study estimates loan and deposit for technical efficiencies instead of profits of the previous study. Samad (2013) investigated the efficiency of Islamic banks using the time varying Stochastic Frontier function on the Islamic banks of 16 countries. Mean efficiencies between the pre global financial crisis and the post global crisis were estimated at 39 and 38 percent respectively and the difference was not statistically significant.

DATA AND METHODOLOGY

Data

Forty three banks were examined. Data for labor, deposits, loans and investments were obtained from the Bank and Financial Institutions’ Activities, Division of Finance, Ministry of Finance, the Peoples’ Republic of Bangladesh for 2010. Data for fixed capital were obtained from the Website of the respective banks. Data are annual. The descriptive statistics of variables are provided in Table 1.

Table1: Descriptive Statistics of Variables

	LABOR	CAPITAL	LOANSINVT	DEPOSIT
Mean	2,812.35	2,575.93	83,302.51	83,578.84
Median	1,511.00	1,615.53	68,434.00	65,126.00
Maximum	20,840.00	26,888.23	390,837.0	464,886.0
Minimum	49.00	0.00	2,804.000	1,851.000
Std. Dev.	4,088.80	4,360.86	77,609.86	85,924.20
Observations	43	43	43	43

Labor refers to the number of fulltime and part-time workers working for the bank. Capital describes the fixed capital of banks such as bank premises, computers, etc., and is expressed in Taka, the local currency of Bangladesh. Deposits, Loans and investments are considered the banks’ output.

Methodology-Stochastic Frontier

Each bank’s efficiency was analyzed using the time invariant stochastic frontier method developed by Aigner, Lovell, and Schmidt (1977) and later refined by Pitt and Lee (1981) and Batties and Colie (1992). As this experience has developed, stochastic frontier modeling has become popular using distinct

parameterizations of an inefficiency term in stochastic production or cost frontier models. The frontier production assumes that a producer has a production function:

$$Q_i = f(X_i, \beta) \tag{1}$$

where X_{it} is a (1x k) vector of inputs and other explanatory variables used for the quantity of output of i th firm and β is a (k x 1) vector of unknown parameters to be estimated.

Stochastic frontier analysis assumes that each firm potentially produces less than it might produce due to a degree of inefficiency. Specifically,

$$Q_i = f(X_i, \beta)\xi_i \tag{2}$$

where ξ_i is the level of efficiency for i th firm; $0 \leq \xi_i \leq 1$. That is, efficiency (ξ_i) lies in the interval between zero and one. If $\xi_i=1$, the firm achieves the optimum output with the technology provided by the production function $Q_i = f(X_i, \beta)$. When $\xi_i < 1$, the firm is not making the most of the inputs X_i given the technology embodied in the production function (2). Since output is assumed to be strictly positive ($Q > 0$), the degree of technical efficiency (ξ_i) is assumed to be strictly positive, i.e. $\xi_i > 0$.

The production of output assumes that it can be subject to random shock, implying that

$$Q_i = f(X_i, \beta)\xi_i \exp(\vartheta_i) \tag{3}$$

Taking natural log of both sides yields

$$\ln Q_i = \ln \{f(X_i, \beta)\} + \ln (\xi_i) + \vartheta_i \tag{4}$$

Assuming the production function is linear in log and defining $v_i = -\ln (\xi_i)$ yields

$$\ln Q_i = \beta_0 + \sum \beta_j \ln(X_i) + \vartheta_i - v_i \tag{5}$$

Restricting $v_i \geq 0$, implies $0 < \xi_i < 1$ as specified in (6). ϑ_i is a random error and is assumed to be iid (independent and identically distributed) as $N(0, \sigma^2)$ and independent of v_i which represents technical efficiency/inefficiency.

The most commonly used production is the Cobb-Douglas function as:

$$Q = L^\alpha K^\beta \tag{6}$$

where L and K are labor and capital; α and β are elasticity of output with respect to labor and capital respectively.

This paper estimates the following Cobb-Douglas production function using the frontier stochastic method:

$$\ln(Q_{it}) = \beta_0 + \beta_1 \ln(K_{it}) + \beta_2 \ln(L_{it}) + V_{it} - U_{it} \tag{7}$$

where Q is the total output, K is capital, and L is labor. All variables are expressed in natural log, ln.

Unlike other businesses such as coal mines, agriculture, electricity utilities, etc., where inputs and outputs are more visible and measurable, a banking firm's input and output is less clearly defined. Since a bank

produces such a wide variety of services, including such functions as account services, loan services, deposit services, and safekeeping services for its customers, it becomes difficult to clearly identify inputs with appropriate outputs (Humphrey, 1991; Benson and Smith, 1976; Sealy and Lindley, 1977). In this paper, I have followed an intermediary approach where banks use their employees and fixed capital as inputs and produce loans and deposits as outputs. The TE for banks' deposits mobilizations and financing loans are estimated.

Methodology-Parametric and Non-Parametric Tests

Once the TE for deposit mobilizations and loan financings is obtained for each bank, parametric tests (T-test, ANOVA, and Welch F-test) and non-parametric tests (Wilcoxon/Mann-Whitney and Kruskal-Wallis) are performed to determine whether there are significant differences in the TE between the Islamic banks and conventional banks.

The Jarque–Bera statistic is used to verify the normality test of the series. The null hypothesis, H_0 , is that the series is normally distributed. The alternative hypothesis, H_a , is that the series is not normally distributed. If the Jarque-Bera statistic is insignificant for both series, the series are normally distributed and the null hypothesis cannot be rejected. Parametric tests such as a t-test, Welch F test, and ANOVA are applied when the data series are normally distributed. If the null hypothesis of a normal distribution is rejected for both series, then it is necessary to apply a non-parametric test such as Mann-Whitney/Kruskal-Wallis K test.

For the parametric test, the null hypothesis, $H_0: \mu_{conbk} = \mu_{isbk}$, is tested against the alternative hypothesis, $H_a : \mu_{conbk} \neq \mu_{isbk}$, where μ_{conbk} = the mean of conventional banks and μ_{isbk} = the mean of Islamic banks.

For the non-parametric test, the null hypothesis is $H_0: Med_{conbk} = Med_{isbk}$: There is no difference in median efficiency between conventional banks and Islamic banks, where Med_{conbk} and Med_{isbk} are the medians of conventional banks and Islamic banks, respectively. The alternative hypothesis is $H_a : medconbk \neq Medisbk$: There is a difference in median efficiency between conventional banks and Islamic banks.

EMPIRICAL RESULTS

Table 2 and Table 3 show the regression estimates of equation (7) for loans and investment and deposits.

Table 2: Stochastic Frontier Estimates of Loans and Investments Efficiency

Number of obs = 42		
Wald chi2(2) = 107		
Prob > chi2 = 0.0000		
Log likelihood = -21.39		
Variables	Coefficient	Z-statistics
Log labor	0.60	6.94*
Log capital	0.11	2.11**
Constant	6.20	10.33*
Sigma v	0.13	
	(0.17)	
Sigma u**	0.69	
	(0.19)	
Sigma2	0.49	
	(0.23)	
Lambda	5.20	
	(0.36)	

Parenthesis () shows standard deviation. * Significant at 1 percent, ** Significant at 5 percent level. **Likelihood-ratio test of sigma_u=0: $chibar2(01) = 7.19$ Prob>=chibar2 = 0.004

Table 2 shows that coefficients of labor and capital are significant factors for the production of loans and investments. Labor is the most significant factor in determining bank efficiency. Employee elasticity of output (deposits) is 60 percent compared to 11 percent of fixed assets. The sum of coefficients, 0.71 (0.60 + 0.11), shows a decreasing return to scale for the production of loans and investments. The null hypothesis, $H_0: \beta_1 = \beta_2 = 0$ (i.e. the joint coefficient of labor and capital=0), is tested by the LR test. The probability of Wald $\chi^2 >$ is 0.0000 rejects the null hypothesis of joint coefficients, $\beta_1 = \beta_2 = 0$. The standard deviation of two error components, σ_u , and σ_v , which are labeled sigma_u and sigma_v, is 0.17 and 0.23, respectively. The null hypothesis, $H_0: \sigma_u = 0$ (that there is no technical inefficiency), is tested by the Likelihood-ratio test. The low P-value, 0.004, for χ^2 rejects the null hypothesis that there is no technical inefficiency, i.e. $\sigma_u = 0$.

Table 3: Stochastic Frontier Estimates of Deposit Efficiency

Number of obs = 42		
Wald chi2(2) = 43900000.0		
Prob > chi2 = 0.0000		
Log likelihood = -17.394662		
Variables	Coefficient	Z-statistics
Log labor	0.58	130.0 *
Log capital	0.16	50.0*
Constant	6.12	202.0*
Sigma v	0.0000002 (0.0002)	
Sigma u**	0.72 (0.073)	
Sigma2	0.53 (0.00002)	
Lambda	328,000 (0.079)	

Parenthesis () shows standard deviation. * Significant at 1 percent. **Likelihood-ratio test of sigma_u=0: chibar2(01) = 7.19 Prob>=chibar2 = 0.004

Table 3 shows that both bank employees and bank fixed assets are significant factors for deposit efficiency. However, labor is the most significant factor. Employee elasticity of output (deposit) is 58 percent compared to 16 percent of fixed assets. The sum of coefficients, 0.74 (=0.58+0.16), shows a decreasing return to scale for the production of deposits.

The LR value has an approximately χ^2 distribution with the parameters shown in Table 1. LR = -17.39 and it is significant. The significance provided by the probability of Wald $\chi^2 >$ is 0.0000. The significance means the null hypothesis of joint coefficients, $\beta_1 = \beta_2 = 0$, is rejected. The standard deviation of two error components, σ_u , and σ_v , which are labeled sigma_u and sigma_v, is 0.7322504 and 2.23e-08, respectively.

The null hypothesis, $H_0: \sigma_u = 0$ (that there is no technical inefficiency) is tested by the Likelihood-ratio test. The low P-value, 0.004, for χ^2 rejects the null hypothesis that there is no technical inefficiency, i.e. $\sigma_u = 0$. Comparative descriptive statistics of deposits and loans TE for domestic banks and foreign banks obtained from the frontier estimates are provided in Table 4.

Table 4: Comparison of the Descriptive Statistics of Efficiencies between Islamic Banks and Conventional Banks

	Islamic Banks		Private Domestic Banks	
	Loan Efficiency	Deposit Efficiency	Loan Efficiency	Deposit Efficiency
Mean	0.596	0.612	0.628	0.606
Std.dev	0.20	0.23	0.18	0.18
Minimum	0.23	0.20	0.23	0.32
Maximum	0.90	0.99	0.90	0.99
Jerque-Bera	0.15	0.01	1.42	1.13
Probability	0.92	0.99	0.49	0.56

This table shows descriptive statistics of the sample for domestic and private banks.

Table 4 shows mean efficiencies of private domestic banks for loans and deposits are 62.8 percent and 60.6 percent respectively, compared to 59.6 and 61.2 percent for Islamic banks. The minimum efficiencies of private domestic banks for loans and deposits are 23 percent and 32 percent respectively, compared to 23 percent and 20 percent for Islamic banks. The standard deviations of loans and deposits for domestic banks are smaller (18 percent and 18 percent) compared to those of Islamic banks' 20 percent and 23 percent.

The insignificance of Jarque-Bera is supported by high probability for both series' (loan efficiency and deposits efficiency) failure to reject the null hypothesis of a normal distribution. The failure to reject the null hypothesis of normal distribution suggests the appropriateness of the application of the parametric test and the redundancy of the non-parametric test. Table 5 provides the result of the parametric test.

Table 5: Mean Difference Analysis of Technical Efficiencies for Islamic banks and Conventional Banks

Variable	Mean of Conventional Banks	Mean of Islamic Banks	Test of Mean Difference
Deposits	0.60	0.61	-0.006
Loan	0.62	0.59	0.02

This table shows mean financing efficiencies.

Table 5 shows that the mean of loan financing efficiencies of the domestic conventional banks and the Islamic banks is 62.8 percent and 59.6 percent respectively. The test of mean difference shows that the difference of TE between Islamic and conventional banks is not statistically significant. This suggests that there is no difference in the TE between them.

With regard to loan efficiency, Table 5 shows that the TE of the conventional banks and the Islamic banks are 60 percent and 61 percent respectively. That is, the inefficiencies of conventional banks and Islamic banks are 40 percent and 39 percent respectively. The test of mean difference for loans shows that the difference of TE between the Islamic banks and the conventional banks is not statistically significant. This suggests that there is no difference in the TE between them.

One possible explanation for the equality of efficiency between the conventional banks and the Islamic banks is the competitiveness of the market structure of the Bangladesh banking industry. When the market is competitive, Islamic banks must successfully compete with the conventional banks for their survival. They cannot be less efficient than the conventional banks.

An analysis of the Bangladesh banking market concentration was conducted. Results are reported in Table 6. The result of market concentration study suggests that the Bangladeshi banking market is unconcentrated and highly competitive. This is substantiated by the Herfindahl-Hirschman Index.

Based on the US Department of Justice Merger Guidelines of 1982, an "unconcentrated" market is defined when the HHI Index is less than 1,000. Table 6 shows that the concentration in both deposits and loans markets is less than 500, suggesting that both the deposits and loans markets of Bangladesh are highly competitive. These data demonstrate why there is such limited difference in deposit and loan efficiencies between the domestic banks and the foreign banks in Bangladesh.

Because of competitiveness it is plausible that there are no differences in deposit mobilizations and loan financing efficiencies between the Islamic banks and the conventional banks.

Table 6: HHI Estimate for Deposit and Loan & Investment Market

HHI for Market	HHI ₄	HHI ₈	HHI ₁₂
HHI loan & investment	274.18	317.76	351.55
HHI Deposit	329.86	368.91	400.55

This table shows estimates for the deposit and loan market. HHI denotes the Herfindahl-Hirschman Index.

CONCLUSIONS

This paper estimates the TE of domestic commercial banks and foreign banks operating in Bangladesh using the stochastic frontier function during 2010. Annual data was used to estimate the TE of banks using the parametric stochastic frontier method. Jarque- Bera statistics was used for a normality test in determining whether to use the parametric test or non-parametric test for the comparison of efficiency between Islamic banks and conventional banks. The paper finds: (1) The Likelihood-ratio test rejects the null hypothesis, $H_0: \sigma_u = 0$, that there is no technical inefficiency. The rejection of the null-hypothesis suggests that there are technical inefficiencies. Both labor and capital are found to be significant factors for loans and deposits efficiencies. (2) The results of JarqueBera statistics suggest the application of both parametric and non-parametric tests. The estimates found that the mean technical efficiencies of loans and deposits of domestic banks are 62.8 percent and 60.5 percent respectively, compared to 58.7 percent and 58.6 percent of foreign banks.

All parametric tests, t-test, Satterthwaite-Welch t-test, Anova F-test, and Walch F-test, show no statistical evidence of significant differences in technical efficiencies between the Islamic banks and the conventional banks. All parametric test statistics fail to reject the null hypothesis of the equality of mean technical efficiencies. The findings of this paper confirm the previous findings of Samad (2007).

One possible explanation for the equality of efficiencies of the Islamic banks and the conventional banks is the competitiveness of the loans and deposit market structure of the Bangladesh banking industry. The estimates of Herfindahl-Hirschman Index support the hypothesis.

There are a few limitations of this study. (i) The paper provides the estimated technical efficiency of one year (2010). A study of an extended period of five or more years could be undertaken for robust results of bank efficiencies. (ii) Since banks use many inputs such as labor, capital, interest expenses, and deposits and produce many outputs such as securities, loans, income, and other financing, it is worth conducting a future study to incorporate these inputs and outputs for finding the detailed technical efficiencies, including scale efficiencies.

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LONG-RUN PURCHASING POWER PARITY AND EXCHANGE RATES: EVIDENCE FROM THE MIDDLE EAST

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ABSTRACT

This paper examines the validity of Purchasing Power Parity and investigates the market integration between Jordan and its major trading partners, namely, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates. Unit root tests, Johansen co-integration test and a vector error correction model were employed to test data covering the period 2005Q1-2012Q4. The unit root tests demonstrated that all variables were integrated of order one. The results of co-integration tests showed that a co-integrating relationship existed between exchange rates, domestic and foreign price levels for four Gulf Cooperation Council countries. The two remaining countries, Oman and United Arab Emirates, do not have a co-integration relationship. For the vector error correction model, we found the error correction terms for Jordan with the Gulf Cooperation Council countries carried the expected sign. This suggests that whenever there is a deviation from the equilibrium co-integrating relationship, the exchange rate interacts in a dynamic fashion by adjusting to restore its long-run equilibrium. Finally, the models passed all the diagnostic checking. In conclusion, these results provide evidence that the Purchasing Power Parity model holds in the long run. The results also show the Jordanian economy is integrated with six trading countries.

JEL: C32, F31, F37

KEYWORDS: Purchasing Power Parity; Johansen Co-Integration; Vector Error Correction Model, Jordan and Gulf Cooperation Council

INTRODUCTION

Exchange rates are important to innumerable economic activities. Investors care about the effect of exchange rate fluctuations on their international portfolios. Tourists care about the value of their home currency abroad. Central banks care about the value of their international reserves and open positions in foreign currency as well as about the impact of exchange rate fluctuations on their inflation objectives. In addition, exchange rates influence markets directly and indirectly. The direct influence occurs as the market for foreign exchange is by far the largest market in the world. The indirect influence occurs because exchange rate shifts can affect various asset prices. Therefore, it is no surprise that forecasting exchange rates has long been prioritized in international finance research agendas. Still, most research literature is characterized by empirical failure.

One of the major theories that explains exchange rate determination is Purchasing Power Parity (PPP). PPP is the simplest tool for global traders, investors, economists, policy makers and academicians to predict exchange rates. Besides exchange rate prediction, PPP is commonly used as a first step in making inter-country comparisons based in real terms of gross domestic product (GDP) and its component expenditures. GDP is commonly used as an economic indicator for size, growth, and health of a nation. PPP also allows countries to be viewed through a common reference point. A special topic to be taken into consideration by

investors and monetary authorities is integration of the international market. This topic is not discussed widely in Middle East and North Africa (MENA) Countries, and there has been limited research on the topic of MENA's market integration. But this topic has been investigated for the market of United States of America and European countries.

PPP states that the exchange rate between two currencies are in equilibrium when their purchasing power is the same in each of the two countries. This refers to the 'law of one price', which means that identical goods should sell for identical prices in different countries' markets. As a result, the exchange rate between countries should equal the ratio of the countries' price levels of a fixed basket of goods and services. For example, when a country's domestic price level increases more rapidly than its major trading partner, the country is experiencing inflation, and its exchange rate must depreciate in order to return to PPP. There are two types of PPP theory, namely, absolute and relative PPP. Absolute PPP theory states that the exchange rate between the currencies of two countries should equal the ratio of the price levels of the two countries and the basket of goods should be the same domestically and abroad if the goods' prices are converted into a common currency. Therefore, absolute PPP theory postulates that the purchasing power of money should be equal between countries.

$$S = \frac{P}{P^*} \quad (1)$$

Where S is the nominal exchange rate measured in units of domestic currency per unit of foreign currency, P is the domestic price level and P^* is the foreign price level.

The relative PPP hypothesis, on the other hand, states that the exchange rate should be proportionate to the ratio of the price level and does not compare domestic and foreign levels of purchasing power. Rather, it focuses on changes in this purchasing power. Relative purchasing power parity theory, therefore, states that the inflation rate differentials between two countries are offset through inverse changes in the nominal exchange rate so that the purchasing power ratio between the two remains constant (Suranovic, 1999).

$$S = k \left(\frac{P}{P^*} \right) \quad (2)$$

Where k is a constant parameter. Since information on national price levels normally is available in the form of price indices rather than absolute price levels, absolute PPP may be difficult to test empirically.

The Gulf Cooperation Council (GCC), which comprises Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates plans to convert its cooperation status into a union to enhance economic integration as well as strengthen the economy. Jordan has been invited to join them. Despite differences in environmental conditions, the GCC countries have undertaken parallel economic programs to promote economic growth and development. They have instituted a number of reforms with the objective of enhancing economic efficiency as well as stimulating international competitiveness of international trade. The reforms include exchange rate system privatization and liberalization. Jordan, began the liberalization program and privatization in the early 1990s to increase economic efficiency, avoid future financial crises as well as promote home currency value.

The effects of poor currency value and instability of exchange rates could be greater if the countries were closely-linked in the form of cooperation or a union. However, in this respect, no study has been undertaken focusing on these countries. Therefore, the main purpose of this study is to examine the validity of PPP and to investigate market integration between Jordan and its major trading partners, namely, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates. Although PPP is regarded as one of the central doctrines in the international economy, limited studies have been conducted on Jordan with its trading partners. As a result, for this study, the GCC countries were selected as they were planning to form a union.

This study could assist the GCC countries in evaluating their performance and future plans. The findings of that PPP hold between Jordan and its major trading partners implied that the Jordanian economy is integrated with these countries. Hence, these had important policy implications on cross-border agreements for international trade and investment with these countries. It is crucial for authorities in Jordan and the GCC countries to enhance exchange rates and remove all barriers to have a successful union, particularly in reducing double taxation.

The paper is organized as follows. Section 2 discusses the existing literature, and Section 3 discusses the methodology and data analyzed in this study. Section 4 reports the empirical results, and the last section provides the conclusion and overview of this study.

LITERATURE REVIEW

The PPP theory has been tested for several countries using various statistical methods, sample periods and frequency of data. Despite the extensive research on PPP, to our knowledge, there are only a few analyses for the Middle East countries. In particular, Abumustafa (2006) for Jordan, and Drine and Rault (2008) for different panels of countries including Jordan. Abumustafa (2006) examined PPP between Jordan and Bahrain, and between Jordan and Germany using the unit root method and found no evidence of PPP. Drine and Rault (2008) apply panel co-integration techniques to test the PPP for combinations of countries, such as the OECD, the countries in Africa, Asia, Middle East and North Africa (MENA), Latin America and Central and Eastern European. They reported favorable evidence of PPP in the OECD panel while weak PPP in the MENA panel. For the remaining panels, their study shows that PPP does not seem to characterize the long-run behavior of the real exchange rates.

Many recent studies have examined the hypothesis of PPP in different countries, with the most recent by Al-Gasaymeh and Kasem (2015A) and Al-Gasaymeh and Kasem (2015B). Al-Gasaymeh and Kasem (2015A) test the strong form of PPP and the weak form of PPP between Jordan and its major trading partners covering the period of 2000M1-2012M12. They found evidence for weak PPP but not for strong PPP, hence, the conditions of proportionality and symmetry restrictions may be one of the reasons that PPP not hold when being tested empirically. While, Al-Gasaymeh and Kasem (2015B) investigate the role of country characteristics on purchasing power parity. The distinction is to investigate whether trade, inflation and geographical (distance) contribute towards the validity of purchasing power parity. They conclude that purchasing power parity depends on the country's characteristics with this perspective, it is appropriate to investigate purchasing power parity among countries with similar characteristics. A Study by Al-Zyoud (2015) who examines long-run movement between the Canadian dollar and US dollar exchange rates for the period 1995:01 to 2008:08 employing the Engle-Granger co-integration test. The analysis suggests that absolute PPP does not hold, indicating no long-run relationship between the observed exchange rate and PPP rate. The result showed no co-integration between actual exchange rate and PPP rate, suggesting there exists no long-run relationship between Canadian dollar and US dollar exchange rates. Kamrul et al (2014) found mixed results on the validity of PPP relationship in South Asian countries employing Pesaran (2004, 2007) to identify the degree of cross-sectional dependence and apply a panel unit root test accommodating this dependence on the real exchange rate series of five South Asian countries. This result was in contrast to the findings of previous studies in similar countries, which did not accommodate cross-sectional dependence (CSD) in their estimation. This finding implies that real shocks do not have a permanent effect on the real exchange rate with other factors remaining the same, and no active policy intervention is warranted for the sustainability of external balance.

Ariful and Rajabrata (2014) confirm mixed test results for the stationarity of South Asian real exchange rates, employing unit root tests by allowing both single and multiple endogenous structural breaks for Bangladesh, India, Pakistan and Sri Lanka for the period of 1957 to 2011. Overall empirical evidence

indicates that long-run purchasing power parity does not hold for major South Asian countries. Jayaraman and Chee-Koeng (2014) investigate whether the purchasing parity power theory holds with regard to five countries under fixed exchange rate regimes for 14 Pacific island countries. The findings show that long-run PPP hypothesis holds for all five Pacific island countries. Guglielmo et al (2013) examine the PPP hypothesis in a number of Sub-Saharan countries by testing the order of integration in the log of their real exchange rates vis-à-vis the US dollar. The test results led to the rejection of PPP in all cases.

