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A special issue devoted to issues in
Accounting and Finance

Guest Editors
Cheng Fan Fah and **Maswati Abd Talib**

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Pertanika is the official journal of Universiti Putra Malaysia. The abbreviation for Pertanika Journal of Social Sciences & Humanities is *Pertanika J. Soc. Sci. Hum.*

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ABSTRACTING/INDEXING

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Preface

In view of the success of publishing the "Special Issue in Accounting and Finance" in 2013, where 10 high-quality articles were published, the Faculty of Economics and Management encouraged the department of Accounting and Finance to spearhead another special issue for this year. There are **ten articles** in this special issue which comprises six finance and four research papers related to accounting.

The six finance articles in this Special Issue can be grouped into two areas of study. The first group of articles comprises studies on Malaysian Capital Markets. The second group of articles covers issues of international interest. There are three articles in the first group and they study momentum profitability, top management characteristics, a firm's international diversification activities and mergers and acquisitions for Malaysia-listed companies. The three articles in the second group are on the determinants of the performance of Japanese banks, bank efficiency in Bangladesh and US-exchange rate behaviour.

The other four articles in accounting cover Islamic accounting education, management accounting and corporate governance. Two articles are on Islamic accounting education which investigate the decision making process of Muslim and non-Muslim on the issue of environmental reporting and the other one examines the accounting educators' awareness of Syari'ah based accounting (SbA). The article on management accounting studies the activity based costing (ABC) approach in improving the performance of university evaluation system. Finally, the fourth article discusses the effect of corporate governance attributes (ownership structure and independent board chair) on the performance of finance companies.

I wish to take this opportunity to thank all our contributors and the reviewers who have made this issue possible. We would like to thank the Dean Prof. Dr. Mohd. Shahwahid Othman; Deputy Dean, Assoc. Prof. Dr. Azmawani Abdul Rahman; Deputy Dean, Associate Prof. Dr. Bany Ariffin Amin Noordin and the Head of Accounting and Finance Department, Dr. Amalina Abdullah, for their support in bringing this publication to reality.

We are equally thankful to Dr. Nayan Deep S. Kanwal, Chief Executive Editor, without whose significant input, this publication would not have been possible. Last but not least, we are grateful to Ms. Erica Kwan Lee Yin, Publication Officer, Journal Division and all the staff of the Journal Editorial office for their hard work and patience in bringing this special issue to print.

Cheng Fan Fah,
Maswati Abd Talib

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Momentum Profitability in Malaysia

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ABSTRACT

This paper reports evidence of short-term momentum profits in a study of 700 stocks traded in the emerging Malaysian stock market. For this purpose, momentum portfolios were formed over a full sample period and other sub-periods that included the Asian Financial Crisis, Global Financial Crisis and the period between the two crises. Significant negative returns were observed during the economic downturn brought about by the Asian Financial Crisis, consistent with literature. Moreover, the results showed positive returns over the period characterised by rising market index. This finding is consistent with publication and may be explained as due to investors' confidence being high in a rising market. In addition, individual stock momentum observed was studied to determine whether it was attributable to industry effect, which is a less explored topic. The results of the current study showed that strategies of buying past winning industries and selling past losing industries appeared to be profitable in this market. Thus, this research's findings have added to the literature on this topic from an emerging market place.

Keywords: investment, portfolio selection, momentum strategies, industry momentum
JEL classifications: G11; G14; G01; G02

INTRODUCTION

Momentum strategies had been adopted by practitioners long before any formal academic research began. Evidence shows that investment professionals can take advantage of stock return predictability. It has been shown that mutual funds and pension fund managers tend to buy stocks that show positive returns (Grinblatt & Titman, 1989, 1991; Lakonishok, Shleifer & Vishny, 1992). Grinblatt, Titman and Wermers (1995) revealed that almost three quarters of equity funds track

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momentum. In fact, investors are placing more emphasis on the investing style of the money managers they have appointed (Hedge Funds Review Editorial, 2011). All these serve to highlight the importance and popularity of proven trading strategies.

Momentum profitability was first documented by Jegadeesh and Titman (1993) and has since stirred intense enthusiasm among researchers. It is a form of anomaly as it defies the traditional view of market efficiency. Momentum premises on the notion of return continuation and predictability over the short to medium term. It follows that investors would earn abnormal returns if they were to follow a simple strategy to go long on outperforming stocks and short on underperforming stocks. There is now voluminous evidence that shows momentum trading strategy is profitable. However, most of the pervasive evidence of momentum profits stems from studies on developed markets. While existence of momentum is remarkably consistent in these countries, the findings are far less conclusive in the emerging markets. For example, Hameed and Kusnadi (2002) reported little evidence of momentum profits in the six emerging Asian markets, while Chui, Titman and Wei (2000) documented significant momentum profitability in eight Asian stock markets.

This paper enhances the existing literature by offering insights into momentum profitability using data from an emerging market - Malaysia. It is one of Asia's moderate-growth economies. It is highly open and externally competitive, being ranked the 12th (out of more than 180 countries) most business-friendly country globally, according to a World Bank report in 2013. In the early years of 1985-1995, Malaysia recorded a decent average growth rate of 7.3 per cent per annum. After the 1997 Asian Financial Crisis, it continued to post an annual GDP growth averaged at 4.6 per cent per annum (2000 to 2012). Even in the wake of the recent 2007 global crisis, Malaysia has shown to be resilient and has not suffered a financial crisis. This is suggestive of the country's strong economic fundamentals and sound macroeconomic policies since the 1997 Asian crisis. The sustainability and resilience underpin the attractiveness of Malaysia as an investment destination for international investors. Therefore, the authors believe a detailed investigation of momentum effect designed for this market is both timely and relevant as investors can gauge the success of implementing such strategy in Malaysia.

The objective of this paper is two-fold. First, we examined if there is overall evidence of momentum profitability. While there have been cross-country studies that included Malaysia as one of the emerging countries in their sample, they were not designed specifically to investigate the phenomenon in Malaysia. In this paper, momentum strategies were implemented over different sub-periods to examine if there was any distinctive pattern associated with different economic states. Some preceding studies on developed markets argue that momentum effect is conditional on market states and profits are derived largely from the "up" market, thus supporting the investor overconfidence theory (Cooper, Gutierrez

& Hameed, 2004; Huang, 2006). Others found no relationship between momentum profitability and the states of the economy (Griffin, Ji & Martin, 2003). Daniel and Moskowitz (2013) suggest "momentum crashes" following market declines. The second objective of this study is to investigate if individual stock momentum in Malaysia is driven by momentum in industrial returns. Moskowitz and Grinblatt (1999[2] pioneered the study of industry momentum using US data. Employing strategies of buying stocks of past winning industries and selling stocks of past losing industries, they documented substantive evidence of momentum effect across industries. To date, there is limited research on this topic compared to the large body of literature on individual stock momentum. Moreover, the evidence presented is controversial.

The remainder of this paper is structured as follows: Section 2 reviews the related research of the field. Section 3 discusses the data and methods. Section 4 analyses and presents the empirical findings. Section 5 concludes the paper.

RELATED RESEARCH

Since the documentation of momentum returns by Jegadeesh and Titman (1993) more than two decades ago, research interest in this field of study has been kept alive. In their landmark paper, Jegadeesh and Titman (1993) reported significantly positive momentum returns in the US market. Internationally, numerous studies have confirmed momentum in other developed markets.[3] While evidence of significant momentum returns was documented to be pervasive across numerous developed markets, the findings were not conclusive for the emerging markets. Rouwenhorst (1999) conducted a momentum study on 20 emerging markets and found evidence of momentum. Hart, Slagter and Dijk (2003) examined a broad range of stock selection strategies in 32 emerging markets. They documented significant, albeit small, excess returns in internationally diversified portfolios. Chui *et al*. (2000) reported that momentum strategies were highly profitable in the eight Asian stock markets examined, conditional on market states. Interestingly, a closely related paper presented opposite findings to the preceding studies. Hameed and Kusnadi (2002) found no significant evidence of momentum which implemented the strategies on six Asian markets. However, all these studies reporting less significant momentum returns of emerging countries were using data prior to 2000. Reliable results might thus be hampered by a lack of high quality and comprehensive data (Cagici, Fabozzi, & Tan, 2013). In this recent paper, Cagici *et al*. (2013) categorised 18 emerging

[2]Using data from 20 industry portfolios, Moskowitz and Grinblatt (1999) documented a strong and prevalent industry momentum effect. They further reported that individual stock momentum was completely subsumed by industry effect.

[3]See for example, Rowenhorst (1998), Hurn and Pavlov (2003) and Phua, Chan, Faff and Hudson (2010).

markets into three regions, and firmly established strong evidence of momentum effects for all the emerging markets, with the exception of Eastern Europe. However, studies on momentum effects on individual emerging countries using recent data remain scarce to date.

A few studies have investigated momentum effects on market states. In testing overreaction theories of momentum conditioning on market state, Cooper *et al*. (2004) found that momentum profits are dependent on the market states, as predicted. They further documented that momentum was exclusive to the upmarket state. Huang (2006) revisited Cooper *et al*.'s (2004) proposition in the international context and found that momentum profit was only evident in the bullish market, which is consistent with the precedent findings. Others offered contradictory views. Muga and Santamaria (2009) reported evidence of momentum effect in both up- and down-market states in the Spanish market. To investigate whether momentum effect was present during an economic downturn, Grobys (2014) employed stock market indices of 21 countries during the most recent recession and found that momentum strategy yielded statistically significant negative returns. This confirmed Daniel and Moskowitz's (2013) finding of momentum reversals occurring following market declines.

Given the intense research interest on momentum returns, various theories have been put forward to explain the anomaly. However, there is still disagreement among academics as to what is the best explanation. In general, there are two camps with different explanations for momentum: risk-based and behavioural. Risk-based explanations attributed momentum profits to common factors that were not being captured in the standard pricing model, while behavioural model proponents argue that investors are irrational. Thus, their behaviours are not necessarily explainable by any risk-based model. The models based on psychological reasoning address particular constraints on investor rationality that either causes an under-reaction of prices to information, or overconfidence and self-attribution bias of investors. Hong, Lim and Stein's (2000) under-reaction theory, and Daniel, Hirshleifer and Subrahmanyam's (1998) overconfidence model belong to this camp. Others approached industry effect as a potential source of momentum. While there has been tremendous interest in stock momentum, there is relatively scant research on industry momentum. Pioneering the studies of industry momentum, Moskowitz and Grinblatt (1999) documented that momentum effect was primarily an industry phenomenon, that is, stock momentum dissipated once the industry effect was controlled. In a similar vein, Ji and Giannikos (2010) showed that industry momentum was profitable on a global basis. Other studies offer contradictory evidence on the profitability of industry momentum. Using the constituents of S&P/ASX 200 index, Li, Stork, Chai, Ed and Ang (2014) reported no evidence of industry-driven momentum in their analysis, and Nijman, Swinkels and Verbeek (2004) suggested that

industry momentum did not seem to play a role in explaining individual stock effects in Europe.

DATA AND METHODOLOGY

Data

The monthly stock prices of our data were sourced from DataStream Thomson Reuters. Our sample comprised 776 companies listed on Bursa Malaysia, and the data included firms of all sizes. Thus, the sample captured almost the whole market, given that there were 900 stocks traded on Bursa Malaysia in 2013. Moreover, companies that were delisted during the period were not excluded to avoid survivorship bias. However, Finance stocks and REITs were excluded from the sample. Stocks with price histories of less than two years were dropped from the sample due to the overlapping nature of the momentum strategy that requires a longer time frame to be constructed meaningfully. When there were missing values of stock prices due to non-trading periods, they were not substituted with the previous observations as that could create an artificial momentum effect. The longest time frame adopted in this study was 217 months, or 18 years, spanning from September 1995 to September 2013. This time frame spanned the two major financial crises (the Asian Financial Crisis and the Global Financial Crisis) that impacted the country's financial markets. Hence, consideration was given not just to the breadth of coverage but also the length of history. Based on this price data, monthly returns were then computed for each stock. In addition, the highest and lowest 0.5 per cent of the extreme returns were also removed from the observations. To check robustness, returns were computed without the outliers being removed but the results were very similar. Hence, only results with extreme returns removed are reported in this paper.

To investigate the persistence of momentum effect in industries, the Industrial Classification Benchmark (ICB) was used to classify stocks into different industries. ICB is an industry classification system that was jointly developed by Dow Jones Indexes and the FTSE Group. The benefit of using this system lies in its general availability among the academicians and practitioners, and its uniform classification of industries globally. This allows for meaningful comparisons among the sectors and industries worldwide. The ICB classification in this study was sourced from DataStream and it consists of four levels of hierarchy. The second level of classification (super-sectors) that partitions the entire industry into 19 super-sectors instead of other narrower definitions of industries was opted so as to ensure there were at least eight companies in each industry portfolio. This way, all the portfolios were adequately diversified and had negligible firm-specific risks. Descriptive statistics of the industries are presented in Table 1. There are 16 industries classified under this level of ICB classifications, and the number of companies in each industry group varied from eight to 170. The Oil and Gas sector had the largest average monthly returns

(1.33 per cent per month), followed by Healthcare (1.25 per cent per month) and Telecommunications (1.22 per cent per month). Meanwhile, Basic Resources had the lowest average returns (0.31per cent per month) among all the industries.

TABLE 1
Descriptive statistics of industries (January 2000 – September 2013)

Industry	ICB code	Number of firms	Mean returns	Standard Deviation
Oil & Gas	0500	22	0.0133	0.1479
Chemicals	1300	26	0.0056	0.1400
Basic Resources	1700	48	0.0031	0.1455
Constructions & Material	2300	96	0.0041	0.1452
Industrial Goods & Services	2700	170	0.0060	0.1491
Automobiles & Parts	3300	19	0.0045	0.1252
Food & Beverage	3500	84	0.0079	0.1174
Personal & Household Goods	3700	74	0.0037	0.1492
Healthcare	4500	17	0.0125	0.1158
Retail	5300	24	0.0068	0.1282
Media	5500	8	0.0070	0.1618
Travel & Leisure	5700	26	0.0070	0.1375
Telecommunications	6500	10	0.0122	0.1804
Utilities	7500	12	0.0069	0.1210
Real estate	8600	73	0.0063	0.1414
Technology	9500	65	0.0069	0.1920
Total		774	0.0887	

This table reports descriptive statistics for each industry classified under the Industry Classification Benchmark (ICB). The ICB code is the classification code assigned by Dow Jones Indexes and the FTSE Group according to the nature of a company's business. Number of firms is the number of companies within each portfolio. Mean returns and standard deviation denote the average return and standard deviation of each industry group on a monthly basis. Total mean return is the average return of all industries on a yearly basis.

Methodology and variables

Individual stock momentum

To construct the momentum trading strategy, the approach of Jegadeesh and Titman (1993) was modelled in this study. Firstly, all eligible stocks were ranked based on their past J-month lagged returns (J = 1, 3, 6 or 9). At the end of every month, the stocks were ranked in ascending order based on their past J-month cumulative returns. The stocks were then sorted into three and five groups. Meanwhile, the stocks with the highest returns during the past J months were assigned to the winner portfolio (Winner), and those with the lowest past J-month returns were sort into the loser portfolio (Loser). For instance, for the three-decile portfolio, stocks in the top 30 percent decile were assigned to the winner portfolio, while the bottom 30 per cent went to the loser portfolio. These portfolios were then held for K subsequent months (K = 1, 3, 6 or 9). Hence, a total of 16 trading strategies were generated. The investment period returns were computed as average monthly returns. The portfolios are rebalanced every month. Following

the convention of the literature, the study incorporated a one-month gap between the formation period (J), and the investment period (K) to attenuate microstructure issues such as bid-ask bounce and short-run stock return reversal effect.[4]

As the study used monthly returns, when the investment periods exceeded one month, it unavoidably created overlaps in the investment period returns. Following conventional wisdom, overlapping portfolios were constructed. Thus, in any given month, *t*, the strategies held a series of portfolios that were selected in the month before, as well as in the previous K-1 months, depending on the strategies adopted. For example, the monthly return for a three-month strategy would be the average of the portfolio returns of the strategies of this month, the previous month and the previous two months. In this study, the focus was on the extreme portfolios returns of the momentum portfolios were the differences between the winner and loser portfolios. The momentum returns were computed on all 16 strategies since different time frames could embody different pieces of information. The variable of J1K3 was referred to as the strategy of ranking stocks based on the returns of the past one month and the go long on winner and short on loser for the following three months, with a one-month lag between the ranking and the investment periods.

[4]See the approaches of Jegadeesh (1990) and Lehman (1990).

Industry Momentum

The method of examining industry momentum was analogous to the one adopted by Moskowitz and Grinblatt (1999). Instead of stratifying individual stocks into winning and losing portfolios, we now sorted and invested in the entire industry. Similar to the individual stock momentum approach, the strategy called for taking a long (short) position in the winner (loser) industry. In each month, all the industries under consideration were ranked into five deciles based on their past J-month returns. The top 20 per cent of the performers were defined as winner industries and the bottom 20 per cent as loser industries. The rest of the procedures are analogous to the one detailed in subsection 3.2.1.

RESEARCH FINDINGS

This section reports on the returns of various momentum strategies performed for the entire sample period (1995-2013) and the different market states (the Asian Financial Crisis 1997-1999, the Global Financial Crisis 2007-2009, and the "up-period" 2000-2006, as characterised by rising KLCI). In addition, momentum returns within each industry sector are represented.

Momentum profitability

Table 2 presents the average monthly returns of the different composite portfolio strategies performed in Malaysia over the period of January 2000 to September

2013. J3K6 refers to the strategy of ranking stock based on the returns of the past three months. This portfolio was then held for six months. The sample stocks in this study were aggregated into three and five deciles, respectively. Table 1 shows the average monthly returns of winner, loser and momentum returns of both the three-decile and five-decile portfolios. The results showed that positive momentum profits clustered toward shorter horizons. Specifically, only strategies with short (one month and three month) formation horizons generate positive significant returns. At the 5-percent significance level, five out of 16 strategies yielded significant positive returns for the three-decile sorting portfolios and three out of 16 strategies earned significant positive returns for the five-decile portfolios. Meanwhile, there were some momentum profits over short formation horizons, and the profits diminished over the longer term. It appears that momentum strategies based on more recent past performance produced overall better returns in terms of economic magnitude and statistical reliance. Specifically, the three-month formation strategies generated the highest returns, followed by one-month formation strategies. Besides, an indirect relationship was also observed between the length of the investment period and the profitability of the strategy. In other words, the shorter the investment period, the higher the momentum return. This seems to suggest that strategies based on shorter formation and investment horizons are more profitable overall. As can be seen from Table 1, the most profitable portfolio was the one that selected stocks based on the returns of the past three months and which held the portfolio for the subsequent three months (J3K3). This strategy yielded a total return of 0.41 per cent per month for the three-decile portfolio and 0.39 per cent for the five-decile portfolios. These were translated into annualised returns of 5.09 per cent and 4.84 per cent, respectively. Not all the strategies are effective, however. In Table 2, most strategies of a six-month formation period and all the strategies of a nine-month formation period were actually shown to yield negative momentum, suggesting a mean reversion in the longer term. This may be explained as the market overreacting to new information initially and correcting the biases subsequently.

TABLE 2
Returns of momentum strategies (January 2000 – September 2013)

	Panel A (3 deciles)				**Panel B (5 deciles)**			
	Winner	Loser	Winner-Loser		Winner	Loser	Winner-Loser	
J1K3	0.0055	0.0023	0.0031	***	0.0052	0.0021	0.0031	***
	2.13	*0.82*	*4.16*		*1.96*	*0.68*	*3.04*	
J1K6	0.0054	0.0035	0.0019	***	0.0050	0.0034	0.0016	**
	2.72	*1.53*	*3.50*		*2.45*	*1.41*	*2.21*	

J1K9	0.0062	0.0053	0.0010	**	0.0059	0.0054	0.0005	
	4.09	*3.02*	*2.54*		*3.80*	*2.94*	*1.05*	
J1K12	0.0069	0.0064	0.0005	*	0.0065	0.0065	0.0000	
	5.77	*4.82*	*1.83*		*5.31*	*4.66*	*0.05*	
J3K3	0.0058	0.0016	0.0041	***	0.0053	0.0013	0.0039	**
	2.32	*0.55*	*3.25*		*2.03*	*0.43*	*2.50*	
J3K6	0.0053	0.0034	0.0019	**	0.0050	0.0034	0.0016	
	2.79	*1.41*	*2.16*		*2.58*	*1.36*	*1.47*	
J3K9	0.0059	0.0052	0.0007		0.0054	0.0052	0.0002	
	3.91	*2.91*	*1.19*		*3.48*	*2.77*	*0.29*	
J3K12	0.0065	0.0062	0.0003		0.0058	0.0063	-0.0005	
	5.41	*4.64*	*0.63*		*4.70*	*4.48*	*-1.05*	
J6K3	0.0045	0.0027	0.0019		0.0039	0.0027	0.0012	
	1.82	*0.86*	*1.19*		*1.47*	*0.79*	*0.62*	
J6K6	0.0040	0.0042	-0.0002		0.0029	0.0047	-0.0018	
	2.04	*1.76*	*-0.18*		*1.42*	*1.81*	*-1.39*	
J6K9	0.0047	0.0060	-0.0014	*	0.0036	0.0064	-0.0029	***
	2.97	*3.42*	*-1.97*		*2.19*	*3.40*	*-3.42*	
J6K12	0.0054	0.0069	-0.0015	***	0.0045	0.0074	-0.0028	***
	4.45	*5.21*	*-3.02*		*3.57*	*5.19*	*-4.92*	
J9K3	0.0032	0.0037	-0.0005		0.0020	0.0039	-0.0019	
	1.25	*1.18*	*-0.32*		*0.74*	*1.13*	*-0.93*	
J9K6	0.0030	0.0054	-0.0024	**	0.0015	0.0057	-0.0042	***
	1.46	*2.24*	*-2.25*		*0.68*	*2.19*	*-3.27*	
J9K9	0.0040	0.0068	-0.0027	***	0.0025	0.0072	-0.0046	
	2.50	*3.82*	*-3.80*		*1.51*	*3.80*	*-5.29*	
J9K12	0.0050	0.0074	-0.0024	***	0.0036	0.0078	-0.0042	
	4.02	*5.58*	*-4.64*		*2.71*	*5.48*	*-6.95*	

This table reports the mean returns of winner portfolios, loser portfolios and momentum returns. Returns are calculated based on different combinations of formation and investment periods, and there is always a month's gap between the formation and the investment period. In Panel A, the samples were based on their past J month returns into three deciles. The top 30% of stocks were winners and the bottom 30% of stocks were losers. In Panel B, all the stocks were sorted into five deciles, with the top 20% and bottom 20% being the winners and the losers. Then, we waited for one month and after that, went long for winners and short for losers for the subsequent K months. The sample period was from January 2000 to September 2013. The *t*-statistics are *italicized*. **denotes significance at the 5% level and *** at the 1% level.

Attributes of firms have been shown to contribute to cross-sectional variation in expected returns. Table 3 reports the average size of the relative strength portfolios formed on the basis of past three-month ranked returns. The average size is the average natural logarithm of market capitalisation of the firms in each portfolio. It is indicated in Table 3 that loser portfolios are on average smaller than winner portfolios, and the prior returns are positively related to the average size of the firms. While size is a common proxy of systematic risk, this report does not seem to support the proposition that momentum strategies systematically pick high-risk stocks.

TABLE 3
Average size of J3 momentum portfolios

Panel A (3 deciles)		Panel B (5 deciles)	
Portfolio	Average Size	Portfolio	Average Size
1-loser	4.59	1-loser	4.42
2	5.09	2	4.90
3-winner	5.06	3	5.12
		4	5.17
		5-winner	4.99

This table reports average sizes of different relative strength portfolios. Average size was calculated as the natural logarithm of average market capitalisation of stocks in each portfolio. In Panel A, sample stocks were sorted into three deciles based on their past three-month lagged returns. The portfolio with the 30% lowest lagged return was the loser portfolio (portfolio 1) and portfolio with the 30% highest lagged return was the winner portfolio (portfolio 3). Panel B sorted sample stocks into 5 deciles. Portfolio 1, with the 20% lowest returns, was the loser portfolio and portfolio 5 with the highest 20% returns was the winner portfolio.

For practicality, we briefly consider the profitability of the strategies after taking transaction costs into account. The brokerage fee charged for stock trading was between 0.5 per cent and 0.7 per cent, and it could go as low as 0.42 per cent for online transactions. Other costs included the 0.03 per cent clearing fee and 0.001 per cent for stamp duty, subjected to their respective minimum and maximum charges. Since the most profitable J3K3 strategy yielded an annualized return of 5.09 per cent, the net profit is therefore a mere approximation of 1.5 per cent per annum. This might not be impressive in economic magnitude but the interest was more in establishing the existence of momentum *per se* in this market.

4.2 Momentum Profits over Sub-periods

The returns of various portfolios of the entire sample period (1995-2013) were also calculated. The returns were small and statistically not reliable. However, when the returns were computed for the period after the Asian Financial Crisis, some shorter-term returns became significantly positive. This prompted us to examine if the volatility during this crisis period had contributed to the insignificant results of the longer-sample period. Tests over the period of the Global Financial Crisis and the period between the two crises were also modelled to examine momentum profits across time. Since the broader-based measure of three-decile portfolios produced better returns, the focus was then placed on this alternative in this section.

Table 4 summarises the monthly average returns of momentum portfolios over the sub-periods of the Asian Financial Crisis (June 1997-December 1999) and the Global Financial Crisis (January 2007-December 2009). The findings in Panel A indicated that during the Asian Financial Crisis, most the strategies tested yielded statistically significant negative returns, implying strong reversals of momentum effect. This is consistent with Grobys' (2014) finding that momentum

strategy produced negative returns during an economic downturn. Although the crisis period referred to in Grobys (2014) was the more recent Global Financial Crisis, while the downturn referred to herein was the Asian Financial Crisis, the two results were not inconsistent as Malaysia was more adversely impacted by the Asian Financial Crisis than by the recent crisis. In Panel B, reversals of momentum returns over the Global Financial Crisis were further observed. This occurred to most of the strategies modelled. Most negative momentums in this crisis period were, however, less significant in a statistical sense. To acquire a sense of the economic state of the country over the time span, the country's main stock market index Kuala Lumpur Composite Index (KLCI) from 1995-2013 was plotted, as given in Exhibit 1. As illustrated by the chart, the equity market had been volatile during the two crises periods.

Daniel *et al*. (1998) attributed momentum profits to investor overconfidence. This theory predicts that investors systematically make decisions to reinforce their belief to maintain their confidence, and at the same time filters out information that reminds them of the mistakes they have made in earlier decisions. This leads to overreaction to news in a rising stock market scenario. Some studies used states of market to test the proposition and found that momentum profits occurred only in the economic "up" market (Cooper *et al*., 2004; Huang, 2006). It is rationalised that investor overconfidence is high when the overall market is performing well. In this context, momentum portfolios over the period of 2000-2006 where the index systematically climbed to 1445 before it took a dip during the global crisis were constructed. Table 4 reports significant positive results for some strategies of shorter horizons, resembling the results of the sample period of 2000-2013. The result is also consistent with that of Daniel and Moskowitz (2013) that momentum strategies were generally effective in "normal" market states. In times of market stress, on the other hand, reversals of momentum effect were evident instead.

TABLE 4
Momentum returns of different sub-periods

Panel A: Asian Financial Crisis					
	Winner-Loser			Winner-Loser	
J1K3	-0.0181	**	J6K3	-0.0210	**
	-2.67			*-2.30*	
J1K6	-0.0210	***	J6K6	-0.0198	***
	-6.24			*-4.59*	
J1K9	-0.0153	***	J6K9	-0.0249	***
	-9.86			*-9.70*	
J3K3	-0.0262	**	J9K3	-0.0230	**
	-3.30			*-2.66*	
J3K6	-0.0201	**	J9K6	-0.0256	***
	-3.69			*-4.21*	
J3K9	-0.0192	***	J9K9	-0.0292	***
	-8.56			*-8.82*	

Panel B: Global Financial Crisis				
	Winner-Loser		Winner-Loser	
J1K3	0.0010	J6K3	-0.0036	
	0.45		*-0.68*	
J1K6	-0.0017	J6K6	-0.0045	
	-0.87		*-1.14*	
J1K9	-0.0004	J6K9	-0.0032	*
	-0.31		*-1.87*	
J3K3	0.0005	J9K3	-0.0068	
	0.14		*-1.22*	
J3K6	-0.0014	J9K6	-0.0090	**
	-0.42		*-2.28*	
J3K9	0.0000	J9K9	-0.0081	***
	-0.02		*-4.94*	

Panel A reports momentum returns (winner minus loser) of nine strategies of the sub-period of the Asian Financial Crisis (June 1997-December 1999), while Panel B reports momentum returns of the sub-period of the Global Financial Crisis (January 2007-December 2009). Stocks were sorted into three deciles. There was a one-month lag between the formation and the investment period. The *t*-statistics are *italicized*. ** and *** denote 5% and 1% significance level, respectively.

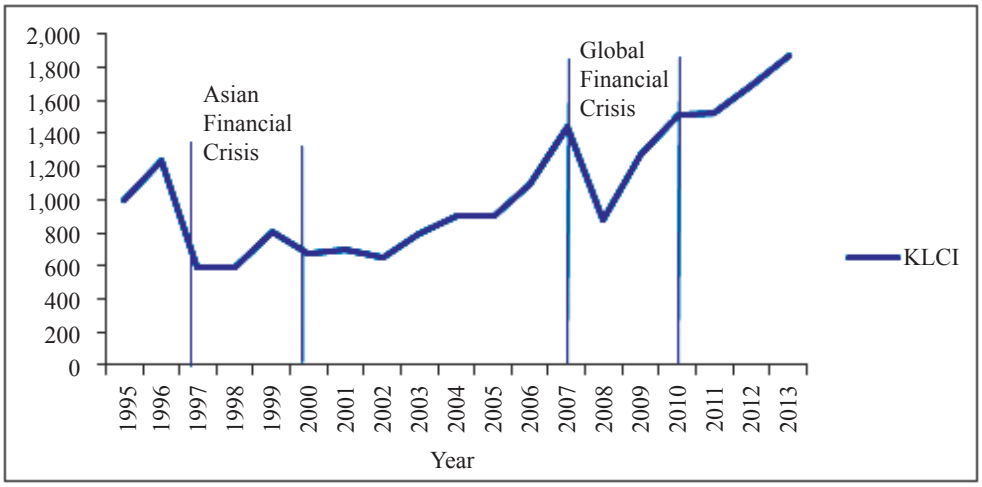

Exhibit 1. Kuala Lumpur Composite Index (KLCI) for the period of 1995 – 2013

Industry Momentum

Firms of the same industries are subjected to the same economic cycles and driven by similar underlying factors that impact the industry. Therefore, firms in the same industry tend to be more highly correlated. Moskowitz and Grinblatt (1999) suggested that stock momentum was primarily an industry phenomenon and that if industry effect was controlled, individual stock momentum would disappear. In order to examine if the industry effect accounts for momentum profitability in Malaysia, we performed the strategy of buying the top 20 per cent past-winner industry portfolios and selling the bottom 20 per cent past-loser industry portfolios. The results revealed that the industry momentum was both profitable economically and significant statistically for different formation and

holding horizons. In Table 6, it can be seen that the most profitable industry momentum strategy is the one that was ranked based on the past one-month horizon and held for the subsequent three-month period. This strategy produced an annualized return of 8.76 per cent, higher than the one reported for individual stock momentum. While individual stock momentum seems to be more profitable over the intermediate (3 months) formation period, industry momentum produces largest returns when the formation period is short (1 month). Similar to individual stock momentum, industry level momentum profits congregate at shorter formation periods. These results provided a good indication that industry momentum is profitable for different formation and investment horizons in Malaysia and industry effect can probably explain momentum in Malaysia.

TABLE 6
Performance on industry momentum trading strategies

	Winner	**Loser**	**Winner-Loser**	
J1K3	0.0086	0.0016	0.0070	***
	3.36	*0.61*	*7.19*	
J1K6	0.0075	0.0042	0.0032	***
	4.07	*2.07*	*5.62*	
J1K9	0.0085	0.0056	0.0029	***
	6.05	*3.74*	*9.54*	
J1K12	0.0087	0.0065	0.0022	***
	8.48	*5.96*	*9.95*	
J3K3	0.0076	0.0018	0.0058	***
	3.13	*0.65*	*4.33*	
J3K6	0.0072	0.0036	0.0036	***
	3.69	*1.66*	*4.27*	
J3K9	0.0079	0.0048	0.0031	***
	5.39	*3.16*	*6.30*	
J3K12	0.0082	0.0060	0.0022	***
	7.64	*5.38*	*6.00*	
J6K3	0.0076	0.0031	0.0045	***
	2.83	*1.11*	*3.26*	
J6K6	0.0078	0.0046	0.0032	***
	3.63	*2.24*	*3.41*	
J6K9	0.0086	0.0058	0.0028	***
	5.30	*3.87*	*4.27*	
	Winner	**Loser**	**Winner-Loser**	
J6K12	0.0085	0.0065	0.0020	***
	7.40	*5.85*	*3.76*	
J9K3	0.0064	0.0033	0.0031	***
	2.30	*1.19*	*2.20*	
J9K6	0.0070	0.0052	0.0019	*
	3.19	*2.53*	*1.82*	
J9K9	0.0079	0.0064	0.0014	**
	4.83	*4.32*	*2.03*	
J9K12	0.0080	0.0071	0.0010	
	6.90	*6.39*	*1.61*	

Average monthly returns at industry level over the period of January 2000 to September 2013 are reported in this table. Industries were ranked based on past J-month returns. The top 20% performers were the winners and the bottom 20% performers were losers. A long (short) position was then taken for the winner (loser). There was a one-month gap between the formation and the investment periods. Momentum returns were the winner returns minus loser returns. The *t*-statistics are *italicized*. ** represents 5% significance level and *** 1% significance level.

CONCLUSION

The profitability of momentum strategies over different sub-periods was examined in this paper. For the sample period of January 2000 to September 2013, significantly positive momentum returns was observed for the shorter duration strategies. Momentum returns turned from positive to negative when the formation period lengthens. In other words, the momentum strategy lost its efficacy when the formation period was six months and beyond. It also noticed that momentum profits diminished when the investment period was longer. This suggests that investors should take the length of both the durations of formation and investment period into consideration before making any investment decision. In addition, the behaviour of the momentum strategies during the two major financial crises that were impacting the country's economy was also investigated. The results revealed that during the period of the Asian Financial Crisis, most returns were negative. The strong momentum reversals observed during this period are consistent with the findings of the recent studies. Similar results were obtained for the period of the Global Financial Crisis, although the reversals were less significant in a statistical sense. Moreover, momentum profitability over the period characterised by a rising market index (2000-2006) was examined and momentum returns were found to closely resemble those of the study period of 2000 to 2013.

The investigation was then proceeded to examine if momentum effect was present at the industry level. The results indicated that most trading strategies that bought past industry winner and sold past industry losers realised significant positive returns. It also appeared that industry momentum strategies were generally more profitable than stock momentum strategy in Malaysia. Thus, the finding has added to the limited body of literature on industry momentum, using data from an emerging market place. It implies that return continuation may be exploited by employing industry momentum trading strategies in Malaysia. Therefore, besides academic contribution, this paper has also provided important information to investment professionals as well.

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Key Determinants of Japanese Commercial Banks Performance

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ABSTRACT

This paper reports how six bank-specific characteristics and several market and macroeconomic factors influence Japan's commercial bank performance in the recent years that cover global crises. The results suggest that net interest margin is an important performance variable. It is negatively correlated with credit risk, capital adequacy, while liquidity risk, asset quality, management efficiency have positive influences. The effects of income diversification and size are positive though not significant; so, is bank concentration positive for performance. GDP growth and money supply have negative and significant relationships on performance although their effects are marginal compared with bank-specific variables. The global crisis did have significant effect. To take into account profit persistence, GMM technique was applied and it produced moderate support for earnings persistence and there is good deal of competition. These are findings on Japanese banking.

Keywords: Net interest margin, Credit risk, Liquidity, capital, managerial efficiency, and Generalized Moments Method.

INTRODUCTION

Factors that affect performance of the bank have been debated broadly in the banking literature. Growing interest in this field of research also corresponds with an emphasis on quality and safety for banks in recent years, particularly after the global financial crisis have led to adjustment rules. Therefore, factors affecting the performance of banks need to be examined more closely for this special period using a more comprehensive model with six bank-specific factors, several macroeconomic factors and crisis period dummies as time trend controls. The aim of this study was

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to identify bank-specific factors associated with banking sector performance using the little used net-interest margin, NIM, as performance ratio. Some new dimensions were incorporated in this research: Japan as a key economy is studied over a lengthy period incorporating control variables for financial crises and macroeconomic factors. Meanwhile, advanced econometric methods were used so the results are robust. To produce robust results, the Generalized Method of Moments (GMM) panel regressions estimation was chosen for its power to reduce common estimation errors.

Japan is a developed country and the impact of global events in developed countries have been buffeting that country while Japan itself was slowly putting in place reforms needed to improve the economy that had entered a long period of stagnant growth since 1994. Japan is also a country that has a dominant role in international financial relations and economic. There is no serious study using a comprehensive model to test Japan's banking performance. In this sense, even if it is less affected by crisis, it is important to test to see if it is so. Identifying the performance relevant factors for this major banking sector would assist in the fast-tracking of reforms now underway in 2014 in this country. This is a major motivation for undertaking this study with a large sample of banks.

Once control factors were entered within the advanced test model which mainly concerned with the six bank-specific variables, significantly correlations of major factors with performance measures could clearly be observed. The results would have us argue in favour of six bank-specific factors being the main drivers of banking performance in Japan. Both market and macroeconomic factors, as well as time trends, are less important than the six significant factors, which are characteristics of banks.

These results are relevant to understand industry competitiveness as well. A competitive banking sector promotes economic efficiency by reducing funding costs of producers for working capital and investments. High bank margins create impediments to financial intermediation by lowering deposit rates, which discourages savings to flow to the banks and results in high lending rates that reduce investment opportunities for both banks and borrowers (Fungáčová & Poghosyan, 2011). Hence, NIM is also thought to be a broadly useful performance factor on effectiveness of intermediation, as well as a proxy for industry competition. Unlike variables such as return of asset ROA (around 0.9 per cent of assets in our time period, which included the global financial crisis) and return of equity ROE (about 10 per cent) are results of managed variables from accounting choices of top management. Therefore, NIM was taken into consideration in this study of banking performance.

Despite the fact that the recent financial crisis is the most severe in the world, especially in developed countries, it is generally accepted that Asian and the

Pacific countries have passed though this economic problem quite successfully. Bank industry of Japan has experienced financial crisis of 1991 to 1997 in its country, the Asian financial crisis of 1997, and recently global crisis of 2008. It has been argued that one of the main factors contributing to the resilience of Asian banks is regulatory environment changes that occurred after Asian financial crisis and practicing sound risk management.

The remaining part of the paper is organised as follows: Section 2 gives a brief review of the relevant literature on determinants of net interest margins. Section 3 provides a description of the data, specification of the empirical model and methodology. Section 4 presents and interprets the results of this study. The last section concludes the report.

BANKING PERFORMANCE LITERATURE

The banking performance literature is based on two major approaches (call them theories, if you like) and prior studies have been piecemeal in the sense that different authors used one or few factors to test if performance is related to these factors. There has not been a major comprehensive approach that includes all major performance relevant variables. Many models have been put forward to explain possible factors for performance of banks. Usual factors have been grouped as internal and external factors in the literature. Internal factors relate to actions at the bank level known as bank-specific determinants. The external factors refer to economic and legal environment at the country level or at industry and macroeconomic levels. Some explanatory variables have been picked up without them being comprehensive; each researcher proposed a combination from these two categories. Among them are competition, credit risk, market risk, average operating costs, etc.

In general, the vast empirical evidence has yet led to consensus confirming banking performance is explained, by which a number of potential factors suggested by theories and a *priori* reasoning. There is scant support for market structure theory (the first of the two) or the role of bank management as dealers in the market to determine performance. Ho and Saunders (1981) offered a theoretical framework on determinants. In their so-called dealership model, a bank is assumed to be a risk-averse dealer in the credit market, acting as an intermediary between the demanders and suppliers of funds to set interest rates on loans and on deposits to balance the asymmetric arrival of loan demands and deposits. An alternative to the dealership approach is the firm-theoretical model, originally developed by Klein (1971) and Monti (1972). This idea views banking firm in a static setting where the supply and demand of deposits and loans simultaneously clear both markets (Zarruck & Madura, 1992; Wong, 1997). Some of the variables in this study are from this approach, or in other words, we approach this research from this framework.

The structural approach is choice-theoretic. As such, it relies on a theoretical model of a banking firm using the business goal of optimisation such as in Panzar and Rosse (1987). This paper takes a different approach. The research topic was approached using a non-structural approach for performance by considering performance as linked to investment strategies and other factors such as firm-characteristics within the macro environment as buffeted by crisis events relevant for the industry. In short, the literature was used to gather potential bank-specific and macroeconomic variables. In addition, some proxies were also used to represent profit persistence (Goddard *et al*., 2011). This is explained in the section for results.

While theories are motivated by some of these factors as relevant, no general theory of performance provides a unifying framework. This paper brings together elements of literature into an estimable model that hypothesises correlation of a large number of factors with banking performance. For this purpose, data over an 11-year period and selected ten theory-suggested factors for performance were used. In order to achieve the accuracy of findings, advanced econometric models linking performance to key factors (in this paper, on Japan) were employed. The following were considered as the direct factors in this study:

Liquidity risk: Poor levels of liquidity are major causes of bank failures. During periods of increased uncertainty, financial institutions may decide to diversify their portfolios (improve asset quality) and/ or raise their liquid to reduce risks of banking run. In this respect, risks can be divided into credit and liquidity risk. According to the definition of the Basel Committee on Banking Supervision (1997), liquidity risk arises from the inability of a bank to accommodate decreases in liabilities or to fund increases in assets. Literature on two very important functions of banks - Liquidity creation and Risk transformation - show that these two functions do not move in the same direction.

Deep and Schaefer (2004) constructed a measure of liquidity transformation the "liquidity transformation gap" as the difference of liquid liabilities and liquid assets held by a bank, scaled by total assets on the two hundred largest U.S. banks during 1997-01. They concluded that banks do not appear to create much liquidity. Berger and Bouwman (2009) used data on the U.S. banks over 11 years and found that a relationship between capital and liquidity creation is significantly positive for large banks, but insignificant for medium-sized banks and negative for small banks.

Distinguin, Roulet, & Tarazi (2013) found that European and U.S. publicly traded commercial banks decreased their regulatory capital when they created more liquidity, i.e., they funded larger portions of illiquid assets with liquid liabilities. Small banks do actually strengthen their solvency standards when they face higher illiquidity. Horváth *et al*. (2012) used Granger-

causality tests to on capital and liquidity in Czech banks over 2000-10 (11 years), and found that capital Granger caused liquidity creation negatively in the case of small banks, while liquidity creation was shown to positively affect large banks.

Shen *et al*. (2010) investigated the causes of liquidity risk and the relationship between bank liquidity risk and performance for 12 advanced economies over the period 1994-2006. They found that liquidity risk may lower bank profitability (ROA and ROE) because of higher cost of fund, but increase bank's net interest margins because banks with high levels of illiquid assets in loans may receive higher interest income. Note that this study limited the determinant to one factor, while in our paper, multiple factors were identified.

Credit risk: Since most of the bank earning accrues from loans, credit risk plays an important role in the NIM. As per insolvency theory, a bank fails when bank's assets become less than liability. In most cases, falling asset values is due to credit risk arising from non-performance of loan. Ahmad and Ariff (2007) found that an increase in loan loss provision is also considered to be a significant determinant of potential credit risk. So, credit risk is the main risk to banks. It is an internal factor that is familiar to bank management. Athanasoglou *et al*. (2008) suggests that the risk banks have far-reaching consequences for the profitability of banks and its security. Demirgüç-Kunt and Huizinga (1999) found credit risks have positive effects on NIM on 80 developed and developing countries. Kasman *et al*. (2010) found that credit risk is significantly and positively related to banks' NIM. Poghosyan and Cihak (2011) highlighted the importance of other sources of bank risk in addition to leverage; these include asset quality, earning profile which should be taken into account when designing benchmark criteria for bank soundness.

Capital adequacy: Most recent theories predict that capital improves bank performance. Some theories suggest that higher capital ratio of banks introduces a strong attraction to monitor borrowers and invest in safer assets, and thus reduces the probability of default. Demirguc-Kunt and Huizinga (1999) found a positive relationship between bank performance and capitalization, while Naceur and Goaied (2008) reported high NIM and profitability to be associated with banks with a relatively high amount of capital. Garcia-Herrero *et al*. (2009) showed better capitalised banks tended to be more profitable, while Beltratti and Stulz (2009) found that large banks with more Tier-1 capital and more deposit financing revealed significantly higher returns during crisis. Athanasoglou *et al*. (2008) demonstrated that capital is important in explaining bank profitability. Naceur and Omran (2011) found that bank-specific characteristics, particularly bank capitalisation and credit risk, have positive and significant impacts on banks' net interest margin, cost efficiency, and profitability. Berger and Bouwman (2013) found that capital helped small banks to increase their probability of survival and

market share at all times (during banking crises, market crises, and normal times) while capital enhanced the performance of medium and large banks mainly during banking crises. Once again, it is important to note that these are the two factors connecting profitability, while this study aimed to provide a multifactor model.

Asset quality: Asset quality and both credit and liquidity risks are closely related to each other. Asset quality reflects the quantity of existing and potential credit risks associated with loan and investment portfolios and other assets, as well as off-balance sheet transactions. Poor quality of the loan assets slowed down banks to expand more credit to the domestic economy, thereby adversely affecting economic performance. In addition, strong competition among banks erodes margins. In order to compensate for declining profitability, bank managers might increase loan growth with quality of their loan portfolios. Hawtrey (2009) argued that the Australian banks resilience is because of higher loan quality resulting from responsible lending practices. Sangmi and Nazir (2010) applied CAMEL parameters to evaluate the financial performance of the two major banks operating in northern India. Asset quality is concerned that both the banks have shown significant performance. They concluded that low nonperforming loans to total loans shows that the good health of the portfolio a bank and lower the ratio indicates better bank performance.

Managerial efficiency: During the last two decades, a large number of bank failures occurred. The empirical literature identified that a large proportion of non-performing loans and a low level of cost efficiency were the two main reasons of these failures. The fundamental dispute is that bad management increases the probability of bank failures. The bad management hypothesis forecasts that cost efficiency exerts an impact on non-performing loans, as bad managers do not monitor loan portfolios efficiently. According to the bad management hypothesis, low efficiency is a signal of poor managerial performance, which also affects loan lending behaviour. Efficient cost management is a precondition for the improved efficiency of the banking system and that banks have much to gain if they improve their managerial practices.

Williams (2004) studied a large sample of European savings banks using 1990-8 data. He found that decreases in cost and profit efficiency tend to be followed by deteriorations in loan quality, which support the bad management hypothesis. In contrast, Rossi *et al*. (2005) showed similar findings to those of Williams but for a longer time period. Goddard *et al*. (2013) found managerial efficiency measured as cost-income ratio appears to be a more important determinant of performance than either concentration or market share. Athanasoglou *et al*. (2008) found that operating expenses are negatively and strongly linked to profitability.

Size: Obviously, size and performance are closely related to each other inversely since size is a proxy for lower risk. Larger banks are expected to have higher level and variety of loan products than smaller banks, all of which reduce risks of bank. Besides, there are economies of scale from larger size, i.e., reduced risk and economies of scale lead to improved performance. Furthermore, recent financial crisis data revealed that bank size is associated with large risks to public financial activity.