Moreover, Mustafa et al (2014) observed in-country prices from the Turkey over the investigation period of 2005-2012. Following Esaka (2003), the study used a panel estimation framework consisting of 12 disaggregated consumer price indices to identify whether the relative prices of goods between sub-regions of the Turkish economy could be represented by stationary time series properties. The results in general point out that the tests applied for empirical purposes tend to verify the non-unit root characteristics of goods which accept that in the branch of tradable and that non-tradable goods and services, to a much greater extent than tradable, tend not to reject the non-stationary null hypothesis. Oguz (2013) argues these studies are not consistent in Romania by employing Zivot–Andrews unit root test, taking structural breaks into account using annual data from 1991 to 2012. The results show that PPP does not hold in Romania. Adrian et al (2014) employed a dataset of exchange rates for five major currencies (the *lira* of Barcelona, the pound sterling of England, the *pond groot* of Flanders, the florin of Florence and the *livre tournois* of France) to consider whether the law of one price and PPP held in Europe during the late fourteenth and early fifteenth centuries. The results reported in other recent studies indicated that many elements of modern economic theories could be traced back over 700 years in Europe.

Previous empirical studies on Asian countries have found mixed results. Phylaktis and Kassimatis (1994), Salehizadeh and Taylor (1999), Wang (2000) and Azali *et al.* (2001) found evidence to support long-run PPP for Asian economies. However, Lee (1999) found mixed evidence of PPP from thirteen Asian Pacific economies. On the other hand, the results of Cooper (1994), Doganlar (1999), Holmes (2001), Alba and Papell (2007) and Jiranyakul and Batavia (2009) failed to show evidence supporting PPP for Asian Pacific countries. There are numerous studies on PPP conducted in developed countries. Some studies that support exchange rate stationarity for developed countries are Oh (1996) for the G-6 and OECD countries, Papell (1997) for the industrial countries, Lothian (1997, 1998) for the OECD countries, Husted and MacDonald (1998) for the OECD, Coakley and Fuertes (1997) for the G-10 countries and, Koedijk *et al* (1998) for 17 developed countries. On the other hand, some studies have also shown that real exchange rates are non-stationary. These studies were done by Canzoneri *et al.* (1999) for the OECD countries, Alba and Park (2003) for 65 developing countries, and Wu and Chen (1999) for eight Pacific countries and 15 developed countries.

Finally, there are some studies which re-investigate the PPP issue using non-linearity approaches. Obstfeld and Taylor (1997) and O'Connell and Wei (1997) reported additional evidence of non-linear reversion of prices. However, O'Connell (1998), using a balance threshold autoregression (TAR) model for the post-Bretton Woods real exchange rates in a panel framework, found little support for PPP deviations. Wu and Chen (2008) investigated PPP convergence using a threshold vector error-correction model. They found that PPP convergence and the half-life of real exchange rates was less than two and a half years.

METHODOLOGY AND DATA

In this paper, we first examine time series properties. The unit root test of ADF and Kwiatkowski, Phillips, Schmidt, and Shin (1992) (KPSS) tests were used to examine the stationarity of the data. Unit root tests were first implement on level, and then on first difference of the data. If the series were stationary of first order, then we could proceed to test the existence of the long-run relationship among these variables using Johansen co-integration test. If the maximum Eigen statistic and trace statistic was greater than the 5% critical value, then we rejected the null hypothesis. Lastly, we use vector error correction model (VECM)

to investigate the dynamic short-run relationship between the exchange rate and price level as well as its adjustment towards long-run equilibrium. Various diagnostic tests such as normality test (Jarque-Bera), an autocorrelation test (Langranger multiplier), a heteroskedasticity test (ARCH Test) and a stability test (Ramsey RESET) were performed to ensure robustness of the model. EViews provides a variety of powerful tools for testing a series (or first or second difference of the series) for the presence of a unit root. In addition to the existing Augmented Dickey-Fuller (1979), and Phillips-Perron (1965), tests, EViews now allows researchers to compute the GLS-Dickey-Fuller, Kwiatkowski, Phillips, Schmidt and Shin unit root tests. All of these tests are available as a series. Using EViews software, the following discussion outlines the basic features of ADF unit root tests. Consider a simple AR (1) process:

$$y_t = \rho y_{t-1} + x_t' \delta + \varepsilon_t \tag{3}$$

Where x_t are optional exogenous regressors which may consist of constant, or a constant and trend, ρ and δ are parameters to be estimated, and the ε_t are assumed to be white noise. If $|\rho| \geq 1$, y is a nonstationary series and the variance of y increases with time and approaches infinity. If $|\rho| < 1$, y is a (trend-) stationary series, thus, the hypothesis of (trend-) stationarity can be evaluated by testing whether the absolute value of ρ is strictly less than one. The unit root tests generally the null hypothesis test $H_0 : \rho = 1$ against the one-sided alternative $H_1 : \rho < 1$. The test of weak PPP consists in testing the existence of a co-integration relationship between the nominal exchange rate and the price ratio. Let,

$$E = k (P/P^*) \tag{4}$$

Where k is a constant parameter. Rewrite equation (4) in log form

$$\log e_t = \beta_1 \log p_t - \beta_2 \log p^* \tag{5}$$

Estimation co-integration regression

$$\log e_t = c + \beta_1 \log p_t - \beta_2 \log p^* + \varepsilon_t \tag{6}$$

$$\log e_t - c - \beta_1 \log p_t + \beta_2 \log p^* = \varepsilon_t \tag{7}$$

Where e_t , p and p^* are the exchange rate, the domestic price, and the foreign price respectively, t denoted for time subscript and c is constant, ε_t is the error term, if ε_t is a stationary process with zero mean then PPP holds in the long run. However, if ε_t is non-stationary implying that deviation from PPP are cumulative and not ultimately self-reversing, then PPP fails in the long run. Let $X_t = (e_t, p_t, p_t^*)$. If all components in X_t are integrated of order 1, $I(1)$, the co-integration vector satisfies the restriction of proportionality, i.e., $\alpha = (1, -1, 1)$. Hence, testing the co-integration among e_t , p and p^* examining the proportional restriction of the co-integration vector are ways of testing the validity of PPP. Then, the test of co-integration between the nominal exchange rate and the national price levels is calculated by estimating the following regression:

$$\log e_t - c - \beta_1 \log p_t + \beta_2 \log p_t^* = \varepsilon_t \tag{8}$$

Where e is the nominal exchange rate, P , P^* the domestic price, and the foreign price respectively and $c =$ constant, β_1 , $\beta_2 =$ coefficient. $\varepsilon_t =$ error term. For strong PPP to be valid β_1 should be positive and equal

to one, β_2 should be negative and equal to one in order for PPP to hold. For relative PPP β_1 and β_2 does not need to be equal to 1.

In this paper, the co-integration procedure developed by Johansen, (1988) and Johansen, (1990) was employed to examine long-term relationships between the different models within economics. Co-integration refers to the possibility that non-stationary variables can be a linear combination that is stationary. From a statistical perspective, a long-term relationship means the balance variables move together in time, so that any short-term deviations from long-term trends will be corrected. These series are said to be co-integrated and, therefore, a common root stochastic trend. Using the Johansen-Juselius (1990) procedure again, in the n -variable first order given by VAR.

$$\Delta X_t = A_1 X_{t-1} + \varepsilon_t \tag{9}$$

By subtracting X_{t-1} from each side of the equation, equation (9) can be rewritten as:

$$\begin{aligned} \Delta X_t &= A_1 X_{t-1} + X_{t-1} + \varepsilon_t \\ &= (A_1 - I) X_{t-1} + \varepsilon_t \\ &= \pi X_{t-1} + \varepsilon_t \end{aligned} \tag{10}$$

Where X_{t-1} and ε_t are $(n \times 1)$ vectors; A is an $(n \times n)$ matrix of parameters; I is an $(n \times n)$ identity matrix; and π is defined as $(A_1 - I)$. The rank of π equals to the number of co-integration vectors, also, the model in equation (11) can be generalized to allow for a higher-order autoregressive process.

$$\Delta X_t = \sum_{i=1}^{m-1} \pi_i \Delta X_{t-i} + \pi_m X_{t-m} + \varepsilon_{at} \tag{11}$$

The most important function is still the grade as equal to the number of independent co-integration vectors. As we know that the rank of a matrix is equal to the number of its characteristics which are different from zero, so the number of individual co-integration vectors in this model may be determined by checking the significance of the characteristic roots π . The test for the number of co-integration vectors can be accomplished with the help of two likelihood ratios (LR) tests on the track of statistics and maximum eigenvalue statistics as shown below:

Trace Test : $L_{trace(r)} = -T \sum L_n (1 - \lambda_i)$ (12)

Maximum eigenvalue test : $L_{\max(r,r+1)} = -TL_n (1 - \lambda_{r+1})$ (13)

Where λ_j , the estimated eigenvalues and T is the number of valid observations, the null hypothesis of traces of statistical tests that the number of individual co-integration vector is smaller than or equal to r against a general alternative which gives the result of not more than r co-integrating vectors the last λ max statistical tests the null hypothesis that there is vectors r co-integrating against the alternative of $r + 1$ co-integrating vectors. In general, λ max statistics is more preferable, because it represents the result of exactly r co-integrating vectors.

An important practical issue for the implementation of the unit root test is specification of the lag length p . If p is too small, the remaining serial correlation in the errors will bias the test. If p is too large, the power of the test will suffer. The idea is to include enough lagged-dependent variables to rid the residuals of serial

correlation. There are several ways of choosing how many lags need to be added. First, we can use the testing-down strategy, which starts with a reasonably large number of lags and test down until they are all significant. This is one of the lag selection criteria that EViews automatically calculates (Mahadeva and Robinson, 2004). The second test, tests the residuals each time to see whether they contain any serial correlation. We choose a p that renders the residuals serial uncorrelated. Another way is to start with a reasonably large number of lags and test down, choose p (less than the specified maximum) to minimize one of the following criteria: Akaike information criterion, Schwartz Bayesian information criterion. For ADF, this study will consider whether they contain any serial correlation, choose a p that renders the residuals serial uncorrelated. For PP and KPSS the lag length was chosen based on the lowest AIC criteria. To perform the Johansen test, we have to decide the lag length (k) in the vector autoregressive (VAR) model, and to examine the appropriateness of including a time trend in the model. We started from a general lag system where the lag has to pass all the diagnostic tests.

This paper will extend the PPP literature by using quarterly data that covers the period from 2005Q1 to 2012Q4 and take the US dollar as a reference currency to construct the real exchange rates for Jordan and six GCC countries. The price series are based on the consumer price index and the nominal exchange rates are end period spot rates relative to the US dollar (domestic price of the US dollar). All data are taken from the International Monetary Fund’s International Financial Statistics database.

RESULTS AND DISCUSSIONS

The ADF and KPSS unit root tests were conducted and the results can be seen in Table 1 and Table 2. The result of ADF test clearly show that for all the countries the null hypothesis of unit root cannot be rejected at 1% significant level when all the variables are in the level but can be rejected when they are tested at first difference. This implies all the variables are stationary at first difference. The results of KPSS test shows that the null hypothesis of stationary or no unit root can be rejected at 1% significant level when all variables are tested in their level. However, the null hypothesis of stationary cannot be rejected when all variables are tested in their first differences. Thus, we concluded that all the series are $I(1)$ processes.

Table 1: The ADF Unit Root Test

Variable	At Level		First Difference	
	Constant	Trend	Constant	Trend
ER J-Bahrain	-2.436(3)	-2.397 (3)	-4.150(2)***	-4.113(2)***
CPI Jordan	-1.510(0)	-2.902(0)	-8.642(0)***	-8.678(0)***
CPI Bahrain	-2.195(4)	-3.361(2)	-3.112(3)***	-12.23(0)***
ER J-Kuwait	-1.337(0)	-1.589(0)	-6.6769(0)***	-6.687(0)***
CPI Kuwait	-0.0037(5)	-2.940(5)	-3.6115(4)***	-6.304(2)***
ER J-Qatar	-2.304(0)	-0.108(0)	-5.634(0)***	-5.952(0)***
CPI Qatar	-2.499(1)	-1.948(1)	-4.339(0)***	-4.908(0)***
ER J- Saudi Arabia	-1.724(0)	-1.673(0)	-7.484(0)***	-7.508(0)***
CPI Saudi Arabia	-1.326(4)	-1.673(0)	-7.484(0)***	-7.508(0)***
ER J- Oman	-1.991(0)	-1.380(0)	-7.250(0)***	-7.33(0)***
CPI Oman	-2.69(5)	-2.457(0)	-7.765(0)***	-8.678(0)***
ER J- UAE	-2.804(0)	-0.925(0)	-7.251(0)***	-7.877(0)***
CPI UAE	-2.738(10)	-2.252(0)	-4.060(0)***	-6.683(0)***

Notes: Figures are the t -statistics for testing the null hypothesis that the series is nonstationary. *** and ** denotes significance at 1% and 5% levels. Figures in parenthesis are lag length. The ADF unit root tests is conducted to test the null hypothesis of unit root. The results cannot be rejected at 1% significant level when all the variables are in the level but can be rejected when they are tested at first difference; this means all the variables are stationary at first difference.

All the series are $I(1)$ process so the co-integration test can be implemented to examine the long-run relationship among these variables. Table 3 displays the results for the Johansen co-integration test. The results show that there exists a co-integrating relationship between exchange rate, domestic and foreign

price levels for Jordan and Bahrain, Kuwait, Qatar, and Saudi Arabia. And there is no co-integrating relationship among Jordan-Oman and Jordan-United Arab Emirates. The existence of a long-run relationship between the exchange rates of Jordan and its trading partner, CPI Jordan and CPI trading partner support the theory of PPP, indicating that it will hold over the estimated periods.

Table 2: The KPSS Unit Root Test

Variable	At Level		First Difference	
	Constant	Trend	Constant	Trend
ER J-Bahrain	0.4679(0)***	0.4571(0)***	0.126(0)	0.064(0)
CPI Jordan	1.0501(6)***	0.3297(3)***	0.2639(6)	0.1113(0)
CPI Bahrain	1.2445(1)***	0.2526(6)***	0.436(4)	0.143(7)
ER J-Kuwait	1.176(0)***	0.7097(0)***	0.1219(3)	0.0622(4)
CPI Kuwait	1.0877(6)***	0.2237(3)***	0.3256(4)	0.1424(9)
ER J-Qatar	1.023(6)***	0.2365(6)***	0.405(9)	0.0902(2)
CPI Qatar	1.048(6)***	0.2536(6)***	0.3267(14)	0.1250(9)
ER J- Saudi Arabia	0.796(0)***	0.736(0)***	0.1055(2)	0.0718(2)
CPI Saudi Arabia	0.796(0)***	0.736(0)***	0.1055(2)	0.0718(2)
ER J- Oman	1.3387(1)***	0.4959(1)***	0.2756(2)	0.0516(1)
CPI Oman	1.0073(6)***	0.2533(6)***	0.4535(11)	0.1315(0)
ER J- UAE	1.003(6)***	0.247(6)***	0.461(8)	0.057(7)
CPI UAE	0.985(6)***	0.278(6)***	0.462(9)	0.096(1)

Notes: Figures are the LM-statistics for testing the null hypothesis that the series is stationary. *** and ** denote significance at 1% and 5% levels. Figures in parenthesis are lag length. The KPSS unit root tests is conducted to test the null hypothesis of unit root. The results of KPSS test shows that the null hypothesis of stationary or no unit root can be rejected at 1% significant level when all variables are tested in their level.

Table 3: The Johansen-Juselius Co-integration Tests

Null Hypotheses	Eigenvalue	Trace	Critical Value (1%)	Max-Eigen	Critical Value (5%)
Jordan-Bahrain					
(r = 0)	0.424347	42.864***	35.65	35.896***	25.52
(r ≤ 1)	0.092794	6.9681	20.04	6.3300	18.63
(r ≤ 2)	0.009769	0.6380	6.65	0.63808	6.65
Jordan-Qatar					
(r = 0)	0.347410	36.813***	36.65	27.742***	25.52
(r ≤ 1)	0.123672	9.0713	20.04	8.58098	18.63
(r ≤ 2)	0.007516	0.4903	6.65	0.49036	6.65
Jordan-Kuwait					
(r = 0)	0.35225	45.990***	35.65	27.792***	25.52
(r ≤ 1)	0.24703	18.197	20.04	18.159	18.63
(r ≤ 2)	0.000603	0.0386	6.65	0.03861	6.65
Jordan- Saudi Arabia					
(r = 0)	0.318665	37.085***	35.65	23.405***	25.52
(r ≤ 1)	0.191232	13.679	20.04	12.946	18.63
(r ≤ 2)	0.011940	0.7327	6.65	0.73273	6.65
Jordan- Oman					
(r = 0)	0.3173	36.352***	35.65	24.050***	25.52
(r ≤ 1)	0.1754	12.30196	20.04	12.150	18.63
(r ≤ 2)	0.0024	0.15166	6.65	0.1516	6.65
Jordan- UAE					
(r = 0)	0.394511	38.836***	35.65	32.611***	25.52
(r ≤ 1)	0.08622	6.2242	20.04	5.86076	18.63
(r ≤ 2)	0.005576	0.3634	6.65	0.36347	6.65

The co-integration test can be implement to examine the long-run relationship among these variables. Table 3 displays the results for the Johansen co-integration test. The results showed that there exists a co-integrating relationship between exchange rate, domestic and foreign price levels. Notes: r indicates the number of co-integrating vectors. *** and ** denote significance at 1% and 5% levels.

For the country pairs for which co-integration relationship is detected, we proceeded to the VECM, which is a test for short-run relationships among the exchange rate, domestic price level and foreign price level. Table 4 reports on the VECM obtained for Jordan-Bahrain, Jordan-Kuwait, Jordan-Qatar, Jordan-Saudi Arabia and Jordan-United Arab Emirates respectively. The diagnostic tests such as normality test (Jarque-Bera), an autocorrelation test (Langranger multiplier), a heteroskedasticity test (ARCH Test) and stability test (Ramsey RESET) are also reported.

The estimated coefficients of the co-integrating vector shown in Table 4 indicate that these are correctly signed for Jordan-Bahrain and Jordan-Saudi Arabia. Hence, it seems to represent a PPP relationship for Jordan-Bahrain and Jordan-Saudi Arabia. The results indicate that the error-correction terms (ECTs) for Jordan-Bahrain, Jordan-Kuwait, Jordan-Qatar, Jordan-Saudi Arabia, Jordan-Oman and Jordan-United Arab Emirates carried the expected sign. This suggests that whenever there is a deviation from the equilibrium co-integrating relationship, the exchange rate interacts in a dynamic fashion by adjusting to restore long-run equilibrium. Lastly, the models passed all the diagnostic checking. The diagnostic tests results showed that the residuals were normally distributed, there was no serial correlation, no heteroskedasticity or misspecification problems, and the models were stable.

CONCLUSION

The main purpose of this paper was to examine the validity of PPP and to investigate the market integration between Jordan and its major trading partners, namely, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates based on data covering the period of 2005Q1-2012Q4. The results of co-integration tests showed that a co-integrating relationship existed between the exchange rate, domestic and foreign price levels for Jordan and seven countries, namely, Bahrain, Kuwait, Qatar and Saudi Arabia. Hence, lending support to the validity of PPP. Additionally, there was no co-integrating relationship among Jordan-Oman, Jordan-United Arab Emirates due to recent agreements made with Jordan and some trade barriers such as double taxation and distance. The findings of PPP holding between Jordan and its major trading partners implied that the Jordanian economy was integrated with these countries. This finding has important policy implication on cross-border agreements for international trade and investment with these countries. The efforts to promote trade within these economies and remove barriers with these countries. Given that the goods and services markets appeared quite integrated, future liberalization will likely be pronounced in financial markets. If we envision this process of integration continuing, in particular in the Middle East region, and to the extent that this process requires even more political engagement, we believe the prospects for cooperation along a variety of dimensions are good.

The implications of this paper for policy makers, for Jordan and the GCC country governments is that the degree of conformity to PPP is much less in these countries compared to more developed countries. This should be taken into account when considering the proposed GCC Union, since the absence of PPP relationships between its prospective members raises some doubts about its feasibility or at least long-run sustainability. Moreover, it is well-known that there is a negative relationship between any misalignment of the exchange rate and economic performance such as economic growth, imports, exports and investment and, therefore, the lack of PPP is a reason for concern about growth in these countries and calls for exchange rate management policies. Such policies appear to be crucial in this group of countries also because exchange rate misalignment has a negative effect on export performance.

Overall, our analysis highlights the fact that managing the exchange rate effectively is one of the key challenges in Jordan and the GCC countries and one of the most important issues that should be addressed in that region given the adverse impact on the economy of exchange rate misalignments. In order for the GCC members to have a successful union and achieve objectives faster, it is important to have a similar level of economic performance, in particular in the exchange rate regime.

Table 4: Vector Error-Correction Results

Variables	Expected Sign	Jordan-Bahrain	Jordan-Kuwait	Jordan-Qatar	Jordan-Saudi Arabia	Jordan-Oman	Jordan-UAE
Standardize β Co-integrating Vector							
ER_{t-1}		1.00	1.00	1.00	1.00	1.00	1.00
CPI_{t-1}	-	1.28**	1.56***	6.27***	0.38***	-3.45***	-4.88***
CPI^*_{t-1}	+	27.05***	-1.02***	-19.89***	0.20**	2.17***	5.02***
Standardize α Coefficients							
ECT	-	-0.021***	-0.15***	-0.04**	-0.16***	0.22***	-0.007**
ΔER_{t-1}		0.13	0.09	0.09	0.42	0.38	0.15
ΔER_{t-2}		-0.29	-0.19	-0.14	0.15	-0.14	-0.13
ΔCPI_{t-1}		-0.72	-0.74	-0.53	-0.16	-0.01	-0.31
ΔCPI_{t-2}		0.15	-0.35	0.74	0.29	-0.04	0.46
ΔCPI^*_{t-1}		-0.82	-2.32	0.60	1.49	0.61	-0.95
ΔCPI^*_{t-2}		-0.82	-1.44	-0.55	0.18	1.10	0.08
C		0.009	0.03	-0.0009	-0.03	-0.04	-0.04
D1			-0.03				
D2					-0.04		
D3						-0.03	
D4							-0.05
Diagnostic Tests							
R^2		0.1874	0.8351	0.2055	0.8127	0.8405	0.7308
Adjusted R^2		0.0877	0.8115	0.1062	0.7859	0.8178	0.6923
S.E. of Regression		0.0497	0.0155	0.0208	0.0163	0.0121	0.0227
F-Statistics		1.8785	35.439	2.0693	30.3767	36.8976	18.999
JB		5.0259	0.3177	5.0167	5.0972	1.2284	0.8000
BG – (LM Test)		1.1975	2.5693	0.0955	0.8245	0.0123	0.8502
ARCH Test		0.95688	0.4979	0.3759	0.0921	0.2993	0.0086
Ramsey RESET		0.7939	2.9145	0.4013	2.9579	0.0638	0.6066

Table: 4 reported the VECM obtained for Jordan-Bahrain, Jordan-Kuwait, Jordan-Qatar, Jordan-Saudi Arabia and Jordan-United Arab Emirates respectively. The diagnostic tests such as normality test (Jarque-Bera), an autocorrelation test (Langranger multiplier), a heteroskedasticity test (ARCH Test) and stability test (Ramsey RESET). Note: Δ = First difference operator; ***, ** and * denote significant at 1%, 5% and 10% level respectively. D1, D2, D3 and D4 are dummies introduced to correct the normality. D1 = 1 in 2006Q1, 2007Q3, 2009Q1, 2012Q2, 2012Q3 and 2012Q4; D1 = -1 in 2005Q2, 2006Q1, 2007Q4, 2009Q3, 2010Q2, 2010Q4, 2012Q2; and zero in all other quarters. D2 = 1 in 2005Q3, 2006Q2, 2007Q1, 2007Q4, 2008Q3, 2010Q2, 2011Q3; D2 = -1 in 2006Q3, 2007Q3, 2008Q4, 2009Q3, 2010Q1, 2010Q3, 2011Q1, 2011Q2, 2012Q1; and zero in all other quarters). D3 = 1 in 2007Q1, 2007Q3, 2008Q1, 2008Q2, 2009Q3 and 2010Q3; D3 = -1 in 2005Q2, 2006Q1, 2007Q4, 2008Q3, 2010Q2, 2010Q4, 2012Q2; and zero in all other quarters. D4 = 1 in 2005Q3, 2006Q2, 2007Q1, 2008Q4, 2009Q3, 2010Q2, 2011Q3; D4 = -1 in 2006Q3, 2007Q3, 2009Q4, 2010Q3, 2011Q1, 2011Q3, 2012Q1, 2012Q1; and zero in all other quarters.

Further future studies the symmetry and proportionality condition on PPP (strong version of PPP), which has also been the object of a considerable research, has to be taken into account. One implication of unit root tests is that the restrictive conditions of proportionality and symmetry restrictions are satisfied in PPP. That is, nominal exchange rates and aggregate price ratios move together in a one-to-one fashion in the long run. However, transportation costs, and differences in the composition of price indexes may each lead to violations of proportionality and symmetry in PPP, leading to the looser definition of so-called weak PPP

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DETERMINANTS OF PRIORITY SECTOR LENDING: EVIDENCE FROM BANK LENDING PATTERNS IN INDIA

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ABSTRACT

Mandatory directed credit or priority sector lending (PSL) is part of the regulatory framework for commercial banks/ financial institutions in many countries, both developing and developed. However, compliance and lending effectiveness of such programs may be determined by a host of factors. This may be particularly so in developing countries, where availability of finance for the vulnerable sectors like agriculture, small businesses, weaker sections, is scarce. The present paper aims at examining the patterns of priority sector lending by banks, with a view to identifying the factors which determine this lending, and implementation challenges for lending by banks in such programs. The paper is based on an analysis of secondary data relating to priority sector lending (1998-2014) for eighty banks in India, and is supported by findings from the survey of ninety-seven lending officers of various banks. The results indicate gaps in patterns of the sectoral target compliance by different bank groups, along with the lending preferences and challenges faced by banks in such lending. It also identifies bank-specific characteristics like the nature of ownership, size, performance, etc., which have a significant impact on the priority sector lending patterns. Based on its findings, the paper offers policy suggestions for improving the effectiveness of priority sector lending program.

JEL: G21, G34, O16

KEYWORDS: Banks, Directed Credit Program, Priority Sectors, Bank Ownership, Small Business Credit

INTRODUCTION

Directed Credit Programs (DCP) have been adopted by many countries, including Japan, Philippines, Brazil, Nigeria, India, Nepal, China, Pakistan, USA, Korea, etc. as a tool to direct financial resources towards select sectors of the economy, which need special thrust for growth (Vittas and Wang 1991, Schwarz, 1992, and Kohli, 1997). Although the directed lending programs differ significantly in each country in terms of size, scope, strategy, focus, etc. (Vittas and Cho, 1995), the primary objective is to provide credit support to the priority sectors of each economy, so that the growth is sustainable and inclusive. The prominent priority sectors identified in most countries under the directed credit programs mainly include areas like agriculture (Brazil, Pakistan, India, Philippines, USA, etc.) and small-scale industry (Japan, Korea, India, USA, Philippines, etc.), both of which employ a large number of people, are geographically well spread across the entire nation and occupy small size owners (Shirota, Paulo and Meyer 1990, and RBI Paper, 2005). Since such programs are key tools of economic policy, and involve a huge amount of credit resources, it is important to monitor the performance and to ensure effectiveness of such programs. The experience with the impact of DCPs has been quite different in various countries. Some of the studies observe that while it has been more successful in countries like Japan and Korea, the same cannot be said about other countries where it was fraught with implementation issues (Calomiris and

Himmelberg, 1993, Stiglitz and Uy 1996, Llanto, Geron and Tang, 1996, Kohli, 1997, and Reztis, Tsiboukas and Tsoukalas, 2003).

There is a case for government intervention in credit markets in most developing countries like India, Mexico, and Philippines, etc. (Besley, 1994, and Berger and Udell, 2006) in view of market imperfections and structure of the banking system which is predominantly state-owned. Hence, this may bring in lending issues related to bank ownership, size, performance, lending efficiency and such others.

Unlike large corporate borrowers, most of the borrowers in priority areas (small-scale sector, agriculture, weaker sections, etc.) are by their very nature, small in size, may not have verifiable financial statements, sufficient or asset-based collaterals, and may be located in rural areas or small towns. This could lead to their higher probable risk of default if the lending banks' structures are not flexible to adapt to peculiar nature of such lending. Thus, it presents a set of challenges to many banks, especially large and state-owned (public sector banks) ones, which have fixed structures and who rely more on transaction based lending technologies. As against this, smaller banks or privately owned ones have a comparative advantage in relationship-based lending, which may be more suitable for priority sector type of lending. Therefore, it was seen that smaller banks are able to lend more to smaller firms (Peek and Rosengren, 1995, Cole, Goldberg and White 2004, Berger, Miller, Petersen, Rajan and Stein 2005, and Berger and Black, 2010). In terms of bank ownership, especially in developing countries with market imperfections, state-owned or public sector banks were found to lend more to state-owned and to larger firms (Banerjee and Duflo, 2004, and Berger, Klapper and Zaidi, 2006). Similarly, factors like probable higher risk of default by borrowers, lower risk absorbing capacity of lender, political interventions in lending, etc. have also been found to be important factors adversely impacting such lending (Banerjee and Duflo, 2003, Featherstone, Wilson, Kastens and Jones, 2007, Bhaumik and Piesse, 2008, Guha, 2009, and Cole, 2009). Thus, it is important to understand the determinants of this lending, challenges faced by banks, and structures, which will make it easier for them to lend to priority areas.

In India, post nationalization of banks in 1969, government through the Central Bank, i.e. the Reserve Bank of India (RBI), introduced directed credit program (DCP) termed as "Priority Sector Lending" (PSL). Under this program, the RBI stipulated that at least 40% of average net bank credit (ANBC) or of credit equivalent amount of off-Balance sheet exposures (OBE), whichever is higher, must be given to certain select sectors. These were the ones which were hitherto the neglected sectors of the economy like agriculture, small-scale enterprises, weaker sections, export credit, housing, education, etc. Within this, the targets for lending to agriculture and weaker sections were fixed at 18% and 10% respectively. The PSL guidelines have been in place in India for over 40 years now. A substantial sum of the banks' funds (40%) is diverted specifically to these areas, and is not available for lending to other areas. It is, therefore, important that they are actually put to good use to serve the national objectives, and not otherwise. Banks, however, have faced challenges in complying with the total PSL targets and sectoral targets (agriculture, weaker sections). It is seen that some banks may be inclined to lend to more lucrative areas in PSL, like housing, education, export credit, etc., which have had better creditworthiness and an urban focus (Roy, 2006, Rao, Das and Singh, 2006, Uppal, 2009, and Raman, 2013). Furthermore, some banks with specific characteristics may be better equipped to lend to smaller firms, and to PSL borrowers who have special features unlike those of a normal corporate. An understanding of the factors impacting PSL by banks may help to frame certain policy and structural recommendations for better implementation of the PSL guidelines.

The RBI Committees which have examined the PSL policy from time to time have analyzed some generic issues relating to it, and in a more qualitative manner. Academic literature within this field is also limited in terms of issues covered, or of the time period covered, or in confining methodology to either secondary analysis or primary survey. While secondary data analysis may highlight certain lending patterns, the reasons for them can be better explained by bank lending officers who face the ground realities. Therefore, a primary survey is necessitated to support the secondary data analysis. This is especially valid for PSL

since it is a special kind of lending with its own peculiarities, expectations and challenges. The present study, therefore, provides an updated analysis of the subject and uses both secondary and primary data to highlight certain lending patterns, challenges faced by banks, and factors impacting the effective execution of PSL program in India. Based on this, an attempt has been made to offer a few recommendations to policy makers in order to enable the PSL program to be more effective from a bank lending perspective. The rest of the paper is organized as follows. The next section is of "Literature Review," which provides a survey of some of the previous studies related to this subject. The section after that is of "Data and Methodology," which includes details on the secondary data used for the study, on how this data has been organized for analysis, various tools used for data analysis, and primary survey details. This is followed by the section on "Results and Discussion," which explains the different findings from the study in terms of the lending patterns, preferences and challenges faced by banks; bank group wise differences in PSL compliance; sector wise differences in PSL compliance; relationship of PSL to bank characteristics and; PSL guideline suggestions. The final section is of "Concluding Comments," which lists out the conclusions from the study, and policy recommendations emerging therefrom.

LITERATURE REVIEW

The need for and positive impact of the directed credit program (DCP) on inclusive growth of a country, and on growth of different sectors, has been analyzed by various studies like those conducted by Eastwood and Kohli (1999), Burgess, Wong and Pande (2005), and Swamy (2011). Banks in India, are an important part of the financial system and lend substantially to various segments of the economy, even though informal sources of credit still remain the main competitor, especially in rural India (Satyasai, 2008, Devaraja, 2011, and NSS 70th Round, 2013). In his study, Pradhan (2013) states that although the share of informal credit out of total rural credit has fallen over the years from 92.8% in 1951 to 42.9% in 2002, it is still a prominent figure. Out of the balance 57.1% (which is institutional credit), co-operatives and commercial banks (including Regional Rural Banks) account for nearly 91%. Main reasons for the dependence of rural borrowers on informal sources of credit despite them being very expensive include, flexibility in repayment terms, provision of credit for non-professional reasons like marriage, litigation, etc., ease in taking credit, and availability of loans without collaterals.

Within the priority sector lending (PSL) areas, a structural shift has been noticed in lending patterns of banks over the years. While banks, overall, have met the total PSL targets, there seems to be in general, a preference to lend to sectors other than agriculture, small-scale industries (SSI) and weaker sections (which are the desired sectors from social welfare point of view), since the other priority sector areas are more lucrative and less risky (Roy, 2006, Rao, Das and Singh, 2006, Uppal, 2009, and Raman, 2013) The planning commission of Government of India, in its eleventh five-year plan document, has observed that "PSL to agriculture/ SSI has diluted in the last ten years by a shift in the focus to better creditworthy activities such as housing, transport, professional activities, etc."

Within the banking system, few types of banks may be better at PSL than the others. The impact of bank size on lending and the fact that smaller banks have a comparative advantage in lending to smaller borrower firms, has been explored by many studies. Smaller borrowers have less of verifiable financial records and more of soft information. Smaller banks seem to be at a comparative advantage in relationship-based lending by procuring and acting on such soft information, and hence are able to lend more to such smaller firms. Larger banks instead focus more on hard information, which is easier to communicate, and thus focus more on larger firms where transaction based lending technologies are easily applicable (Peek and Rosengren, 1995, and Berger, Miller, Petersen, Rajan and Stein, 2005). PSL comprising of small business sized firms, agriculture and weaker sections with mostly opaque financials and lesser collaterals, may not hence be very suitable for transaction based lending technologies, and rather may be more aligned to relationship-based lending. Given that the larger banks have a lower proportion of their loan assets to small

borrower firms, this could be partly explained by their need to avoid agency problems and inconsistency in lending processes, due to their large size.

Therefore, they employ standard criteria based more on quantitative assessment of financial records leading to a “cookie cutter” approach, as against smaller banks, which rely more on qualitative information and thus, character based lending, thereby having more flexibility in lending (Cole, Goldberg, and White, 2004). Berger and Udell (2006) go on to say that while the smaller banks have a comparative advantage in lending based on relationship or soft basis, but this could also include "judgment" lending. Herein, judgment of the lending officer based upon his experience and training, is used to assess and extend loans. Berger and Udell (2006) in their study assess the issue of credit availability to small and medium enterprises (SMEs) in a holistic manner, rather than in a narrow sense. Lending technologies, as defined in terms of procuring information, screening them, structuring loan contracts and monitoring mechanisms, are viewed as a conduit to enable varying government policies and financial structures to translate to credit availability to SMEs. The study underlines the importance of considering not only bank size, but also its nature of ownership and the lending environment to explain their varying lending technologies, and hence credit availability to smaller firms. This aspect is further explored in the study by Berger, Klapper, Peria and Zaidi (2006) which uses data from India, and states that in developing countries, relationship is quite important in bank lending since the legal and regulatory structure is not always strong and supportive for creditors, and financial systems are more fragile. Furthermore, such countries have more of state-owned, i.e. public sector banks, which are larger in size.

The study found that private sector banks have a comparative advantage in providing main relationship to opaque firms, while foreign and state-owned banks have such comparative advantage vis-à-vis foreign firms and state-owned firms respectively. Furthermore, nationalized banks are not as likely as State Bank of India (SBI) to act as the main banks for SMEs. Neither of the two categories of state-owned banks are providing main relationship in rural markets as well, in a disproportionate manner, thereby not serving their mandate of PSL as per RBI guidelines. Kumar and Francisco (2005) found that smaller firms have more difficulty in credit access and have more credit constraints, and state-owned banks are more likely to lend to larger firms. Thus, government intervention in ownership of banks may not be very favorable for lending to small and information ally opaque firms.

Impact of government ownership in banks on their lending behavior is supposed to have three alternative views: social, agency and political. Social view suggests that state-owned banks maximize social objectives as against private sector banks who are driven more by profitability. Agency view suggests that agency cost in state-owned banks is higher, leading to corruption and misallocation of resources. Since public sector banks have some non-measurable objectives (primarily social) to serve, their employees have lower incentives. They may, therefore, resort to other measures to promote personal benefits, leading to sub optimal allocation of financial resource and inefficiency. Political view suggests that state-owned banks serve as a conduit for supplying political patronage, and this impacts their lending behavior. It suggests that politicians have their personal objectives to serve (to gain or maintain voting support) by creating and maintaining public sector banks. The findings of the study by Sapienza (2002) mainly support the political view in most sections, as also the agency and social views in some others. This raises policy issues that government ownership in banks could distort resource allocation, and politicized financial allocation has a negative impact on productivity and growth.

The agency view has been supported by a few other studies. Banerjee and Duflo (2004, 2014) found that the small firms are credit constrained, and that the banks also find such lending profitable. In spite of this, banks are reluctant to increase the amount of lending and especially to new firms, mainly to avoid possible action against them for bad decisions (good performance anyway does not attract enough rewards). This may as well be peculiar to public sector banks. In another study, Banerjee, Cole, and Duflo (2003) attempted to understand the plausible reasons for under lending by banks, and found that the banks have inertia of

lending, and lend more based on past loan limits. The penalties for bad lending to loan officers are more than rewards for increased lending (inertia and fear of prosecution). Regression analysis showed the impact of vigilance activity on credit given by public sector banks, which fell by 3-5% on account of the same, during the study period (vigilance data had 72% of frauds related to credit extended illegally). Further, banks find it easier and more convenient to invest in risk-free government securities than to lend to borrowers, since it may involve a rather lengthy and cumbersome process of screening and monitoring them. Finally, such lending may not be perceived to be very profitable to banks on account of the high default rates. The importance in lending, of a suitable employees' performance appraisal systems, was also highlighted in the study by Cull and Xu (2000), wherein they found that banks have been more effective, than direct government transfers, in lending to state-owned enterprises in China, mainly because the incentives to lend to good-quality borrowers were built into the bank employees' performance appraisal systems. Bhaumik and Piesse (2008) in their study, attempt to understand the credit disbursal behavior of three types of banks (as distinguished by ownership), i.e. state-owned (public sector) banks, private sector banks and foreign banks, and found some differences across them. In general, size or geographical coverage (number of branches) was found to be a more important factor for private sector banks, while non-performing assets (NPAs) was a more significant factor for credit disbursal for public sector banks.

Featherstone, Wilson, Kastens, and Jones (2007), in their study explored the lender and borrower specific factors which impact bank lending to agriculture. Among other things, borrower's character, and his credit risk or the expected probability of default, were found to be significant factors impacting the loan amount. Loan officer characteristics, in terms of percent of time lenders spent on agricultural loans and number of years' experience as an agricultural loan officer, were also found to be significant. The study by Rao, Das and Singh (2006) on assessing the impact of certain bank variables on SSI lending found the bank size and NPAs to be negatively related to SSI lending by public sector banks. Ahmed (2010) in his paper found that quality of loans and performance of the credit delivery system as measured by credit-deposit (C/D) ratios emerged to be the two prime factors to have influenced the volume of PSL in the study area. The study by Beck, Kunt and Peria (2008) concludes that overall banks consider SME lending to be very profitable. However, macro-economic instabilities in developing countries and competition in developed countries were considered to be the main obstacles in SME lending. In another study to understand the impact of risk aversion behavior of banks in India on their lending, Bhaumik and Piesse (2008) found that persistence of past lending, treatment of NPAs, regulations regarding NPAs and second generation reforms, norms of PSL, all have an impact on bank lending by making them more risk averse. Thus, it seems that risk aversion of banks, and their worry over NPAs (risk of default) is a critical factor impacting their lending in general. This is likely to be more so for PSL, which is perceived to be riskier form of lending. The study also puts a question mark on efficacy of PSL by banks, but further states that this is a political decision.

The political view, including the issue of political pressures faced by public sector banks, acting as a major deterrent to their lending, has also been discussed in few other studies. Cole (2009) in his study, assesses the impact of elections on agricultural lending in India, to check for presence of political intervention. The study found that there is an increase (by 5-10%) in agricultural lending by public sector banks during election years. More lending is observed in districts where a margin of victory or loss is narrow for the ruling party, thus signifying the presence of tactical redistribution to achieve electoral or political goals. Further, loan defaults were found to be higher around election time, thereby indicating that these loans were made for political intentions. The cost of such lending was also found to be quite high, especially since this increased agricultural lending did not lead to increased agricultural output. Thus, government ownership of enterprises exposes their resources to misuse by government for their political motives, and therefore, leads to inefficiency. A similar finding is noted in the study by Guha (2009), which aimed to see if agricultural and SSI lending by banks is influenced by political motives. It was found that credit to these sectors rose before and during general election years and thus, had political cycles. Subramaniam and Subramaniam (2009) in their study, have also stated that the "loan melas" and system of lending in rural areas encouraged corruption and tendency to default among the borrowers.

Thus, banks which focus more on lending efficiency by lowering their NPAs, may find it difficult to lend more to PSL, where risk of default may be higher. It may, therefore, require more discipline, compliance attitude and risk absorption capacity in banks to be able to lend to priority areas. This is normally indicated by a bank's Capital Adequacy Ratio (CAR) which is its solvency measure and defines its risk. It is generally seen as a bank's ability to bear losses, strength of its stability, performance and as compliance of regulatory provisions (Posner, 2014, Ikpefan, 2013, and Huang, 2005). The study by Kolari, Berney and Ou (1996) found that small business credit had a positive impact on profitability of smaller banks, and that CAR and Return on Assets (RoA, a measure of profitability) are positively related. The study by Berger and Bouwman (2013) found that capital could help banks, especially smaller banks, improve their performance in terms of survival probability, profitability and market share. The performance itself of banks, may also be dependent upon nature of ownership. In the Indian context, private sector banks have mostly performed better than public sector banks. The privatization process in India, has helped improve their performance (Das, Nag and Ray, 2004, Ghosh, 2010, and Mishra et al., 2013).

Since regulatory and lending environments are important factors determining lending, few changes in policy guidelines and inclusion of new sectors may also encourage better PSL compliance. The study by Mohan (2006) puts into perspective, the need to lend beyond traditional avenues, given the changes in demand and supply pattern of agricultural products. Not just production, financing of other affiliated activities like diversification, value added (processing) services, technology, inputs, marketing, distribution and rural infrastructure are also important for agricultural lending objectives to succeed. National objectives as outlined in government policy documents (Approach to twelfth five-year plan, 2012-17), highlight areas of national priority. Therefore, including some of these areas in the PSL sector eligibility list, will help align PSL policy to national economic policy.

Research Gap

Academic research within this area focuses on a range of issues in such lending in a specific context. This is either of target compliance or of relationship of lending to bank size or nature of bank ownership or its risk aversion or profitability, etc. They are not considered altogether as linked to each other. In addition, most of these studies are limited in terms of the time period covered. Further, latest or an updated study on some of these issues, is not available. Finally, very few of them use both secondary data analysis and primary survey to support each other, in the same study. The present study thus, aims to fill these gaps by 1.) Combining the related issues to understand the complete picture, rather than by taking them in isolation, 2.) Taking a sufficiently long time period for the study (from 1998 to 2014), 3.) Using the latest period (2014) to provide an updated study for the area, and 4.) Using both secondary and primary tools of analysis. Secondary data analysis is supplemented with qualitative analysis from the primary survey to arrive at conclusions and recommendations for strengthening the PSL program.

Research Objective and Questions

The primary objective of this study is to examine the PSL patterns of banks and to assess whether any bank-specific characteristics have an impact on this lending. Thus, an attempt is made to examine whether the banks have, over the study period, complied with the PSL targets as per the RBI guidelines, and exhibited any patterns or preferences or faced any challenges. Possible reasons for the same are identified in terms of the factors impacting PSL. This helps us to offer policy recommendations in order to make this program more effective in its implementation. Accordingly, the research questions are 1.) What are the lending patterns, preferences and challenges faced by banks in PSL? 2.) Does the pattern and target compliance differ significantly across bank groups and sectors in PSL? 3.) What bank-specific characteristics influence PSL patterns? 4.) How can the PSL program be made more effective for lending by banks?

DATA AND METHODOLOGY

The study is based on secondary data analysis and primary survey.

Secondary Data

Banks dominate the Indian Financial System with 68.50% of the market share, in which the scheduled commercial banks have almost 93% market share. Within this, the public sector banks have nearly 72.70% of the share, followed by private sector banks (20.8%) and foreign banks (6.5%) (RBI Report: Trend and Progress of Banking in India, 2014). Secondary data was collected from banks as, 1.) For trend Analysis, total 80 banks: 28 public sector banks (SBI group plus nationalized banks), 20 private sector banks and 32 foreign banks, and 2.) For principal component analysis (PCA) and panel regression analysis, total 46 banks: 27 public sector banks (SBI group plus nationalized banks), 19 private sector banks and 18 foreign banks. Bank groups (public, private and foreign) have been classified in the study in terms of the nature of ownership, as per the RBI classification. Data for public sector banks is available in all the sectors of agriculture, weaker Sections, SSI and other PSL (total PSL minus agriculture minus SSI lending) including housing and education, from 1998 to 2014. For private sector banks, data for SSI sector lending and hence for other PSL sector, is not attainable. Rest of the data (total PSL, agriculture and weaker sections' lending) is available from 2001 to 2014. Data of foreign banks is present for total PSL only, and from 2005-2014.

The total PSL target for foreign banks during the study period is 32%, which is different from that of other banks (40%). Therefore, this group has been analyzed separately and is not included in analysis for total PSL. As per the RBI guidelines, PSL target is to be computed as percentage of Adjusted Net Bank credit (ANBC) or credit equivalent amount of Off-Balance Sheet Exposure, whichever is higher. In the present study, PSL has been used in terms of this percentage, and not in absolute amounts, since the nature of bank lending is better exhibited by such percentages. Entire data has been taken from various tables listed under the head, "Statistical Tables Relating to Banks in India," for each year of the study period. This appears on the website of Reserve bank of India (RBI), under the head of "Publications" (Annual).

Secondary Data Analysis

Apart from tools like trend analysis, averages, growth rates, standard deviation, etc., certain additional tools have been used, 1.) ANOVA to test differences in target deviations across PSL sectors and bank groups, 2.) Principal Component Analysis (PCA) to reduce the number of variables and to combine them into meaningful bank characteristics, and 3.) Panel regression analysis to understand the impact on PSL, of bank characteristics as drawn from PCA above. Basis literature review, nine important variables (definitions derived from RBI Glossary) of a bank's performance were identified, and collated in a panel format for public sector banks (1999-2014), private and foreign banks (2005-2014). 1.) Deposits plus advances of the banks, i.e. volume of business, used as an indicator of bank size, 2.) Number of employees to denote employee strength, and also used as a measure of bank size, 3.) Total assets of the bank, used as a measure of its size, 4.) Total number of branches, i.e. branch strength and reach, and also used as a measure of bank size, 5.) Capital Adequacy Ratio (CAR): This is a ratio of capital to risk weighted assets, and is arrived at by dividing the capital of the bank with aggregated risk weighted assets for credit risk, market risk and operational risk. This is a measure of bank's solvency, risk absorption capacity and capital strength.

Statutory authorities encourage banks to maintain minimum CAR as per the norms, hence it also reflects compliance and discipline attitude of banks, 6.) Return on Assets (RoA) is a profitability ratio of the bank which indicates the net profit (net income) generated on total assets. It is computed by dividing net income by average total assets of the bank, 7.) Net interest margin (NIM) is the net interest income (difference between the interest income and the interest expenses) divided by average interest earning assets of the bank and is thus, an indicator of its profitability, 8.) Credit-Deposit ratio (C/D ratio) is computed by dividing

total credit extended by the bank, by its deposits, and is an indicator of its lending aggressiveness, and 9.) Net NPA (non-performing assets) ratio to total assets is a measure of credit default rate for the bank. Lower NPAs is an indicator of its lending efficiency. An asset, including a leased asset, becomes non-performing when it ceases to generate income for the bank.