Demirgüç-Kunt and Huizinga (2011) distinguished between absolute size as measured by the logarithm of total assets and systemic size as measured by liabilities-to-GDP ratio. They found that banks with large absolute size tended to be more profitable as indicated by the return on assets, whereas banks with large systemic size tended to be less profitable. Pasiouras and Kosmidou (2007) found a negative relationship between size and profitability as did Ben Naceur and Goaied (2008). Goddard *et al*. (2004) found only weak evidence for any consistent or systematic size–profitability relationship. Micco *et al*. (2007) found there no statistically significant correlation between relative bank size and bank return. Shih, Zhang, and Liu (2007) also found that in China, size is not correlated to bank performance. Cornett *et al*. (2010) found that banks of all size groups suffered bank performance decreases and the largest banks faced the largest losses.

Market structure: View regarding the relationship between bank concentration and net interest margin is contrasting. The structure–conduct–performance (market-power) hypothesis states that increased market power yields monopoly power. Based on this view, more concentrated markets charge higher interest on loan and pay lower rate for deposit. On the other hand, the efficient-structure (ES) theory claims that market concentration is not the case of a bank's superior profitability and attributes the higher profit to superior efficiency, which enables efficient banks to gain market share and earn higher profits.

In supporting the first theory, Molyneux and Thornton (1992) found a statistically significant positive relationship between bank return on capital and concentration ratio across eighteen European countries between 1986 and 1989. Goddard *et al*. (2011) examined the persistence of bank profit in 65 national banking industries as an indicator of intensity of competition. They found that persistence is positively related to the size of entry barriers. Mirzaei *et al*. (2013) investigated the effects of market structure on profitability and stability for 1929 banks in 40 emerging and advanced economies over 1999–2008. They viewed that a greater market share led to higher bank profitability in advanced economies. Nevertheless, this hypothesis is not supported in emerging economies.

In contrast, the study by Staikouras and Wood (2004) indicated a negative but statistically insignificant relationship between bank concentration and bank profits. Similarly, Mamatzakis and Remoundos (2003) did not justify the

traditional hypothesis of Structure-Conduct-Performance in the Greek banking sector. Athanasoglou *et al*. (2008) and Ben Naceur and Goaied (2008) did not find any evidence to support the SCP hypothesis. A recent study by Chortareas *et al*. (2012) considered the determinants of interest rate margins in Latin American banking sector covering the period 1999–2006; the results demonstrated that the concentration index and the market share had little or no influence on interest rate margins. Some of the macro factors are discussed below.

GDP growth: There is no conclusive result on the effect of economic growth on NIM. On the one hand, higher growth signals greater demand for bank loans and the banks could then charge more for their loans. On the other hand, as far as economic growth shows, under increased competition and macroeconomic stability, one can expect a lower spread is associated with stronger growth. Claeys and Vennet (2008) studied the Central and Eastern European countries (CEEC) and found that in the Western European countries, higher economic growth is associated with higher margins, whereas no link is found in the Central Eastern European countries. Kosmidou (2008) and Flamini *et al*. (2009) found that output growth has a positive impact on bank profitability, while Demirguc-Kunt *et al*. (2003), Sufian (2009), Liu and Wilson (2010), and Tan (2012) found a negative effect.

Thus, it can be concluded that the increase in economic growth can lead to an increase in economic activity and improved business performance among borrowers, a situation that called for the banks to reduce their interest margins. In contrast, low economic growth weakens debt service to borrowers and contributes to increased credit risks and interest margin.

Inflation: Empirical studies have shown that the effects of inflation on bank performance depend on whether operating expenses and revenue increase at a higher rate than inflation. In other words, the impacts of inflation on bank profitability depend on whether inflation is fully anticipated. Thus, inflation is one of the main paths through which it is possible to affect the operations and margins of banks through interest rates. Perry (1992) suggested that the effect of inflation on bank performance is positive if the rate of inflation is fully anticipated. This gives them the opportunity to adjust the interest rates accordingly and consequently earn higher profits.

In a study of 80 developed and developing countries, Demirgüç-Kunt and Huizinga (1999) found a positive relationship between inflation and net interest margin. The same result was also found in other studies [see Staikouras and Wood (2004) for European banks, Athanasoglou *et al*. (2008) for Greek banks, and Albertazzi and Gambacorta (2009) for 10 industrialized countries].

On the other hand, negative impacts of inflation on bank profitability have been found in other studies. Afanasieff *et al*. (2002) studied the behaviour of bank

interest spread in Brazil and found that the inflation rate negatively affected interest margins. Kosmidou (2008) and Naceur and Kandil (2009) also found inflation rate negatively affected interest margins in the study conducted for Greek and Egypt, respectively.

Other factors: There are a lot of other performance determinants such as taxation, off-balance sheet items and non-traditional activity, as well as indicators of the quality of the offered services that can be taken as additional functions. Demirguc-Kunt and Huizingha (1999) considered a comprehensive set of determinants and found that macroeconomic factors implicit and explicit financial taxation also explained the variation in interest margins. Vivas and Pasiouras (2010) investigated the relevance of non-traditional activities in the estimation of bank efficiency levels using a sample of 752 publicly quoted commercial banks from 87 countries around the world. The results indicated that non-interest income resulted in higher and statistically significant different profit efficiency scores compared to the traditional model.

As this brief review suggests, there are quite a number of factors that have been suggested as correlated with bank performance. It is the aim of this study to gather these factors and also test if all of them are associated with bank performance by using a different procedure of GMM, which is advanced for this kind of research using panel regressions.

DATA AND METHODOLOGY

Econometric Specification

To examine the determinants of net interest margin (NIM) in our large sample of commercial banks, this study employed a dynamic panel data approach since the tests and fine-tuning methodology pointed to this as the most appropriate research method. The dynamic panel models use panel data that are large in cross-sectional dimension and short in time series one: this is the econometric justification, namely that $n > t$ in the matrix and that the GMM handles the dynamic nature of the relationship over time. Both the time and cross-sectional variations are located in the model and the method also allows inclusion of lag dependent variables (test profit runs) and unobserved individual-specific effects. Furthermore, the model is efficient in allowing for variations of relationships across subjects and time. It also permits individual-specific dynamics to be captured. Consequently, the results help to avoid any bias arising from either the time series dynamics influence or heterogeneity of banks. The GMM dynamic panel data approach was used as advocated by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998).

Empirical work on the determinants of bank performance potentially includes three sources of inconsistency: very persistent profits, endogeneity and omitted variables. The dynamic panel techniques help to correct these potential problems. In the banking literature, using the fixed and/

or random effects model within panel data causes difficulty when lagged dependent or independent variable has influences especially in some time periods or across several banks. According to Baltagi (1995), neither the Generalized Least Squares (GLS) estimator nor the Fixed Effect estimator will produce consistent estimates in the presence of dynamics and endogenous influences. This is the third reason for avoiding these methods.

The linear dynamic panel data model can be specified as follows:

$$NIM_{it} = c + \delta NIM_{it-1} + \sum_{j=1}^{J} \beta_j X_{it}^{j} + \sum_{k=1}^{K} \beta_k Y_{it}^{k} + \sum_{l=1}^{L} \beta_l Z_{it}^{l} + \varepsilon_{it}$$

$$\varepsilon_{it} = v_i + u_{it} \quad (1)$$

Where, NIM_{it-1} is the one-period lagged of dependent variable and δ is the speed of adjustment to equilibrium. NIM_{it} is the net interest margin of bank i at time t, with $i = 1,\ldots,N$, $t = 1,\ldots,T$, c is a constant term, X_{it}'s are bank-specific variables, Y_{it}'s industry-specific variables, Z_{it}'s the macroeconomic variables, and ε_{it} is the disturbance with v_i as the unobserved bank-specific effect and u_{it} the idiosyncratic error. This is a one-way error component regression model, where $v_i \sim (IIN(0, \delta_v^2)$ and independent of $u_i \sim (IIN(0, \delta_u^2)$.

Put the lagged dependent variable on the right-hand side of the equation, i.e. this variable is correlated with the error term, ε_{it}, which is a function of the bank specific effect, v_i. Due to this, dynamic panel data estimates of Equation (1) suffer from a bias. Estimator option in such environment is to use GMM proposed by Arellano and Bond (1991). This procedure differentiates the model to eliminate the effects of a bank-specific or time invariant bank-specific variables, as well as endogeneity issue in the model. In addition to these favourable characteristics of the model, stationary regressors are certain. GMM uses the orthogonal condition between different errors and lag dependent variable, which are valid under the assumptions that the error term is serially uncorrelated, and the lag of the explanatory variables are weakly exogenous.

For consistency of GMM estimators, the test relies on two test specifications. First is the Hansen test for over identification of restrictions. The GMM estimation of dynamic panel data increases the number of conditions, and therefore, the Hansen test is used to test over-identification restrictions. Second is the Arellano–Bond order 2 for second order serial correlation in the disturbance term. Failure to reject the null hypothesis in both tests will give supports to reliable estimations.

The GMM estimators are typically used in one-step and two-step. The one-step uses a weighted matrix independent of the parameters estimated, while the two-step GMM uses the optimal weighting matrix as weighted by consistent covariance matrix. In this study, the two-step estimator was used as it is more efficient. Windmeijer

(2005) showed that the two-step GMM estimation with various instruments could lead to biased standard errors and parameter estimates. Bias in the two-step standard measures can be corrected by using Windmeijer's (2005) correction procedure, which was used in this study to greatly reduce this problem. In this study, this correction procedure was implemented to get robust results.

Data and Variables

Unbalanced panel data of 115 commercial banks were used in this work and these resulted in 1265-year observations over 11 years ending in 2012. The bank balance sheet and income statements were obtained as bank-specific observations from the BankScope database provided by Fitch-IBCA. Therefore, the variables were taken from published financial information source widely used in published studies. Meanwhile, data on concentration, inflation, money supply and GDP growth were computed from the world development indicators. It is important to note that the sample of this study included only commercial banks. The number of banks in the sample accounted for 73% of the total assets of commercial banks during the period.

TABLE 1
Descriptive statistics of the Variables in the Model

Variable	Mean	Standard Deviation	Minimum	Maximum
NIM	1.612	0.394	0.000	3.172
LR	-0.215	0.103	-0.845	0.246
CR	0.005	0.008	-0.001	0.175
CA	0.807	25.555	-0.191	909.000
AQ	0.047	0.027	0.000	0.198
ME	0.012	0.003	0.000	0.079
ID	0.003	0.003	-0.027	0.022
LTA	16.967	1.174	13.812	21.419
CONCEN	55.313	3.514	50.156	58.834
GDPG	0.816	2.486	-5.527	4.652
M2	215.700	13.912	202.807	241.234
INF	-0.165	0.768	-1.983	1.055

Notes: NIM is the net interest rate margin defined as the interest rate income minus interest rate expenses over average total earning assets; LR is a measure of liquidity risk calculated as ratio of financing gap (difference between bank's loan and customer deposit) to total assets; CR is a measure of credit risk calculated as loan loss provisions over total loans; CA is a measure of capital adequacy calculated as equity capital to total loans; AQ is a measure of asset quality calculated as nonperforming loan over total loans; ME is a measure of managerial efficiency calculated as operating expenses to total asset; ID is a measure of income diversification calculated as non-interest income over total assets; LTA is a measure of size calculated as natural logarithm of total assets; CONCEN is 5-Bank asset concentration for Japan that is assets of five largest banks as a share of total commercial banking asset; GDPG is GDP growth (annual %); M2 is money and quasi money as % of GDP; and INF is inflation, end of period consumer prices (percent change).

Table 1 presents the descriptive statistics of the sample. The NIM, the proxy variable for interest rate spreads, has a mean value of 1.612 per cent. The average inflation rate in the region in the period under study was -0.165 per cent, and the average GDP growth was 0.816 per cent. Meanwhile, non-interest income over total asset is so small, indicating banks are cautious in engaging to non-interest income generating activities. Entering to the field of non-interest income generating activities will more likely be faced with the risks of mistake, and this will consequently result in losses.

FINDINGS OF THE STUDY ON JAPAN BANKS

This study began with an OLS analysis on the NIM as the dependent variable and the LR, CR, CA, AQ, ME, ID, LTA, CONCEN, GDPG, M2 and INF as the independent variables. Table 2 shows the preliminary OLS regression results. The results indicated that all bank-specific, industry- specific and macroeconomic variables affected NIM in the Japanese banking sector. Meanwhile, liquidity risks (LR) and asset quality (AQ) managerial efficiency (ME) were found to be positively related to NIM as well, whereas credit risk (CR), capital adequacy (CA), income diversification (ID) and size (LTA) had negative influence on bank's performance. All the country specific variables, except for GDP growth, negatively influenced NIM.

TABLE 2
OLS regression (NIM as the dependent variable)

Variables	OLS		VIF	1/VIF
constant	2.34	***		
	(8.92)			
LR	0.149	***	1.21	0.827
	(1.97)			
CR	-3.360	***	1.33	0.750
	(-3.43)			
CA	-0.006	***	2.26	0.443
	(-14.44)			
AQ	3.552	***	1.79	0.559
	(9.97)			
ME	55.395	***	4.07	0.246
	(12.49)			
ID	-45.288	***	1.53	0.653
	(-15.90)			
LTA	-0.026	***	2.78	0.360
	(-2.6)			
CONCEN	-0.008	***	2.46	0.406
	(-2.50)			
GDPG	0.007)	**	1.72	0.582
	(1.8)			

M2	-0.002	***	2.67	0.375
	(-2.98)			
INF	-0.030	***	2.14	0.468
	(-2.26)			
R^2	0.5749			
Adjusted R^2	0.5711			
F-statistic	153.41	***		

Note: VIF is the Variance Inflation Factor. The mean VIF is 2.18

This OLS regression results are reliable with the Adjusted R-squared values of 0.5711 (57.11%), a strong explanatory power for the variation in NIM. The significant variables in the model explain 57 percent of the variations in the NIM, a result that is seldom observed in the literature. Note that the macroeconomic variables are entered though not quite influential are shown. The time trend variables, though included in the test runs, are not shown in the table above. The F-statistics of 153.41 suggests a good model fit, which is significant. Finally, a check on VIF (Table 2, column number 3) shows that there is no multicollinearity problem. The regression was done with White's correction so it ensured that heteroskedasticity was controlled in the results of the current work.

The specified linear dynamic panel data model was estimated and the results in Table 3 are a summary of the results attained for the determinants of NIM. It is worth noting that the results reported are based on the estimations obtained from the two-step GMM panel data procedures[1].

Necessary diagnostic tests were also conducted, and the results showed that all the tests are satisfactory in all regressions. The Sargan test did not reject the over identification restriction of the models. The Wald chi-squared test is statistically significant at the 0.01 probability level. The Arrelano–Bond AR (2) tests showed no second-order serial correlation was detected, so the results from the GMM estimation are consistent. Finally, the significance of a lagged dependent variable gave a good reason for the use of dynamic panel data model; therefore, it could be relied upon to carry out statistical inference associated with the model.

The test statistics in Table 3 shows that the lagged dependent variable, NIM, is positive and significant. It can be interpreted as verification of persistence in NIM in the commercial banks. In this study, δ takes the value of about 0.49, which means that net interest margin continued to be just moderate, so the level of competitive market structure is quite high in Japan's banking sector.

[1]Windmeijer (2005) suggested this procedure to correct the estimated asymptotic standard errors since the two-step GMM estimators are downward biased.

TABLE 3
GMM regression (NIM as the dependent variable)

Variables	Different GMM		
	0ne step	Two steps	Two steps with robust SE
constant	-2.405 ***	0.219	0.219
	(-3.01)	*(0.33)*	*(0.12)*
NIM_{t-1}	0.562 ***	0.491 ***	0.491 ***
	(12.36)	*(9.4)*	*(4.25)*
LR	0.699 ***	0.455 ***	0.455 **
	(5.38)	*(3.42)*	*(1.81)*
CR	0.001	-0.269	-0.269
	(0.00)	*(-0.84)*	*(-0.55)*
CA	-0.002 ***	-0.002 ***	-0.002 ***
	(-7.04)	*(-8.49)*	*(-5.27)*
AQ	1.107 ***	0.945 ***	0.945 ***
	(3.8)	*(4.6)*	*(2.55)*
ME	28.210 ***	27.060 ***	27.060 ***
	(6.7)	*(5.52)*	*(3.06)*
ID	0.973	2.804	2.804
	(0.54)	*(1.58)*	*(0.75)*
LTA	0.244 ***	0.074 **	0.074
	(4.47)	*(1.78)*	*(0.64)*
CONCEN	-0.001	0.015 ***	0.015
	(-0.08)	*(3.38)*	*(1.23)*
GDPG	-0.005	-0.010 ***	-0.010 **
	(-1.53)	*(-5.54)*	*(-2.24)*
M2	-0.006 ***	-0.008 ***	-0.008 ***
	(-4.43)	*(-8.52)*	*(-3.62)*
INF	-0.006	-0.004	-0.004
	(-0.69)	*(-0.75)*	*(-0.45)*
Wald χ^2	3454.84 ***	106003.8 ***	3477.13 ***
Hansen p-value	0.000	0.0802	
AR(1) p-value		0.0349	0.0550
AR(2) p-value		0.8925	0.8925
Number of observations	1033	1033	1033

Notes: ***, ** and * indicate significance at 1, 5 and 10-percent levels, respectively. Values in parentheses are Z-statistics. Hansen test is a test of over-identification restrictions. Arellano–Bond order 1 and 2 are the tests for the first- and second-order correlation, respectively, asymptotically N (0, 1), test the first-differenced residuals in the GMM estimation. The two-step errors are computed according to Windmeijer's (2005) finite-sample correction. Time dummies were included to capture period-specific effect but are not reported.

Now, the bank-specific factors were examined; Liquidity risk (LR) is positively related to net interest margin. This is consistent with the literature that argues that banks have a propensity to pass their liquidity risk to consumers by increasing the interest rate margin. The banks that hold more liquid assets will be able to meet the unforeseen events which are not predictable. Due to the quality of the services that is provided after the recent financial crises, banks have been paying more attention to improving liquidity risk management. As satisfactory liquidity level to meet unexpected contingencies is costly, in practice, it keeps a balance between short-term and long-term situations.

The effect of credit risk (CR) is negative on the net interest margin, although statistically not significant; this indicates that banks with higher credit risk tend to demonstrate lower profitability. One explanation for this result is sensitivity of the bank's NIM to credit risk. Credit risk (loan loss provisions over total loans) tends to be a forward-looking indicator. The result shows that, like all other studies elsewhere, credit risk is important in determining NIM. Correct actions on credit risk will help banks to become more efficient to avoid moral hazard exposure.

Capital adequacy (CA) is statistically significant and is negatively related to NIM. The capital adequacy ratios indicate the credit worthiness of the bank and the bank's capital adequacy level is the result of a combination of factors such as regulatory costs and the bank's business strategy. So, the expected sign between net interest margin and capital adequacy ratio depends on the magnitude of the transfer of these factors to the customers (Claeys & Vander-Vennet, 2008). Another possibility is that a negative relationship between net interest margin and capital adequacy ratio would be considered if the risk of default is very low resulting in lower capital cushions; this is perhaps true given the tenacity of the central bank in Japan not to punish banks for bad behaviour in this period of turmoil. According to the signal hypothesis, managers may have private information about future performance. It may be less expensive for low-risk institutional managers to signal quality by maintaining a high ratio of CA than manager of high-risk institutions (Hughes & Mester, 1998).

As for asset quality (AQ), bad credit occurs when the bank manager in prior periods, facing competitive conditions, increased loans with less stringency to meet short-term profit targets (Berger & Udell, 2003). Problems will occur when dealing with impaired assets and direct them by creating a reserve for write off. The results of the current study showed that AQ (non-performing loan over total loans) has positive and statistically significant relationship with NIM. These results indicate that the commercial bank, despite having experienced financial crises, did not make rational decision concerning their loans.

The results also showed that managerial efficiency (operating expenses to total asset) is positively affecting NIM. This

result provides evidence that banks must manage their performance, and irrespective of their size, the more profits they have, the more efficient the banks are. The finding is consistent with the bad management hypothesis of Berger and DeYoung (1997). Low level bank profitability is a signal of poor management practices. Obviously, proper management cost is needed so as to improve the efficiency of the banking sector everywhere.

On the subject of income diversification, previous research has shown contrary results (see DeYoung & Rice, 2004; Mercieca *et al*., 2007). Better performing banks use less non-interest income. On the other hand, other research reports such as that of Baele *et al*. (2007) argue that non-interest income can increase efficiency of bank. The results of the current study showed a positive but statistically insignificant relationship between income diversification (ID) and NIM. This result revealed that managers of banks proceeded to use non-interest income more slowly and is consistent with the findings of many other studies.

Meanwhile, research carried out on bank size reveals that the relationship between size and performance of banks is more complex, and is connected to many other factors such as economic growth, market discipline, country, etc. A recent study distinguishes between absolute size as measured by the logarithm of total assets and the systemic size as measured by liabilities-to-GDP ratio. The empirical results of these studies are mixed. For instance, Demirgüç-Kunt and Huizinga (2011) found banks with large systemic size tend to be less profitable, while Pasiouras and Kosmidou (2007) found economies of scale and scope for smaller banks or diseconomies for larger financial institutions; and Ben Naceur and Goaied (2008) revealed that size impacts negatively on profitability. In contrast, Kosmidou (2008), and Beltratti and Stulz (2009) reported a positive relationship. In this study, size of bank (logarithm of total asset) was found to be positive but there was no statistically significant relationship observed between bank size (LTA) and NIM for commercial banks in Japan.

The concentration is not statistically significant in explaining NIM: in a sense, it helps us to reject the Structure–Conduct–Performance (SCP) hypothesis and the Relative-Market-Power (RMP) hypothesis. This study has shown that macroeconomic variables (GPD growth, money supply, and inflation) affect NIM as well. All the macroeconomic variables are negatively associated with commercial bank margins. These results are statistically significant for GDP growth and money supply (M2), but are not significant for inflation. Macroeconomic control variables such as inflation clearly affect the performance of the banking sector. For instance, Maudos and Guevara (2004) argued that the reduction in the interest margin in Europe in the 1990s to be correlated to economic growth that reduces costs. Angelini and Cetorelli (2003) considered negative association between GDP growth and NIM

for European banks.

Performance of banks after the recent financial crisis has been the worst; there are significant variations across the world in the stated period. In order to investigate the effects of this time factor on the variables in the model, the time dummy variables were considered in this study. Time was found to play an important role in the period of our study; the period 2007–09 was negatively and significantly associated to NIM. This result confirms that the global financial crisis has contributed significantly adversely. One reason for this negative association might be related to procyclicality of loan loss provisioning in Japan.

CONCLUSION

This study has reported the results of an investigation on the determinants and persistence of net interest margin of Japanese commercial banks over the most recent years, including the financial crisis years. The intention is to build a robust model while controlling for macroeconomic and time trend effects. The results presented with a large data set over a current 11-year period are interesting in a number of ways. First, the results showed that the most significant variables are bank-specific factors, which have highly significant coefficients, which are sensitive to NIM, attest strongly that net interest margin is the most important performance measure as a good proxy for performance. There are a lot of studies using return on assets or return on equity: NIM has been neglected certainly for Japan, and yet this is a reliable performance factor based on market-driven forces and strongly correlated with the identified determinants. Second, the multi-factor model with control variables appears to work very well, as supported by test statistics attesting to the model fitness. Compared to the results obtained using simpler methods such as OLS cross-sectional regressions, the method used (GMM) has considerably improved the results because of its advanced features to reduce errors in estimation[2].

Third, strong evidence is found for profit persistence, which several authors have connected to the present prevalent industry structure theory of Panzar-Rosse. A significant coefficient for the lagged dependent variable, δ, takes the value of about 0.49, which means that the net interest margin continues at this moderate level in the sector suggesting competitive market structure in Japan's banking sector. Significant coefficient of the lagged dependent variable, δ, can be interpreted as a measure of the extent to which NIM is stable for periods after the current period.