Since each of these variables is expressed in a different unit, they were scaled for the sake of consistency by taking their deviations from mean and dividing the difference by their respective standard deviations. A correlation matrix of these variables indicated that many of these were highly correlated to each other and therefore, Principal Component Analysis (PCA) was used to correct this issue. This also helped to reduce the number of variables, so that meaningful inferences on bank characteristics can be drawn from the components suggested by PCA test results. Based on the factor loadings of each variable in a component and original scaled data of variables, factor scores for each component were computed and collated in the panel format. A regression analysis was then carried out on this data set, separately with fixed effects and random effects, and out of these, one was chosen based on Hausman test results. Since the result in most bank groups indicated that random effects is better for the data taken, Breusch and Pagan Lagrangian multiplier test for random effects, was conducted, which confirmed presence of heteroskedacity in data. So, cross-sectional time-series FGLS regression was run to correct this problem, and thereafter final results were obtained and analyzed. In the bank group (of foreign banks) where Hausman test confirmed that fixed effects model is a better model, it was re-run to remove heteroskedacity and the final results were then used for interpretation.

Primary Survey

The empirical results from data analysis have been supplemented through survey results. It has been done by a structured questionnaire which had detailed questions catering to each of the research questions of the present study, in a similar sequence. The options under each question were devised mainly based on prior research studies, and policy suggestions were mainly based on national policy documents and prior research studies. A mix of ranking, rating and semantic scale questions was used based on research objectives of respective questions. Enough scope was left for open-ended questions to provide for issues, which may have been missed out otherwise. Responses to these open-ended questions, along with personal interviews of some of the respondents, were separately analyzed by creating their main themes, and then relating them to questionnaire findings. The questionnaire was filled in by 97 lending officers of various banks, most of them belonging to senior management roles. A validity test by expert opinion, and reliability test by Cronbach Alpha test ($\alpha = 0.867$, $n = 121$), were done, which positively confirmed these two aspects of the primary survey. Mean ranks/ scores, percentages, etc. were used as main tools of analysis.

RESULTS AND DISCUSSION

In order to identify the determinants of PSL, the lending patterns, preferences and challenges faced by banks were analyzed. Differences in target compliance by banks across bank groups and sectors, were also analyzed.

Lending Patterns, Preferences and Challenges Faced by Banks

At the outset, the trends in compliance by banks over a period of time, were examined. Figure 1 presents lending to total PSL, agriculture, weaker sections, SSI and other PSL by sample banks. Total PSL, agriculture and weaker sections is for all banks (public plus private), while SSI and other PSL are for public sector banks only. Public sector banks data is available from 1998-2014 while that of private sector banks is from 2001-2014. Weaker sections' data is present from 2001 to 2014. Data for lending to housing and education sectors is available for public sector banks from 1998-2014, but is missing from 2002-2007 in between this period.

Figure 1: Trends in PSL

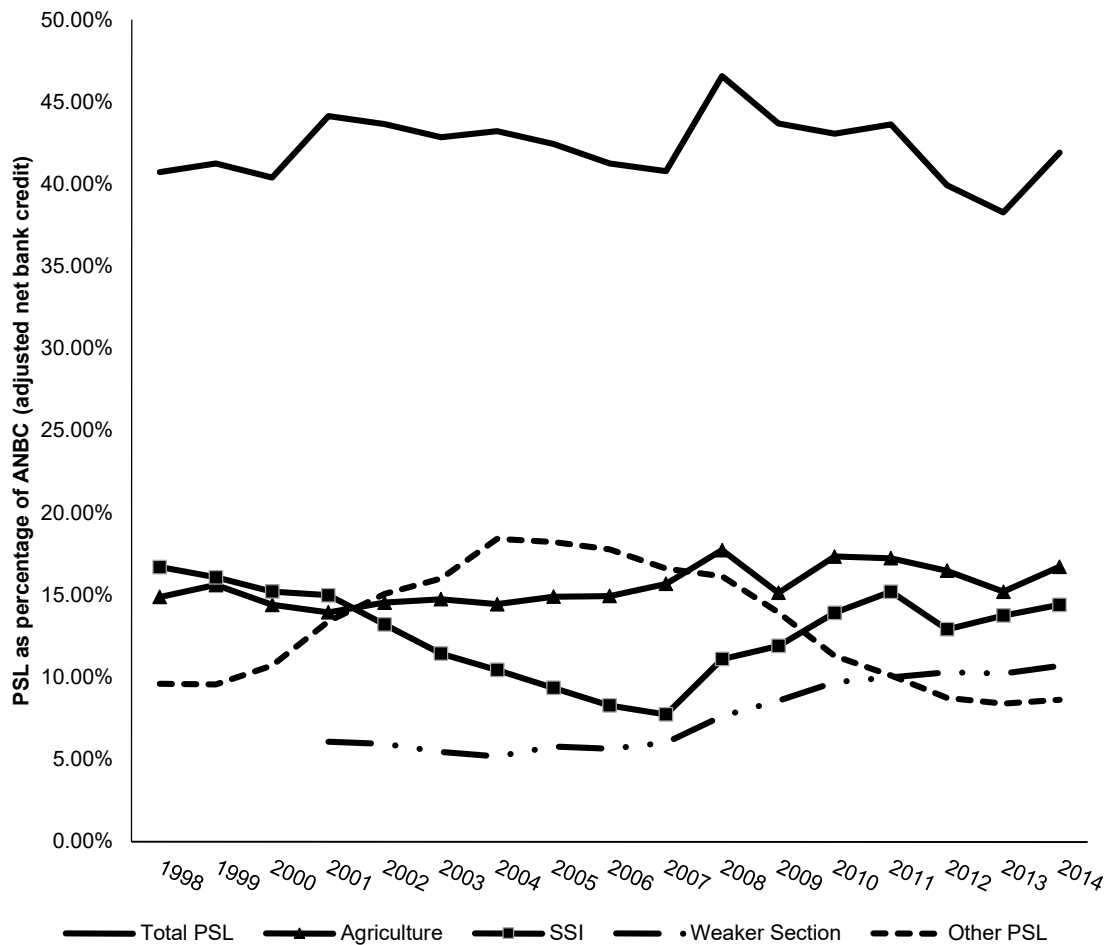


Figure 1 highlights trends in PSL (Total and sectoral) by sample banks, over the years during the study period.

Data relating to average PSL percentage of the study period, of various bank groups to different sectors in PSL, is presented in Table 1 below.

Thus, the average PSL (total) by banks is well above the target of 40% during the study period. However, the average lending to sectors of agriculture and weaker sections, is quite below their targets as defined in RBI guidelines (Table 1). Total PSL percentage received a boost in years 2001, 2008 and 2014 when the previous declining trend was corrected by an upswing. While in the year 2001, the increase was accompanied with an increase in mainly share of other PSL (Total PSL minus agriculture and SSI), in the year 2008, it showed an increase in share of agriculture, SSI and weaker section lending as well. As per the RBI Working Group Report (2015), a notable increase in agriculture share in PSL was seen during early 2000s when the Central Government initiated a Comprehensive Credit Policy for reviving the growth of agricultural credit. Similar revival signs were also noticed in SSI share of PSL, after the broadening of the definition of the SSI sector in the year 2006-07.

Table 1: PSL Target Compliance and Trends

Parameter	Total PSL	Agriculture	SSI	Weaker Section	Other PSL		
					Total	Housing	Education
Target as per RBI guidelines	40%	18%	none	10%	none	none	none
Average PSL	42.23%	15.53%	12.75%	7.663%	13.10%	5.982%	1.055%
Compounded annual Growth Rate (CAGR) in PSL percentage	0.1808%	0.7328%	-0.9204%	3.582%	-0.6745%	9.260%	16.80%
SBI Group	42.11%	16.58%	12.83%	9.452%	12.97%	6.075%	1.089%
Nationalized Banks	41.73%	15.63%	12.66%	8.268%	13.41%	5.889%	1.020%
Private Banks	43.28%	14.28%	N.A.	5.364%	N.A.	N.A.	N.A.
Foreign Banks	32.85%	No target	No Target	No Target	N.A.	N.A.	N.A.
	(target: 32%)		Target				

Table 1 presents data for average PSL, and its growth rate over the study period, for various bank groups, and to different sectors in PSL.

As for the sector al lending, percentage lending to other PSL category increased until 2004, but started declining thereafter. Its average for the entire study period is, however, quite substantial (13.10%). Out of this other PSL category, sector of “Housing” seems to be the preferred choice of banks taking over 45% of the share of lending to this sector (Table 1) and showing a high growth rate as well (9.26%). This is also substantiated by our primary survey findings where this sector has been ranked as number one in preference order of banks. Percentage lending to SSI sector, even though ranked in the survey as second most preferred sector for lending by banks, is showing a negative growth (-0.92%) over the study period. This may signify that banks may be facing challenges in lending here. The average percentage of lending to agriculture, has not met the target, and it also shows a paltry growth rate (0.73%), during the study period. Further, it ranks low in the preference order of banks, as per the survey findings. The least preferred sector is of weaker sections. The main reason for such a sector preference order by banks, is cited as, “Better value and quality of collaterals offered against loans in these sectors,” followed by, “Borrowers are located in urban areas, which are easier to reach and access,” and then, “Lower default rates in these sectors’ lending.”

Lending to weaker sections has been gradually increasing over the years and has finally managed to surpass its target of 10% since 2012 for some banks. The sustainability of this trend may, however, be uncertain, since banks are still concerned of lending efficiency (lowering default rates and having collaterals) mainly due to fixed lending processes of public sector banks and high risk of penalties for bank employees for higher default rates in loans extended by them. As per the survey, loans to weaker sections are given without sufficient collaterals and for objectives with little incremental income, which do not enable loan repayments, which discourages this kind of lending by banks. Instead, a more effective alternative as many of them suggested, is to use the micro finance system for this kind of lending which institutions are better equipped to handle the peculiar challenges of this kind of lending.

In general, the number-one challenge faced by banks in PSL emerged to be, “Higher probability of NPAs (default rate).” Sector ally as well, the greatest challenge in lending to SSI sector and weaker sections turned out to be, “Higher risk of default (NPAs),” followed by “Lower value of collateral offered against the loan.” The biggest challenge in lending to the agriculture sector is cited as, “Policy interventions by the government like a loan waiver, etc.,” followed by, “Higher risk of default (NPAs).” Thus, the main challenge faced by banks in most priority sectors, seems to be related to lending efficiency, in terms of probable high risk of credit default (NPAs) and lesser collaterals of loans given. The prominent reason in case of agriculture lending is government/political interference like loan waivers. This has also figured very frequently in qualitative comments/ recommendations of respondents, and is the topmost ranking policy suggestion of the survey as, “Lower political interference in decisions to grant loans or to waive off loans.”

As per our primary survey findings, almost 70% of the respondents feel that a good amount of importance is assigned to PSL in banks. However, in spite of this, it seems that adequate employees and resources are not deployed by banks to this area of lending. 42.1% of respondents have rated the level of deployment as inadequate, as against 39% who have rated it as adequate. Only 11.6% of the respondents have rated this at the highest level of adequacy. The main reason cited for inadequate resource deployment by banks was a shortage of bank staff in general. Further, the majority of respondents (55.7%) opined that banks prefer to lend to borrowers in urban areas rather than in the rural areas, as against 11.4% who opined that they did not. The main reason for such urban preference was cited as, “Easy access due to stronger network of urban branches,” followed by “Better-trained staff in urban branches.” The above responses thus, highlight the need for strengthening of branches by hiring and training of suitable staff for this particular sector, on account of its special needs and challenges.

Some of the private sector banks which have more flexible structures, and human resource (HR) policies have managed to do this and have therefore, been able to lend more to PSL. The number one ranked factor which may adversely affect the motivation of advances managers to focus on PSL, came up to be “Possibility of administrative action against advances managers in case of high defaults (NPAs) in PSL accounts.” This was followed by, “Not enough incentives built into employee performance appraisal system to increase lending to comply with targets.” This finding, along with an analysis of general recommendations and personal interviews, supports the fact that building the right culture and HR policy in banks, is important to boost their PSL. This is also the second most preferred ranking policy suggestion of the primary survey, as “Build in special awards and recognition for employees who perform effectively in PSL area in terms of lending more to smaller/ needy sections while minimizing risk of defaults.” Thus, the HR policy for PSL must be designed separately than for the other forms of bank lending, keeping its special features in mind.

Bank Group Wise Differences in PSL Compliance

On an average, all bank groups (SBI group, nationalized banks, private sector banks and foreign banks) complied with the overall target of PSL over the study period and in fact, exceeded the same. This is evident from the data in table 2 below.

Table 2: Bank Groupwise PSL Compliance Details

	SBI Group	Nationalized Banks	Private Banks	Foreign Banks
Target: Total PSL	40%	40%	40%	32%
Average PSL	42.11%	41.73%	43.28%	32.85%
Average Standard deviation	4.389%	4.719%	7.538%	12.19%
CAGR in PSL percentage	-0.1986%	0.0860%	0.2821%	1.628%
Average Percentage of banks not complying target in a year	26.05%	26.75%	23.17%	55.66%
Average Percentage of non-compliant years of target by a bank	23.98%	28.53%	20.85%	56.79%

Table 2 presents details of PSL compliance for various bank groups over the study period.

However, ANOVA tests' results suggest that bank ownership type had a significant impact on such positive target deviations. These results are presented in Table 3 below. Private sector banks have significantly higher positive target deviations, followed by public sector banks and then followed by foreign banks. Further, as per the data in Table 2, private sector banks have also done significantly better than the public sector banks, with their higher average lending (43.28%), and a higher per annum growth rate (CAGR of 0.28%). They also have the lowest average percentage of banks not complying with the target in a year, as well as the lowest average percentage of non-compliant years of target for a bank during the study period. However, their standard deviation is higher (7.53%) than that of public sector banks. Foreign banks, even

though have met their targets on an average, have the highest standard deviation (12.19%). Moreover, they have the highest average percentage of banks not complying with the PSL target in a year, and the highest average percentage of non-compliant years of target for a bank. This indicates that there is a wide variation among different banks in this category in terms of their PSL target compliance.

Table 3: Impact of Bank Ownership Type on PSL Target Compliance

Average Total PSL Target Deviations		Impact of Bank Ownership on Total PSL Target Deviations	
Bank Group	Average Target Deviation (%)	Bank Groups Compared in ANOVA	ANOVA Result
SBI Group	2.201	All bank groups	F(3,902)= 6.159***, p= 0.0004
Nationalized Banks	2.211	Public, Private	F(1,647) = 14.64***, p=0.0001
Private	4.181	Private, Foreign	F(1,515) = 11.47***, p= 0.0008
Foreign	0.9488	Public, Foreign	F(1, 644) = 3.339*, p= 0.0681
		SBI Group, Nationalized	F(1, 387) = 0.000), p= 0.9830
Average Agriculture Target Deviations		Impact of Bank Ownership on Agriculture Lending Target deviations	
Bank Group	Average Target Deviation (%)	Bank Groups	ANOVA Result
SBI Group	-1.487	SBI Group, Nationalized, Private	F(2,709)= 11.08***, p= 0.0000
Nationalized Banks	-2.360	Public, Private	F(1, 710) = 17.99***, p= 0.0000
Private	-3.490	SBI Group, Nationalized	F(1,456) = 6.512**, p= 0.0110
Average Weaker Section Target Deviations		Impact of Bank Ownership on Weaker Section Lending Target Deviations	
Bank Group	Average Target Deviation (%)	Bank Groups	ANOVA Result
SBI Group	-0.6406	SBI Group, Nationalized, Private	F(2, 625) = 61.84***, p= 0.0000
Nationalized Banks	-1.732	Public, Private	F(1, 626) = 115.99***, p= 0.0000
Private	-4.658	SBI Group, Nationalized	F(1, 375) = 9.155***, p= 0.0027

(*), (**) and (***) indicate significance at 10%, 5% and 1% levels, respectively. Table 3 presents the findings of ANOVA test for impact of bank ownership type on PSL target deviations. Target deviations of private sector banks (positive for total PSL, and negative for sectoral) are significantly higher than those of other bank groups. Thus, while they have done better in total PSL target compliance, they are lagging behind in sectoral target compliance.

Sector Wise Differences in PSL Compliance

If we look at the sector wise target compliance, the picture is opposite. Table 4 presents ANOVA test findings relating to impact of sector type on target compliance. While banks exceeded the targets of total PSL, they have, in general (excluding foreign banks, which do not have these sectors' targets), not been able to comply with the targets of sectors in PSL, i.e. of agriculture (18%) and weaker section lending (10%). The sectoral target deviations are negative and are significantly lower than of total PSL. However, between the two sectors of agriculture and weaker sections, there is no significant difference in their negative target deviations. This suggests that the situation is equally challenging for banks with regard to the target compliance of both these sectors.

Within this, if we further analyze the position of various bank groups (Table 3), private sector banks, which were better than public sector banks in total PSL target compliance, are doing worse in the sectoral targets' compliance. Their negative target deviations in both these sectors are significantly higher than those of public sector banks. They also have a higher standard deviation here. However, they seem to be trying to come up to speed by displaying a higher CAGR over the study period, i.e. 4% in agriculture and 7.52% in weaker section lending. Within public sector banks' category, SBI group's negative sectoral target deviations are significantly lower than those of nationalized banks, which shows its better lending to these sectors. However, the biggest bank in this group, SBI, has a mean lending of total PSL of only 39.2% over

the study period which is lower than the 40% target. In fact, it has not been able to comply with this target in nearly 60% of the years during the study period.

Table 4: Impact of Sector Type on PSL Target Compliance

Average Target Deviations		Impact of Sector Type on Target Deviations: Anova Results	
Sector	Average Target Deviation (%)	Sectors Compared in ANOVA	ANOVA Result
Total PSL	3.022	Total PSL, Agriculture, Weaker Sections	F(2, 2012)= 281.76***, p= 0.0000
Agriculture lending	-2.864	Total PSL, Agriculture	F(1, 1385) = 378.77***, p= 0.0000
Weaker Section lending	-2.724	Total PSL, Weaker Sections Agriculture, Weaker Sections	F(1, 1289) = 355.31***, p= 0.0000 F(1, 1350) = 0.3511, p= 0.5536

(*), (**) and (***) indicate significance at 10%, 5% and 1% levels, respectively. Table 4 presents findings of ANOVA test for impact of sector type on PSL. Target compliance for total PSL (positive target deviations) by banks was significantly better than for sectors, where the target deviations were negative. However, there was no significant difference between the negative target deviations of the two sectors of agriculture and weaker sections. This signifies that the situation was equally challenging for compliance by banks, in both these sectors of agriculture and weaker sections.

As against this, smaller banks like State Bank of Suarashtra, Nainital Bank and Lakshmi Vilas bank, have had full compliance in every single year of the study period. Thus, public sector banks are lending lesser percentage to PSL, as compared to private sector banks. Most of the public sector banks are larger in size, have fixed organization structures and human resource (HR) polices. They may thus, have lesser scope for relationship-based lending, which may be required for PSL. Political pressures and fear of prosecution for credit defaults amongst their employees may be higher, acting as other deterrents to such lending (where the probability of defaults may be higher). Private sector banks with more flexible structures, processes and approach to make PSL as a commercially viable business opportunity, are faring better in this regard. However, sect oral lending to agriculture and weaker sections is better for public sector banks, and within this, is best for the SBI group. This may be on account of their better rural reach or their higher commitment to social cause of PSL. Such a higher commitment could be on account of their government ownership, and also since some of them like SBI, were part of framing the original PSL guidelines.

Relationship of PSL to Bank Characteristics

The next part of the present research is to understand the reasons underlying the above trends in PSL by banks, in terms of the bank characteristics which may impact such lending patterns. This was done by relating this lending (PSL as percentage of ANBC) to bank characteristics through PCA and panel regression analysis. For the category of overall banks (public and private sector banks), the PCA test extracted three components, i.e. bank size, bank performance and lending efficiency, explaining nearly 73% of the total variance. The regression analysis showed a significant relation of first two of these components to PSL percentage. The findings are collated and presented in Table 5. The following regression equation was estimated to identify determinants of PSL percentage of banks:

$$PSL\ Percentage = \alpha + \beta_1 (Bank\ Size) + \beta_2 (Bank\ Performance) + \beta_3 (Lending\ Efficiency) \tag{1}$$

Generalized Least Squares estimates were obtained. The results are presented in Table 5. Bank Size: This factor comprises of variables like number of branches, number of employees, asset size and volume of business, and has a significant negative impact on PSL percentage ($\beta_1 = -.02805$). This indicates that bank size is inversely related to PSL by banks. The smaller banks are lending more to PSL. This is in line with the findings from earlier studies, which show that the smaller banks that rely mainly on relationship banking, are able to lend more to smaller-sized borrowers like in SSI sector, agriculture, etc. These sectors may not have verifiable financial records. It may, therefore, be difficult for larger banks to lend to such borrowers, since these banks tend to rely more on transaction based lending technologies (Cole, Goldberg and White, 2004, Berger, Miller, Petersen, Rajan and Stein, 2005, and Uchida, Udell and Watanabe, 2008).

Some of the personal interviews conducted with small banks, which have a very healthy track record of PSL compliance, also confirms this trend. They have aligned their hiring and HR policies to suit the peculiar demands of PSL. Lending to SSIs, agriculture, etc. in rural/ small towns is better handled by local staff, i.e. officers recruited from that area itself, who are well versed with local conditions, culture and people. They may thus, be able to lend better and get timely repayments. So, instead of using staff from general pool, who may be reluctant to be posted in such areas and may also take time to understand and adapt to local conditions, this may be a better strategy for PSL.

Local staff may be preferred for hiring for PSL, even though these people may not be meeting some of the otherwise stringent professional requirements of bank's hiring policies. Aligning the HR policies to PSL also emerges as the main theme from the survey, and from its qualitative comments and recommendations. Bank performance: This comprises of variables of RoA, NIM and CAR (Table 5). This component has a positive significant relation with PSL percentage ($\beta_2 = 0.10209$). So, higher the focus of the banks on profitability, earning efficiency of assets (NIM and RoA) and higher their risk absorption capacity and compliance attitude (CAR), higher is their PSL. Since PSL is considered by banks to be riskier form of lending, higher risk absorption capacity of banks helps them to lend more to PSL. Further, the reason why some of the private small banks are able to lend more to priority sector areas, is that they view PSL as a commercially viable business and profit-making opportunity, instead of seeing it merely as a social obligation. Since the beta coefficient of this factor is higher than that of bank size, it has a larger impact on PSL of banks. This may suggest that in India, banks, which are more disciplined in their approach by focusing on better performance, are lending more to PSL. This is also substantiated by the qualitative comments and recommendations of the survey where many respondents have cited attitude of the banks to comply with the RBI guidelines, emanating from top management's attitude and bank culture, as an important factor contributing to higher PSL by banks. Personal interviews with some senior bank officers (including a past chairman of SBI), have also concluded that the compliance attitude and culture of a bank are the most important factors, which could induce banks to lend more to the priority sector.

Lending efficiency: This component comprises of variables of C/D ratio (positive) and net NPA ratio (negative). While it is not a significant factor impacting PSL percentage in the overall banks group, it is showing very high negative and significant relationship for public sector banks' category, which forms a big component of total banks' category.

For the group of public sector banks (SBI group plus nationalized banks), the three components from PCA test are the same as for overall banks' category. These explain nearly 75% of the total variance. However, the regression results suggest that the last two components of bank performance and lending efficiency, have a significant impact on PSL percentage. Component of bank size is significant at the p-value of about 20% only. It is hence, not a very strongly impacting factor for this group of banks. The findings are summarized and presented in Table 6. The following regression equation was estimated to identify determinants of PSL percentage of public sector banks:

$$PSL \text{ Percentage} = \alpha + \beta_1 (\text{Bank Size}) + \beta_2 (\text{Bank Performance}) + \beta_3 (\text{Lending Efficiency}) \quad (2)$$

Generalized Least Squares estimates were obtained. The results are presented in Table 6. Bank performance has a positive significant relation with PSL percentage ($\beta_2 = 0.1254$), thus signifying that public sector banks with higher profitability, more disciplined attitude and risk absorption capacity, lend more to priority sector. On the other hand, the component of lending efficiency has a negative significant relationship with PSL percentage ($\beta_3 = -.17116$). This indicates that banks which have a higher focus on lending efficiency, by having higher C/D ratios combined with keeping lower NPAs, lend less to PSL. Since the beta coefficient of this factor of lending efficiency is higher than that of bank performance, it has a larger impact on PSL. Even in the survey findings, a good number of respondents have cited credit discipline of borrowers as a major factor impacting PSL. They opine that factors which reduce lending efficiency, like high probability

of credit default (NPAs), lower collaterals, financing for objectives/ projects, which are financially unviable, political interference in agriculture lending leading to high defaults, are all prominent challenges and factors which discourage banks from lending more to priority sector areas.