The results suggest that there is negative association between credit risk, capital adequacy and macroeconomic variables. It might be because of the low default risk resulting in lower capital cushions. The findings also indicate that the period 2007–09 is negatively and significantly associated with NIM. In this

[2]These test run outputs are recorded by the researchers, and are available for viewing if requested.

regard, it means that the global financial crisis has contributed significantly and adversely to the banking performance in Japan. Liquidity risk, asset quality and managerial efficiency have positive and significant influences on bank's NIM, while income diversification and size have positive but not significant impacts on NIM. Although many studies argue that banks with diversify in non-interest income are able to engage in reduction in margin lending business, a statistically significant relationship between non-interest income diversity and NIM between commercial banks is not found in the current work.

The current findings regarding concentration can be interpreted as not supporting both the Structure-Conduct-Performance (SCP) hypothesis and the relative market-Power (RMP) hypothesis. Thus, further research on various countries set by considering different economic blocs will reveal clear picture of the role of industry and macroeconomic factors in the banking performance. Moreover, performance testing on other dependent variables such as return of asset and return of equity may help researchers to have more relevant views of the factors affecting the performance of Japanese commercial banks.

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Appendix 1 Test results on multicollinearity

TABLE 1
Correlation Matrix (N x T = 1033)
This table shows multicollinearity test results indicating there is no concern about explanatory variables included in the model to run GMM panel regressions.

Variables	NIM	LR	CR	CA	AQ	ME	ID	LTA	CONCEN	GDPG	M2	INF
NIM	1.00											
LR	-0.17	1.00										
CR	0.17	0.04	1.00									
CA	-0.12	0.06	-0.02	1.00								
AQ	0.52	-0.06	0.45	-0.05	1.00							
ME	0.38	-0.05	0.18	0.58	0.30	1.00						
ID	-0.41	0.36	-0.01	-0.03	-0.17	-0.03	1.00					
LTA	-0.55	0.26	-0.06	-0.08	-0.34	-0.62	0.34	1.00				
CONCEN	-0.27	-0.03	-0.15	-0.03	-0.41	-0.16	-0.09	0.13	1.00			
GDPG	0.04	-0.01	-0.01	0.02	0.08	0.01	0.06	-0.01	-0.25	1.00		
M2	-0.32	-0.07	-0.21	-0.02	-0.36	-0.22	0.04	0.14	0.64	-0.19	1.00	
INF	0.05	0.03	0.06	0.02	0.01	0.04	-0.11	-0.02	-0.02	0.54	-0.39	1.00

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Top Management Characteristics and Firm's International Diversification Activities: Evidence from a Developing Nation

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ABSTRACT

Recent trend shows that foreign investment has increased rapidly, and raises a question as to whether managerial characteristics impact international diversification, as claimed by the Uppsala internationalisation process theory. This paper investigates the relationship between top management team's characteristics and firm's Outward Foreign Direct Investment, that is, international diversification. This study focuses on 83 of the top 100 largest Malaysian multinational firms. The entropy measure is used as the proxy for level of international diversification. Age, international experience, educational level and functional background are proxies reflecting the management's cognitive abilities and competencies. The findings showed that age and functional background have significant positive influence on the level of international diversification. In addition, the results also suggested there is a reasonable support for upper echelons theory and Uppsala internationalisation process theory.

Keywords: International diversification, entropy, upper echelons theory, Uppsala internationalisation process theory.

INTRODUCTION

Business environment has changed remarkably in the past few decades. Market liberalisation, economic and industry globalisation have been the impetus for most of the firms to go abroad to invest. Firms are racing against each other in order

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to pursue overseas business or investment opportunities that would enhance values to the firm. This strategy is also known as international diversification or Outward Foreign Direct Investment (OFDI).

Uppsala internationalisation process model by Johanson and Vahlne (1977) states experiential knowledge is crucial in firm's expansion to other countries and also management of international operation. This model builds on two assumptions that are based on uncertainty and bounded rationality. First, experience in operations, current activities and understanding of foreign markets drive the change towards OFDI. Second, firms change their business through decision to commit OFDI to strengthen their position in foreign markets. On top of that, the recent updated model by Johanson and Vahlne (2009) mentions the importance of insider rapport as a necessary condition for successful internationalisation. This relationship can enhance the learning curve in a way to build trust and commitment that come with prior experience of top management team (TMT).

At the same time, recent years have witnessed a flourishing of research on CEO and top management characteristics. Upper echelons theory by Hambrick and Mason (1984) suggests that the composition of the TMT creates the foundation for managerial decisions and eventually helps decide a firm's behaviour on strategic decisions. This theory places emphasis on macro-organisational research, and also on dominant coalition of the organisation, particularly at the YMT level based on their cognitive orientation, values and knowledge base. All in all, the competition among the firms to venture internationally has raised the call for improving or equipping management team characteristics with a set of skills in order to function more effectively under new complex international business environment (Tihanyi *et al*., 2000) after international entry.

This study focuses on TMT characteristics to determine its influence on the level of international diversification using Malaysia-based multinational firms as an example of multinational firms from developing country. The number of firms investing abroad via international diversification has increased, particularly in this country. Nashir (2010) reported that this country's MNCs are the largest investors in Indonesia with investment totalling RM8.2 billion (US$2.7 billion). Firms such as IJM Plantation, IOI Corporation, Sime Darby Group, United Plantations Bhd. and Asiatic Development Bhd. are among those investing in that country.

According to Arif and Lopez (2007), the major push factors for outward OFDI are increase in wealth of individuals and corporations, high domestic savings, increase in labour costs compared to costs in neighbouring countries, limitations of domestic demand, liberalisation of strategic sectors such as health, education, telecommunication and utilities, and also government's efforts in promoting OFDI. It is said that capital abundance due to high

domestic saving enjoyed from remarkable growth during pre-1997 economic crisis and post-crisis years also contributed to corporations going abroad (Tajul & Amirul, 2010). In addition, Arif and Lopez (2007) noted that government's promotion to go abroad is not new as it started in the 1970s, as part of New Economic Policy (NEP), where the outward-oriented firms are given incentives such as tax exemption and so on. According to Syed (2008) and Syed and Kitchen (2008), technological skills, knowledge capabilities and various government's efforts in promoting expansion have certainly enhanced local firms' global competitive advantage.

There are studies that focus on TMT characteristics and their influences on firm's international diversification strategy such as that by Jaw and Lin (2009) on Taiwan's high-tech firm. The TMT educational background is found to be not important, as reported by Herrmann and Datta (2005) in a US study of manufacturing firms, whereby they mentioned educational background is significant. Wally and Becerra (2001) from a study of US MNCs in European community found education is not significant to international diversification strategy. The conflicting findings from these studies are believed to be due to the country-specific differences or even sample specific.

This study contributes to this literature in the following ways: First, according to Nielsen (2010a), there have been many studies on the importance of firm-level experience of top management. Other aspects remain unexplored such as the impacts of managerial knowledge and expertise at the top management level (Hambrick & Mason, 1984). Therefore, this study attempts to explore the relationship between TMT characteristics and international diversification. The managerial team's attributes (age, educational level, functional background and international experience) are added to other factors used in prior studies.

DEVELOPMENT OF MALAYSIAN MULTINATIONAL CORPORATIONS

FDI in the tested country could be notable as early as during the British colonial period especially in the mining and plantation sectors. The influx of FDI began during the 1980s and 1990s due to strategic policy introduced by the former Prime Minister, Mahathir, in order to propel the economy to become industrialised away from commodity-based economy. This led to promotion of Heavy Industries Policy, which was geared to accelerate industrial growth, in line with the NEP, designed to eradicate poverty, as well as under the National Economic Recovery Plan which helped to serve as a blue print for better management of economy after the 1997-8 financial crisis. However, FDI were mostly in the context of inward FDI.

Outward FDI is considered as relatively new compared to more developed nations such as the US and Japan. Ariff and Lopez (2007) dated inward FDI from mid-1970s. Malaysia's decision to progress via export-orientation had been the contributing

factor on a significant change on the export structure during 1970s and 1980s (Ariffin & Fauzias 2006; Syed, 2008). The formation of ASEAN Free Trade Area in 1992 was one of the added factors on the reshaping of the economic landscape with larger FDI. Since then, FDI has been regarded as one of the main drivers for achieving sustainable high growth and development.

Syed and Fariza (2007) mentioned the fast-changing technology, economic integration, changes in consumer tastes and also increased in global competition as motivating MNCs to go abroad. The introduction tariff-related incentives, financial and non-financial incentives were parts of various policies to encourage internationalisation activities. Establishment of Export-Import Bank of Malaysia is one of the examples that shows commitment to encourage firms to go abroad.

In promoting internationalisation, government-linked corporations (GLC) were the initial movers (Tajul & Amirul, 2010) to take a lead; Petroliam Nasional Berhad (Petronas), Telekom Malaysia Berhad (TM), Sime Darby Berhad and FELDA are some of the GLCs leading the way. Initial foreign market door-opening was done through government-to-government diplomatic initiatives. According to Mahathir (2011), it is important to have friendly relationship with foreign countries because it will create business opportunities and knowledge transfer to local firms. The Look East Policy was part of an effort to gain competitive skills and knowledge from Japan and Korea, as well as Taiwan. Syed and Fariza (2007) noted that Malaysians' participation in OFDI is notable and significant in the global market. UNCTAD (2006) reported that the country is ranked at 32nd position among 128 economies worldwide. It was noted that overseas investments are mainly on oil and gas and services sector, followed by manufacturing, agriculture and construction sectors.

THEORETICAL PERSPECTIVE AND HYPOTHESIS DEVELOPMENT

Top Management Team (TMT)

The definition of TMT has taken centre stage in the literature. TMT definition is based on the original work of Cyert and March's (1963), who referred to it in their "dominant coalition" theory (Carpenter *et al*., 2004). Carpenter *et al*. (2004) showed that individuals at higher level of management are expected to have greater influence on decisions that are strategic in nature. The identification of top team constructs and team membership is often associated with the measurement heuristic (by title or position) of senior management level. Upper echelons studies were conducted by early researchers using the "dominant coalition" as the central construct for TMT. Hambrick and Mason (1984) argued that upper echelon perspective should be of interest because this group and its members provide a crossing point between the firm and the environment.

Finkelstein and Hambrick (1996) introduced "supra-TMT" as a concept to include members of TMT and the board of director into one unit. However, this concept was theoretically and empirically challenged. Fama (1980) stated board of directors and TMT are not the same as both assume distinct roles in firms. Jensen and Zac (2004) highlighted that the "supra TM" concept should be rejected since there was inconsistent evidence that TMT and board of directors be distinguished as a subgroup. Thus, TMT as unit of analysis does not include board of directors of the firm.

Upper Echelons theory suggests that the composition of the TMT creates the basis for managerial decisions and ultimately the behaviour of the firm. Studies belonging to this body of research stated that managers' observable experiences are valid proxies for their cognitive orientation, values and knowledge as subsequently impacting the strategic choices. The psychological factors (beliefs, knowledge, assumptions and values) are of central significance to the upper-echelons theory. This theory places emphasis on macro-organizational research, with emphasis on dominant coalition of the organization, particularly at the top management.

Top Management Team Characteristics and International Diversification

In an earlier research, Tihanyi *et al*. (2000) mentioned that the dominant coalition studies focused on the organizational leadership of individual (CEO) to the entire team of top managers. However, the organizational studies have placed more emphasis on the observable demographic characteristics such as age, tenure, experience in order to predict or explain the relationship between demographic characteristics and organisation's performance. According to Herrmann and Datta (2005), most of the upper echelons studies have focused on CEO characteristic with an implied assumption that absolute decision making power is vested on the CEO.

As discussed earlier, the challenges associated with international diversification strategies are imminent. In order to cope with these challenges, international diversification strategies demand that top managers possess certain cognitive abilities, orientation and competencies that are acquired through experience and education. The upper echelon theory associates top managers' experiences and education with their cognitive ability and competencies. The upper echelon theory argues that experience, education, and functional background of the top managers, among others, influence their cognitive ability and strategic decisions. The upper echelon theory sees top managers as powerful actors that make effective strategic decisions that enhance firm competitiveness and performance. Similarly, internationalisation process theory stresses on the importance of managers' prior knowledge and experiences which serves as valuable contributors to their

networking experiences to better facilitate firms' international diversification strategy. The insights from internationalisation process theory provide links to the upper echelon perspective via managers' ability to make effective strategic decision.

Top managers with more international experiences, education and diverse functional background make effective decisions to minimise risks than managers with lesser experiences and education, or similar functional background. Top managers who possess more of such characteristics make effective strategic decisions such as thorough evaluating multiple options for new opportunities, minimising risks and uncertainties that characterise venturing into international business, as well as sustaining firms' competitiveness. Thus, a firm's strategic decisions are strongly influenced by the background characteristics and previous experience of the manager (Child, 1974; Hambrick & Mason, 1984). Therefore, integrating the insights from the upper echelons theory and Uppsala internationalisation process theory, the current research used the background and experiences of TMT members as having considerable influences on a firm's strategic choice relating to internationalisation strategies.

i TMT Age

Wiersema and Bantel (1992) mentioned that earlier research had shown younger managers were correlated with more strategic change behaviour. Meanwhile, older executive are said to be less willing to settle in to new ideas (Bantel & Jackson, 1989). This is due to the career stage factor where financial security is essential and risk-taking behaviour is seen as a career threat (Wiersema & Bantel, 1992). According to Tihanyi et al. (2000), strategic change initiative is more attractive to younger and more energetic managers who are willing to indulge in risk-taking behaviour. As mentioned by Hambrick and Mason (1984), older executives may incline towards status quo. They also noted that younger managers have the tendency towards "attempting the novel, the unprecedented, taking risk". The updated Uppsala internationalisation process model theorises that the level of international diversification is positively related with knowledge and experience of the managers. Experience and knowledge are generally associated with older executives. In contrast, older executives typically possess less physical and mental stamina (Child, 1974) and also fewer information-processing abilities (Herrmann & Datta, 2005). Although recent study shows insignificant relationship, it is believed that age will influence firms' level of international diversification. Therefore;

H1:The higher average age of TMT member is negatively associated with the level of international diversification.

ii TMT International Experience

Adler and Bartholomew (1992) suggested development of managers' cross-cultural skills and lessening chauvinist attitude

contributes to ineffectual international careers through international experience. Sullivan's (1994) work indicates there is an association between TMT international experience and international diversification. On the other hand, Sambharya (1996) found that the level of international background was positively related to international diversification due to a number of reasons. Finally, according to Tihanyi *et al*. (2000), international assignment may establish a manager's rapport with or contact, which will become useful in facilitating future global ventures. Network theory also indicates that inter-organisational and interpersonal relationships from business and social networks shape firms' behaviour on internationalization. Therefore;

H2: The higher percentage of TMT member with international experience is positively associated with high level of international diversification.

iii TMT Educational Level

The educational level of managers has been associated with their cognitive orientation and knowledge base (Hermann & Datta, 2005). Managers with above average educational level are expected to have more tolerance for ambiguity which is vital in seeking and evaluating multiple options for new opportunities. For instance, Datta and Rajagopalan (1998) and Wiersema and Bantel (1992) have linked educational background with greater innovation, knowledge, skills and openness to change. Grimm and Smith (1991) pointed out that TMT employed strategic changes were more likely to hold an MBA degree. Therefore, managers' socio-cognitive abilities play important role on internationalisation success (Herrman & Datta, 2005). However, Herrmann and Datta (2005) argued that high level of education is occasionally detrimental to decision-making due to excessive analysis. In respect of the logical link between educational level and socio-cognitive capacities, it is hypothesised that:

H3: The higher average educational level of TMT members is positively associated with high level of international diversification.

iv TMT Functional Background

Functional background is an indicator of cognitive biases and the type of knowledge they bring on to the job (Walsh, 1988) in terms of critical job knowledge and skills that are contoured by their functional experiences (Herrmann & Datta, 2005). Michael and Hambrick (1992) found TMT's core specialisation to have influence on the nature of diversification that firms would or could undertake. In relation to team's functional heterogeneity, Bantel and Jackson (1989) found that diverse functional background among TMT is associated with innovation among banking firms. Wally and Becerra (2001) support the findings of earlier studies, i.e. TMT's diverse functional expertise was found to be positively related to international diversification strategy among US MNCs in the European Community. Herrman and Datta (2005) found that there was no significant relationship between

functional background and international diversification. Therefore:

H4: High diversity of functional experience among TMT members is positively associated with international diversification.

RESEARCH METHODOLOGY

The section presents related models and discussion on the sample size and variables used as proxies for TMT characteristics, diversification and control variables. In addition, data processing and analysis used in this study are also explained.

Model I: $D_i = \alpha + \beta_1 MC_i + \beta_1 ROE_i + \mu_i$

Model II: $D_i = \alpha + \beta_1 Age_i + \beta_2 Exper_i + \beta_4 Background + \beta_5 MC_i + \beta_6 ROE_i + \mu_i$

Where (D) represents international diversification, MC is log of market capitalization that captures firm size, Age is CEO's Age, Exper is international experience, Background is functional background, ROE is return on equity, and (μ_i) is error term.

Sources of Data

This study used secondary data from the annual report of the MNCs and Capital IQ database. Meanwhile, demographic data such as age, international experience, education and functional background were extracted solely via content analysis of TMT biographic information from firms' annual reports and Capital IQ database. Target sample consisted of listed Malaysian MNCs that have invested abroad extensively over the previous five years. In addition, the target sample must be listed and ranked as the largest hundred over 5 years prior to the sample period in order to qualify. Based on these requirements, the final sample was 83 MNCs.

Variables Selection and Analysis

There are five variables: entropy as measure of multi-nationality or diversification level is the dependent variable, while the other four are age, international experience, education and functional background. On the other hand, more variables [namely, market capitalisation and Return on Equity (ROE)] were also used as control variables.

The diversification strategy undertaken by firm, as indicated by the multi-nationality level, was measured via the entropy measure. This measure was used in Qian (1996) who provided an indicator signifying multinationality (Sullivan, 1994). Thus, the entropy is characterised by a multi-dimensional measure because it takes into consideration both the spread and the amount of international expansion. Hitt, Hoskisson and Kim (1997) mentioned that entropy measure considers both the number of global market regions in which a firm operates and the importance of each global market region relative to total assets. Using Qian's (1996) approach, the entropy measurement involves calculation of the number of subsidiaries in any one country relative to the total foreign holdings held by the firm. The entropy formula as follows:

$$D = -\sum_{i=1}^{n} S_i log_e(1/S_i) \quad (3)$$

Where,
D: Index of multinational diversification computed at the end of the observed period.
Si: Number of subsidiaries in the country *i* or region *i* to the total number of foreign subsidiaries.

TMT age was computed as the average age of executives in the TMT members, as in Hermann and Datta (2005). Biographical information in the annual report Capital IQ database was inspected to determine the age of all members of the top management team. Then, data of the age of the TMT was aggregated to calculate the mean to find the average age at firm level.

Datta and Rajagopalan (1998) adopted seven-point scale on the highest degree earned: (1 = high school, 2 = some college, 3 = undergraduate degree, 4 = some graduate school, 5 = master's degree, 6 = attended doctoral programme and 7 = doctorate) as measures on educational level, while Wally and Becerra (2001) adopted three-point scale as follows; 1 = Bachelor degree or less, 2 = Master's degree, and 3 = PhD. In this study, the scale was modified to five-point scale while maintaining the scale concept used by Datta and Rajagopalan (1998) as educational measures; (1 = Diploma and lower, 2 = Bachelor degree, 3 = Professional qualification, 4 = Master degree, and 5 = Doctorate). Thus, TMT educational level was measured as the average educational level of TMT from the assigned score of each individual member. Then, the score of TMT educational level was aggregated to calculate the mean to find the average educational level for each firm.

Functional background of the TMT members was classified based on their functional experience prior to the current function and comparison was made against the Bursa Malaysia core industry classification that firms are operating. This classification was partially adopted the method used by Wally and Becerra (2001), where the current and past functional titles were used to make such classification as proxy of TMT diversity. Individual TMT member was coded one and zero as indicators of member non-core function and core function members, respectively. Core function refers to TMT member with operational background directly related to the industry classification, while non-core function refers to TMT member who is not directly related to the operation. The score for each firm was assigned based on the current and past title position which was then aggregated and a simple percentage calculation was done to determine proportion of TMT with non-core functional experience.

Based on the past literatures on the practice of international diversification studies, this study controlled for firm size (log of firm market capitalization) and ROE (firm average on equity for the last five years). Both the variables have been associated with higher levels of international diversification.

Upon completion of individual level data collection, the gathered data were

aggregated in the following manner: age and educational level values were aggregated separately and the mean of each variable was calculated to determine firm level average, respectively. Meanwhile, simple calculation of percentage was computed based on individually-coded international experiences and functional background in order to measure TMT's diversity.

Multiple regression was used to determine the possible relationship between Dependant Variable (Entropy) and Independent Variables (age, international experience, education level and functional background with the presence of Control Variable (market capitalisation and return on equity). Given the nature of the subject, this method has been widely used despite many potential statistical issues on the reliability of the parameters from this procedure.

RESULTS AND DISCUSSION

Table 1 is a summary of descriptive statistics and correlations matrix. The statistics indicates that none of the correlation coefficient among the independent variables is large enough to suggest the existence of multicollinearity in the regression equation. In order to test H1 to H4, two sets of Ordinary Least Squares (OLS) regression model were run. Model I includes the control variables, whilst Model II includes all the variables.

The results are summarised in Table 2, which indicates that the incremental R^2 between model II and model I (R^2 of 0.277 versus 0.079). This finding suggests that TMT characteristics jointly explain the dependent variable only partially. The results are also similar to the reports in the previous studies, whereby size and performance of the firm have been found to be associated with international diversification.

For Hypothesis 1, it was found that the hypothesis is not supported. The result is contrary. Higher age is positively associated with international diversification. This brings to the notion of Uppsala internationalization process model by Johanson and Vahlne (2009) that prior experience is of value that may influence firm to engage international diversification strategy. Therefore, logically the higher the age the more experienced the management, especially with networking they bring into their respective jobs. Johanson and Vahlne (1977) also mentioned that international expansion is an incremental process with knowledge of the firm. Thus, it can be assumed that higher age is related to the knowledge and experiences of the management.

As hypothesised in H2 and H3, it was observed that international experience and educational level are not significantly related to international diversification. This is contrary to the findings by Herrmann and Datta (2005), which revealed that educational level and international experience of TMT were significantly associated with international diversification. However, this study confirms the findings of Wally and Becerra (2001) in the context of U.S. multinationals in the European Community that educational level and international

experience are not significantly associated with strategic change in international diversification. This conflicting finding is also found in the literature. TMT international experience somehow does contribute to firms' behaviour towards international diversification strategy.

On the final hypothesis (H4), it was anticipated that the functional background of TMT would be positively associated with international diversification. In this study, a significant association was found between TMT functional background diversity and international diversification. The findings confirm the earlier study by Wally and Becerra (2001). The study also supported Jaw and Lin's (2009) findings from the study on corporate elite characteristics and firm's internationalisation of Taiwanese firms operating in technologically diverse TMT increases cognitive homogeneity; they also found that it enables overcoming of 'group-think' at the top of the firm. Therefore, the heterogeneous ability within TMT construct can create synergistic assistance in foreign market issue problem solving.

CONCLUSION

Internationalisation has increased significantly in the recent decades and it is becoming a trend among Malaysian MNCs. Economic and market liberalisationn have been among the pushing factors that prompt international diversification strategy of firms. Advancement in technology such as communication, transportation and information technology has certainly changed the business landscape with globalisation that can make product to be sold anywhere around the world. Mohammadreza *et al*. (2010) noted that MNCs' behaviour, as well as expansion strategies, has affected today's globalisation of business environment. For instance, China, which famously practised a closed economy policy, was forced to liberalise her trade policy to acknowledge the opportunities presented to China in the era of globalisation.

Although international diversification strategy is relatively new to this country compared to more developed nations, its adoption is inevitable because it presents opportunity of new markets. According to the upper echelons theory, firm's behaviour towards any strategic decisions is the reflection of its managerial skills and cognitive abilities, while Uppsala internationalisation process model stresses on the importance of experiential learning and networking that build commitment and thrust towards international venture. This is based on the assumption of 'uncertainty and bounded rationality' that drives firms towards international diversification strategy.