Table 5: Impact of Bank Characteristics on PSL: Overall Banks (Public and Private Sector)

Principal Component Analysis (PCA)			Panel Regression			
Variable	Bank Characteristic	Initial Eigen-values	Coefficient (β)	z Value	Probability Value P> z	
Deposits plus advances	Volume of Business					
Number of employees	Employee Strength	Bank Size (1)	3.542	-0.02801*** (0.0068)	-4.13	0.000
Total Assets	Advances					
Total number of branches	Branch strength					
Capital adequacy Ratio (CAR)	Risk absorption capacity	Bank Performance (2)	1.990	0.1021*** (0.0208)	4.91	0.000
Return on Assets (RoA)	Profitability					
Net Interest Margin (NIM)	Lending Aggressiveness	Lending Efficiency (3)	1.061	-0.0135 (0.0205)	-0.66	0.509
Credit-Deposit Ratio (C/D ratio)	Risk of credit default					
Net NPAs (non-performing assets) to total assets (negative in PCA)						
		Constant		-0.0586** (0.0263)	-2.23	0.026

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. PCA: Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0.6870; Bartlett's Test of Sphericity, Sig.: 0.000 Cross-sectional time-series FGLS regression. Number of obs= 549; number of groups= 46; wald chi2(3)= 72.99; Prob>chi2 = 0.0000 The values within the parentheses are standard errors. (*), (**) and (***) indicate significance at 10%, 5% and 1% levels, respectively. Table 5 presents the results of tests of PCA and regression for the group of overall banks. The PCA test extracted three components representing bank characteristics of bank size, bank performance and lending efficiency. Out of these, the first two characteristics, i.e. of bank size and of bank performance, had a significant impact on PSL percentage of overall banks.

For the group of private sector banks, the PCA test extracted three components explaining 77% of the total variance, and the regression analysis shows a significant relation of PSL percentage with all three of these. Summary of the findings, is presented in Table 7. The following regression equation was estimated to identify determinants of PSL percentage of private sector banks:

$$PSL \text{ Percentage} = \alpha + \beta_1 (\text{Bank Size}) + \beta_2 (\text{Bank Performance}) + \beta_3 (\text{Lending Aggressiveness}) \quad (3)$$

Generalized Least Squares estimates were obtained. The results are presented in Table 7.

Bank Size: Here again, the relationship is negative and significant ($\beta_2 = -0.0338$), signifying that the smaller banks are lending higher percentage to PSL.

Bank performance: This component here comprises of RoA (positive), CAR (positive) and NPA ratio (negative). It has a positive significant impact on PSL ($\beta_2 = 0.1265$). So, banks with higher asset efficiency (higher RoA and lower NPAs), and with higher risk absorption capacity and compliance attitude (higher CAR), are able to lend more to PSL.

Table 6: Impact of Bank Characteristics on PSL: Public Sector Banks

Variable	Principal Component Analysis (PCA)		Panel Regression			
	Bank Characteristic		Initial Eigen-values	Coefficient (β)	z Value	Probability Value $P> z $
Deposits plus advances	Volume of Business	Bank Size	3.617	-0.0158 (0.0118)	-1.32	0.187
Number of employees	Employee Strength (1)					
Total Assets	Advances					
Total number of branches	Branch strength					
Capital adequacy Ratio (CAR)	Risk absorption capacity	Bank Performance (2)	2.029	0.1254*** (0.0287)	4.38	0.000
Return on Assets (RoA)	Profitability					
Net Interest Margin (NIM)						
Credit-Deposit Ratio (C/D ratio)	Lending Aggressiveness	Lending Efficiency (3)	1.128	-0.1712*** (0.0334)	-5.13	0.000
Net NPAs to total assets (negative in PCA)	Risk of credit default					
	Constant			-0.0442 (0.0416)	-1.06	0.288

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization PCA: Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0.6924; Bartlett's Test of Sphericity, Sig.: 0.000 Cross-sectional time-series FGLS regression. Number of obs= 389; number of groups= 27; wald chi2(3)= 47.16; Prob>chi2 = 0.0000 The values within the parentheses are standard errors. (*), (**) and (***) indicate significance at 10%, 5% and 1% levels, respectively. Table 6 presents the results of tests of PCA and regression for the group of public sector banks. The PCA test extracted three components representing bank characteristics of bank size, bank performance and lending efficiency. Out of these, the last two characteristics, i.e. of bank performance and of lending efficiency, had a significant impact on PSL percentage of public sector banks.

Lending aggressiveness: The component has high loadings of C/D ratio (positive) and NIM (negative). This has a positive and significant relation with PSL percentage, ($\beta_3 = 0.2638$). Thus, banks in the private sector which are more aggressive in terms of lending (higher percentage of deposits given as loans, combined with lower interest margins), tend to lend more to PSL. Since its beta coefficient is the highest, it has the highest impact on PSL, followed by bank performance and then by bank size.

For the group of foreign banks, the PCA test again extracted three components explaining 74% of the variance. The regression result, however, shows a significant relation to only one component, that of profitability. This factor here comprises of RoA and NIM. It has a significant negative impact on PSL percentage ($\beta_2 = -.2431$). The other two factors of bank size and lending aggressiveness do not have a significant relation with PSL. Unlike in case overall and public bank groups, where profitability measures were combined with CAR to signify discipline attitude also, in the group of foreign banks, profitability stands out alone. Summary of the findings is presented in Table 8. The following regression equation was estimated to identify determinants of PSL percentage of foreign banks:

$$PSL \text{ Percentage} = \alpha + \beta_1 (\text{Bank Size}) + \beta_2 (\text{Bank Profitability}) + \beta_3 (\text{Lending Aggressiveness}) \quad (4)$$

Table 7: Impact of Bank Characteristics on PSL: Private Sector Banks

Principal Component Analysis (PCA)			Panel Regression			
Variable	Bank Characteristic		Initial Eigen-values	Coefficient (β)	z Value	Probability Value P> z
Deposits plus advances Number of employees Total Assets	Volume of Business	Bank Size (1)	4.144	-0.0338** (0.0151)	-2.24	0.025
	Employee Strength					
	Advances					
Total number of branches	Branch strength					
Capital adequacy Ratio (CAR)	Risk absorption capacity	Bank Performance (2)	1.771	0.1265*** (0.0308)	4.11	0.000
Return on Assets (RoA)	Profitability					
Net NPAs to total assets (negative in PCA)	Risk of Default					
Credit-Deposit Ratio (C/D ratio)	Lending Aggressiveness	Lending Aggressiveness (3)	1.040	0.2638*** (0.0489)	5.39	0.000
Net Interest Margin (NIM) (negative in PCA)	Risk of Default					
	Constant			-0.1475*** (0.0513)	-2.87	0.004

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. PCA: Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0.7239 ; Bartlett's Test of Sphericity, Sig.: 0.000 Cross-sectional time-series FGLS regression. Number of obs= 160; number of groups= 19; wald chi2(3)= 44.55; Prob>chi2 = 0.0000 The values within the parentheses are standard errors. (), (**) and (***) indicate significance at 10%, 5% and 1% levels, respectively. Table 7 presents the results of tests of PCA and regression for the group of private sector banks. The PCA test extracted three components representing bank characteristics of bank size, bank performance and lending aggressiveness. All these three characteristics had a significant impact on PSL percentage of private sector banks.*

Ordinary Least Squares estimates were obtained. The results are presented in Table 8 Thus, it seems that the foreign banks which focus more the profitability aspect, would lend less to PSL, which is perceived as a non-lucrative area of lending by banks in general. Unlike a few profitable private sector banks like Ratnakar bank, Nainital bank, etc., which have made PSL as a business proposition and view it as a profit-making opportunity, foreign banks do not seem to have done so. This could be because of their limitations in terms of branch reach or of knowledge of local culture, conditions and practices, or such other reason.

PSL Guideline Suggestions

In the primary survey, almost 78% of respondents opined (as against 2.3% who did not) that the current RBI guidelines relating to PSL, are in alignment with the national objectives of fast, sustainable and inclusive growth and in ensuring equitable growth across all sectors of society. However, out of this, only 29% felt that this was to a “great extent.” This implies that there is a scope for making a few improvements here. The most favored general policy suggestions in the survey, included lowering political interventions in lending, and redefining employee policies to build in incentives for higher risk adjusted lending. Some of the new sector suggestions for inclusion in the PSL eligibility list, which received great support from the respondents, were, 1.) Projects for improving rural infrastructure in various areas like roads, transport facilities, rural electrification, housing, etc., 2.) Projects to build more hospitals and healthcare facilities (especially in rural areas), 3.) Green, environment friendly projects and bio diversity conservation projects, and 4.)

Table 8: Impact of Bank Characteristics on PSL: Foreign Banks

Variable	Principal Component Analysis (PCA)		Panel Regression			
	Bank Characteristic	Initial Eigen-values	Coefficient (β)	t Value	Probability Value P> t	
Deposits plus advances Number of employees Total Assets	Volume of Business	Bank Size (1)	4.171	0.0735 (0.0608)	1.21	0.244
	Employee Strength					
	Advances					
Total number of branches	Branch strength					
Capital adequacy Ratio (CAR) (negative in PCA)	Risk absorption capacity					
Return on Assets (RoA)	Profitability	Bank Profitability (2)	1.497	-0.2431*** (0.0498)	-4.87	0.000
Net Interest Margin (NIM)						
Credit-Deposit Ratio (C/D ratio)	Lending Aggressiveness	Lending Aggressiveness (3)	1.046	-0.1277 (0.1169)	-1.09	0.290
Net NPAs to total assets	Risk of Default					
	Constant			-0.0000* (0.0000)	-1.79	0.091

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. PCA: Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0.7348; Bartlett's Test of Sphericity, Sig.: 0.000 Fixed-effects (within) regression. Number of obs= 86. Number of groups= 18; F(3,17) = 71.37; Prob > F = 0.0000 The values within the parentheses are standard errors. (*), (**) and (***) indicate significance at 10%, 5% and 1% levels, respectively. Table 8 presents the results of tests of PCA and regression for the group of foreign banks. The PCA test extracted three components representing bank characteristics of bank size, bank profitability and lending aggressiveness. Out of these, only the bank profitability characteristic had a significant and negative impact on PSL percentage of foreign banks.

Projects to build schools especially in rural areas. This will help boost the overall economic development of rural areas, where the majority of Indian population resides, in a holistic manner. It will thereby support the credit policy initiatives of banks, and make it an integral part of the broader national objective of balanced and inclusive growth. The intent and spirit of compliance for PSL, are present in most banks, and they in general align with its objectives. This is evident from the personal interviews of a few lending officers, as also from the fact that suggestions in the survey to reduce the PSL target from current 40% and agriculture target from 18%, received the lowest support. Relevant findings from the survey are presented in Table 9.

Table 9: Primary Survey Findings: Policy Suggestions for Better PSL Compliance

Suggestions for Policy Changes and Amendments in RBI Guidelines to Increase PSL Compliance					
Options	Mean Agreement Score	Rank	Percentage of Respondents		
			Disagree	Neutral	Agree
Lower political interference in decisions to grant loans or to waive off loans	4.453	1	5%	2%	93%
Build in special awards and recognition for employees who perform effectively in PSL area in terms of lending more to smaller/ needy sections while minimizing risk of defaults	4.035	2	6%	12%	83%
More awareness campaigns in banks to build positive culture of executing social responsibilities	4.023	3	8%	7%	85%
Widen the definition and add more sectors in PSL	4.000	4	6%	8%	86%
Reduce the total PSL target percentage from current 40% to lower levels	3.093	11 (second last rank)	45%	3%	51%
Reduce the sub target of agriculture from 18% to lower levels	2.651	12 (last rank)	59%	6%	35%
Suggestions for New Sectors/ Categories to be Added in the PSL Eligibility List to Ensure Better Adherence to National Objectives					
Options	Mean Agreement Score	Rank	Percentage of Respondents		
			Disagree	Neutral	Agree
Projects for improving rural infrastructure in various areas like roads, transport facilities rural electrification, housing etc.	4.232	1	7%	7%	86%
Projects to build more hospitals and healthcare facilities especially in rural areas	4.221	2	7%	2%	91%
Green, environment friendly projects and bio diversity conservation projects	4.209	3	5%	7%	88%
Projects to build schools especially in rural areas	4.174	4	5%	8%	87%

* 86 respondents answered these questions, rest skipped them. Table 9 presents the primary survey findings for suggestions by respondents with respect to changes in PSL policy and guidelines to ensure more PSL target compliance, and to include new sectors in the PSL eligibility list to ensure better adherence to national objectives. Respondents were asked to assign an agreement score to each option, on a scale of 1 to 5 ("strongly disagree" to "agree"). Final ranks were assigned to options based on their respective mean agreement scores.

CONCLUSIONS

The findings of the study suggest that banks in general, have complied with the total PSL targets, with private sector banks faring better in this regard. However, they all have been unable to comply with the sectoral targets for agriculture and weaker section lending, with public sector banks being slightly better in this regard. As per the survey findings, a distinct preference was noticed among banks for lending in urban areas, and to select sectors in PSL, like housing and sectors other than agriculture and weaker sections. Urban preference was mainly because of ease of borrower access to stronger network of urban branches, and better-trained staff in them. Sectoral preference was driven by better collaterals and lower default rates. Some prior studies (Roy, 2006, Rao, Das and Singh, 2006, Uppal, 2009, and Raman, 2013) have also observed similar reasons for such preferences. Bank characteristics like the type of ownership, size and performance were found to be significant determinants of PSL. In general, bank size had a negative and significant impact on PSL. This is consistent with findings of some of the prior studies, which have found that larger banks and state-owned banks lend more to larger firms and state-owned firms. Smaller banks and private sector banks seem to have a comparative advantage in lending to smaller firms (Peek and Rosengren, 1995, Cole, Goldberg and White, 2004, Berger, Miller, Petersen, Rajan and Stein 2005, Berger,

Klapper, Peria and Zaidi, 2006, and Berger and Black, 2010). Bank performance, as measured by its higher financial strength (CAR), and higher profitability (RoA, NIM), had a positive and significant impact on PSL. Earlier studies have found a significant relationship between bank ownership and bank performance. It was observed that private sector banks have performed better than the public sector banks (Das, Nag and Ray, 2004, Ghosh, 2010, and Mishra et al., 2013). Further, most of the private sector banks in India are smaller in size than public sector banks. Therefore, higher PSL percentage by better performing banks is understandable, particularly in light of the fact that ownership and size were found to be significant determinants of PSL in our study. From the above, it can be concluded that smaller banks, or those banks with better performance, are likely to have greater proportion of their lending as PSL.

Among the public sector banks, greater emphasis on lending efficiency (as shown by higher C/D ratios and lower NPAs) was an important determinant impacting their PSL with a negative sign, and with the largest beta coefficient. This is further supported by the perceptions of the lending officers in the survey, which indicates that in this sector, probable high default rates, lower collaterals, and a politically damaged repayment culture, were considered to be prominent deterrents to PSL. These deterrents to lending have also been found significant by prior studies like of, Featherstone, Wilson, Kastens, and Jones (2007), Bhaumik and Piesse (2008), Cole (2009), Guha (2009), and Subramaniam and Subramaniam (2009). In the private banks' group, lending aggressiveness (as shown by high C/D ratio and low NIM) was found to be the most important determinant of PSL and with a positive sign. This signifies that private sector banks, which have a more aggressive approach to lending, have a higher PSL percentage. In the foreign banks' category, the only significant factor impacting the PSL, was of bank profitability. Contrary to the situation in other bank groups, this relation was found to be negative for foreign banks. This implies that the more profitable banks in this group are lending less to PSL. This may, perhaps be because in case of other bank groups, profitability was also combined with a risk measure of higher CAR or of lower NPAs, to signify bank performance. It was not profitability alone, and the combination of these, thus had a positive impact on PSL in the other bank groups.

While public sector banks have better social focus, they are also fraught with agency costs and political patronage issues, as was found by a few prior studies as well (Sapienza, 2002). Private sector banks have less of these constraints. Furthermore, with their sharper focus on profitability, they are able to better convert lending segments like of PSL, into profit-making opportunities. The efficiency of public sector banks in lending to small enterprises, has been found to be lower by a few prior studies as well (Berger, Miller, Petersen, Rajan and Stein, 2005, Kumar and Francisco, 2005, Berger, Klapper, Peria and Zaidi, 2006, and Berger and Udell, 2006).

Policy Recommendations

Based on the findings from the study, a number of policy recommendations can be made for improving the effectiveness of PSL program. Some of the important suggestions which emerge from the findings are as follows. In view of the significance of bank size and nature of ownership in PSL, it may be worthwhile considering the idea of establishing public sector banks sponsored smaller-sized, separate entities, which are privately managed, for lending to priority areas within the PSL program. Similar suggestion has also been made in a few earlier studies (Berger, Miller, Petersen, Rajan and Stein, 2005). Lending to small and rural borrowers in PSL is more aligned for relationship lending. This requires flexibility in organization structures and policies to cater to the peculiar nature of PSL, where public sector banks may not have a comparative advantage. Smaller, private and distinct entities may be equipped to have greater flexibility in this regard. They may also be able to distance themselves from political interventions. Therefore, separate entities of banks (especially of public sector banks) may be established for PSL, to better serve its objectives. Further, while considering proposals for consolidation in Indian banking industry, the adverse impact of bank size on PSL may also be considered by the government (Peek and Rosengren 1995). In view of the significance of lending efficiency in determining PSL patterns, it is important to reorient the human

resource (HR) policies to make them favorable for PSL. Such redesigning of HR policies which takes into account the special characteristics of PSL, can be undertaken by the private sector banks on their own. However, for public sector banks (which constitute a major part of the banking system in most developing countries), this may require initiative/ approval of the government. It may be emphasized that there is an urgent need to redesign HR policies to ensure higher PSL. These policies may permit hiring of local staff, special training of staff, and separate performance review systems, which allow for higher genuine default rates and built in incentives for better risk adjusted performance of employees. This was also underlined in the opinions of the lending officers who were respondents in the survey. Similar suggestions have emerged from a few prior studies as well (Banerjee, Cole and Duflo, 2003).

The study provides empirical support to the argument that PSL is, and should be considered as a viable business proposition which can be lucrative for banks. This is supported by the positive relation found between bank performance and PSL. Therefore, a conducive culture in banks needs to be built, and appropriate strategies to be drawn to focus on PSL as a viable business proposition. It is, thus, evident that while banks have shown commitment to the social cause underlying the PSL program, they are facing a number of challenges in its implementation. It would help if banks’ top management, RBI and policy makers can make it easier for them to comply with the PSL targets by strengthening the PSL program. Such a strengthening can be done, both through policy changes and through process improvements in banks. This will help make this program more effective in contributing to the national efforts of achieving fast, balanced, sustainable and inclusive growth.

APPENDIX

Appendix A: Primary Survey Findings: Ranking Preferences

Issue	Options	Mean Rank	Rank	Percentage of Respondents Favoring the Option in This Rank
Challenges faced by banks in PSL (87)	Higher probability of NPAs (default rate)	7.586	1	46
	Higher cost in processing applications in view of smaller value of loan and limited understanding of borrower regarding banking requirements	6.391	2	18
Challenges faced by advances managers in PSL (86)	Possibility of administrative action against advances managers in case of high defaults (NPAs) in PSL accounts	5.174	1	31
	Not enough incentives built into employee performance appraisal system to increase lending to comply with targets	4.930	2	29
Reasons for inadequate allocation of resources to PSL in banks (69)	Shortage of bank staff in general	5.188	1	48
	Banks perceive PSL to be a non-lucrative area	4.870	2	32
Reasons for preference by banks to lend to borrowers in urban areas, rather than in rural areas (75)	Easy access due to stronger network of urban branches	5.267	1	36
	Better-trained staff in urban branches	4.627	2	29
Sectors in order of preference by banks to lend to, in PSL, as against the others (80)	Housing	6.688	1	48
	SSI (MSE)	5.700	2	19
	Export Credit	5.625	3	15
	Weaker Sections	2.788	7 (last)	45

Figure in parenthesis under each issue in “Issue” column represents number of respondents who answered that question, rest of them skipped answering that question. Appendix A presents the findings of the primary survey highlighting preferences of respondents for factor options as ranked by them in order of importance, under each issue listed in the first column. Final ranks were assigned to factor options based on their respective mean ranks.

Appendix B: Primary Survey Findings: Agreement Scores

Issue	Options	Mean Agreement Score	Rank	Percentage of Respondents		
				Disagree	Neutral	Agree
Reasons for banks preferring some sub sectors over the others in priority sector area (88)	Better value and quality of collaterals offered against loans in these sectors	3.795	1	17%	8%	75%
	Borrowers are located in urban areas which are easier to reach and access	3.682	2	18%	11%	70%
	Lower default rates in these sectors' lending	3.648	3	25%	7%	68%
Challenges faced by banks in lending to agriculture sector (87)	Policy interventions by the government like loan waiver etc.	4.138	1	14%	8%	78%
	Higher risk of default (NPAs)	3.713	2	21%	10%	69%
Challenges faced by banks in lending to weaker sections (87)	Higher risk of default (NPAs)	4.172	1	11%	7%	82%
	Lower value of collateral offered against the loan	3.862	2	15%	9%	76%
Challenges faced by banks in lending to SSI sector (86)	Higher risk of default (NPAs)	3.256	1	36%	10%	53%
	Lower value of collateral offered against the loan	3.163	2	35%	20%	45%
Bank-specific characteristics which may influence its lending patterns, adversely impacting level of PSL by banks (86)	Lower credit efficiency/capability as reflected in higher NPAs	3.733	1	22%	8%	70%
	Nature of bank ownership structure: SBI group, nationalized, private or foreign	3.628	2	14%	7%	79%
	Lesser employee strength	3.360	3	33%	13%	55%

Figure in parenthesis under each issue in "Issue" column represents number of respondents who answered that question, rest of them skipped answering that question. Appendix B presents findings of the primary survey to highlight the top-ranked factor options for each issue listed in the first column. Final ranks were assigned to options based on their respective mean agreement scores. Respondents were asked to assign an agreement score to each option on a scale of 1 to 5 ("strongly disagree" to "strongly agree").

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ILLIQUIDITY EXPOSURE OF SIZE AND VALUE IN MALAYSIAN EQUITY RETURNS

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ABSTRACT

This study examines pricing implications of size, value, illiquidity and momentum effects in Malaysian stock returns. It employs time series and panel methods in testing APT-motivated pricing models over a sample period of 14 years up to 2013. Results indicate the significance of illiquidity over size and value factors. Capital Assets Pricing Model (CAPM) poorly performs in explaining average stock returns. An asset's exposure to size, value, momentum, and illiquidity characteristics subordinates CAPM's explanatory power. Momentum trading strategy is profitable in short to intermediate horizons, yet momentum risk factor is unable to improve the efficiency of pricing models. Application of illiquidity adjusted Fama-French three-factor model is apparently persuasive for investments and related decisions in Malaysia.

JEL: G10, G12

KEYWORDS: Illiquidity, Pricing, Risk Factors, Malaysia

INTRODUCTION

The variation in average stock returns in cross section has been a topic of explanation for large numbers of studies over the last several decades. Static single-period CAPM (Sharpe, 1964 and Lintner, 1965) shows low battery at the power and relative performance of multifactor Arbitrage Pricing Theory and Intertemporal CAPM motivated models. Among these models, the three factor model (Fama & French, 1993) has been successful in many markets even though some authors, including Rahim and Nor (2006) find it to be inconclusive in general. The evidence in favor of other explanatory factors and anomalies including momentum and liquidity premiums, with its recent attention on behavioral explanations, has stimulated asset-pricing research. Especially, the research seeks empirical evidence from emerging markets where information asymmetry is observed in common, suggesting that most of the anomalies are differently formed relative to the US markets.

The interest of extending the work to emerging markets can be attributed to many relative differences. Emerging markets are different (Iqbal et al., 2010; Gunathilaka, 2012) in institutional, political and macroeconomic perspectives and these conditions are known to be volatile. This volatility disallows parameters to remain constant over time. Hence, the present study examines CAPM and other - Arbitrage Pricing Theory (APT) motivated-pricing models in an advanced emerging market, the Kuala Lumpur Stock Exchange. The idea of this article is to present evidence of higher returns in market illiquidity and demonstrate significance of illiquidity and momentum risk factors in APT motivated-pricing models. We focus on evidence of improved efficiency in asset pricing models and in extending the literature by studying an emerging context, which is, arguably, an ideal context to investigate illiquidity effects. This is true because these markets are mostly illiquid relative to that of developed markets. More specifically, the two-fold objectives of this paper are: Examine pricing implications of illiquidity and momentum in the presence of market risk premium, size and book-to-market, the well documented risk factors, and; Discuss the significance of illiquidity risk factor adjusted pricing models in Malaysia. The rest of the paper covers

ideas of prior research, the nature of the data and methodology concerning how the tests are carried on, together with the results and concluding comments.