This study found that there is a linkage between upper echelons, as suggested by the Uppsala internationalisation process model. As anticipated earlier, diverse functional background of TMT is positively associated with international diversification. It was found that the more diverse the TMT background, the more significant the association would be with

international diversification. Diversity of functional background indicates the level of experiences and skills; thus, it confirms both upper echelons theory and Uppsala internationalisation process model that international diversification moves parallel with the level of experiential knowledge.

However, it was found that Uppsala model stands up against upper echelons perspective when TMT average age shows a positive relationship with international diversification. Logically at the older age, one will have more experience and knowledge than younger executives, thus resulting in more accurate and faster judgment. This also implies support for the Uppsala internationalisation process model on the experiential knowledge influence on international diversification.

On the other hand, educational level and international experience were found to have insignificant influence on international diversification. Although the measure used is consistent with that of earlier studies, the results are in contrast with some of the previous literatures. Nonetheless, the results of this study almost mirrors those in Wally and Becerra's (2001) study, which also found educational level and international background as not significantly associated with international diversification. The insignificance of educational level is confirmed as in Herrmann and Datta's (2005); TMT characterised by high educational level sometimes leads to excessive analysis which can be a detriment to the decision making process. Though international experience was found to be insignificant, it is still believed to provide some added values in decision making.

Therefore, the findings of this study also suggest that certain TMT characteristics are relatively strongly associated with international diversification. This goes in line with the high levels of ambiguity and uncertainty in the international business environment that require certain TMT characteristics to help firms face fierce competitions. In addition, Uppsala internationalisation process model stresses on the importance of management's prior knowledge, which also serves as a valuable contributor to networking experience. Networking at the upper echelons facilitates firms' international diversification strategy.

TABLE 1
Correlations matrix

	Variables	Means	Std Dev	1	2	3	4	5	6
1	Entropy	0.35	0.11	-					
2	TMT average age	51.56	2.62	0.095**	-				
3	TMT international experience	0.10	0.12	-0.024	-0.033	-			
4	TMT educational level	2.64	0.81	0.007	-0.087	-0.036	-		
5	TMT functional background	0.47	11.32	0.230**	0.155	0.123	-0.049	-	
6	Market capitalisation	0.23	2.48	0.276*	-0.102	0.063	-0.071	0.038	-
7	Return on equity	3.37	2.34	-0.093	0.185	0.106	-0.124	0.143	0.336**

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

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

TABLE 2
Result of OLS regression (TMT characteristics and international diversification)

Variables	*Model I (Control Variables)*	*Model II (Full Model)*
TMT average age		0.013***
		(0.000)
TMT international experience		-0.077
		(0.704)
TMT educational level		0.033
		(0.707)
TMT functional background		0.576**
		(0.002)
Market capitalisation	0.153	0.133
	(0.000)	(0.000)
Return on equity	-0.014	-0.005
	(0.000)	(0.000)
R-squared	0.079	0.277
Constant	1.07	-0.923
N	83	83
F	4.342***	9.645***

Standard Errors in parentheses
**. Significant at 0.05 level (2-tailed).
***. Significant at 0.01 level (2-tailed)

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Effects of Mergers and Acquisitions on Revenue Efficiency and the Potential Determinants: Evidence from Malaysian Banks

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ABSTRACT

This paper discusses on identifying the effects of regulators-guided mergers on production efficiency gains of Malaysian banks as measured by revenue efficiency ratio. The paper also examines the potential bank-specific and macroeconomics determinants correlated with revenue efficiency. The study sample consisted of banks that were engaged in mergers during 2002-2009 matched with those not engaged in mergers as the control sample. Results showed that revenue efficiency did not improve after the merger. Meanwhile, size, market power and management quality were shown to be correlated with revenue efficiency.

Keywords: Regulator-guided merger; Revenue efficiency; Malaysian banking sector; bank-specific; macroeconomics determinants.
JEL Classification: G21; D24

INTRODUCTION

On 14th February 2000, the banking regulator, Bank Negara Malaysia (BNM) promoted the merger event on the financial institutions and formed 10 anchor banks so that the regulatory capital could be improved so as to prevent recurrent bank failures in post-independence Malaysia. Some have termed this exercise as 'forced merger' to improve their efficiency and productivity. This activity was guided by BNM to face three industry challenges: foreign banks competition; big sized domestic commercial banks serving a small economy; and the effects of the 1997-9 financial crisis. As a result, ten (10) anchor banks were established due to the forced or guided merger exercise on 14th February 2000. The expected outcome of the mega-mergers is for the anchor banks to be more

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efficient compared to the efficiency in the prior period (Cornett *et al*., 2006; Akhavein *et al*., 1997).

Berger *et al*. (1993) recommended that bank could expect enhanced gainfulness, better costs and better administration quality for purchasers with more prominent measures of trusts intermediated if banks considered that they were efficient. The main motive of merging is to enhancing the wealth or value of shareholders by maximising profits (Chong *et al*., 2006), that is, the banking sector would show a greater degree of profit efficiency. Several studies (Kamarudin *et al*., 2014a; Kamarudin *et al*., 2014b; Kamarudin *et al*., 2013; Sufian *et al*., 2013) have suggested that revenue inefficiency is the one that could affect lower level of efficiency in banks' profitability.

Thus, instead of focusing on the level of profit efficiency in the event of merger, it would be more useful to compare it with cost efficiency to discover the continuation of revenue efficiency and the main impact on the banks' profitability. By employing the method of Data Envelopment Analysis (DEA), the present research contributes significantly to the limited knowledge to the importance of revenue efficiency in the banking sector. This study also sought to report findings on potential determinants that are correlated with producing revenue efficiency. For this purpose, Multivariate Regression Analysis (MRA) was applied in the current work.

The paper is organized in the following order: the subsequent section discusses relevant information obtained from the literature review. Discussions on data and methodology are given in section 3. The study elaborates on the results and relevant discussion in section 4. Finally, section 5 presents discussions on conclusion and policy implications.

LITERATURE REVIEW

Studies which combined both cost efficiency and profit efficiency have shown that inefficiency of revenue efficiency leads to different levels of cost efficiency and profit efficiency (Ariff & Can, 2008; Bader *et al*., 2008). Revenue efficiency is characterised as how successfully a bank offers its yields. Most extreme revenue is accomplished as a consequence of creating yield package proficiently (Rogers, 1998). Essentially, revenue efficiency is deteriorated into technical and allocative effectiveness which are identified through managerial variables and routinely connected with administrative components (Isik & Hassan, 2002). English *et al*. (1993) stated that with a specific end goal to determine revenue productivity, banks ought to concentrate on both efficiencies; technical efficiency (that is managerial effectiveness from working on the achievable generation probability bend) and allocative productivity (that is, bank delivering the revenue boosting blend of yields focusing around certain regulation).

An alternative approach to enhance revenue efficiency proposed by a few studies is for banks to create higher quality administrations and charge higher costs

by circumvent any unseemly decision of inputs and yields amounts or mispricing of yields (Rogers, 1998). Revenue inefficiency could be decently recognised by means of the benefit capacity on the grounds that this capacity joins both cost efficiency and revenue efficiency to assess benefit productivity (Akhavein *et al*., 1997), suggesting a guide to this research that profit efficiency is the way to assess bank efficiency in this case.

Revenue efficiency will completely influence efficiency of the profit despite the fact that there is higher level of cost efficiency. Generally, the level of revenue efficiency is the main consideration that impacts efficiency on the level of banks' profit efficiency. Akhavein *et al*. (1997) and Bader *et al*. (2008) expressed that there have been restricted studies done on banks' revenue efficiency. If the studies were narrowed down to revenue efficiency on the bank mergers, there is indeed a paucity of studies. It can be inferred that revenue efficiency is important in activity of mergers as it may also minimise cost (Cornett *et al*., 2006). Opportunities for revenue efficiency give an impression of being the most profitable in those mergers that offer the best open door for cost cutting exercises.

This review reveals the following gaps in research. First, there are numerous studies that have examined the effects of mergers on cost efficiency and profit efficiency in the banking sector under voluntary scheme. Next, there are limited findings on the banking sector in developing countries. Finally, none of the previous studies focused on the revenue efficiency concept in bank mergers. Therefore, this study presents novel contribution findings on the effects of mergers on revenue efficiency and also the determinants using data from the banking sector in Malaysia.

METHODOLOGY AND DATA EMPLOYED

The present study accessed data on all commercial banks in Malaysia over 1995 to 2009. The BankScope database is the main source of banks' financial data. The data were analysed from those banks registered as merged in the Malaysian banking sector during the year 2000. Two event windows were created for the test periods: 1995 to 1996 as pre-merger period that excluded the Asian Financial Crisis years of 1997-8 and the pre-merger period of 1999-2001 and 2002 to 2009 (the latter is considered as the period of post-merger). A total of 34 commercial banks were involved in this sample (14 domestic commercial banks were involved in the mergers, whereas 20 foreign and domestic commercial banks were not involved (refer to Table 1).

Method of Measurement in the First Stage

The study used the DEA frontier analysis method known as the programming approach of Mathematic (Malmquist, 1953). The technique of liner programming creates the frontier of the observed ratios of input-outputs in DEA.

DEA was first introduced to compute each Decision Making Units' (DMUs)

efficiency (Charnes *et al*., 1978). The efficiency of firms' production is due to the maximum output generated by utilising the minimum mix of inputs. Furthermore, the DEA method was first employed by Sherman and Gold (1985) to compute banks' efficiency. According to Bader *et al*. (2008), many studies have used DEA to examine banking efficiency. Nevertheless, this non-parametric approach was originally urbanised by Farrell (1957).

However, to measure cost, revenue and profit efficiency, this study employed the DEA efficiency system known as Excel Solver under the model of VRS developed by Zhu (2009). The efficiencies models are given in Equations (1) – (3) below. Note that the range of cost, revenue and profit efficiency scores is truncated between 0 and 1.

Frontier Type	Cost Efficiency (1)	Revenue Efficiency (2)	Profit Efficiency (3)
VRS	$min \sum_{i=1}^{m} p_i^o \tilde{x}_{io}$ *subject to* $\sum_{j=1}^{n} \ddot{e}_j x_{ij} \le \tilde{x}_{io} \quad i=1,2,...,m;$ $\sum_{j=1}^{n} \ddot{e}_j y_{rj} \ge y_{ro} \quad r=1,2,...,s;$ $\ddot{e}_j, \tilde{x}_{io} \ge 0$ $\sum_{j=1}^{n} \ddot{e}_j = 1$	$max \sum_{r=1}^{s} q_r^o \tilde{y}_{ro}$ *subject to* $\sum_{j=1}^{n} \lambda_j x_j \le \tilde{x}_{io} \quad i=1,2,...,m;$ $\sum_{j=1}^{n} \ddot{e}_j y_{rj} \ge \tilde{y}_{ro} \quad r=1,2,...,s$ $\lambda_j \tilde{y}_{ro} \ge 0$ $\sum_{j=1}^{n} \lambda_j = 1$	$max \sum_{r=1}^{s} q_r^o \tilde{y}_{ro} - \sum_{i=1}^{m} p_i^o \tilde{x}_{io}$ *subject to* $\sum_{j=1}^{n} \lambda_j x_{ij} \le \tilde{x}_{io} \quad i=1,2,...,m;$ $\sum_{j=1}^{n} \ddot{e}_j y_{rj} \ge \tilde{y}_{ro} \quad r=1,2,...,s$ $\tilde{x}_{io} \le x_{io}, \tilde{y}_{ro} \ge y_{ro}$ $\lambda_j \ge 0$ $\sum_{j=1}^{n} \lambda_{j=1}$

(Source: Zhu, 2009)

Where,

s = observation of output
m = observation of input
r = s^{th} output
i = m^{th} input
q_r^o = output r's price of DMU0
p_i^o = input i's price of DMU0
$\tilde{y}_{ro}$ = r^{th} output that maximise revenue for DMU0
$\tilde{x}_{io}$ = i^{th} input that minimise cost for DMU0
y_{r0} = r^{th} output for DMU0
x_{i0} = i^{th} input for DMU0
n = DMU observation
j = n^{th} DMU
λ_j = non-negative scalars
y_{rj} = s^{th} output for n^{th} DMU
x_{ij} = m^{th} input for n^{th} DMU

Measuring on the three efficiency concepts could provide the efficiency levels of the banking sector on the events of before and after the merges and also explain the importance of revenue efficiency to the banking profitability.

Variables and Approaches

Since the issue of selecting what constitutes inputs and outputs is still arbitrary, this study used the intermediation approach because it was assumed that bank is more suitably classified as an intermediary entity (Sufian *et al*., 2013; Sufian & Kamarudin, 2014; Sufian *et al*., 2014). The input variables are stated as follows: Xa (total deposits), Xb (expenses on labour) and Xc (capital of physical). Meanwhile, the input variables are listed as follows: Wa (Deposit's price), Wb (labour's price) and Wc (physical capital's price).

Next, the output variables are stated as follows: Ya (total loans), Yb (investment), and Yc (off-balance sheet items). There are three output prices used in this study (namely, Ra = loans' price; Rb = investments' price; and Rc = off-balance sheet items' price). The data employed to construct the efficiency frontiers are summarised below:

Summary of the Variables Used

Variables	Mean (RM mil.)	Std. Deviation (RM mil.)	Maximum (RM mil.)	Minimum (RM mil.)
Xa	27953.1000	41139.7260	243132.0000	190.1000
Xb	471.7530	3739.6490	61176.0000	3.6000
Xc	226.9400	331.0460	1420.0000	0.7000
Wa	0.0340	0.0160	0.1300	0.0050
Wb	0.0310	0.3870	6.3360	0.0020
w3	2.1480	2.5070	15.9710	-0.2860
Ya	19848.6440	29665.8620	185783.2000	38.3000
Yb	5758.1590	8673.0510	61677.5000	39.7000
Yc	13283.3860	18945.4480	129453.3000	4.6000
Ra	0.1430	0.2130	2.5120	0.0340
Rb	0.3600	0.4720	1.1940	0.0010
Rc	0.0300	0.2210	3.6300	0.0010

Note: Xa: Deposits (total deposits), Xb: Labour (expenses of personnel), Xc: Physical capital (Book value of fixed asstes), Wa: deposit's price (total interest expenses over total deposits), Wb: labour's price (personnel expenses over total assets), Wc: physical capital's price (other operating expenses over total fixed assets), Ya: Loans (loans and interbank lending), Yb: Investment (total investment or securities), Yc: Off-balance sheet items (value of the off-balance sheet activities), Ra: loans' price (total interest income on loans over total loans), Rb: investments' price (other operating income over investment), and Rc: off-balance sheet items' price (net fees and commissions over off-balance sheet items).

Method of Measurement in the Second Stage

The next function of the present research was to classify the possibility of bank-specific and macroeconomics determinants that were likely to be correlated with revenue efficiency during the post-merger period. The majority of past studies have utilized a model of multivariate regression to concentrate on the relationships between bank efficiency and potential logical variables to identify them as the determinants of efficiency.

By using the revenue efficiency scores as the dependent variable, this study appraised the accompanying model:

$$Z_{jt} = \alpha_t + \beta_{jt}\,(LNTA_{jt} + LLRGL_{jt} + ETA_{jt} + BDTD_{jt} + LOANSTA_{jt} + NIETA_{jt} + LNGDP_{jt} + INFL_{jt} + DP_{jt} + LNTA_{jt}*DP_{jt} + LLRGL_{jt}*DP_{jt} + ETA_{jt}*DP_{jt} + BDTD_{jt}*DP_{jt} + LOANSTA_{jt}*DP_{jt} + NIETA_{jt}*DP_{jt} + LNGDP_{jt}*DP_{jt} + INFL_{jt}*DP_{jt}) + \varepsilon_{jt}$$

Z_{jt}	Revenue efficiency of the j-th bank in the period t
LNTA	Log of total assets (size of bank)
LLRGL	Loan loss reserve to gross loan (asset quality)
ETA	Equity to total assets (capitalisation)
BDTD	Banks' deposit over total deposit (market power)
LOANSTA	Total loan over total assets (liquidity)
NIETA	Non-interest expense over total assets (management quality)
LNGDP	Log of gross domestic product (gross domestic product)
INFL	Customer prices index (inflation)
DP	Dummy post-merger period
LNTA*DP	Interaction bank size and dummy post-merger
LLRGL*DP	Interaction asset quality and dummy post-merger
ETA*DP	Interaction capitalisation and dummy post-merger period
BDTD*DP	Interaction market power and dummy post-merger period
LOANSTA*DP	Interaction liquidity and dummy post-merger period
NIETA*DP	Interaction management quality and dummy post-merger period
LNGDP*DP	Interaction gross domestic product and dummy post-merger period
INFL*DP	Interaction inflation and dummy post-merger period
j	Number of bank
t	Number of year
α	Constant term
β	Vector of coefficients
ε_{jt}	Normally distributed disturbance term

This study applied the step-wise regression method or separated models rather than the simultaneous models in order to avoid multicollinearity problems. Therefore, the proposed model contained 11 models.

Variables Description Used in the MRA Models

The natural logarithm of the variable total assets (LNTA) is a proxy of size of bank. This regression result exhibits that the large bank size is capable of becoming more efficient due to the benefits obtained such as increasing in revenue, quality of services and higher leverage from financial capital (Sufian *et al*., 2012). Meanwhile, loan loss reserve over gross loan (LLRGL) is a proxy of asset quality. Coefficient is assumed to be negative due to the bad loans (non-performing loans) that can reduce the level of efficiency on the banking sector (Ismail *et al*., 2009).

Capitalisation measured by earning over total assets (ETA) could exhibit that the well-capitalised banks would increase revenue of banks and profitability because of the lower expected bankruptcy costs, lower expected costs of financial distress and lower portfolio's risk (Demirguc-Kunt & Huizinga, 1999).

Banks' deposit over total deposit (BDTD) is a proxy of market power. The regression outcome suggests that the large market power contributes to the high bank concentration and therefore, changes both loan rates and market shares in imperfectly competitive loan markets and will contribute to the tendency of banks to charge high loan mark-ups (Carletti *et al*., 2007; Graeve *et al*., 2007). Total loan over total assets (LOANSTA) is a proxy of liquidity. Amid a frail economy, banks may be depressingly influenced since borrowers are prone to default on their advances. Ideally, banks ought to exploit great financial situations and watchman themselves amid unfavourable conditions (Sufian & Habibullah, 2009). Meanwhile, management quality is measured by non-interest expense over total assets (NIETA). The efficient banks are expected to operate at lower costs. On the other hands, higher profits earned by banks that are more efficient may be appropriated in the form of higher payroll expenditures paid to more productive human capital (Molyneux & Thornton, 1992; Athanasoglou *et al*., 2008).

Gross domestic product is entered as natural logarithm of gross domestic product (LNGDP). The coefficient of LNGDP is expected to be positive with the bank efficiency which shows that higher LNGDP leads to higher revenue efficiency. Furthermore, the variable of inflation (INFL) is measured by consumer price index. It may have immediate impacts such as increment in the cost of work and aberrant impacts like changes in premium rates and resource costs on bank execution. Finally, dummy for post-mergers periods (DP) is a proxy of revenue efficiency in the Malaysian banking sector during the post-merger period. DP is a binary variable that takes a value of 1 for post-merger years, and it is 0 otherwise. As expected, this coefficient was found to be positive, indicating that the banking sector has been relatively more revenue efficient during the-post merger periods.

Expected sign on variables

Variable	Description	Expected Sign
Bank-specific characteristics		
LNTA (Bank size)	Natural logarithm of total assets	+
LLRGL (Credit risk)	Loan loss reserve over gross loan	-
ETA (Capitalisation)	Total book value of shareholders equity over total assets	+
BDTD (Market power)	Banks' deposit over total deposit	+
LOANSTA (Liquidity)	Total loans over total assets	+/-
NIETA (Overhead expenses)	Non-interest expenses over total assets	-
Macroeconomics		
LNGDP (Economy growth)	Natural logarithm of gross domestic product	+
INFL (Inflation)	Consumer price index	+/-

EMPIRICAL RESULTS

Banking Sector in the Pre-Merger Period

Table 2 presents a summary of the means for cost efficiency, revenue efficiency and profit efficiency, which were 83%, 79.7% and 69.5% in the period of pre-merger (1995 to 1996). One all the more method for translating this result is to recommend that these banks had slacked (were wasteful) by not completely utilising the inputs proficiently to create the same yields (cost inefficiency) and by not completely delivering the yields effectively utilising the same data (revenue inefficiency). An alternate clarification is that no DMU can be 100% cost or revenue efficient since all organisations utilise slack assets to face changing needs from clients. Banks have slack in the event that they are unsuccessful in completely minimising cost and expanding the revenue (profit inefficiency). The levels of cost, revenue and profit inefficiencies are indicated as 17%, 20.3% and 30.5%, respectively.

Meanwhile, the result means of cost efficiency summarised that bank used only 83% of the assets or inputs to deliver the same level of yield amid the period of pre-merger. As such, on the normal, banks saving money segment has not completely utilised 17% of its inputs, or it could have spared 17% of its inputs to create the same level of yields if no slack was required by DMUs.

On average, however, the banking sector was more efficient in using its inputs in the period of pre-merger, contrasted with its capacity to produce profits and revenues. For revenue efficiency, the normal bank could just produce 79.7% of the revenues, short of what it was at the first anticipated that would create. Thus, banks could generally have created 20.3% of yields given the same level of inputs if no slack was needed for managing an account business. Detectably, the inefficiency of the revenue is trailed by the profit sides. Similarly, the normal bank could get 69.5% of what was reachable.

Although lower level of revenue efficiency was discovered, indicating that the higher level of revenue inefficiency, the cost efficiency was apparently the most elevated amid the period of pre-merger period. Looking at revenue efficiency and cost efficiency, the higher level of profit inefficiency led to the higher level of inefficiency in the revenue.

Banking Sector in the Post-Merger Period

During the period of post-merger (2002 to 2009), the banking sector scored 91.4%, 80.7% and 88.8% for mean of cost, revenue and profit efficiencies, respectively. Meanwhile, the scores of 8.6%, 19.3% and 11.2% were respectively indicated for the cost, revenue and profit inefficiencies (refer to Table 2).

In relation to cost efficiency, the results implied that bank had generally used only 91.4% of the assets or inputs so as to deliver the same level of yield. In this manner, it could have spared 8.6% of its inputs to deliver the same level of yields, if no slack was needed for managing an account business.

However, a similar finding is also noted, in which on average more efficient banking was identified during the period of post-merger. The result demonstrated that a bank could generally produce 80.7% of the revenues than it was relied upon to create. This seemed, by all accounts, to be a change in efficiency. Subsequently, there was a slack of 19.3%, implying that the normal bank had that much slack in creation. The largest amount of inefficiency is generally on the revenue side, emulated by the profits. Similarly, the normal bank could acquire 88.8% of what was accessible, and had a slack of 11.2% when using the same level of inputs.

In summary, all the banks' efficiency proportions were enhanced after the period of merger. In particular, revenue efficiency enhanced from 79.7% to 80.7% (pre to post-merger period). Profit efficiency increased from 69.5% to 88.8% and cost efficiency enhanced from 83% to 91.4%. Besides, the results also indicated that the lower level of revenue efficiency might contribute to the different levels between cost and profit efficiency since the level of profit efficiency was found to be lower than cost efficiency.

Thus, more awareness should provide to the improvement of banks' revenue efficiency since the revenue efficiency might influence the lower or higher level of profit efficiency in the banking sector. The efficiency results were further tested in order to attain more robust results by performing the t-test parametric and the Mann-Whitney (Wilcoxon) and Kruskal-Wallis non-parametric tests.

Tests of Robustness

Table 3 is a summary of the results obtained from the parametric and non-parametric tests. The Malaysian banking sector exhibited higher cost efficiency and profit efficiency mean in the period of post-merger (0.9140>0.8300 and 0.8880>0.6950) through the t-test on the parametric test. Furthermore, the Kruskall-Wallis and Mann-Whitney (Wilcoxon) tests on the non-parametric test also verified the findings. Thus, the banks' cost and profit efficiency were demonstrated to have been enhanced during the period of post-merger.