LITERATURE REVIEW

Iqbal et al. (2010) propose that CAPM has generally failed both in developed and emerging markets. They suggest an augmented version of Fama-French models to perform best. Based upon similar arguments, a number of studies has explored different explanatory factors claiming that the beta (β) of CAPM cannot fully explain average stock returns in cross section. Among these risk factors, size, value and momentum effects have been widely researched. Value effect (Rosenberg et al., 1985), the observation of higher returns for firms with higher book-to-market equity (BME) ratios over low BME, has been argued to be a long-side anomaly (Phalippou, 2008). Phalippou (2008) reports that stocks with institutional investors are free of value premium. Fama and French (1998) give evidence of BME effects in 12 emerging markets including Malaysia. Fama and French (1993) three-factor model includes the size effect (Banz, 1981) and the value effect in addition to the market risk premium of CAPM. Size effect, the observation of higher returns for small stocks over big, has been confirmed by many subsequent studies including Blume and Stambaugh (1983), Jensen et al. (1997) and Eleswarapu and Reinganum (2004). The returns of size and BME portfolios represent compensation for additional market risk (Fama & French, 1993). However, Jensen et al. (1997) argue that these effects are significant only in expansive monetary policy periods. This also makes an appeal for further empirical studies on whether size and BME effects are disappearing as Fama and French (2011) report no size premium in any of four global regions.

While Agarwal (2010) argues that the size factor is indeed a proxy for financial distress risk, Liu (2006) argues it to be a result of liquidity risk in small firms. Naturally, the size effect may display its exposure to liquidity in emerging markets, due to relative illiquidity in these markets. Liquidity hypothesis, that the returns should be higher in illiquid assets, has been substantiated in different markets. Lam and Tam (2011) suggest liquidity adjusted four-factor model to be a best-use model in Hong Kong stock market. They use many liquidity proxies including Amihud (2002) illiquidity measure. Amihud (2002) develops this measure using daily price and volume data and shows that it is significant. The discussion of liquidity effect is particularly important due to absence of conclusive results (Marcelo & Miralles, 2006). They insist the importance of application of a market-wide risk proxy rather than individual stock-related characteristics like bid-ask spreads. Liu (2006) provides evidence of significant liquidity premium. They insist the robustness to the CAPM and the Fama-French three-factor model. In contrast, Nguyen and Lo (2013) find liquidity discount, they document evidence of significantly lower returns in illiquid stocks than stocks with more liquidity. On this ground, we examine whether illiquidity subsumes size and book- to-market in the Malaysian market. Jegadeesh and Titman (1993) find opportunity to make profits using a zero investment strategy because past winners (losers) become losers (winners) subsequently.

Momentum effect, relation between an asset's return and its recent relative performance history, has been extensively researched (Asness et al., 2013) and many subsequent Asian studies including Ansari and Khan (2012) in the Indian market, have confirmed the effect. Chan et al. (1999) demonstrate that momentum strategies are profitable for intermediate horizons. Asness (1997) finds partial success of momentum strategy. He reports strongly working momentum strategy for low-value (expensive) stocks. However, Hameed and Kusnadi (2002) find no momentum in Asian markets. In contrast, Husni (2006) provides evidence in Malaysia, and reveals that momentum profits are more pronounced among high trading volume turnover stocks. This Malaysian evidence is consistent with Lee and Swaminathan (2000) who find the momentum effect as a result of volume. Despite the arguments that the momentum is a result of incorrect measurements (Schierck et al., 1999) and that window dressing by institutional investors contribute to momentum effect (Sias, 2007) many studies have attempted to find its significance in explaining average returns in cross section. Carhart (1997) promotes a four-factor model with momentum. However, subsequent evidence has no consistency, for instance, momentum is a significant risk factor for Nartea et

al. (2009) but Lam and Tam (2011) find inability of the momentum factor to explain returns in cross section. Given these arguments, the present study contributes related literature by examining the equity returns in an advanced emerging market in the Asian region.

METHODOLOGY

This study conducts time series and panel data tests of Capital Asset Pricing Model and other APT-motivated models including FF three-factor model, and Carhart (1997) four-factor model augmented with illiquidity premium. We test efficiency of market risk premium (*MRP*), FF risk factors (*SMB* and *HML*), Momentum (*WML*) and illiquidity (*ILQ*). *ILQ* is measured using Amihud's (2002) illiquidity measure. The empirical model takes the following linear form in an APT-setting.

$$R_{pt} - R_{ft} = \alpha + \beta_{p1}F_{1t} + \dots + \beta_{pk}F_{kt} + e \quad 1$$

Where, R_{pt} is the expected return on portfolio p ($p=1, \dots, N$) at time t ; R_{ft} is the return on the risk-free asset

at time t ; F_k refers to $(1 \times k)$ vector of risk factors. The factors are *MRP*, *SMB*, *HML*, *ILQ* and *WML*. β s are the factor sensitivities to excess returns of p^{th} portfolio. Market portfolio is proxied by Kuala Lumpur Composite Index (KLCI), at time t . We apply time series regressions restricting to first stage with an objective of validating the factors. Answering the question whether co-skewness risk captures liquidity, following Lam and Tam (2011), we test robustness by including the higher moment factor, co-skewness (*CSK*), $(MRP - \bar{MRP})^2$ in time series regressions. Panel estimations use Stock and Watson (1993) and Kao and Chiang (2000) Dynamic Ordinary Least Squares (*DOLS*) for Cointegrated Panel Data with homogeneous long-run covariance structure across portfolios. Panel *DOLS* test statistics consist of standard asymptotic distributions, and it uses a robust single equation approach that resolve endogeneity through leads and lags of first differences of the regressors, and for serially correlated errors by a generalized least squares procedure. Construction of *SMB* and *HML* risk factors follow the methodologies of related studies including Fama and French (1993); Carhart (1997); Liu (2006); Lam and Tam (2011) and Nguyen and Lo (2013). *SMB* is the return for the small stock portfolio over big, measured as the simple average of value weighted returns of three small stock portfolios [Small - (High/Middle/Low-*BME*)] minus three big stock portfolios [Big-(High/Middle/Low-*BME*)]. *HML* is the difference between the monthly average returns on the two portfolios within the high *BME* group and, on the two portfolios with Low *BME* group. Therefore, *HML* risk factor is estimated in a similar process to *SMB*. *HML* is the return for the high *BME* stock portfolio over low, measured as the simple average of value weighted returns of two high *BME* stock portfolios (High *BME*-Small/Big) minus two low *BME* stock portfolios (Low *BME*-Small/Big).

Following the methodologies of Jegadeesh and Titman (1993), Carhart (1997), and Nardea et al. (2009) *WML* is constructed using buy/winner and sell/loser portfolios that are formed based on J -month lagged returns and held for K months. Having tested multiples of J -months by- K -month portfolios (Table 1), we apply the six-month lagged and three month forward ($j6 - k3$) momentum strategy in ascertaining return premium. The process of estimation of returns to the winners involve obtaining equally weighted returns of the top quintile of the momentum-descending-sorted firms (equal to 160 firms by 2013), those who are also independently size-sorted and classified as small and big. Returns of similarly obtained loser/sell portfolios, which consist of last quintile of firms, are used to create the *WML* risk factor. *WML* is defined as the difference in average returns of two winners (Small-Winner and Big-Winner) and two losers (Small-Loser and Big-Loser).

Table 1: Momentum in Stock Returns

	K = 3	K = 6	K = 9	K = 12
J = 3	*0.64 (3.01)	*0.54 (2.67)	0.19 (0.93)	-0.04 (-0.30)
J = 6	*5.84 (34.16)	0.34 (1.80)	0.04 (0.28)	-0.13 (-0.97)
J = 9	*5.66 (43.95)	*2.94 (20.04)	-0.04 (-0.35)	-0.08 (-0.70)
J = 12	*5.48 (54.09)	*3.66 (33.64)	*1.75 (16.46)	-0.11 (-1.08)

This table depicts average monthly returns for Zero-investment portfolios formed on J-month lagged and K month holding periods. Reported in parentheses are t-statistics. * indicates 1% level significance.

We construct illiquidity risk factor in a similar method used to *SMB* and *HML* construction in related studies including Fama and French (1993) and Lam and Tam (2011). Illiquidity of stocks is estimated using Amihud (2002) measure and stocks are independently sorted into three portfolios (low, medium and high illiquidity). The monthly illiquidity risk factor (*ILQ*) is the difference in average returns on the two high-illiquidity portfolios (Small-High and Big-High) and the average returns on the two low-illiquidity (Small-Low and Big-Low) portfolios. The Amihud (2002) measure is given as:

$$ILQ_{it} = \frac{1}{D_{it}} \sum_{d=1}^{idt} \frac{|r_{idt}|}{Vol_{idt}} \tag{2}$$

Where, *ILQ* is the illiquidity of firm *i* at the day *d* at month *t*; *r* is the return percentage (Lei et al., 2013) of firm ‘*i*’ at day ‘*d*’ at month ‘*t*’; *Vol* is the volume in Malaysian Ringgit of firm ‘*i*’ at day ‘*d*’ at month ‘*t*’. Hence, monthly illiquidity is equally weighted based on the observed days for illiquidity measure in the month ‘*t*’.

Test Assets

We use 48 test portfolios, 36 of them are size (*SZ*) (Market capitalization), book-to-market equity (*BME*), momentum (*Mom*) and illiquidity (*ILQ*) sorted (i.e., 2×3×3×2=36). In view of momentum risk factor’s insignificance observed in estimations, we form 12 more portfolios restricting to three risk characteristics. These 12 are, therefore, *SZ-BME-ILQ* sorted (i.e., 2×3×2=12). *SZ* and *ILQ* bisect at 50 percent break point while *BME* and *Mom* trisect at bottom 30 and top 30 percentiles. This process, carried on at the end of December of the year, results in stock portfolios for which the succeeding year’s value weighted monthly returns are calculated from January to December. Table 2 reports summary statistics in two panels. Panel (A) uses *WML-BME-ILQ-SZ* sorted 36 portfolios and (B) uses *BME-ILQ-SZ* sorted 12 portfolios. For its brevity, portfolios are depicted as P/i/j/k, where ‘*i*’ ‘*j*’ and ‘*k*’ represent embedded risk characteristics of each portfolio. Table 2 also depicts the annual average number of firms in each portfolio under two size categories. The number of firms reported for each liquid (1) and illiquid (2) portfolios show that many big firms are grouping in to the liquid category while many small firms are in the illiquid category. Further, we observe evidence to the contrary, big firms outperform small except in case of loser portfolios (portfolios with indication ‘1’ for momentum) across all cases. The value stock portfolios (i.e., high *BME*) outperform growth stock portfolios (i.e., low *BME*) across all the cases reported, confirming the value premium.

Table 2: Summary Statistics of Test Portfolios (P)

P/I/J/K: WML-BME-ILQ-SZ Sorted 36 Portfolios									
P	MEAN RETURNS		SD		P	MEAN RETURNS		SD	
	Sm {#F}	Bg {#F}	Sm	Bg		Sm {#F}	Bg {#F}	Sm	Bg
P111	-0.98 {16}	-1.20 {34}	9.91	7.24	P222	-0.12 {30}	-0.07 {12}	5.29	5.24
P112	-0.45 {21}	-1.73 {08}	7.53	7.95	P231	-0.12 {06}	0.32 {20}	7.74	6.38
P121	-0.93 {08}	-0.23 {24}	7.62	7.41	P232	0.41 {42}	0.66 {12}	5.44	5.83
P122	0.15 {31}	-0.18 {11}	5.79	5.94	P311	-1.27 {14}	-0.07 {44}	6.97	5.06
P131	1.17 {06}	0.50 {20}	8.95	8.02	P312	-1.45 {16}	-0.67 {06}	7.07	7.27
P132	0.66 {42}	0.82 {09}	6.53	7.98	P321	-0.79 {06}	0.41 {34}	7.74	5.35
P211	-0.42 {11}	-0.41 {37}	6.89	5.73	P322	-0.39 {26}	0.00 {09}	5.49	6.23
P212	-1.07 {14}	0.09 {06}	6.65	7.39	P331	-0.33 {07}	0.49 {18}	8.89	6.77
P221	-0.12 {06}	0.21 {32}	6.02	5.25	P332	-0.03 {40}	-0.08 {08}	5.71	6.39
BME- ILQ-SZ Sorted 12 Portfolios									
P11	-1.04 {41}	-0.42 {20}	5.9	5.4	P12	-0.94 {89}	-0.83 {123}	6.12	6.5
P21	-0.63 {51}	0.20 {20}	5.88	5.44	P22	-0.14 {32}	-0.03 {57}	5.11	4.81
P31	0.13 {115}	0.41 {86}	7.05	6.72	P32	0.34 {19}	0.52 {28}	5.55	5.78

This table reports mean returns and standard deviations (SD) of (A) WML 1/2/3 –BME1/2/3 – ILQ 1/2- Size (Sm/Bg) sorted 36 portfolios (B) BME-ILQ-Size sorted 12 portfolios across the sample, from 2000 to 2013. For instance, ‘P111 – Sm’ is Loser/Low/Liquid/Small – Portfolio. #F is the annual average number of firms in each portfolio.

Our data sources include DataStream database and Bursa Malaysia resources. The data set consists of 803 (2013) companies listed on Bursa Malaysia, the Kuala Lumpur Stock Exchange, from January 2000 to December 2013. Consistent with prior studies, we use monthly return data, value-weighted market returns using Kuala Lumpur Composite Index, and one-month Treasury bill yield to proxy the risk free rate. *MRP* is the return of KLCI over risk free rate. Given the above procedure in constructing, the table 3 depicts the summary statistics of risk factors. *WML* (momentum risk factor) is 9.43% for the sample period from 2000 to 2013. The minimum premium -7.39% and maximum of 36.17% indicate that the strategy is more prudent in bear markets. The correlation coefficients of factors explain that *SMB* and *ILQ* are positively correlated among other weakly correlated factors. It suggests that the size effect persists in market illiquidity. Illiquidity has an average of negative 2.38%, suggesting a liquidity premium over the period.

Table 3: Summary Statistics

	SUMMARY STATISTICS				CORRELATION COEFFICIENTS					
	MEAN	SD	MIN.	MAX.	MRP	CSK	SMB	HML	WML	ILQ
MRP	0.51	4.32	-15.51	13.39	1					
CSK	0.19	0.34	0.00	2.52	-0.15*	1				
SMB	-1.21	2.62	-8.52	9.40	-0.16*	0.10*	1			
HML	-1.71	2.45	-12.71	4.55	0.24*	-0.17*	-0.42*	1		
WML	9.43	5.05	-7.39	36.17	-0.20*	0.28*	0.07*	-0.23*	1	
ILQ	-2.38	3.51	-10.94	9.75	-0.27*	0.16*	0.74*	-0.17*	0.01*	1

MRP is the Market risk premium, *CSK* is co-skewness ($MRP-MRP^2$), *SMB* is the Small minus Big, *HML* is High minus Low, *WML* is the distance between average returns of Winner and Loser and *ILQ* is Illiquidity risk factor. *SD* is Standard Deviation of risk factors. Summary statistics are in percentages, monthly. Significance *1% level.

RESULTS

Table 4 and 5 report results of time series regressions for 36 and 12 portfolios respectively. The test results have been grouped under *BME* categories, Low, Medium and High in table 4a. Table 5 presents the results of panel estimations for CAPM, and other APT-motivated models using dynamic OLS. Accordingly, in its single factor DOLS model, R^2 of *MRP* is 48% (12Ps) and 36% (36Ps). Not reported in the table, *ILQ*, *SMB* and *HML* have R^2 s of 8%, 2.4% and 4.4% respectively in their single factor estimations. Thus, *ILQ* factor is stronger than the *SMB* and *HML* risk factors. This fact is verifiable in DOLS model estimations, FF model has an adjusted R^2 of 56%, while *MRP*, *SMB* and *ILQ* jointly explain about 58% (see panel (a) of Table 6). *MRP* and *SMB* premiums are significant across all portfolio categories with positive coefficients. This significance has no difference even under panel estimations given in Table 5. *SMB* factor loading shows a

decrease as the *SZ* increases, indicating that size effect is priced. *HML* shows a significant positive association in high to medium *BME* groups (We have tested *SZ-BME* sorted 12 portfolios and *SZ-BME-Mom* 18 portfolios (these results are available upon request) and the coefficients of these factors show no impairment across diversifications). The monotonic factor loading of *HML*, the value effect, shows significance in medium to high *BME* portfolios. *HML* factor loadings show an increase as the *BME* increase, indicating value effect. However, this evidence on *HML* contrasts Fama and French (1993) who find negative *HML* slope for small stocks. According to distress effect argument, high *BME* stocks tend to be relatively more distressed (Fama and French, 1992) and naturally require a return premium. Consistent with this argument, we find that the slopes are higher and significant in High-*HML* category, while low slopes are insignificant in Low-*HML* (i.e., growth stocks) category. This observation persists in common across portfolios.

Table 4: Results of Time Series Regressions

BME	P1/1/1	P1/1/2	P1/2/1	P1/2/2	P2/1/1	P2/1/2	P2/2/1	P2/2/2	P3/1/1	P3/1/2	P3/2/1	P3/2/2
MRP												
Low	0.93*	0.96*	1.24*	1.23*	0.88*	0.75*	1.01*	0.91*	0.62*	0.88*	0.81*	0.60*
Med	1.06*	0.87*	1.12*	0.87*	0.82*	0.84*	0.88*	0.82*	0.66*	0.72*	0.85*	0.83*
High	0.68*	1.04*	1.15*	1.17*	0.86*	0.83*	0.96*	0.80*	1.10*	0.88*	1.01*	0.85*
SMB												
Low	1.73*	1.51*	0.79*	0.13	1.06*	1.12*	0.51*	0.45	1.10*	1.46*	0.57*	0.53
Med	1.20*	1.43*	0.83*	0.77*	1.16*	1.03*	0.47*	0.17	1.91*	1.21*	0.32	0.70*
High	1.66*	1.43*	1.21*	0.67**	1.85*	1.15*	1.04*	0.82*	1.55*	1.18*	0.35	0.44
HML												
Low	0.21	0.20	0.44**	-0.14	-0.16	0.23	0.25*	0.31	0.16	0.15	0.02	0.15
Med	0.69*	0.39**	0.80*	0.73*	0.37**	0.34**	0.40*	0.26	0.81*	0.38**	0.27	0.47**
High	1.29*	0.88*	1.22*	0.62**	0.99*	0.88*	0.98*	0.77*	0.95*	0.59*	0.57*	0.62*
WML												
Low	-0.21**	-0.09	-0.08	-0.05	-0.07	0.05	-0.08**	0.07	-0.07	-0.01	-0.03	0.10
Med	0.04	0.06	-0.02	0.01	0.02	0.06	-0.03	0.08	0.04	0.11*	0.01	0.06
High	0.06	0.08**	0.09	0.02	0.05	0.12*	0.08	0.09**	0.12	0.09**	0.05	0.10
ILLIQUIDITY												
Low	-0.81*	-0.02	-0.20	0.38	-0.33	-0.03	-0.13	0.07	-0.57**	-0.64*	-0.55*	-0.27**
Med	-0.17	-0.28	-0.38	-0.16	-0.59*	-0.13	-0.27	0.13	-0.84*	-0.46*	-0.39*	-0.23**
High	-0.67**	-0.16	-0.60*	-0.07	-0.56*	-0.22**	-0.53*	-0.36**	-0.53**	-0.31**	-0.35**	-0.08**
CONSTANT												
Low	0.03	0.02**	0.01	-0.01	0.01	-0.01	0.01	-0.01	0.00	-0.01	-0.01	-0.03
Med	0.00	0.00	0.01	0.01	0.00	0.00	0.01	-0.01	0.00	-0.02**	0.00	-0.01
High	0.02	0.01	0.00	0.01	0.01	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.01
ADJ. R²												
Low	0.27	0.46	0.62	0.40	0.36	0.32	0.64	0.26	0.22	0.40	0.62	0.12
Med	0.44	0.59	0.55	0.51	0.47	0.57	0.64	0.44	0.30	0.46	0.61	0.37
High	0.19	0.65	0.57	0.43	0.40	0.63	0.63	0.48	0.39	0.57	0.53	0.38

The table depicts results of 36 time series regressions. *Pi/j/k/L-H* (Mom-*SZ*-*Illiq*-*BME*) represent portfolio with momentum trisections (*Loser1*, *Winner3*)/*Size* bisects (*Small1*, *Big2*)/*illiquidity* bisects (*liquid1*, *illiquid2*)/*BME* trisections (*Low*, *Medium* and *High*). For instance, *P111L* is *Loser/Small/Liquid/Low* – Portfolio. Each factor's coefficient is reported with * for significance at 1% level and ** for 5% level where appropriate.

WML is insignificant in both time series and panel models; even after lead and lag structure is considered in the panel models. Where it becomes marginally significant, the magnitude of the coefficient is relatively low. Moreover, the adjusted R² shows no improvement as the momentum factor introduced in to Fama-French model (see Table 6). The illiquidity factor is negative as expected, and significant in all winner portfolios, suggesting that liquidity is priced in momentum-buy-side transactions. Further, negative illiquidity slopes are significant across value stock portfolios (see Table 4), suggesting that illiquidity factor is less-priced in case of growth stocks, in other word, illiquidity premium is important in value stocks due to relative low-liquidity. The inclusion of co-skewness in the model, (where explanatory variables become *MRP*, *SMB*, *HML*, *ILQ*, *WML* and *CSK*) produced consistent results to those reported in table 4a and 4b, and insignificant coefficients of *CSK*.

Table 5: Results of Time Series Regressions

	MRP		SMB		HML		ILQ		WML		CONSTANT		ADJ R ²	
	Liq	Illiq	Liq	Illiq	Liq	Illiq	Liq	Illiq	Liq	Illiq	Liq	Illiq	Liq	Illiq
P11	0.59*	0.75*	1.21*	1.47*	0.03	0.12	-0.90*	-0.46*	-0.13*	-0.07	0.01	0.01	0.51	0.67
P12	0.71*	0.72*	1.37*	1.23*	0.50*	0.31*	-0.79*	-0.47*	-0.01	0.04	0.00	-0.01	0.65	0.75
P13	0.72*	0.79*	1.90*	1.26*	1.03*	0.73*	-1.06*	-0.42*	0.02	0.07**	0.01	0.00	0.62	0.76
P21	0.87*	0.83*	0.63*	0.52**	0.19	0.01	-0.60*	-0.15	-0.07*	-0.04	0.00	0.00	0.79	0.49
P22	0.79*	0.68*	0.56*	0.48*	0.42*	0.39*	-0.70*	-0.25**	-0.02	0.00	0.00	0.00	0.75	0.68
P23	0.88*	0.77*	0.94*	0.81*	0.85*	0.67*	-0.91*	-0.59*	0.04	0.04	0.00	0.00	0.74	0.67

This table reports results of time series regressions on Size-BME-ILQ sorted 12 portfolios. P/k/i represent portfolio with Size bisects (Sm1, Bg2) / BME trisects (Low, Medium and High). Ps are reported in columns according to their ILQ category: liquid and illiquid. For instance, 'P11-Liq' is Small/Low – Liquid Portfolio. Coefficients are reported with significance *1% and ** 5% level.

One might argue that the association between returns of test assets may decline the significance of these results. We report results of panel estimations in Table 6, it suggests that illiquidity premium is significantly priced when the time variation (Lead/lags) and cross sectional variations are considered together. The negative slope explains compensation of illiquidity. WML does not improve efficiency in all models across portfolios. MRP, SMB and ILQ jointly explain more than FF model, yet adjusted R² in illiquidity adjusted FF model outperforms all other models. The R² of CAPM+ILQ model is 42% in case of 36 portfolios (54% in 12 Ps) (not reported in the table) which suggest that efficiency improvement of FF model is marginal relative to liquidity adjusted CAPM. We observed a significant positive correlation between SMB and ILQ (Table 3), and the low marginal efficiency between FF model and ILQ adjusted CAPM model supports a conclusion that illiquidity is able to control size effect. However, we doubt on whether the illiquidity measure we used in this study captures the market illiquidity, perhaps a perfect measure would completely replace size premium in Malaysian market. The explanatory power of these models decreases as the portfolios modified to include many characteristics, for instance R² is higher in the case of a 12 portfolio test over a 36 portfolio test. Given these results, one might conclude that liquidity adjusted FF model provides a reasonable solution in explaining cross section of average stock returns. Yet, these solutions are not absolute explanations; perhaps, the behavioral explanations would be more worthwhile in Malaysian market.

Table 6: Dynamic OLS (Panel) Estimations

Apt-Motivated Models	MRP	SMB	HML	WML	ILQ	Adj.R ²
Size (2)-BME (3) Illiquidity: 12 portfolios: N=1824						
CAPM	0.929*					0.48
FF	0.976*	0.781*	0.448*			0.56
CAPM+SMB+ILQ	0.912*	0.737*			-0.157*	0.58
FF+ WML	0.986*	0.813*	0.502*	0.026**		0.57
FF+ ILQ	0.905*	1.058*	0.561*		-0.676*	0.63
FF+ WML+ ILQ	0.945*	1.108*	0.620*	0.044	-0.301*	0.63
Size (2)-BME (3)-Momentum (3)-Illiquidity (2):36 portfolios: N=5320						
CAPM	0.918*					0.36
FF	0.963*	0.745*	0.428*			0.42
CAPM+SMB+ILQ	0.932*	0.875*			-0.605*	0.45
FF+ WML	0.973*	0.777*	0.483*	0.024**		0.42
FF+ ILQ	0.922*	1.018*	0.539*		-0.678*	0.49
FF+ WML+ ILQ	0.932*	1.069*	0.598*	0.015	-0.299*	0.51

Table depicts the coefficients reported with *significance at 1% level and ** 5% level, obtained in regressions under CAPM and other APT-motivated models. The estimations follow Kao and Chiang (2000) Dynamic Ordinary Least Squares (DOLS) for Co-integrated Panel Data with homogeneous long-run covariance structure across cross-sectional units. DOLS step-estimations results reported in adjacent columns, using 156 monthly observations from 2001 to 2013.

CONCLUSION

Research on pricing assets has been active for many years. The role of market illiquidity and momentum trading effect are of interest due to inconsistent and mixed evidence. This paper examines these effects in presence of well-known market wide risk factors, size and book-to-market, in a market with relatively little evidence. The evidence collected in this study demonstrates a significance of illiquidity risk factor over size, however, it does not permit us to replace size factor, perhaps due to the application of an imperfect measure of liquidity. FF three-factor model retains its significance in explaining average returns in cross section. A two-factor model with Market risk premium and illiquidity performs a little less than FF three-factor model. Results display a joint power of these factors and favor application of a 4-factor model, FF three factors together with illiquidity. The short-term momentum trading strategy found profitable in Malaysian market, yet momentum risk factor shows no role in explaining stock returns. However, none of these models explain more than two-third of the variations, thus leaving room, perhaps most challengingly, for behavioral explanations of returns in cross section.

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PROFESSIONAL EDUCATION BACKGROUND AND EARNINGS MANAGEMENT OF CHAIRMEN AND SENIOR MANAGERS

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ABSTRACT

In this study, we investigated how chairmen of the board (COBs) and senior managers, who have professional education background, implement earnings management based on their professional knowledge. The empirical results showed that, regardless of whether COBs are concurrently holding positions as chief executive officers (CEOs), varying degrees of earnings management were exercised as they applied their professional education background and adopted discretionary accruals (DAs) or manipulating operating cash flows. Because DAs demonstrate self-reverse effect as accounting principles, they should be used cautiously and conservatively to manage earnings. COBs and senior managers are individuals who manage earnings. When COBs have accounting background and concurrently hold CEO positions, they exhibit the highest degree of earnings management. Directors and external investors must pay additional attention when COBs concurrently serve as CEOs, because this enables them to manipulate the financial statements of companies based on their professional knowledge.

JEL: M1, M14

KEYWORDS: Earnings Management, Discretionary Accrual (DA), Real Earnings Management (REM), Professional Education Background

INTRODUCTION

Fierce global business competitions have produced larger organizations. These organizations are in urgent demand for educated professionals for company management. Berle and Means (1932) proposed a concept on the separation of ownership and management and indicated that shareholders no longer operate their companies in most leading US companies; instead, these companies are controlled by internal senior managers. In addition, Jensen and Meckling (1976) indicated that when company ownership and management diverge, managers (operators) may use their personal positions for perquisite consumption or suboptimal investment decisions to maximize personal utility. The main function of financial statements is to provide credible information for investors deciding on investment combinations. However, generally accepted accounting principles grant senior managers certain degrees of judgment and discretion to increase information usefulness. Hence, managers manipulate the earnings reports through choice accounting principles for their personal benefits, which include maintaining share prices or contract specifications (Healy and Wahlen, 1999). Companies may simultaneously adopt various earnings management techniques to generate profits. In 2001, several false financial statements were revealed in the United States. These incidents involved Enron, WorldCom, and Xerox, which affected the US capital market, and struck market investors' confidence in the financial statements of companies. A series of financial malpractices has successively emerged in Taiwan. Some examples include the 2004 Procomp and 2007 Rebar-Eastern cases. To strengthen corporate governance mechanisms, the Taiwanese government

recently promoted various reform policies to ameliorate existent flaws, fulfill authoritative responsibilities, and protect the equities of shareholders. Of the various corporate governance reform programs, the greatest attention is placed on enhancing the structures of board of directors. The board of directors not only guides company operation strategies but also acts as the key internal mechanism that supervises the top management in opportunistic behaviors. Therefore, the board of directors plays crucial and pivotal roles in corporate governance. Jensen and Meckling (1976) emphasized that adding external directors restrain and supervise the opportunistic behaviors of other directors because external directors are not at stake (directly or indirectly) with the company, often have independent statuses, and value personal reputation. They provide professional opinions on decisions as well as independent and impartial supervisory functions (Fama, 1980). Klein (2002) indicated that external directors strengthen the competence of the board of directors. When the board of directors consists of large proportions of external directors, companies are unlikely to be engaged in earnings management. Holland (1973) indicated that the professional knowledge and work style of a person are developed from his or her education background. Specifically, individuals apply their attained knowledge and reflect them in work performance. In contrast to ordinary external directors, finance and accounting specialists demonstrate high supervision efficiencies (DeZoort and Salterio, 2001). However, when compared with other members of the board, chairmen of the board (COBs) often have superiority during decision-making processes (Kakabadse et al., 2006; Balta et al., 2010).

When COBs concurrently serve as chief executive officer (CEO), they acquire increased decision-making authority and control. This centralization of authority reduces the supervision effects of the board (Booth et al., 2002) and the quality of financial statements (Kamarudin et al., 2012). CEOs play pivotal roles in organizational decisions (Berle and Means, 1932; Galbraith, 1967; Mason, 1958). Several studies have indicated that CEOs frequently conduct earnings management behaviors for their personal benefits (Healy, 1985; DeAngelo, 1986; Dechow et al., 1995; DeAngelo et al., 1994), which indirectly harms company values (Roychowdhury, 2006) and misguides external investors toward making irrational decisions. Specifically, when CEOs have a professional education background, they apply their professional knowledge to achieve their expected targets (Funke, 2001; Koyuncu et al., 2010). However, when COBs concurrently serve as CEOs, they secure true decision-making authority. Therefore, we determined whether professionally educated directors and CEOs (specifically with an accounting background) apply their professional knowledge to work performance and decision making as well as how professionally educated COBs who are and are not concurrently holding CEO positions use their professional knowledge to influence earnings management. The subsequent sections of this paper are listed as follows: Section 2 introduces literature review and hypotheses; Section 3 presents empirical model and methods; Section 4 provides results and analysis; and Section 5 offers conclusion and recommendations.

LITERATURE REVIEWS AND HYPOTHESES

Agency Problem and Earnings Management

The topic of corporate governance constantly receives considerable attention in globalizing economies. Watts and Zimmerman (1986) indicated that when ownership and management diverge, CEOs have greater access to quality information than do corporate shareholders. To maximize personal benefits, these individuals may become motivated to provide biased information and generate behaviors that result in the deadweight loss of companies, thereby impairing corporate values. Leuz et al. (2003) asserted that CEOs can leverage the asymmetry between internal and external company information without exposing the true financial conditions. Thereby, CEOs can practice earnings management and conceal the misappropriated company benefits on financial statements. Lang et al. (2006) and Leuz (2006) have indicated that centralized corporate ownerships are highly related to earnings management. In addition to accessing personal benefits, CEOs manipulate earnings management to avoid replacements. This is because CEO replacements are often related to prior underperformance. In addition to CEOs, owners are tempted to manipulate company earnings. For example, Bhojraj et al. (2009) found that, through real earnings

management (REM), companies direct financial analysts to disclose short-term optimism and allure increased external investors. Njah and Jarboui (2013) indicated that companies manipulate earnings as soon as the year before mergers and acquisitions to merge and acquire other cross-shareholding institutions. Therefore, owners and operators are both motivated to manipulate earnings. Schipper (1989) divided the earnings management of companies into two methods. First, is to adopt accrual-based earnings management, through increased revenue and reduced expenditure in accrual-based accounting. The other is manipulating operating cash flows (OCFs) to change earning levels, which is known as real economic activity-based earnings management (hereinafter referred to as REM). Researchers have primarily focused on the aspect of accrual-based earnings management (Healy and Wahlen, 1999). Until Roychowdhury (2006) developed the REM model, recent earnings management studies have mainly focused on REMs in which companies manipulate the timing and quantities of real operational activities to adjust earnings (Cohen and Zarowin, 2010; Gupta et al., 2010). In this study, earnings management involved manipulating accrual items (accrual-based) and changing earning levels through operating cash flows (REM).

Professionally Trained Directors

Directors are typically regarded as individuals who have professional knowledge, experience, and abilities; they use their professional skills and previous experiences to provide companies and senior managers with various assistance and recommendations, thereby increasing the quality of decisions and supervision of the board. Spence (1973) showed that educational attainment and work quality are significantly positively correlated and are frequently regarded as indicators of knowledge and basic competence in operations management (Hambrick and Mason, 1984). The professional competence of board members is crucial in providing companies with recommendations and consultation support. For example, when board members have a finance and accounting-related background, they can directly assess and supervise CEOs from the financing perspective and determine whether these CEOs are engaged in earnings management behaviors (Bhagat and Black, 1999). DeZoort and Salterio (2001) found that directors who specialize in finance and accounting are apt at proposing recommendations for financial statement-related problems or practicing supervisor rights for preventing major financial misstatements and earnings manipulations by CEOs. Xie et al. (2003) indicated that companies comprise large proportions of external directors who have management backgrounds and that instances of earnings management behaviors are rare. Defond, et al. (2005) investigated the characteristic change of board and corporate governance relationships under the Sarbanes–Oxley Act. They determined that markets responded positively when finance experts were appointed to audit committees. However, these markets demonstrated no reaction when financial experts who did not specialize in accounting were appointed, suggesting that investors tended to trust the financial conditions of companies reported by finance experts who were accounting experts. In addition, Lai and Tam (2007) showed that external directors who have a finance and accounting or law background increased the supervisory functions of auditors.

Fama and Jensen (1983) indicated that the board of directors is considered to play key roles in corporate governance when companies supervise CEOs. However, authority becomes centralized when COBs concurrently serve as CEOs, which exacerbates conflicts of interests and wanes investors' expectations in the supervision efficiency of the board of directors (Booth et al., 2002). Studies have indicated that, in addition to CEOs, companies practice earnings management for taxation (Zimmerman, 1983; Erickson et al., 2004), marketing (Bhojraj et al., 2009), and mergers and acquisitions (Njah and Jarboui, 2013), showing that both CEOs and companies are motivated to manipulate earnings. In contrast to other board members, COBs are often pivotal figures during decision-making processes. Therefore, the decision-making authority among board members cannot be considered equal (Kakabadse et al., 2006; Balta et al., 2010). Authority is centralized when COBs concurrently hold CEO positions. Consequently, external directors cannot optimize supervision efficiencies (Shivdasani and Yermack, 1999; Adams et al., 2005). Other studies have indicated that when COBs concurrently serve as CEOs, they have excess decision-making authority and high control over CEOs, which impairs the supervision of the board of directors and subsequently reduces

the quality of financial statements (Boone et al., 2007; Kamarudin et al., 2012; Arena and Alves-Braga, 2013). In summary, directors who have a professional education background are likely to demonstrate improved supervision effects on CEOs. However, when COBs concurrently serve as CEOs, authority is centralized, thereby impairing the supervision effects of the board of directors. Professionally educated COBs may manipulate financial statements for personal benefits. We inferred that COBs who have a professional education background present various supervision effects. COBs have a business and accounting background influence the earnings management plans of companies. Therefore, the following hypotheses were formulated:

H1: COBs who have a professional education background significantly influence the earnings management of companies.

H1-1: COBs who have a business background are significantly positively correlated with the earnings management of companies.

H1-2: COBs who have an accounting background are significantly positively correlated with the earnings management of companies.

Professionally Trained Senior Managers

In highly competitive environments, corporations prefer hiring professionally knowledgeable and competent managers for sustainable operations. The influence of senior managers on corporate management cannot be disregarded. This management includes guiding and controlling organizational decisions (Berle and Means, 1932; Galbraith, 1967; Mason, 1958). Hitt and Tyler (1991) compiled the qualities of CEOs and assessed whether these qualities affect their decisions. The results showed that varying professional education backgrounds granted CEOs various problem-solving abilities, thereby influencing their decisions. This is because varying professional education backgrounds provided CEOs with different management qualities (Bertrand and Schoar, 2003). Moreover, CEOs vary in professional competence. They adopt different methods to achieve the anticipated targets and exert distinctive influences on their companies (Frank and Goyal, 2009). People's professional knowledge and work style derive from their education background. People apply this knowledge to elevate their work performance (Holland, 1973). Therefore, professionally educated managers apply their professional knowledge to achieve expected goals (Funke, 2001; Koyuncu et al., 2010). For example, Gottesman and Morey (2006) indicated that CEOs that have a management education background exhibited superior fund performance to those without a management education background. Lin and Lee (2008) indicated that accounting performance was significantly positively correlated with management teams that had business background qualities. Jiang et al. (2010) investigated whether chief corporate financial officers (CFOs) manipulate earnings when tempted by stock dividends. The authors indicated that CFOs often have professional knowledge about finance and accounting and are responsible for preparing the financial statements of companies. Therefore, compared with CEOs, earnings manipulations by CFOs are more frequent because of the incentives of dividends. The aforementioned studies have shown that, in contrast to senior managers from other backgrounds, those who have professional finance and accounting knowledge are more likely to practice earnings management and reach the expected earnings levels based on their professional knowledge. In this study, we inferred that professionally educated senior managers present varying operational decisions, which influence the earnings management of companies. The following hypotheses were established:

H2: Professionally educated senior managers significantly influence the earnings management of companies.

H2-1: Senior managers who have a business background are significantly positively correlated with the earnings management of companies.

H2-2: Senior managers who have an accounting background are significantly positively correlated with the earnings management of companies.

DATA AND METHODOLOGY

In this study, accrual-based earnings management (based on discretionary accrual; DA) and REM (based on sales revenue, production cost, and operating cash flow) were used as the dependent variables to investigate whether the business and accounting background of COBs and CEOs affect earnings management.

Data

The research were obtained annual data from the *Taiwan Economic Journal* database and comprised listed and over-the-counter companies in Taiwan from 2008 to 2012. A total of 6,239 entries of observations were initially obtained. Through eliminating the financial, insurance and security industries of abnormal financial structures, public utilities (2,065 entries), and incomplete data during the 4-year period (1,543 entries), the final samples comprised 3,318 entries of observations. Influence of the Business and Accounting Background of Chairmen and Senior Managers on Discretionary Accrual Discretionary accruals have been estimated to assess the degrees of companies' earnings management and measure earnings quality. Dechow et al. (1995) assessed the power for detecting earnings management by using the modified Jones model generated optimal results and has been extensively used in subsequent studies as the most common model for estimating DA techniques. High DAs represent high degrees of earnings management and low earnings quality. In this study, the modified Jones model was used to calculate DA and investigate the correlation between DA and the professional education background of COBs and senior managers. The empirical model was constructed as follows: Relationship between the Business Background of COBs and DA:

$$DA = \beta_0 + \beta_1 PMBA_{board} + \beta_2 BIG_4 + \beta_3 LEV + \beta_4 ACCRUALS + \beta_5 OCF + \beta_6 SIZE + \varepsilon \quad (1)$$

Relationship between the Accounting Background of COBs and DA:

$$DA = \beta_0 + \beta_1 ACC_{board} + \beta_2 BIG_4 + \beta_3 LEV + \beta_4 ACCRUALS + \beta_5 OCF + \beta_6 SIZE + \varepsilon \quad (2)$$

Relationship between the Business Background of Senior Managers and DA:

$$DA = \beta_0 + \beta_1 PMBA_{ceo} + \beta_2 BIG_4 + \beta_3 LEV + \beta_4 ACCRUALS + \beta_5 OCF + \beta_6 SIZE + \varepsilon \quad (3)$$

Relationship between the Accounting Background of Senior Managers and DA:

$$DA = \beta_0 + \beta_1 ACC_{ceo} + \beta_2 BIG_4 + \beta_3 LEV + \beta_4 ACCRUALS + \beta_5 OCF + \beta_6 SIZE + \varepsilon \quad (4)$$

Influence of the Business and Accounting Background of Chairmen and Senior Managers on Real Earnings Management According to the method proposed by Roychowdhury (2006) and Cohen et al. (2008), the degrees of REM through operating cash flow were calculated to investigate the influence of the professional education background of COBs and senior managers on REM. The empirical model is shown as follows:

Correlations between the Business Background of COBs and REM:

$$REM = \beta_0 + \beta_1 PMBA_{board} + \beta_2 BIG_4 + \beta_3 LEV + \beta_4 ACCRUALS + \beta_5 OCF + \beta_6 SIZE + \varepsilon \quad (5)$$

Correlations between the Accounting Background of COBs and REM:

$$REM = \beta_0 + \beta_1 ACC_{board} + \beta_2 BIG_4 + \beta_3 LEV + \beta_4 ACCRUALS + \beta_5 OCF + \beta_6 SIZE + \varepsilon \quad (6)$$

Correlations between the Business Background of Senior Managers and REM:

$$REM = \beta_0 + \beta_1 PMBA_{ceo} + \beta_2 BIG_4 + \beta_3 LEV + \beta_4 ACCRUALS + \beta_5 OCF + \beta_6 SIZE + \varepsilon \quad (7)$$

Correlations between the Accounting Background of Senior Managers and REM:

$$REM = \beta_0 + \beta_1 ACC_{ceo} + \beta_2 BIG_4 + \beta_3 LEV + \beta_4 ACCRUALS + \beta_5 OCF + \beta_6 SIZE + \varepsilon \quad (8)$$

Where, DA =the discretionary accruals; REM =the earning management based on operating cash flow; $PMBA_{board}$ =1 if COBs have a business background, otherwise=0; ACC_{board} =1 if COBs have an accounting background, otherwise=0; $PMBA_{ceo}$ =1 if senior managers have a business background, otherwise=0; ACC_{ceo} =1 if senior managers have an accounting background, otherwise=0; BIG_4 =1 if audited by the big four firms, otherwise=0; LEV =the debt ratio, OCF = cash flow from operations, $ACCRUALS$ = total accruals, $SIZE$ =natural logarithm of total assets; ε =error term.

Dependent Variables

Discretionary Accruals (DA): Dechow et al. (1995) stated that authorities can manipulate earnings when recognizing receivables and inappropriate to regard all changes in credit sales as nonresidual items in the Jones model. Therefore, Dechow et al. (1995) considered changes in receivables as items of DA and included these changes in estimating DA items. This estimation method is similar to the Jones model. The modified Jones model comprises the following terms:

$$TA_{it} / A_{it-1} = \beta_0 [1 / A_{it-1}] + \beta_1 [\Delta REV_{it} / A_{it-1}] + \beta_2 [PPE_{it} / A_{it-1}] + \varepsilon_{it} \quad (9)$$

$$DA_{it} = TA_{it} / A_{it-1} - \left[\hat{\beta}_0 (1 / A_{it-1}) + \hat{\beta}_1 ((\Delta REV_{it} - \Delta REC_{it}) / A_{it-1}) + \hat{\beta}_2 (PPE_{it} / A_{it-1}) \right] \quad (10)$$

Where, TA =total accruals; DA =the discretionary accruals; A =the total assets; ΔREV =change in net revenue; ΔREC =change in receivables; PPE =gross property, plant, and equipment; ε =error term. Real Earnings Management (REM): According to methods adopted by Roychowdhury (2006) and Cohen et al. (2008), we calculated the three aspects of abnormal OCF (below average industry standards), abnormal PROD (above average industry standards), and abnormal discretionary expense (DISEXP; below average industry standards) as indicators for measuring real earnings management (REM). Abnormal OCF:

$$OCF_{it} / A_{it-1} = \alpha_0 + \alpha_1 [1 / A_{it-1}] + \alpha_2 [S_{it} / A_{it-1}] + \alpha_3 [\Delta S_{it} / A_{it-1}] + \varepsilon_{it} \quad (11)$$

Abnormal PROD:

$$PROD_{it} / A_{it-1} = \alpha_0 + \alpha_1 [1 / A_{it-1}] + \alpha_2 [S_{it} / A_{it-1}] + \alpha_3 [\Delta S_{it} / A_{it-1}] + \alpha_4 [\Delta S_{it-1} / A_{it-1}] + \varepsilon_{it} \quad (12)$$

In this study, DISEXP was defined as the sum of advertising, research and development, and operating costs, which were used to estimate abnormal DISEXP.

$$DISEXP_{it} / A_{it-1} = \alpha_0 + \alpha_1 [1 / A_{it-1}] + \alpha_2 [S_{it-1} / A_{it-1}] + \varepsilon_{it} \quad (13)$$

Where, OCF = abnormal cash flow from operations; $PROD$ = abnormal production costs; $DISEXP$ = abnormal discretionary expenses; A =total assets; S =sales revenues; ΔS =change in revenues; ε =error term.

According to the methods adopted by Zang (2007) and Cohen and Zarowin (2010), we multiplied $PROD$ by -1 and added the product to OCF and $DISEXP$, thereby integrating the three variable criteria into a single comprehensive REM indicator as the measuring variable.

Independent Variables

COBs with a business background ($PMBA_{board}$): According to Carpenter and Fredrickson (2001) and Lin and Lee (2008), business backgrounds comprised education in management and finance and a master's degree in business administration (including executive master's business administration). COBs with an accounting background (ACC_{board}): This followed similar methods for categorizing $PMBA_{board}$. COBs who graduated from accounting departments or held accountant-related certifications were distinguished. Senior managers with a business background ($PMBA_{ceo}$): Various companies have differing titles for managers. CEOs are typically entitled as general manager (GMs), vice GMs, associates, managers, CFOs, and directors of accounting. The business background of managers was categorized using similar methods adopted for categorizing COBs. All company managers who have a business background were included. Senior managers with an accounting background (ACC_{ceo}): In addition, managers who graduated from accounting departments or had accountant-related certifications were subsequently distinguished from those with a business background. All four variables were dummy variables that equaled 1 when each specified condition was fulfilled and 0 otherwise.

Control Variables

Big 4 (BIG_4): DeAngelo (1981) claimed that larger accounting firms contribute to better audit quality. Other studies subsequently indicated that large firms have high constraints on the freedom of authorities in earnings management. For example, Becker et al. (1998) distinguished the accounting firms audited by Big 6 and non-Big 6 and indicated that those audited by non-Big 6 exhibited comparatively higher abnormal accruals, suggesting that the choices of accountants affect clients' earnings management behaviors. Chi et al. (2011) deduced a connection between audit experts and high-quality earnings management, indicating that audit experts are highly knowledgeable of industry characteristics. Therefore, when earnings management becomes constrained through DAs, they incline toward increased REM. However, Hamida et al. (2012) indicated that auditors have three motives for participating in or conniving in the earnings management behaviors of clients. These motives comprise stakeholders' pressure, altruism, and opportunism. Defond and Huang (2004) used the degrees of earnings management of audited financial statements to measure the influence of audit quality on economic results and the correlation between audit qualities and accounting firms. The empirical results revealed that, in the Taiwanese market, audit quality was irrelevant to accounting firms but affected strictly by certified accountants.

Specifically, no direct correlation was observed between the Big Four and whether companies engaged in earnings management. In summary, the signs of the Big 4 variable and DA and REM were not predicted in this study. This variable was a dummy variable that equaled 1 when the company was audited one of the Big 4 auditors and 0 otherwise. Debt Ratio (LEV): Press and Weintrop (1990) maintained that debt ratios influence whether companies engage in earnings management. They indicated that high-debt ratio companies are increasingly likely to violate debt covenants. To prevent this, companies of high debt ratios manipulate earnings to polish financial statements. However, DeAngelo et al. (1994) indicated that high debt ratios are related to financial difficulties. Companies renegotiate debt covenants when encountering financial difficulties. To strive for contract renegotiation and alleviate financial burden, companies manipulate financial statements to reduce earnings. Therefore, in this study, the signs of debt ratios, DAs, and REMs were not predicted.