Notwithstanding, an intriguing result was also acquired in regards to the revenue efficiency during the period of pre-merger and post-merger. The t-test results exhibited the higher level of banks' revenue efficiency during the period of post-merger period as compared to the pre-merger period (0.8070>0.7970), although the distinction is not critical. This indicated that the level of banks' revenue efficiency did not progress. The findings obtained from the Kruskall-Wallis and Mann-Whitney (Wilcoxon) tests from the non-parametric tests also support the results.

Determinants of Revenue Efficiency

Table 4 is a summary of the MRA model results on the relationships between the banks' revenue efficiency and their bank-specific and macroeconomics determinant variables using the fixed effects model (FEM) and random effects model (REM).

The table first shows the potential determinants on the banks' revenue efficiency in the periods of pre-merger and post-merger (1995 to 2009). Next, the determinants on banks' revenue efficiency in the period of post-merger were produced from Models 4 to 11, with the interaction variables of dummy for the post-mergers periods (DP). The equations are based on 245 bank year observation covering the period of 1995 to 2009.

The results show that the relationship between revenue efficiency and three determinants [asset quality (LLRGL), capitalization (ETA) and market power (BDTD)] is significantly negative (see Table 4). It is positive in Model 1 and the sign is also consistent in all models. However, the impact of size (LNTA) on the revenue efficiency is only significant in models 4 and 7, while liquidity (LOANSTA) is only significant in models 3, 9 and 10. Management quality (NIETA) is totally insignificant in all models in the estimation regression. Therefore, the three determinants (LNTA, LOANSTA and NIETA) are considered as relatively insignificant in influencing the revenue efficiency.

The first significant determinant is LLRGL proxy of asset quality. The coefficient LLRGL is statistically significant and negative (except in Model 4, where it is significant at 5% level). Similar results have been reported from all models, indicating that the lower ratio of LLRGL increases the asset quality and leads to higher revenue efficiency. The results indicated the banking sector was able to manage and reduce the number of the non-performing loans (NPLs). It was aided by the establishment of *Pengurusan Danaharta Nasional Berhad* (Danaharta) and *Danamodal Nasional Berhad* (Danamodal) in 1998. These entities were set up with the purpose of dealing with the situation of rising NPLs and recapitalisation of the banking sector, as well as acting as a catalyst to rationalise the sector. Danaharta had managed RM39.9 billion of NPLs, meanwhile Danamodal injected RM7.1 billion in the financial institution to reduce the burden of NPLs on the financial institutions. As a result, asset quality was enhanced due to the reduced NPLs which had increased the revenue of the banking sector. The result is consistent with that of previous studies by Sufian and Habibullah (2009), Kosmidou (2008) and Cornett *et al*. (2006), which further supports the argument that lower LLRGL banks face higher asset quality and this contributes to higher efficiency.

The second significant determinant is capitalisation (ETA). The results showed (except in models 3, 4, 6 and 10) significant positive signs on the coefficient, suggesting that the larger capitalisation of bank contributed to higher revenue efficiency. This was because larger or higher capitalisation could reduce all the risks of bankruptcy and increase the revenue of the bank (Berger, 1995; Demirguc-Kunt & Huizinga, 1999). In addition, the positive effect of capital in revenue efficiency showed that by having

more capital, bank could easily extend loans and reap higher revenue and profits (Ramlall, 2009).

Finally, the findings suggest that the level of market power (BDTD) is statistically significant and positive, suggesting that the higher market power will contribute to higher revenue efficiency. The finding is consistent with that of Pasiouras *et al*. (2008), i.e., banks' market share has positive effects on efficiency. Higher market power had contributed to higher bank concentration and therefore changed both loan rates and market shares in a perhaps imperfectly competitive loan market.

Model 2 includes the macroeconomic variables as additional control variables. The results showed gross domestic product (LNGDP) as being relatively insignificant. When the overall models were compared, only models 7 and 11 suggested that gross domestic product (LNGDP) was a significant factor, although it was negative in bank revenue efficiency during the period of 1995 through 2009. Therefore, gross domestic product insignificantly influences the revenue efficiency based on the overall models.

Finally, inflation (INFL) coefficient shows a significant negative relationship with bank revenue efficiency in all models (except for models 4, 6, 8 and 9). The negative sign states that the lower inflation will lead to the higher revenue efficiency of the bank. This result is also consistent with that of a previous study (Kosmidou, 2008). The negative relationship with bank revenue efficiency implies that the levels of inflation were unanticipated. The unanticipated or anticipated inflation could significantly affect performance of the banking sector (Perry, 1992).

As a conclusion, asset quality, capitalisation, market power and inflation are significant determinants that have influenced the higher level of banks' revenue efficiency in the periods of pre- and post-merger.

Robust Test during the Post-Merger Period

The second purpose of this research was to identify the bank-specific determinants of revenue efficiency, particularly during the post-merger period. It proceeded with the robustness test by allowing all the bank-specific determinants to interact and adding control variables (macroeconomic) against the dummy post-merger variable (DP). New six interaction variables (LNTA*DP, LLRGL*DP, ETA*DP, BDTD*DP, LOANSTA*DP* and NIETA*DP) were included in Model 4 to Model 9. In addition, the two macroeconomic variables (LNGDP*DP and INFL*DP in models 10 and 11) had also interacted against DP. Therefore, for these models, the discussion focuses on the findings of the new variables that were added to the baseline specification (Model 1).

Size of Bank

The effect of size is insignificant for revenue efficiency. The result changed when the interaction variable of LNTA*DP

was included in Model 4. The result showed that the coefficient of LNTA*DP is significantly positive at 1% level, indicating that the higher the size of a bank, the higher the revenue efficiency would be during post-merger period. The result is also consistent with that of Cornett *et al*. (2006) and Akhavein *et al*. (1997), providing support to the argument that big banks produced higher revenue efficiency after mergers.

Asset Quality

The effect of asset quality (LLRGL) on the revenue efficiency is significant at 5% level in all models (except for Model 4). Nevertheless, it should be mentioned that asset quality is insignificant for revenue efficiency when the interaction term DP (LLRGL*DP) was included in Model 5. The findings indicated asset quality did not influence the revenue efficiency during the post-merger period.

Capitalisation

The results show (except for models 3, 4, 6 and 10) significant positive signs on the coefficient of ETA, suggesting that larger capitalisation of bank would contribute to higher revenue efficiency. Furthermore, with the interaction term, the result remained the same but significant at 10% level with a positive sign. This indicated that larger capital did not contribute to the higher level of banks' revenue efficiency in the period of post-merger. Most of the previous studies have shown contradictory results, where well-capitalised banks were found to lead to the higher profitability (Athanasoglou *et al*., 2008).

Market Power

The impact of market power (BDTD) on revenue efficiency was found to be significantly positive in all models. This indicated that market power could influence revenue efficiency where a higher market power would lead to higher revenue efficiency. Furthermore, with the interaction term (BDTD*DP), the results were also shown to be significant at 5% and it is positive with revenue efficiency as shown in Model 7. This result is also similar with the findings from the previous studies where the event of M&As increased the market power of large banks and led to higher revenue efficiency. The large market power was a result of the large market share through M&As (Carletti *et al*., 2007).

Liquidity

In all models, liquidity (LOANSTA) was not a significant determinant for revenue efficiency. Nevertheless, when the interaction variable (LOANSTA*DP) was included, the result became significant and only at 10% level with a positive sign. This indicated that larger liquidity did not contribute to the higher level of banks' revenue efficiency in the period of post-merger. Nonetheless, several studies have found contradicting result on liquidity and its influence on efficiency in the period of post-merger (Pana *et al*., 2010; Diamond & Rajan, 2001).

Management Quality

Management quality (NIETA) did not significantly influence revenue efficiency in all the models. However, this determinant changed to significant and positive at 1 % level after the robustness test was carried out with the interaction of DP variable (NIETA*DP) in the regression Model 9. This indicated that management quality could influence revenue efficiency, where a higher management quality would lead to higher revenue efficiency. The positive coefficient indicates that higher costs led to higher quality management and contributed to the higher level of banks' revenue efficiency in the period post-merger. Athanasoglou *et al*. (2008) suggested that the market shares and profits could be enhanced via capabilities of the superior management.

CONCLUSION

This study has the main purpose of identifying the effects of regulator-guided mergers of banks on revenue efficiency in Malaysia during the periods of pre- and post-merger. Most studies focused more on the improvement from mergers but ignored revenue efficiency. The present study investigated the impacts of mergers on the banks' revenue efficiency. The findings obtained could be used for decision making by regulators to enhance banks' efficiency and directly improve the profitability of the banking sector (Cornett *et al*., 2006).

The findings have shown that the difference on the levels of banks' revenue efficiency between the periods of pre- and post-merger is statistically insignificant. This indicates that the level of bank's revenue efficiency did not significantly improve in the period of post-merger. Several studies (Akhavein *et al*., 1997; Ariff & Can, 2008) have also documented similar findings. The researchers suggested that even though the levels of banks' profit efficiency and cost efficiency increased with the impacts of mergers event, the profit efficiency level would still be lower compared to the cost efficiency level in the banking sector. The lower level of banks' profit efficiency rather than cost efficiency is due to banks' failure to improve their revenue efficiency level. Banks may even now confront revenue inefficiency because of delivering a little number of yields, creating an excess of or little of a less expensive or costly yield, and offering it wastefully.

This study also focused on examining the determinants of revenue efficiency, particularly in the period of post-merger. Since the DEA results showed that the revenue efficiency did not improve during post-merger period, this study moved on to the second stage, which was to identify the determinants that could improve revenue efficiency in the period of post-merger. Thus, factors such as size of bank, quality of asset, market share, liquidity, capitalisation and management quality represented the six potential determinants known as the explanatory

variables investigated in this study. Gross domestic product and inflation were two external determinants that were included to serve as additional control variables. The study discovered that only three bank-specific determinants influenced the level of banks' revenue efficiency in the period of post-merger. These were the size of bank, market power and management quality. The improvement of revenue efficiency was also influenced by the inflation, a macroeconomic variable which was used as the additional control variable.

Finally, the research concluded that the findings from the impact of mergers on the level of Malaysian banks' revenue efficiency could provide guidance, better information and also fill in the gap in the literature. The findings may benefit the regulators, the banking sector itself, as well as investors and academics.

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APPENDICES

TABLE 1
Domestic Commercial Banks in Malaysia (Year 2000)

Banks Involved with M&As			
Acquirer		Target	
No	**Bank**	**No**	**Bank**
1	Alliance Bank	2	Oriental Bank
3	Public Bank	4	Wah Tat Bank
5	EON Bank	6	Pacific Bank
7	Hong Leong Bank	8	BSN Commercial Bank
9	Maybank	10	Ban Hin Lee Bank Bhd
11	Southern Bank	12	Sabah Bank Bhd
13	Affin Bank	14	Hock Hua Bank Bhd

Banks Not Involved with M&As	
No	**Bank**
15	Standard Chartered Bank
16	United Overseas Bank
17	Phileo Allied Bank
18	RHB Bank
19	OCBC Bank
20	Overseas Union Bank
21	HSBC Bank Malaysia
22	International Bank Malaysia
23	Citibank
24	Deutsche Bank
25	Bumiputra Commerce Bank
26	Chase Manhattan Bank
27	Bank of Tokyo Mitsubishi
28	Bank Utama
29	Bank of China
30	Bank of Nova Scotia
31	Bangkok Bank
32	Bank of America Malaysia
33	ABN AMRO Bank
34	Arab-Malaysian Bank

(Source: Bank Negara Malaysia)

TABLE 2
Bank Efficiencies Score (1995 to 2009)

BANK	1995-1996 (Pre-Merger)			2002-2009 (Post-Merger)		
	RE	CE	PE	RE	CE	PE
ABN AMBRO Bank	0.8010	0.7670	0.4920	0.5830	0.8010	0.7390
Affin Bank	1.0000	1.0000	1.0000	0.7340	0.8590	0.7760
Alliance Bank Malaysia	0.7740	0.8470	0.5400	0.7290	0.8630	0.7050
Arab-Malaysian Bank	1.0000	1.0000	1.0000	0.7260	0.8570	1.0000
Ban Hin Lee Bank	0.7550	0.6740	0.4890	-	-	-
Bangkok Bank	0.8200	1.0000	1.0000	0.7390	0.8780	0.9050
Bank of America Malaysia	0.5750	0.7390	0.6160	0.9390	0.9190	0.9230
Bank of China	0.8920	0.9700	0.8990	-	-	-
Bank of Nova Scotia	1.0000	1.0000	1.0000	0.8420	1.0000	1.0000
Bank of Tokyo-Mitsubishi	0.9110	1.0000	1.0000	0.8050	0.9790	1.0000
Bank Utama	0.7410	0.7510	0.7140	1.0000	1.0000	1.0000
BSN Commercial Bank	0.6340	0.8530	0.3710	0.9250	0.8900	0.7600
Bumiputra Commerce Bank	0.9910	0.9960	1.0000	1.0000	1.0000	1.0000
Chase Manhattan Bank	1.0000	1.0000	1.0000	0.3770	0.7270	0.5430
Citibank	0.8560	0.8850	0.8720	0.8990	0.9700	0.9810
Deutsche Bank	0.7570	0.7490	0.5010	0.5920	1.0000	1.0000
EON Bank	0.8610	0.7900	0.6000	0.7200	0.9200	0.7490
Hock Hua Bank	0.7460	0.7420	0.5370	-	-	-
Hong Leong Bank	0.7630	0.7930	0.5020	0.9130	0.8580	0.8940
HSBC Bank Malaysia	0.9620	0.8800	0.8770	0.7790	0.8120	0.7370
International Bank Malaysia	0.5160	0.5690	0.2960	-	-	-
Maybank	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
OCBC Bank	0.9120	0.9380	0.8600	0.8650	0.9690	1.0000
Oriental Bank	0.8070	0.7550	0.5480	-	-	-
Overseas Union Bank	0.9220	0.9650	0.8980	-	-	-
Pacific Bank	0.8190	0.7640	0.5820	-	-	-
Phileo Allied Bank	0.3670	0.6470	1.0000	-	-	-
Public Bank	0.7090	0.6360	0.4240	0.8380	0.8530	0.8110
RHB Bank	1.0000	1.0000	1.0000	0.8980	0.9490	0.9510
Sabah Bank	0.6830	0.6720	0.4180	-	-	-
Southern Bank	0.7730	0.7030	0.5190	0.8340	0.8660	0.8210
Standard Chartered Bank	0.7950	0.8370	0.7300	0.9880	0.9990	1.0000
United Overseas Bank	0.5510	0.8550	0.3820	0.8480	0.9400	0.9590
Wah Tat Bank	0.5820	0.6500	0.3180	-	-	-
ALL BANKS	0.7970	0.8300	0.6950	0.8070	0.9140	0.8880

Notes: CE: Cost efficiency, RE: Revenue efficiency, PE: Profit efficiency

TABLE 3
Robustness Test on Banks Efficiencies in the Pre-Merger and Post Merger Periods

	Test groups					
	Parametric test		Non-parametric test			
Tests	t-test		Mann-Whitney [Wilcoxon Rank-Sum] test		Kruskall-Wallis Equality of Populations test	
Hypothesis			MedianPre-merger = MedianPost-merger			
Statistics Test		*t(Prb>t)*	*z(Prb>z)*		*X^2 (Prb> X^2)*	
	Mean	*t*	Mean Rank	*Z*	Mean Rank	*X^2*
Revenue Efficiency						
Pre-merger	0.7970	0.2710	109.6800	– 1.809*	109.6800	3.273*
Post-merger	0.8070		127.8100		127.8100	
Cost Efficiency						
Pre-merger	0.8300	4.033***	91.3500	– 4.423***	91.3500	19.56***
Post-merger	0.9140		134.4300		134.4300	
Profit Efficiency						
Pre-merger	0.6950	5.736***	87.2500	– 5.491***	87.2500	30.153***
Post-merger	0.8880		135.9100		135.9100	

***, **, * indicate significant levels at 0.01, 0.05, and 0.10 respectively.

TABLE 4
Multivariate Regression Analysis Models under Fixed Effect Model and Random Effect Model

Variable	M 1	M 2	M 3	M 4	M 5	M 6	M 7	M 8	M 9	M 10	M 11
CONSTANT	0.7240*	0.8030	0.5660**	1.5620**	0.9600	2.1880**	1.3220**	2.0990**	1.000*	0.5540*	2.9490***
Std. Error	*0.4060*	*0.5820*	*0.2840*	*0.6990*	*0.6220*	*1.0710*	*0.6110*	*1.0410*	*0.5840*	*0.2860*	*1.1130*
Determinants Variables											
LNTA	-0.1080	0.0540	-0.0070	–0.3090**	0.0550	0.0520	0.0850*	0.0400	0.0530	-0.0040	0.0390
Std. Error	*0.0820*	*0.0610*	*0.0570*	*0.1230*	*0.0610*	*0.0550*	*0.0490*	*0.0560*	*0.0600*	*0.0580*	*0.0610*
LLRGL	–0.0130***	–0.0170***	–0.0160***	–0.0180**	–0.0200***	–0.0180***	–0.0170***	–0.0190***	–0.0190***	–0.0160***	–0.0200***
Std. Error	*0.0050*	*0.0040*	*0.0040*	*0.0080*	*0.0060*	*0.0040*	*0.0050*	*0.0040*	*0.0040*	*0.0040*	*0.0040*
ETA	0.3370**	0.2530**	0.1720	0.2240	0.2540**	0.1210	0.2860**	0.2270**	0.2050*	0.1780	0.2120*
Std. Error	*0.1380*	*0.1100*	*0.1100*	*0.1400*	*0.1100*	*0.1210*	*0.1200*	*0.1020*	*0.1110*	*0.1100*	*0.1110*
BDTD	3.8160***	1.0400**	1.3880***	4.6000***	1.0270*	0.9880**		1.0880**	0.9810*	1.3680***	1.0890**
Std. Error	*1.2580*	*0.5260*	*0.5090*	*1.2510*	*0.5250*	*0.4920*		*0.5060*	*0.5220*	*0.5110*	*0.5280*
LOANSTA	0.0020	0.0020	0.0020**	0.0020	0.0020	0.0020	0.0010	0.0000	0.0020*	0.0020**	0.0020
Std. Error	*0.0020*	*0.0010*	*0.0010*	*0.0020*	*0.0010*	*0.0010*	*0.0010*	*0.0020*	*0.0010*	*0.0010*	*0.0010*
NIETA	0.0700	0.2800	0.4230	0.0820	0.2840	0.3080	0.3140	0.3730	0.2930	0.4120	0.3590
Std. Error	*0.4210*	*0.3040*	*0.3030*	*0.2860*	*0.3040*	*0.2370*	*0.2950*	*0.2410*	*0.3020*	*0.3040*	*0.3050*
Macroeconomic Variables											
LNGDP		-0.0840			-0.1160	-0.3240	–0.2000*	-0.2980	-0.1260		–0.4410**
Std. Error		*0.1250*			*0.1330*	*0.2010*	*0.1120*	*0.1900*	*0.1250*		*0.2020*
INFL		–0.0210**	–0.0190**	-0.0120	–0.0190*	-0.0130	–0.0180*	-0.0130	-0.0090	–0.0190**	–0.0620***
Std. Error		*0.0100*	*0.0110*	*0.0180*	*0.0110*	*0.0140*	*0.0100*	*0.0140*	*0.0110*	*0.0110*	*0.0210*
DP			0.0450								
Std. Error			*0.0510*								

***, **, * indicate significant levels at 0.01, 0.05, and 0.10, respectively.

TABLE 4 (Continue)

Variable	M 1	M 2	M 3	M 4	M 5	M 6	M 7	M 8	M 9	M 10	M 11
Interaction Variables											
LNTA*DP				0.0340***							
Std. Error				*0.0110*							
LLRGL*DP					0.0050						
Std. Error					*0.0070*						
ETA*DP						0.1250*					
Std. Error						*0.0730*					
BDTD*DP							0.9530**				
Std. Error							*0.3680*				
LOANSTA*DP								0.0010*			
Std. Error								*0.0010*			
NIETA*DP									6.9000***		
Std. Error									*2.5320*		
LNGDP*DP										0.0070	
Std. Error										*0.0090*	
INFL*DP											0.0530**
Std. Error											*0.0240*
	M 1	**M 2**	**M 3**	**M 4**	**M 5**	**M 6**	**M 7**	**M 8**	**M 9**	**M 10**	**M 11**
R^2	0.3620	0.1930	0.1940	0.3820	0.1960	0.2050	0.1890	0.1990	0.2190	0.1930	0.2100
Adj R^2	0.2410	0.1660	0.1660	0.2570	0.1650	0.1750	0.1620	0.1680	0.1890	0.1660	0.1790
Durbin Watson	2.1400	1.8280	1.8320	2.1800	1.8270	1.8480	1.8450	1.8710	1.9060	1.8300	1.9010
F-statistic	2.9830***	7.0580***	7.0840***	3.0600***	6.3470***	6.7500***	6.8970***	6.4680***	7.3130***	7.0560***	6.9200***
Est. tech	FEM	REM	REM	FEM	REM	REM	REM	REM	REM	REM	REM

***, **, * indicate significant levels at 0.01, 0.05, and 0.10, respectively.

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Opening the Black Box on Bank Efficiency in Bangladesh

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ABSTRACT

The paper examines internal (bank specific) and external (macro and market) determinants of profit efficiency in the Bangladesh banking sector. The analysis consists of two stages. In the first stage, Data Envelopment Analysis (DEA) method was employed to compute profit efficiency of 31 commercial banks operating in the Bangladesh banking sector during the period of 2004 to 2011. In the second stage, panel regression analysis was used to examine contextual factors influencing the productive efficiency of banks. It was found that credit risk, non-interest income and bank size negatively influenced bank profit efficiency. On the other hand, the findings indicate that lower (higher) liquidity has positive (negative) impacts on the profit efficiency of banks operating in the Bangladesh banking sector. Nonetheless, no statistically significant influence of ownership structures was found on bank profit efficiency. Likewise, Bangladesh banks seemed not to have been significantly affected by the global financial crisis. The paper could be extended to include more variables, the non-parametric Malmquist Productivity Index (MPI) method and production function, along with intermediation function. The findings from this study are expected to contribute significantly to regulators, bank managers, investors, and also the existing knowledge on the level of profit efficiency of the Bangladesh banking sector. The paper seeks to provide for the first time empirical evidence on the profit efficiency of the Bangladesh banking sector.

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INTRODUCTION

The banking sector is the main source of funds for long-term investments and

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the foundation of economic growth (Schumpeter, 1934). In any country, the banking sector represents the financial system's fundamental and the efficiency of the banking sector ensures an effective financial system. According to Levine (1998), the efficiency of financial intermediation affects a country's economic growth and at the same time, bank (financial intermediation) insolvencies could result in systemic crises resulting in negative implications on the economy.

The banking sector in Bangladesh has been one of the most important mechanisms of their financial system since the early 1970s. All the financial institutions, including commercial banks, are required to fulfil economic objectives set by the government. Basically, there are four types of banks operating in the Bangladesh banking sector: Government Owned Specialized Banks or State Owned Development Financial Institution (DFIs), Nationalized Commercial Banks or State Owned Commercial Banks (SCBs), Domestic Private Commercial Banks (PCBs) and Foreign Commercial Banks (FCBs).

The efficiency of the banking sector has become an imperative issue in Bangladesh since the formation of the National Commission on Money, Banking and Credit in 1986 (Shameem, 1995). The purpose for the establishment of the commission, among others, is to find solutions for efficient operations and management of the banking system (Shameem, 1995). Furthermore, in 1991 the World Bank also assisted the Central Bank of Bangladesh (CBB) to strengthen the country's banking sector regulation and supervision. In maintaining the stability of the banking system, the efficiency of the banking sector is important so as to ensure that banks remain profitable and healthy.