Total Accrual (ACCRUALS): Francis et al. (1999) and Becker et al. (1998) have indicated that companies tend to exhibit high manipulated DAs when they have high total accrual items. Accruals self-reverse, which means that accruals from previous periods may reverse in the subsequent periods. To prevent this from occurring, accounting policies from previous periods must be subsequently implemented, which results in highly positive abnormal accruals in previous and successive accounting periods (Beneish, 1997). Therefore, the signs of total accruals, DAs, and REMs were not predicted. *Operating Cash Flow (OCF)*: Dechow et al. (1996) indicated that accrual items refer to the difference between accrual and cash bases. The number of DAs reduces inconsistencies between incomes and expenses in OCFs; therefore, OCF and the number of DAs are negatively correlated. In addition, Frankel and Rose (2002) stated that the manipulation of DAs for earnings management declined when OCFs increased. In summary, we predicted a negative correlation between *OCF* and *DA*. *Company Size (SIZE)*: Barth et al. (1998) proposed that when company size can be used as the proxy variable for other economic effects (i.e., persistence of earnings), they influence company earnings. Large company sizes aggravate agency problems. Therefore, company size and earnings management are negatively correlated. However, Watts and Zimmerman (1986) found that companies that exhibit high profitability tends to receive government and investor attentions. Therefore, we considered that, in large companies, authorities formulate comparatively strict regulations to protect investors and increase the transparency of financial statements. To protect reputation, manipulative earnings management behaviors are relatively rare in large companies. However, brokerages often provide financial prediction for large companies. To achieve the predicted financial targets, managers become increasingly performance-driven and are likely to engage in earnings management to achieve earnings targets and share price. Because company size can be adopted as an alternative measure for various missing variables, the company size variable was added to control differences between company values and sizes. Various studies have provided differing opinions; therefore, the sign of company sizes was not predicted in this study. In addition, a natural logarithm was applied to total assets as a measured variable.

RESULTS AND DISCUSSION

Descriptive Statistics

To assess whether COBs and senior managers manipulated DAs or REMs to increase or suppress company earnings, we did not obtain the absolute values of DAs. The average *DA* and *REM* were -0.002 and 0.005, respectively (shown in Panel A, Table 1), indicating that the companies potentially used DAs or REMs to manipulate earnings. $PMBA_{board}$ and ACC_{board} yielded averages of 0.37 and 0.02, respectively, suggesting that accounting background was rare among COBs. $PMBA_{ceo}$ and ACC_{ceo} yielded averages of 0.45 and 0.12, respectively, indicating that both business and accounting background among senior managers were more common than among COBs. BIG_4 yielded an average of 0.90, suggesting that 90% of the listed and over-the-counter companies in Taiwan had their financial statements audited by the Big4 auditors.

The one-way analysis of variance test results for the two subsamples of COBs who were and were not concurrently serving as CEOs are shown in Panel B of Table 1. The table shows that the COBs concurrently serving as CEOs yielded 985 entries, where the COBs not concurrently serving as CEOs yielded 2,333 entries. The means of $PMBA_{board}$ for COBs (COBs with a business background) who were and were not concurrently serving as CEOs were 0.35 and 0.37, respectively ($t = -1.16$). The results failed to reach significance. Average ACC_{board} for COBs (with an accounting background) who were and were not concurrently serving as CEOs were 0.01 and 0.02, respectively ($t = -2.01$). The results reached significance and indicated that the accounting background of the COBs affected their decisions. Regarding the professional education background of senior managers, when COBs were and were not concurrently serving as CEOs, $PMBA_{ceo}$ yielded averages of 0.44 and 0.45, respectively ($t = -1.15$), and the results failed to reach significance. The medians for ACC_{ceo} were 0.08 and 0.91, respectively ($z = -1.98$). The results indicated that the accounting background of senior managers influenced their decisions. Regarding the control variables, BIG_4 yielded averages of 0.89 and 0.91 for companies audited and not audited by the Big Four,

respectively ($t = -2.29$). The results reached significance and showed that whether the Big Four audited companies in which COBs were concurrently and not concurrently serving as CEOs yielded varying results. Furthermore, when the COBs were and were not concurrently serving as CEOs, the averages for *LEV*, *OCF*, and *SIZE* were 0.01 and 0.02 ($t = -2.67$; reached significance), 0.05 and 0.07 ($t = -5.07$; reached significance), and 14.93 and 15.38 ($t = -8.90$; reached significance), respectively. The overall data revealed that whether COBs concurrently served as CEOs influenced company decisions.

Table 1: Summary Statistics

Panel A						n=3,318
Variables	Mean	Std. Dev.	Max	Min	Median	
<i>DA</i>	-0.002	0.094	0.934	-0.730	-0.002	
<i>REM</i>	0.005	0.256	1.033	-1.095	0.031	
<i>PMBA_{board}</i>	0.370	0.482	1.000	0.000	0.000	
<i>ACC_{board}</i>	0.020	0.135	1.000	0.000	0.000	
<i>PMBA_{ceo}</i>	0.449	0.224	1.000	0.000	1.000	
<i>ACC_{ceo}</i>	0.122	0.142	1.000	0.000	1.000	
<i>BIG₄</i>	0.900	0.294	1.000	0.000	1.000	
<i>LEV</i>	0.201	0.127	0.998	-0.614	0.007	
<i>ACCRUALS</i>	0.459	0.322	2.744	-0.064	0.387	
<i>OCF</i>	0.068	0.118	0.522	-0.859	0.062	
<i>SIZE</i>	15.250	1.399	20.668	10.747	15.041	

Panel B: Subsamples of COBs Were and Were Not Concurrently CEO						
Variables	COBs Were Concurrently CEO (n=985)		COBs Were Not Concurrently CEO (n=2,333)		Test of Differences in Means and Median	
	Mean	Median	Mean	Median	Mean (t-Value)	Median (z-Value)
<i>PMBA_{board}</i>	0.350	0.000	0.370	0.000	-1.155	-1.149
<i>ACC_{board}</i>	0.010	0.000	0.020	0.000	-2.008	-1.197
<i>PMBA_{ceo}</i>	0.442	0.429	0.452	0.429	-1.154	-0.711
<i>ACC_{ceo}</i>	0.117	0.083	0.124	0.909	-1.358	-1.975
<i>BIG₄</i>	0.890	1.000	0.910	1.000	-2.289	-2.400
<i>LEV</i>	0.011	0.005	0.024	0.009	-2.670	-1.958
<i>ACCRUALS</i>	0.451	0.402	0.462	0.376	-0.928	-0.408
<i>OCF</i>	0.053	0.049	0.074	0.067	-5.073	-5.100
<i>SIZE</i>	14.935	14.869	15.384	15.130	-8.893	-7.638

This table shows descriptive statistics. The variable Definitions are: *DA*=the discretionary accruals; *REM*= the earning management based on operating cash flow; *PMBA_{board}*=1 if COBs have a business background, otherwise=0; *ACC_{board}*=1 if COBs have an accounting background, otherwise=0; *PMBA_{ceo}*=1 if senior managers have a business background, otherwise=0; *ACC_{ceo}*=1 if senior managers have an accounting background, otherwise=0; *BIG₄*=1 if audited by the big four firms, otherwise=0; *LEV*=the debt ratio, *OCF*= cash flow from operations, *ACCRUALS*= total accruals, *SIZE*=natural logarithm of total assets. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.

The correlations of *DA* and *ACC_{board}* and *PMBA_{ceo}* and *ACC_{ceo}* were significantly positively correlated. *REM* was significantly negatively correlated with *BIG₄* but significantly positively correlated with all other variables. The maximum variance inflation factor among each variable was 1.27 (not shown in table), indicating that collinearity was not pronounced.

Results Analysis

The linear regression model was used to assess H1-1, H1-2, H2-1, and H2-2. In addition to distinguishing whether the COBs were concurrently serving CEO positions, the professional education background of the COBs and senior managers were divided into business and accounting backgrounds to investigate the effects on DA-based and OCF-based earnings management. Professional Education Background of Chairmen and Discretionary Accrual-Based Earnings Management The influence of education background for the COBs concurrently not holding CEO positions on DA is shown in Panel A of Table 2. Model (1) revealed that *PMBA_{board}* and *DA* were significantly negatively correlated (*PMBA_{board}*, $\beta=-0.009$, $p<0.05$), indicating that when the COBs were not concurrently serving as CEOs, their business background induced their inverse manipulation of earnings. Model (2) demonstrated the influence of the COB’s accounting background on DA. *ACC_{board}* and *DA* were significantly positively correlated (*ACC_{board}*, $\beta=0.027$, $p<0.10$).

We deduced that the professional knowledge and skills in finance and accounting of the COBs with an accounting background promoted their ability in upward earnings manipulation. The influence of business background for the COBs concurrently serving as CEOs on DA is shown in Model (3), Panel B of Table 2. Under this condition, the sign of $PMBA_{board}$ and DA were negative but failed to attain significance. The influence of the accounting background of the COBs is shown in Model (4). The empirical results indicated that ACC_{board} and DA were significantly negatively correlated ($ACC_{board}, \beta = -0.066, p < 0.05$), suggesting that the natural conservative characteristic, which is inherent to finance and accounting personnel, of the COBs who had an accounting background and concurrently served as CEOs contributed to their steady operating methods and inclination for downward earnings management.

Regarding the control variables, BIG_4 and DA presented significant positive correlations in all four models. As mentioned, the earnings management behaviors of companies in the Taiwanese audit market are strictly individually influenced by personal certified accountants and show no direct association with the accounting firms. In addition, DAs self-reverse, and accountants may connive with certified clients to certain degrees of earnings management. LEV was positively significant in Models (1) and (2) and negatively significant in Models (3) and (4). $ACCURLS$ was negatively significant in Models (1) and (2) and positively significant in Models (3) and (4). As mentioned, companies implement earnings management based on various reasons. OCF and DA were significantly negatively correlated in all four models, verifying that when OCF was high, the manipulable DA items for achieving earnings management decreased.

Table 2: Professional Education Background of Chairmen and Discretionary Accrual-Based Earnings Management

Panel A: COBs Were Not Concurrently Serving as CEO						
	COBs with a Business Background			COBs with an Accounting Background		
	Model (1)---Eq.(1)			Model (2)---Eq.(2)		
	Coefficient		p-value	Coefficient		p-value
Intercept	0.042		0.069	0.036		0.122
$PMBA_{board}$	-0.009		0.047 *			
ACC_{board}				0.027		0.059
BIG_4	0.014		0.063	0.014		0.067
LEV	0.025		0.083	0.024		0.094
$ACCURLS$	-0.036		0.000 **	-0.035		0.000 **
OCF	-0.537		0.000 **	-0.533		0.000 **
$SIZE$	0.000		0.846	0.000		0.766
Adj R ²	0.405			0.405		
F-Statistic	269.110			269.010		
p-value	0.000			0.000		
Panel B: COBs Were Concurrently Serving as CEO						
	COBs with a Business Background			COBs with an Accounting Background		
	Model (3)---Eq.(1)			Model (4)---Eq.(2)		
	Coefficient		p-value	Coefficient		p-value
Intercept	-0.167		0.000 **	-0.168		0.000 **
$PMBA_{board}$	-0.001		0.834			
ACC_{board}				-0.066		0.016 *
BIG_4	0.017		0.068	0.016		0.084
LEV	-0.232		0.000 **	-0.236		0.000 **
$ACCURLS$	0.021		0.056	0.020		0.064
OCF	-0.314		0.000 **	-0.316		0.000 **
$SIZE$	0.011		0.000 **	0.011		0.000 **
Adj R ²	0.154			0.159		
F-Statistic	31.160			32.300		
p-value	0.000			0.000		

This table reports the estimated parameters of the professional education background of chairmen and discretionary accrual-based earnings management. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.

Professional Education Background of Senior Managers and Discretionary Accrual-Based Earnings Management Table 3 shows the relationship of educated senior managers and DA. Regardless of whether the COBs were concurrently serving as CEOs, the signs of $PMBA_{ceo}$ and DA were both positive but failed

to reach significance in Models (5) and (7). ACC_{ceo} and DA were significantly positively correlated in Models (6) and (8) ($\beta=0.02, p<0.05$; $\beta=0.03, p<0.05$). Other resulting of control variables were similar to those shown in Table 2. DAs self-reverse when accounting principles are applied. The results presented in Tables 2 and 3 show that the COBs and managers with a business background managed earnings cautiously. Despite the presence of earnings management behaviors, they adopted conservative methods and were inclined toward downward earnings management. However, when the COBs and senior managers had an accounting background and COBs concurrently served as CEOs, the COBs presented steady company operation and noticeable downward earnings management behaviors. The CEOs who had professional finance and accounting knowledge were more advantageous compared with those who had a business background. These CEOs may use this advantage to increase company earnings, manipulate COBs to rationalize their behaviors, and achieve the purpose of polishing financial statements.

Table 3: Professional Education Background of Senior Managers and Discretionary Accrual- Based Earnings Management

Panel A: COBs Were Not Concurrently Serving as CEO				
	Senior Managers with a Business Background Model (5)---Eq.(3)		Senior Managers with an Accounting Background Model (6)---Eq.(4)	
	Coefficient	p-value	Coefficient	p-value
Intercept	0.049	0.017 *	0.045	0.028 *
$PMBA_{ceo}$	0.008	0.245		
ACC_{ceo}			0.021	0.050 *
BIG_4	0.014	0.017 *	0.014	0.016 *
LEV	-0.030	0.016 *	-0.030	0.015 *
$ACCURLS$	-0.028	0.000 **	-0.028	0.000 **
OCF	-0.492	0.000 **	-0.492	0.000 **
$SIZE$	0.014	0.017 *	-0.001	0.541
$Adj R^2$	0.343		0.342	
F-Statistic	276.080		276.710	
p-value	0.000		0.000	
Panel B: COBs Were Concurrently Serving as CEO				
	Senior Managers with a Business Background Model (7)---Eq.(3)		Senior Managers with an Accounting Background Model (8)---Eq.(4)	
	Coefficient	p-value	Coefficient	p-value
Intercept	-0.137	0.000 **	-0.142	0.000 **
$PMBA_{ceo}$	0.009	0.338		
ACC_{ceo}			0.027	0.050 *
BIG_4	0.016	0.017 *	0.017	0.013 *
LEV	-0.221	0.000 **	-0.220	0.000 **
$ACCURLS$	0.005	0.518	0.006	0.531
OCF	-0.297	0.000 **	-0.298	0.000 **
$SIZE$	0.009	0.000 **	0.009	0.000 **
$Adj R^2$	0.140		0.142	
F-Statistic	40.260		40.830	
p-value	0.000		0.000	

This table reports the estimated parameters of the professional education background of senior managers and discretionary accrual-based earnings management. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.

Professional Education Background of Chairmen and Real Earnings Management The results for the COBs not concurrently serving CEO positions are shown in Panel A of Table 4. The data showed that $PMBA_{board}$ and ACC_{board} were both significantly positively correlated with REM ($\beta=0.05, p<0.01$; $\beta=0.23, p<0.01$). In Panel B, $PMBA_{board}$ and ACC_{board} for COBs concurrently serving CEO positions were also significantly positively correlated ($\beta=0.06, p<0.01$; $\beta=0.24, p<0.01$), suggesting that, when compared with using DA , the COBs were apt at earnings management through changing OCF . When they concurrently served as CEOs and had an accounting background, optimal effects in earnings management were obtained. The resulting of control variables were similar to those in Table 2.

Table 4: Professional Education Background of Chairmen and Real Earnings Management

Panel A: COBs Were Not Concurrently Serving as CEO				
	COBs with a Business Background		COBs with an Accounting Background	
	Model (9)---Eq.(5)		Model (10)---Eq.(6)	
	Coefficient	p-value	Coefficient	p-value
Intercept	-0.171	0.018 *	0.159	0.027 *
$PMB A_{board}$	0.053	0.000 **		
ACC_{board}			0.226	0.000 **
BIG_4	-0.071	0.002 **	-0.079	0.001 **
LEV	0.054	0.000 **	0.531	0.000 *
$ACCURLS$	0.040	0.053	0.046	0.025 **
$SIZE$	0.012	0.012 *	0.012	0.009 **
$Adj R^2$	0.090		0.094	
F-Statistic	47.970		50.100	
p-value	0.000		0.000	
Panel B COBs were concurrently serving as CEO				
	COBs with a Business Background		COBs with an Accounting Background	
	Model (11)---Eq.(5)		Model (12)---Eq.(6)	
	Coefficient	p-value	Coefficient	p-value
Intercept	0.071	0.528	0.105	0.347
$PMB A_{board}$	0.062	0.001 **		
ACC_{board}			0.241	0.005 **
BIG_4	-0.112	0.000 **	-0.122	0.000 **
LEV	0.562	0.000 **	0.574	0.000 **
$ACCURLS$	-0.048	0.135	-0.047	0.141
$SIZE$	0.003	0.675	0.002	0.787
$Adj R^2$	0.098		0.096	
F-Statistic	22.550		22.061	
p-value	0.000		0.000	

This table reports the estimated parameters of the professional education background of chairmen and real earnings management. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.

Professional Education Background of Senior Managers and Real Earnings Management The results for the COBs not concurrently serving CEO positions are shown in Panel A of Table 5. Similarly, $PMB A_{ceo}$ and ACC_{ceo} were both significantly positively correlated with REM ($\beta=0.08, p<0.01$; $\beta=0.07, p<0.05$). In Panel B, $PMB A_{ceo}$ for the COBs concurrently serving CEO positions remained positive but failed to attain significance, and a significant positive correlation was observed in ACC_{ceo} ($\beta=0.12, p<0.01$). Similar to the results shown in Table 4, when the COBs concurrently served as CEOs, the senior managers with an accounting background had the advantage of possessing finance and accounting knowledge. Although the COBs may have centralized authority, these CEOs can still implement REM to maximize personal benefits. The resulting of control variables were similar to those in Table 2.

Sensitivity Analysis

To confirm the stability of the results, observations were divided into the subsamples of $DA \geq 0$, $DA < 0$, $REM \geq 0$, and $REM < 0$ for sensitivity analysis. The results are presented in Table 6. DA is presented as a dependent variable in Panel A. The COBs who had a business background and were not concurrently holding CEO positions ($PMB A_{boards}, \beta=-0.012, p<0.05$) and those who had an accounting background and were concurrently serving CEO positions implemented reverse earnings management ($ACC_{boards}, \beta=-0.071, p<0.01$). Regardless of whether the COBs concurrently served as CEOs or their background education, all of the senior managers inclined toward positive earnings management, which was particularly evident for the CEOs with a professional accounting background ($ACC_{ceo}, \beta=0.029, p<0.05$). In Panel B, REM was used as the dependent variable. The results showed that regardless of whether the COBs concurrently served as CEOs, they were apt at using OCF for earnings management, which was increasingly evident for those who had an accounting background ($ACC_{board}, \beta=0.18, p<0.01$; $\beta=0.32, p<0.01$). The senior managers presented comparatively noticeable earnings management behaviors when the COBs were not concurrently serving CEO positions ($ACC_{ceo}, \beta=0.067, p<0.05$).

Table 5: Professional Education Background of Senior Managers and Real Earnings Management

Panel A Cobs Were Not Concurrently Serving As CEO				
	Senior Managers with a Business Background Model (13)---Eq.(7)		Senior Managers with an Accounting Background Model (14)---Eq.(8)	
	Coefficient	p-value	Coefficient	p-value
Intercept	-0.099	0.111	-0.069	0.265
PMBA _{cco}	0.084	0.000 **		
ACC _{cco}			0.072	0.027 *
BIG ₄	0.062	0.000 **	0.061	0.000 **
LEV	0.552	0.000 **	0.555	0.000 **
ACCURLS	0.029	0.090	0.026	0.126
SIZE	0.006	0.099	0.006	0.108
Adj R ²	0.092		0.089	
F-Statistic	65.471		63.230	
p-value	0.000		0.000	

Panel B Cobs Were Concurrently Serving As CEO				
	Senior Managers with a Business Background Model (15)---Eq.(7)		Senior Managers with an Accounting Background Model (16)---Eq.(8)	
	Coefficient	p-value	Coefficient	p-value
Intercept	0.098	0.273	0.069	0.437
PMBA _{cco}	0.035	0.231		
ACC _{cco}			0.124	0.002 **
BIG ₄	-0.075	0.000 **	-0.072	0.000 **
LEV	0.408	0.000 **	0.413	0.000 **
ACCURLS	-0.033	0.202	-0.034	0.192
SIZE	0.000	0.934	0.001	0.831
Adj R ²	0.040		0.045	
F-Statistic	13.030		14.660	
p-value	0.000		0.000	

This table reports the estimated parameters of the professional education background of senior managers and real earnings management. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.

Table 6: Professional Education Background of COBs and Senior Managers in Earnings Management

Panel A Professional Education Background and Discretionary Accrual-Based Earnings Management								
	COBs Were Not Concurrently Serving as CEO				COBs Were Concurrently Serving as CEO			
	DA ≥ 0		DA < 0		DA ≥ 0		DA < 0	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
COBs with a Business Background								
PMBA _{board}	-0.012	0.021 *	0.002	0.603	0.012	0.069	-0.006	0.336
COBs with an Accounting Background								
ACC _{board}	0.024	0.190	0.011	0.325	0.000	0.997	-0.071	0.008 ***
Managers with a Business Background								
PMBA _{ceo}	0.009	0.700	0.011	0.053	0.008	0.403	0.002	0.880
Managers with an Accounting Background								
ACC _{ceo}	0.008	0.573	0.015	0.106	0.029	0.031 *	-0.015	0.301

Panel B Professional Education Background and Real Earnings Management								
	COBs Were Not Concurrently Serving as CEO				COBs Were Concurrently Serving as CEO			
	REM ≥ 0		REM < 0		REM ≥ 0		REM < 0	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
COBs with a Business Background								
PMBA _{board}	-0.012	0.352	0.072	0.000 **	0.012	0.069	0.092	0.000 **
COBs with an Accounting Background								
ACC _{board}	0.180	0.000 **	0.101	0.094	0.319	0.000 **	0.104	0.297
Managers with a Business Background								
PMBA _{ceo}	-0.006	0.764	0.078	0.004 **	-0.044	0.106	0.034	0.313
Managers with an Accounting Background								
ACC _{ceo}	0.067	0.027 *	0.023	0.599	0.026	0.467	0.037	0.491

This table reports the estimated parameters of the professional education background of COBs and senior managers in earnings management. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.

CONCLUDING COMMENTS

Since Jensen and Meckling (1976) proposed agency theory, this topic has constantly received attention from researchers and practitioners. Since ownership and management have separated, management has had greater access to high-quality information than corporate shareholders do. They frequently conduct earnings management by changing accounting methods and managing accrual items in self-benefiting purposes to manipulate financial statements, provide biased information, and generate company losses, consequently undermining company values. To counter the earnings management behaviors of managers, companies must establish boards of directors as crucial internal cores for supervising authorities and maintaining sustained company operations. However, COBs are pivotal figures in decision-making processes. When senior managers have increasing authority, their influence amplifies. Consequently, company performance destabilizes. Therefore, we investigated how professionally educated COBs manipulate earnings for personal benefits based on their professional knowledge when they concurrently serve as CEOs. In addition, we separately determined how professionally educated senior managers manipulate earnings for personal benefits based on their professional knowledge when COBs are not concurrently holding CEO positions.

The empirical results show that, regardless of whether COBs were concurrently serving CEO positions, varying degrees of earnings management were exercised by both COBs and senior managers as they applied their professional education background and adopted DAs or changing operating cash flow. Because DAs self-reverse when accounting principles are applied, COBs and managers who have a business background tend to act cautiously and conservatively when managing earnings through DAs. Despite the presence of earnings management behaviors, they are inclined toward downward earnings management. However, when the COBs and managers had an accounting background and those COBs concurrently held CEO positions, the COBs provided increasingly steady management in company operation. Downward earnings management behaviors became increasingly noticeable. By contrast, the managers were advantageous in applying their professional finance and accounting knowledge to increase company earnings and polish financial statements. When adopting OCF-based earnings management, the COBs and managers engaged in increased earnings management behaviors, which was most pronounced when the COBs with an accounting background concurrently served as CEOs. In summary, when either COBs or senior managers have individual decision-making authority, they tend to apply various methods to adjust company earnings based on their professional knowledge to achieve their anticipated targets. Therefore, we suggest external investors and board members pay additional attention when COBs concurrently serve as CEOs, because they may polish the financial statements of companies based on their professional knowledge. When companies hire CEOs, they must be mindful of managers using their professional knowledge to their advantage to manipulate earnings.

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