It could be argued that improvements in profit efficiency could lead to higher bank profitability levels and ensure sustainability of the country's economic growth (Sufian *et al*., 2013; Kamarudin *et al*., 2013; Kamarudin *et al*., 2014a; Kamarudin *et al*., 2014b). Furthermore, profit efficiency is also a firm's maximisation of profit since it takes into account both cost and revenue effects on the changes in outputs scale and scope. Profit efficiency measures how close a bank is in producing the maximum level of profits, given the amount of inputs and outputs and their price levels (Akhavein *et al*., 1997; Akhigbe & McNulty, 2003; Ariff & Can, 2008). Thus, profit efficiency provides a complete description on the economic goal of a bank which requires that banks reduce their costs and increase their revenues. Furthermore, Berger and Mester (2003) and Maudos and Pastor (2003), among others, suggest that profit efficiency offers valuable information on the efficiency of bank managements.

The paper seeks to provide for the first time empirical evidence, which is also known as investigate the "black box" on the profit efficiency of the Bangladesh

banking sector using the frontier efficiency analysis approach, i.e. the non-parametric Data Envelopment Analysis (DEA). Although studies on bank efficiency are voluminous, they have mainly concentrated on the banking sectors of the western and developed countries. Thus, almost virtually nothing has been done to specifically investigate the profit efficiency of the Bangladesh banks which presents the most important efficiency concept since it may influence the profitability of the banks (Maudos *et al*., 2002; Ariff & Can, 2008). On the other hand, empirical evidence on developing countries is relatively scarce and majority of these studies focused on the technical, pure technical and scale efficiency concepts. To do so, a two-stage analysis was adopted in this study. In the first stage, the Data Envelopment Analysis (DEA) method was used to compute the profit efficiency of 31 commercial banks operating in the Bangladesh banking sector during the period 2004 – 2011 to encapsulate the most recent global financial crisis period. In the second stage, panel regression analysis was employed to examine the contextual factors such as the internal (bank specific) and external (macro and market) influencing the productive efficiency of banks.

The findings of this study will add to the current knowledge on the profit efficiency of the Bangladesh banking sector. Even though there has been widespread literature investigating efficiency of the banking sectors, the study on the specific profit efficiency concept of Bangladesh banks is still in its formative stage. This study attempts to fill this gap by extending the previous works on the efficiency of the banking sectors, specifically on the profit efficiency concept.

This study also attempts to identify the internal determinants of profit efficiency. The external determinants will also be taken into account to identify the factors that may influence profit efficiency at the macro level. By recognising all potential determinants, the factors that have the most influence on profit efficiency could be further examined. The findings of this study will be useful to several parties such as regulators, bank managers, investors and also to the existing knowledge on the operating performance of the Bangladesh banking sector.

The paper is set out as follows: the next section provides the related literature and hypotheses, followed by outlining the methodology and data in section 4. Section 5 reports on the empirical results of this study, and section 6 offers conclusions and avenues for future research.

REVIEW OF LITERATURE

The basic concept of efficiency is that it measures how well firms transform their inputs into outputs according to their behavioural objectives (Fare *et al*., 1994). A firm is said to be efficient if it is able to achieve its goals and inefficient if it fails. In normal circumstances, a firm's goal is assumed to be cost minimisation of production. Thus, any waste of inputs is to be avoided so that there is no idleness

in the use of resources. In the production theory, it is often assumed that firms are behaving efficiently in an economic sense. According to Fare *et al*. (1985), firms are able to successfully allocate all resources in an efficient manner relative to the constraints imposed by the structure of the production technology, by the structure of input and output markets, and relative to whatever behavioural goals attributed to the producers.

A wide range of models have been used to investigate a spectrum of efficiency related issues in a wide range of environments. Koopmans (1951) was the first to provide the definition of technical efficiency, where producer is technically efficient if an increase in any output requires a reduction in at least one output and if a reduction in any input requires an increase in at least one other input or a reduction in at least an output. Meanwhile, Liebenstein (1966) was the first to introduce the concept of X-efficiency. The X-efficiency concept defines cost inefficiencies that are due to wasteful use of inputs or managerial weakness. The X-efficiency concept seeks to explain why all firms do not succeed in minimising the cost of production and recognises that the sources of X-efficiency may also be from outside of the firm. In this regard, Button and Jones (1992) suggested that X-inefficiency is partly due to firm's own actions, as well as exogenous factors surrounding the environment in which the firm is operates.

Berger and Mester (2003) have shown that separate evaluation of cost and revenue efficiency may not capture the goal of a bank which is to maximise profit. The profit efficiency concept helps to overcome the shortfall since its main goal is to maximise revenues and profit by minimising costs from various inputs and outputs. Technically, profit efficiency can be divided into two major types, namely; standard profit efficiency and alternative profit efficiency. Maudos *et al*. (2002) suggested that besides requiring that goods and services to be produced at a minimum cost, the measurement of profit efficiency require maximisation of revenues to match the profit maximisation objective. In essence, the wrong choice of outputs or the mispricing of outputs may result in revenue inefficiency.

Adongo *et al*. (2005) posited that profit efficiency occurs only if the costs rise from producing additional or higher quality services, but the increase in revenues should be higher than the increase in cost. Meanwhile, Ariff and Can (2008) suggested that the standard profit efficiency measure assumes the existence of perfect competition in both input and output factors. Their findings indicate that a bank is a price-taker, and this implies that it has no market power to determine the prices of output. On the other hand, the alternative profit efficiency assumes the existence of imperfect competition, where a bank is a price-setter, indicating that it has market power in setting the output prices.

Bader *et al*. (2008) pointed out that

there are a fair number of studies which have examined the efficiency of the banking sectors in developing countries. However, previous studies have mainly concentrated on the technical, pure technical and scale efficiency concept (see for example, Isik & Hassan, 2002; Sufian, 2009; Sufian & Habibulah, 2009). On the other hand, studies which investigated the cost, revenue, and profit efficiency are relatively scarce (e.g., Ariff & Can, 2008) and completely missing within the context of the Bangladesh banking sector. In the light of the knowledge gap, the present paper seeks to contribute to the literature by providing for the first time the empirical evidence on the profit efficiency of the Bangladesh banking sector.

HYPOTHESES DEVELOPMENT

The contextual variables used to explain the efficiency of banks in this study were grouped under two main categories. The first represents bank specific attributes, while the second encompasses economic and market conditions during the period examined. The bank specific variables included in the regression models were LN(LLR/GL) (log of loans loss reserves divided by gross loans), LN(ETA) (log of equity divided by total assets), LN(NII/TA) (log of non-interest income divided by total assets), LN(NIE/TA) (log of non-interest expenses divided by total assets), LN(LOANS/TA) (log of total loans divided by total assets) and LN(TA) (log of total assets).

Credit Risk[3] The LN(LLR/GL) variable was incorporated as the independent variable in the regression analysis as a proxy of credit risk. The coefficient of LLP/TL was expected to take a negative sign because bad loans reduced bank profitability and was consequently expected to exert negative influence on bank profit efficiency. In this direction, Miller and Noulas (1997) suggested that the greater financial institutions' exposure towards high risk loans, the higher the accumulation of unpaid loans resulting in a lower profitability would be.

H0: The relationship between credit risk and bank efficiency is negative after controlling for other bank specific traits and macroeconomic variables;

H1: The relationship between credit risk and bank efficiency is positive after controlling for other bank specific traits and macroeconomic variables.

Capitalization The LN(E/TA) variable was included in the regression models to examine the relationship between efficiency and bank capitalization. Strong capital structure is essential for banks in developing economies since it provides additional strength to withstand financial

[3]Laeven and Majnoni (2003) point out that economic capital should be tailored to cope with unexpected losses and loan loss reserves should instead buffer the expected component of the loss distribution. Consistent with this interpretation, loan loss provisions should be considered and treated as cost, which will be faced with certainty over time, but is uncertain as to when it will materialize.

crises and increase safety for depositors during unstable macroeconomic conditions (Sufian, 2009). Furthermore, lower capital ratios in banking imply higher leverage and risk, and therefore greater borrowing costs. Thus, relatively better capitalized banks should exhibit higher efficiency levels.

H0: The relationship between capitalization and bank efficiency is positive after controlling for other bank specific traits and macroeconomic variables;

H1: The relationship between capitalization and bank efficiency is negative after controlling for other bank specific traits and macroeconomic variables.

Diversification In order to recognise that financial institutions have been generating income from "off-balance sheet" business and fee income in recent years, the LN(NII/TA) variable was entered in the regression models as a proxy measure of bank diversification into non-traditional activities. Non-interest income consists of commission, service charges, and fees, guarantee fees, net profit from sale of investment securities and foreign exchange profit. The variable was expected to exhibit positive relationship with bank efficiency.

H0: The relationship between diversification and bank efficiency is positive after controlling for other bank specific traits and macroeconomic variables;

H1: The relationship between diversification and bank efficiency is negative after controlling for other bank specific traits and macroeconomic variables.

Operating Expenses The LN(NIE/TA) variable was used to provide information on the variation of bank operating costs. The variable represents total amount of wages and salaries, as well as costs of running branch office facilities. The relationship between the NIE/TA variable and bank profit efficiency levels may be negative, because the more efficient banks should keep their operating costs low. Furthermore, the usage of new electronic technology, like ATMs and other automated means of delivering services, may have caused expenses on wages to fall (as capital is substituted for labour).

H0: The relationship between operating expenses and bank efficiency is negative after controlling for other bank specific traits and macroeconomic variables.

H1: The relationship between operating expenses and bank efficiency is positive after controlling for other bank specific traits and macroeconomic variables.

Loans Intensity LN(LOANS/TA) as a proxy of loans intensity is expected to affect bank efficiency positively. However, the loan-performance relationship depends significantly on the expected change of the economy. During a strong economy, only a small percentage of loans will default and bank profitability would increase. On the other hand, the bank could adversely be affected during a weak economy, because borrowers are likely to default on their loans. Ideally, banks should capitalize on favourable economic conditions and insulate themselves during adverse conditions.

H0: The relationship between loans intensity and bank efficiency is positive after controlling for other bank specific traits and macroeconomic variables.

H1: The relationship between loans intensity and bank efficiency is negative after controlling for other bank specific traits and macroeconomic variables.

Size The LN(TA) variable is included in the regression models as a proxy of size to capture for possible cost advantages associated with size (economies of scale). In the literature, mixed relationships are observed between size and profitability, while some studies suggest a U-shaped relationship. LNTA is also used to control for cost differences relating to bank size and the ability of large banks to diversify. In essence, LNTA may lead to positive effect on bank efficiency if economies of scale are observed. On the other hand, if increased diversification leads to higher risks, the variable may exhibit negative effects.

H0: The relationship between size and bank efficiency is positive after controlling for other bank specific traits and macroeconomic variables.

H1: The relationship between size and bank efficiency is negative after controlling for other bank specific traits and macroeconomic variables.

Ownership To examine whether bank ownership exerts significant influence in determining the efficiency of banks operating in the Bangladesh banking sector, following Micco *et al*. (2007) among others, dummy variables DUMSCB (a binary dummy variable that takes a value of 1 for the state owned commercial banks, 0 otherwise) and DUMPCB (a binary dummy variable that takes a value of 1 for the Private Commercial Banks, 0 otherwise) are introduced in regression models IV and V, respectively. Micco *et al*. (2007) pointed out that the state owned commercial banks tend to be relatively inefficient compared to their private and foreign owned bank counterparts throughout the South Asian region. Therefore, the authors expected to find positive relationship between private ownership and bank efficiency under the null hypothesis.

H0: The relationship between private ownership and bank efficiency is positive after controlling for other bank specific traits and macroeconomic variables.

H1: The relationship between private ownership and bank efficiency is negative after controlling for other bank specific traits and macroeconomic variables.

Macroeconomic Conditions To measure the relationship between economic conditions and bank efficiency, LN(GDP) (log of Gross Domestic Products) and LN(INFL) (log of the rate of inflation) were included in the regression models. We did not have any priori expectations on both the LN(GDP) and LN(INFL) variables. Meanwhile, favourable economic conditions might have positive effect on both demand and supply of banking

services, but would have either positive or negative influence on bank's profitability. Staikouras and Wood (2004) pointed out that inflation might have direct effects such as the increase in the price of labour and indirect effects like changes in interest rates and asset prices on bank profitability. Perry (1992) suggested that the effect of inflation on bank performance is dependent on whether inflation is anticipated or unanticipated. Perry (1992) pointed out that in the anticipated case, interest rates are adjusted accordingly, and this results in revenues to increase faster than costs, and subsequently positive impact on bank's profitability. On the other hand, in the unanticipated case, banks may be slow to adjust their interest rates resulting in faster increase of bank costs compared to bank revenues, and consequently negative effects on bank profitability.

Banking Sector Concentration The LN(CR3) variable (log of the three banks concentration ratio) was included to control for the impacts of competition on the efficiency of banks operating in the Bangladesh banking sector. The structure-conduct-performance (SCP) theory posits that banks in a highly concentrated market tend to collude and therefore earn monopoly profits (Molyneux *et al*., 1996), while positive impact is expected under both the collusion and efficiency views (Goddard *et al*., 2001).

H0: The relationship between banking sector concentration and bank efficiency is positive after controlling for other bank specific traits and macroeconomic variables.

H1: The relationship between banking sector concentration and bank efficiency is negative after controlling for other bank specific traits and macroeconomic variables.

Global Financial Crisis To control for the impacts of the global financial crisis on the efficiency of banks operating in the Bangladesh banking sector, the DUMCRIS variable (a binary dummy variable that took a value of 1 for the financial crisis years, 0 otherwise) was introduced in regression model III. It is reasonable to expect the variable to take in a negative sign since banks tend to be negatively affected by adverse economic conditions arising from slow credit growth and deteriorating credit qualities during these periods.

H0: The relationship between global financial crisis period and bank efficiency is negative after controlling for other bank specific traits and macroeconomic variables.

H1: The relationship between global financial crisis period and bank efficiency is positive after controlling for other bank specific traits and macroeconomic variables.

METHODOLOGY AND DATA

Data Envelopment Analysis (DEA)

There are two different frontier analysis methods normally employed to measure bank efficiency: the non-parametric and

parametric methods (Berger & Humphrey, 1997). The most commonly employed non-parametric methods are Data Envelopment Analysis (DEA) and Free Disposal Hull (FDH), while the parametric methods are Stochastic Frontier Approach (SFA), Thick Frontier Approach (TFA) and Distribution Free Approach (DFA). According to Murillo-Zamorano (2004), the choice of estimation approach has attracted debate since no method is strictly preferable over the other.

The study employs the non-parametric DEA method, also known as the mathematical programming approach to compute the efficiency of individual banks operating in the Bangladesh banking sector. The method constructs the frontier of the observed input-output ratios by linear programming techniques. The linear substitution is possible between the observed input combinations on an isoquant (the same quantity of output is produced while changing the quantities of two or more inputs) that is assumed by the DEA method.

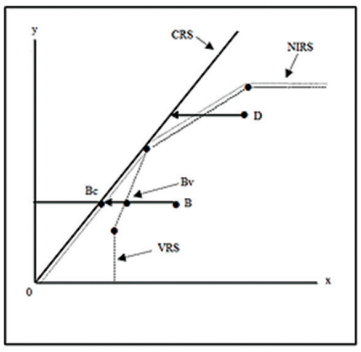
There are six reasons why this study adopted the DEA method. First, each DMU is assigned a single efficiency score that allows ranking among the DMUs in the sample. Second, the DEA method highlights the areas of improvement for each single DMU such as either the input has been excessively used, or output has been under produced by DMU (so they could improve on their efficiency). Third, there is a possibility of making inferences on DMU's general profile. The DEA method allows for the comparison between the production performances of each DMU to a set of efficient DMUs (called reference set). Thus, the owner of DMUs may be interested to know which DMU frequently appears in this set. DMU that appears more than others in this set is called the global leader. Apparently, the DMU owner may obtain a huge benefit from this information especially in positioning its entity in the market. Fourth, the DEA method does not require a preconceived structure or specific functional form to be imposed on the data in identifying and determining the efficient frontier, error and the inefficiency structures of DMUs (e.g., Bauer *et al*., 1998; Evanoff & Israelvich, 1991; Grifell-Tatje & Lovell, 1997). Fifth, the DEA method does not need standardisation, and it therefore allows researchers to choose any kind of input and output of managerial interest (arbitrary), regardless of the different measurement units (Ariff & Can, 2008; Avkiran, 1999; Berger & Humphrey, 1997). Finally, the DEA method works fine with small sample sizes (Avkiran, 1999).

Based on the idea of Farrell (1957) who originally developed the non-parametric efficiency method, Charnes *et al*. (1978) introduced the term DEA to measure the efficiency of each DMU, obtained as a maximum of the ratio of weighted outputs to weighted inputs (hereafter referred to as the CCR model). The more the output produced from the given inputs, the more efficient is the production. The CCR model presupposes that there is no significant relationship between the scale of operations

and efficiency by assuming constant return to scale (CRS) and it delivers the overall technical efficiency (OTE). The CRS assumption is only justifiable when all DMUs are operating at an optimal scale. In practice, however, firms or DMUs may face either economies or diseconomies of scale. Thus, if one makes the CRS assumption when not all DMUs are operating at the optimal scale, the computed measures of OTE will be contaminated with scale inefficiency (SIE).

To obtain robust results, the present study estimated efficiency under the assumption of variable returns to scale (VRS). The VRS model was first proposed by Banker *et al*. (1984), who extended the CCR model. The BCC model, which derives efficiency estimates under the VRS assumption, relaxes the CRS assumption made in the earlier study by Charnes *et al*. (1978). The VRS assumption provides the measurement of pure technical efficiency (PTE). The PTE measures the efficiency of DMUs without being contaminated by scale. Therefore, efficiency results that are derived from the VRS assumption provide more reliable information on the efficiency of DMUs (Coelli *et al*. 1998). The OTE scores obtained from CRS DEA can be divided into two components; one due to SIE and another is due to pure technical inefficiency (PTIE). If there is a difference between the two OTE scores of a DMU (CRS OTE and VRS OTE), then it indicates that DMU has SIE, and SIE could be measured from the difference between the PTE and OTE score (Coelli e*t al*., 1998).

Fig.1 provides a brief illustration. In Fig.1, under the CRS assumption, input-orientated technical inefficiency of point B is the distance BBc, meanwhile under the VRS assumption, the technical inefficiency is only BBv. Therefore, the scale inefficiency cause is due to the difference between BcBv. Although the SE measure provides information concerning the degree of inefficiency resulting from the failure of DMUs to operate with CRS, it does not provide information as to whether a DMU is operating in an area of increasing returns to scale (IRS) or decreasing returns to scale (DRS). This may be determined by running an additional DEA problem with non-increasing returns to scale (NIRS) imposed. Therefore, the nature of the scale inefficiencies, due to either IRS or DRS, could be determined by the difference between the NIRS OTE and VRS OTE scores. If VRS OTE @ PTE ≠ NIRS OTE, DMU is then said to be operating at IRS (point B). On the other hand, if VRS OTE @ PTE = NIRS OTE, DMU is then said to be operating at DRS (point D), as illustrated in Fig.1.



Source: Coelli *et al*. (1998)

Fig.1: Calculation of Scale Economies in DEA

Farrell (1957) posited that technical efficiency reflects the ability of a firm to obtain maximum output from a given set of inputs. The simplest and easiest way to measure efficiency is given as:

$$\text{Efficiency} = \frac{output}{input} \quad (1)$$

This could be done easily if a firm produces only one output by using one input. Nevertheless, firms normally produce multiple outputs by using various inputs and this method will become inadequate. Consequently, Farrell (1957) developed the measurement of relative efficiency which involves multiple, possibly incommensurate inputs and outputs. This technique aims to define a frontier of most efficient DMUs and also measure how far the frontiers are in order to determine the efficiency of DMUs. The relative efficiency could be measured as:

$$\text{Efficiency} = \frac{weighted\ sum\ of\ outputs}{weighted\ sum\ of\ inputs} \quad (2)$$

Thus, this efficiency measure could be written as:

$$\text{Efficiency of DMU } j = \frac{u_1 y_{1j} + u_2 y_{2j} + \ldots}{v_1 x_{1j} + v_2 x_{2j} + \ldots} \quad (3)$$

where

u1 is the weight given to output 1

y1j is the amount of output 1 from DMU *j*

v1 is the weight given to input 1

x1j is the amount of input 1 to DMU *j*

This function can be applied when a common set of weights for DMUs is applicable in comparing the efficiency between DMUs. In practice, however, to find and agree on a common set of weights that could be used is probably difficult. In fact, it is difficult to attach values to each output and input because each DMU could have its own set of criteria. The difficulty in seeking a common weight to determine the relative efficiency was recognised by Charnes *et al*. (1978). They documented the importance of different units which value inputs and outputs differently, i.e. DMUs could use different weights. Therefore, they suggested that each DMU be allowed to adopt a set of weights showing favourable light in comparison to other DMUs. Thus, in order to solve this problem, they suggested that the DEA method use DMUs that could properly value inputs or outputs differently. Hence, the DEA method allows each DMU to choose its own set of appropriate weights so that its own efficiency rating is maximised.

Thus, to maximize the efficiency of DMU j is subject to the efficiency of all DMUs being less than or equal to 1. This can be measured as:

$$\text{Maximize efficiency of DMU } j = \frac{\sum_r u_r y_{rj}}{\sum_i v_i x_{ij}} \quad (4)$$

$$\text{Subject to } \frac{\sum_r u_r y_{rj}}{\sum_i v_i x_{ij}} \leq 1 \text{ for each}$$

DMU j

$ur \geq \varepsilon$

$vi \geq \varepsilon$

However, the equation above represents the fractional linear of the DEA method (Bader *et al*. 2008). The linear programming could be used to solve this model by converting it to linear form. In order to achieve this, the denominator has to be set equal to constant and the numerator has to be maximized. Therefore, the resulting linear programming can be written as the maximised efficiency of DMU j

$$= \sum_{r=1}^{s} u_r y_{rj}$$

$$\text{Subject to } \sum_{i=1}^{m} v_i x_{ij} = 1$$

$$\sum_{i=1}^{m} v_i x_{ij} - \sum_{r=1}^{s} u_r y_{rj} \leq 1 \quad j = 1,2,\ldots n \qquad (5)$$

$ur \geq \varepsilon \quad r = 1,2,\ldots s$

$vi \geq \varepsilon \quad i = 1,2,\ldots m$

where

v_i is the weight assigned to input i

x_{ij} is the level of input i used by DMU j

u_r is the weight assigned to output r

y_{rj} is the level of output r produced by DMU j

ε is a small number (of order of 10^{-6}) that ensures neither input nor output is given zero weight

In fact, if the value of efficiency of unit j is equal to 1, DMU will then be considered as efficient in the sense that no other DMU or combination of DMUs could produce more, along with at least one output dimension without worsening other output levels or utilising higher input levels. In other word, DMU is fully utilising the inputs to produce maximum outputs. However, if the value is less than 1, DMU is then considered as relatively inefficient. Hence, this model is used to find the combination of inputs and outputs weights which could maximize the efficiency of the DMU.

In order to provide a better understanding of the DEA method, a short description of the method is discussed next. Assume that the data of A as being inputs and B as being outputs for each N bank. For the *i-th* bank, these are represented by the vectors of x_i and y_i, respectively. The $A \times N$ input matrix – X, and the $B \times N$ output matrix – Y, represent the data for all N banks. To measure the efficiency of each bank, all outputs over all inputs in the form of ratios are calculated as $u'y_i / v'x_i$ where u is a $B \times 1$ vector of output weights and v is a $A \times 1$ vector of input weights. To select the optimal weight, the following mathematical programming was adopted:

$$\max_{u,v} \quad (u'y_i / v'x_i), t$$

$$\text{subject to} \quad u'y_j / v'x_j \leq 1,$$

$$u, v \geq 0.$$

$$j = 1,2,\ldots,N \qquad (6)$$

However, according to Coelli *et al*. (1998), the ratio has an infinite number of

solutions where, if $(u*, v*)$ is a solution, then $(\alpha u*, \alpha v*)$ is also a solution, etc. Therefore, to avoid this problem, one could impose the constraint $v'x_i = 1$, which leads to

$$\begin{aligned} \max_{\mu,v} \quad & (\mu' y_i), \\ \text{subject to} \quad & v'x_i = 1 \\ & \mu' y_j - v' x_j \le 0, \\ & \mu, v \ge 0, \\ & j = 1,2,...,N \end{aligned} \tag{7}$$

The changing of notation from (u,v) to (μ,v) is used to reflect transformation that is of a different linear programming problem (LP). Hence, one could derive an equivalent envelopment form using the dual form of the above problem as:

$$\begin{aligned} \max_{\theta,\lambda} \quad & \theta, \\ \text{subject to} \quad & y_i + Y\lambda \ge 0, \\ & \theta x_i - X\lambda \ge 0, \\ & \lambda \ge 0, \end{aligned} \tag{8}$$

where

θ is a scalar representing the value of the efficiency score for the *i-th* DMU which will range between 0 and 1

λ is a vector of constant

This envelopment form involves fewer constraints than the multiplier form $(A + B < N + 1)$, and therefore, it is generally the preferred form to solve efficiency (Coelli *et al*., 1998). For the purpose of this study, the DEA Excel Solver developed by Zhu (2009) under the VRS model was adopted to solve the profit efficiency problem. The profit efficiency model is given in equation (9). As can be seen, the profit efficiency scores are bounded within the 0 and 1 range.

Profit Efficiency

(VRS Frontier)

$$max \sum_{r=1}^{s} q_r^o \tilde{y}_{ro} - \sum_{i=1}^{m} p_i^o \tilde{x}_{io}$$

subject to

$$\sum_{j=1}^{n} \lambda_j x_{ij} \le \tilde{x}_{io} \qquad i = 1,2,...,m;$$

$$\sum_{j=1}^{n} \ddot{e}_j y_{rj} \ge \tilde{y}_{ro} \qquad r = 1,2,...,s$$

$$\tilde{x}_{io} \le x_{io}, \tilde{y}_{ro} \ge y_{ro}$$

$$\lambda_j \ge 0$$

$$\sum_{j=1}^{n} \lambda_{j=1} \tag{9}$$

where

s is output observation

m is input observation

r is s^{th} output

i is m^{th} input

q_r^o is unit price of the output r of DMU0 (DMU0 represents one of the n DMUs)

p_i^o is unit price of the input i of DMU0

$\tilde{y}_{ro}$ is r^{th} output that maximize revenue for DMU0

$\tilde{x}_{io}$ is i^{th} input that minimize cost for DMU0

y_{ro} is r^{th} output for DMU0

x_{io} is i^{th} input for DMU0

n is DMU observation

j is n^{th} DMU
λ_j is non-negative scalars
y_{rj} is s^{th} output for n^{th} DMU
x_{ij} is m^{th} input for n^{th} DMU

Panel Regression Analysis

The second objective of this study is to identify the potential bank-specific determinants and additional control variables (macroeconomic) influencing the profit efficiency of the Bangladesh banking sector. In order to examine the relationship between the efficiency of the Bangladesh banks and the contextual variables, a panel cross section regression model was employed for observation (bank) i defined as follows:

$$y_{it} = \beta\, x_{it} + \varepsilon_{it} \quad i = 1,...,N, \quad (1)$$

where

y_{it} is the profit efficiency of bank i at time t
x_{it} is the matrix of the contextual variables
β is the vector of coefficients
ε_{it} is a random error term representing statistical noise
i is the number of banks
t is the year
N is the number of observations in the data set

By using the profit efficiency scores as the dependent variable, this study extends equation (1) and estimates the following regression model:

$$lnPE_{jt} = \alpha_t + \beta_{jt}(lnLLRGL_{jt} + lnETA_{jt} + lnNIITA_{jt} + lnNIETA_{jt} + lnLOANSTA_{jt} + lnTA_{jt} + lnGDP_{jt} + lnINFL_{jt} + lnCR3_{jt} + DUMCRIS_{jt} + DUMSCB_{jt} + DUMPCB_{jt}) + \varepsilon_{jt}$$

where

lnPEjt is the profit efficiency of the j-th bank in the period t obtained from the DEA model
lnLLRGL is a log of loan loss reserve to gross loans
lnETA is a log of equity to total assets
lnNIITA is a log of non-interest income over total assets
lnNIETA is a log of non-interest expense over total assets
lnLOANSTA is a log of total loans over total assets
lnTA is a log of total assets
lnGDP is a log of gross domestic products
lnINFL is a log of consumer price index
lnCR3 is a log of concentration ratio of the three largest banks assets
DUMCRIS is a dummy variable for the global financial crisis years
DUMSCB is a dummy variable of state owned commercial banks
DUMPCB is a dummy variable of private owned commercial banks
j is the number of banks
t is the year
α is a constant term
β is the vector of coefficients
ε_{jt} is a normally distributed disturbance term

Data Collection

The present study gathered data on all commercial banks operating in the Bangladesh banking sector during the years from 2004 to 2011. The source of financial data is the Bureau van Dijk's BankScope database, which provides banks' balance sheet and income statement information. Due to the entry and exit of banks during the years, the actual number of banks operating in the Bangladesh banking sector varies. The final sample comprised of 31 commercial banks of which complete data are available for the years 2004 to 2011. In order to maintain homogeneity, only state owned commercial banks (SCBs) and private commercial banks (PCBs) are included in the analysis. Foreign commercial banks (FCBs) and specialised development banks (SDBs) are excluded from the sample. The complete list of banks included in the study is given in Table 1 below.

TABLE 1
Commercial Banks in Bangladesh – 2004-2011

Bank	Status
Agrani Bank	SCB
Arab Bangladesh Bank Ltd. - A.B. Bank Ltd	PCB
Bangladesh Commerce Bank Ltd	PCB
Bank Asia Ltd.	PCB
BRAC Bank Ltd.	PCB
City Bank Ltd	PCB
Dhaka Bank Ltd.	PCB
Dutch-Bangla Bank Ltd.	PCB
Eastern Bank Ltd.	PCB
Export Import Bank of Bangladesh Ltd.	PCB
First Security Bank Ltd.	PCB
IFIC Bank Ltd.	PCB
Islami Bank Bangladesh Ltd.	PCB
Jamuna Bank Ltd	PCB
Janata Bank	SCB
Mercantile Bank Ltd.	PCB
Mutual Trust Bank	PCB
National Bank Ltd.	PCB
National Credit and Commerce Bank Ltd.	PCB
One Bank Ltd.	PCB
Premier Bank Ltd	PCB
Prime Bank Ltd.	PCB
Pubali Bank Ltd.	PCB
Rupali Bank Ltd.	SCB
Shahjalal Bank Ltd	PCB
Sonali Bank	SCB
Southeast Bank Ltd.	PCB
Standard Bank Ltd.	PCB
Trust Bank Ltd	PCB
United Commercial Bank Ltd	PCB
Uttara Bank Ltd.	PCB

Source: Bankscope Database
Note: SCB is State Owned Commercial Banks. PCB is Private Owned Commercial Banks

The Inputs and Outputs Variables in DEA

The definition and measurement of bank's inputs and outputs in the banking function remain arguable among researchers (Sufian, 2009; Sufian *et al*., 2014). Thus, to determine what constitutes inputs and outputs of banks, one should first decide on the nature of banking technology (bank's approaches). According to Das and Ghosh (2006), the selection of variables in efficiency studies significantly affects the obtained results. The problem is further compounded by the fact that variables selection is often constrained by the paucity of data. Most of the financial services are jointly produced and the prices of costs and outputs are typically assigned to a bundle of financial services.

In essence, there are three main approaches that are widely used in the banking theory literature, namely, production, intermediation, and value added approaches (Sealey & Lindley, 1977). The first two approaches apply the traditional microeconomic theory of the firm to banking and differ only in the specification of banking activities. The third approach goes a step further and incorporates some specific activities of banking into the classical theory and therefore modifies it.

The first approach is the production approach which assumes that financial institutions serve as producers of services for account holders, that is, they perform transactions on deposit accounts and process documents such as loans. Previous studies, which adopted the production approach, are among others (Ferrier & Lovell, 1990; Fried *et al*., 1993; DeYoung, 1997). The second approach, i.e. the value added approach identifies balance sheet categories (assets or liabilities) as outputs which contribute to the value added of a bank such as business associated with the consumption of real resources (Berger *et al*., 1987). Under this approach, deposits and loans are viewed as outputs because they are responsible for the significant proportion of value added.

The third approach, the intermediation approach is the preferred approach among researchers employing the DEA method to examine the efficiency of banking sectors in developing countries (e.g., Sufian, 2011; Sufian *et al*., 2012; Bader et al., 2008). The intermediation approach views banks as financial intermediaries. Under the intermediation approach, banks' primary role is to obtain funds from savers and convert them into loans for profit (Chu & Lim, 1998). Banks are regarded to purchase labour, materials and deposits to produce outputs such as loans and investments. Among the inputs considered include interest expense, non-interest expense, deposits, purchased capital, number of staffs (full time equivalent), physical capital (fixed assets and equipment), demographics, and competition. The potential outputs

are measured as the dollar value of the bank's earning assets where the costs include both the interest and operating expenses (Berger *et al*., 1987). Some of the previous banking efficiency studies which adopted this approach are such as those by Bhattacharya *et al*. (1997), Sathye (2001), and Sufian (2009).

The present study adopts the intermediation approach attributed to three main reasons. First, the study attempts to evaluate the efficiency of the whole banking sector and not branches of a particular bank. Second, the intermediation approach is the most preferred approach among researchers investigating the efficiency of banking sectors in developing countries (e.g., Bader *et al*., 2008; Isik & Hassan, 2002 Sufian *et al*., 2013 and, Sufian & Kamarudin, 2014). Third, Sealey and Lindley (1977) suggested that financial institutions normally employ labour, physical capital, and deposits as their inputs to produce earning assets. Nevertheless, the intermediation approach is preferable in this study since it normally includes a large proportion of any bank's total costs (Elyasiani & Mehdian, 1990; Berger & Humphrey, 1991; Avkiran, 1999).

Therefore, it is reasonable to assume that the efficiency of banks in terms of their intermediation functions is crucial as an effective channel for business funding. In this vein, Jaffry *et al*. (2007) pointed out that banks play an important economic role in providing financial intermediation by converting deposits into productive investments in developing countries. The banking sector of developing countries has also been shown to perform critical role in the intermediation process by influencing the level of money stock in the economy with their ability to create deposits (Mauri, 1983; Bhatt, 1989; Askari, 1991).

For the purpose of this study, three inputs, three input prices, two outputs, and two output prices variables were chosen. The selection of the input and output variables was based on the study of Ariff and Can (2008) and other major studies on the efficiency of the banking sectors in developing countries (e.g., Sufian *et al*., 2012; Sufian, 2011; Sufian & Habibulah, 2009; Bader *et al*., 2008; Isik & Hassan, 2002). The three input vector variables consist of *x1*: Deposits, *x2*: Labour and *x3*: Capital. The input prices consist of *w1*: Price of Deposits, *w2*: Price of Labour and *w3*: Price of Capital. The two output vector variables are *y1*: Loans and *y2*: Investments. Meanwhile, the two output prices consist of *r1*: Price of Loans and *r2*: Price of Investments.

A summary of data used to construct the efficiency frontiers is presented in Table 2.

TABLE 2
Summary Statistics of the Input and Output Variables in the DEA Model

Variable	Mean	Minimum	Maximum	Std. Deviation
Deposit (*x1*)	80,473.73	4,305.00	535,288.40	85,440.89
Labour (*x2*)	1,213.56	51.10	9,345.60	1,402.48
Capital (*x3*)	1,808.54	17.30	23,026.40	2,754.99
Loan (*y1*)	65,040.53	3,073.00	345,991.30	64,038.10
Investment (*y2*)	13,959.01	200.00	134,075.80	20,521.95
Price of deposit (*w1*)	0.07	0.03	0.17	0.02
Price of labour (*w2*)	0.01	0.01	0.02	0.00
Price of capital (*w3*)	1.19	0.08	18.98	1.79
Price of loan (*r1*)	0.12	0.05	0.25	0.03
Price of investment (*r2*)	0.12	0.00	0.81	0.12

Notes: x1: Deposits (deposits and short term funding), x2: Labour (personnel expenses), x3: Capital (fixed assets), y1: Loans (gross loan), y2: Investment (total security), w1: Price of deposits (total interest expenses/ deposits), w2: Price of labour (personnel expenses/ total assets), w3: Price of capital (other operating expenses/ capital), r1: Price of loans (interest income from loans / loans), r2: Price of investment (other operating income/ investment)

Variables Used in Panel Regression Analysis

Six bank specific variables were included in the regression models. The ratio of loan loss reserves to gross loans (LLR/GL) was incorporated as an independent variable in the regression analysis as a proxy of credit risk. Meanwhile, the ratio of equity to total assets (E/TA) was also included in the regression models to examine the relationship between efficiency and bank capitalisation. To recognise that banks have increasingly been generating income from "off-balance sheet" businesses in recent years, the ratio of non-interest income over total assets (NII/TA) was entered in the regression analysis as a proxy measure of bank diversification into non-traditional activities. The ratio of non-interest expenses to total assets (NIE/TA) was used to provide information on the variations of bank operating costs. The LOANS/TA variable was included in the regression models as a proxy measure of bank's loans intensity. The TA variable is included in the regression models as a proxy of size to capture the possible cost advantages associated with size (economies of scale). This variable controls for cost differences according to the size of the bank.

The performance of banks tends to be sensitive to macroeconomic and market conditions. To address this concern, gross domestic products (GDP) were used to control for cyclical output effects. In addition, macroeconomic risk was also taken into account by controlling for the rate of inflation (INFL). CR3 (measured as the concentration ratio of the three largest banks in terms of assets) was entered into the regression models as a proxy variable for the banking sector's concentration.

The DUMCRIS variable (a binary dummy variable that takes a value of 1 for the global financial crisis period, 0 otherwise) was included in regression model III to examine the impacts of the global financial crisis on the efficiency of banks operating in the Bangladesh banking sector.

To capture the effects of organisational forms on bank efficiency, similar regression models were performed by including DUMSCB (a binary variable that takes a value of 1 for the state owned commercial bank, 0 otherwise) and DUMPCB (a binary variable that takes a value of 1 for the private commercial bank, 0 otherwise) in regression models IV and V, respectively.

A summary of the statistics of the dependent and independent variables is given in Table 3.

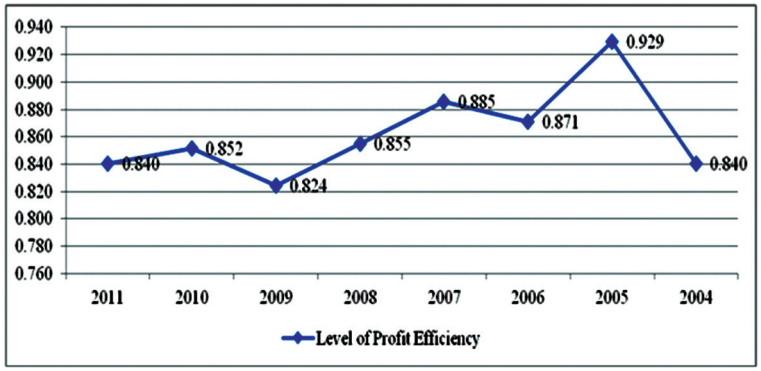
TABLE 3
Descriptive of the Variables Used in the Panel Regression Analysis

Variable	Description	Mean	Std. Dev.	Sources/ Database
	Dependent			
LN(PE)	Natural log of the profit efficiency derived from the DEA method.	-0.079	0.107	Authors' own calculation
	Independent			
	Bank Specific Factors			
LN(LLR/GL)	Natural log of loan loss reserves/gross loans. An indicator of credit risk, which shows how much a bank is provisioning in year t relative to its total loans.	0.379	0.307	Banks' annual financial statements
LN(ETA)	A measure of bank's capital strength in year *t*, calculated as the natural log of equity/ total assets.	0.826	0.240	Banks' annual financial statements
LN(NII/TA)	A measure of bank's diversification towards non-interest income, computed as the natural log of non-interest income over total assets.	0.452	0.192	Banks' annual financial statements
LN(NIE/TA)	Calculated as the natural log of non-interest expense/ total assets and provides information on the efficiency of the management regarding expenses relative to assets in year *t*.	0.484	0161	Banks' annual financial statements
LN(LOANS/TA)	A measure of bank's loans intensity calculated as the natural log of total loans divided by total assets.	1.824	0.058	Banks' annual financial statements
LN(TA)	The natural log of the accounting value of bank *j's* total assets in year *t*.	4.836	0.384	Banks' annual financial statements
	Macroeconomic and Markets Conditions			
LN(GDP)	The natural log of gross domestic products.	3.514	0.056	IMF International Financial Statistics.
LN(INFL)	The natural log of the rate of inflation.	0.898	0.095	IMF International Financial Statistics.
LN(CR3)	The natural log of the three largest banks asset concentration ratio.	1.607	0.071	IMF International Financial Statistics.
DUMCRIS	A binary variable that takes a value of 1 for the global financial crisis period, 0 otherwise.	N.A.	N.A.	Authors' Own Calculations
	Ownership			
DUMSCB	A binary variable that takes a value of 1 for the state-owned commercial bank, 0 otherwise.	N.A.	N.A.	Authors' Own Calculations
DUMPCB	A binary variable that takes a value of 1 for the private commercial bank, 0 otherwise.	N.A.	N.A.	Authors' Own Calculations

EMPIRICAL RESULTS

Profit Efficiency of the Bangladesh Banking Sector: Evidence from Specific Years

Table 4 shows the mean level of profit efficiency for the Bangladesh banking sector for specific years from 2004 to 2011. The results seem to suggest in 2004, the profit efficiency was the highest at 92.9%, while the lowest was during 2009 at 82.4% (see Fig.2). In other words, the Bangladesh banking sector is said to have slacked if they fail to fully minimise costs and maximise revenues resulting in the existence of profit inefficiency. The empirical findings seem to indicate that the highest (lowest) level of profit efficiency (inefficiency) was attained in 2004 [84.0% (7.1%)], while the lowest (highest) level of profit efficiency (inefficiency) was recorded during 2009 [82.4% (17.6%)]. In essence, the empirical findings from this study indicate that on average, Bangladesh banks earned 92.9% in the year 2004, but only 82.4% during 2009 and lost the opportunity to make 7.1% and 17.6% more profit from the same level of inputs in 2004 and 2009.



Source: Authors' Own Calculations

Fig.2. Level of Profit Efficiency in the Bangladesh Commercial Banking Sector by Year

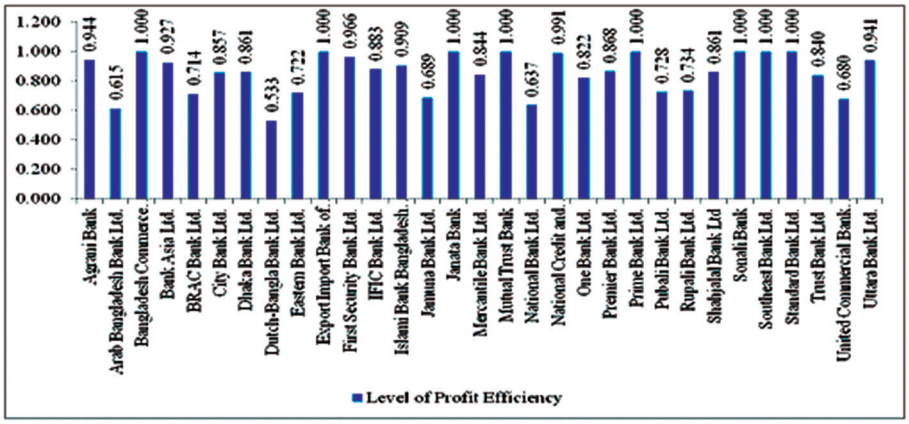
Profit Efficiency of the Bangladesh Banking Sector: Evidence from Specific Banks

The mean profit efficiency levels for specific banks during the years 2004 to 2011 are given in Table 4. The empirical findings seem to suggest that eight banks (Bangladesh Commerce Bank, Export Import Bank of Bangladesh, Janata Bank, Mutual Trust Bank, Prime Bank, Sonali Bank, Southeast Bank, and Standard Bank) exhibited the maximum profit efficiency level. This proves that these banks have not slacked in their intermediation function and have been successful to fully maximise revenues while minimising costs and subsequently attaining perfect profit efficiency.

TABLE 4
Summary on the Level of Profit Efficiency

Bank	2011	2010	2409	2008	2007	2006	2005	2004	Mean Bank
Agrani Bank	1.000	0.782	0.770	1.000	1.000	1.000	1.000	1.000	**0.944**
Arab Bangladesh Bank	0.612	0.625	0.667	0.556	–	–	–	–	**0.615**
Bangladesh Commerce Bank	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	**1.000**
Bank Asia	0.713	0.706	1.000	1.000	1.000	1.000	1.000	1.000	**0.927**
BRAC Bank	0.560	1.000	0.580	–	–	–	–	–	**0.714**
City Bank	1.000	0.714	–	–	–	–	–	–	**0.857**
Dhaka Bank	0.756	0.742	0.910	1.000	1.000	0.912	1.000	0.568	**0.861**
Dutch-Bangla Bank	0.551	0.639	0.483	0.487	0.463	0.568	0.630	0.446	**0.533**
Eastern Bank	0.704	0.739	–	–	–	–	–	–	**0.722**
Export Import Bank of Bangladesh	1.000	1.000	1.000	1.000	–	–	–	–	**1.000**
First Security Bank	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.725	**0.966**
IFIC Bank	0.989	0.781	0.620	1.000	1.000	0.674	1.000	1.000	**0.883**
Islami Bank Bangladesh	1.000	1.000	1.000	1.000	1.000	0.271	1.000	1.000	**0.909**
Jamuna Bank	0.456	0.645	0.747	0.588	1.000	0.824	0.913	0.342	**0.689**
Janata Bank	1.000	1.000	1.000	–	–	–	–	–	**1.000**
Mercantile Bank	0.663	0.757	0.700	0.858	0.815	1.000	0.963	1.000	**0.844**
Mutual Trust Bank	1.000	1.000	1.000	–	–	–	–	–	**1.000**
National Bank	1.000	1.000	0.613	0.656	0.344	0.532	0.445	0.506	**0.637**
National Credit and Commerce Bank	1.000	1.000	1.000	1.000	1.000	0.931	1.000	1.000	**0.991**
One Bank	0.731	0.780	0.734	0.670	0.701	0.962	1.000	1.000	**0.822**
Premier Bank	0.733	1.000	0.870	–	–	–	–	–	**0.868**
Prime Bank	1.000	1.000	1.000	1.000	1.000	1.000	–	–	**1.000**
Pubali Bank	0.809	0.809	0.876	0.852	0.697	0.614	0.639	0.529	**0.728**
Rupali Bank	0.474	0.554	0.620	0.534	1.000	1.000	1.000	0.688	**0.734**
Shahjalal Bank	0.754	0.513	0.622	1.000	1.000	1.000	1.000	1.000	**0.861**
Sonali Bank	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	**1.000**
Southeast Bank	1.000	1.000	1.000	–	–	–	–	–	**1.000**
Standard Bank	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	**1.000**
Trust Bank	1.000	1.000	0.437	0.705	0.575	1.000	1.000	1.000	**0.840**
United Commercial Bank	0.774	0.615	0.650	–	–	–	–	–	**0.680**
Uttara Bank	0.765	1.000	1.000	0.761	1.000	1.000	1.000	1.000	**0.941**
Mean Year	**0.840**	**0.852**	**0.824**	**0.855**	**0.885**	**0.871**	**0.929**	**0.840**	**0.857**

Fig.3 illustrates that United Commercial Bank 68% (32%), National Bank 63.7% (36.3%), Arab Bangladesh Bank 61.5% (38.5%) and Dutch-Bangla Bank 53.3% (46.7%) exhibited the lowest (highest) profit efficiency (profit inefficiency). The results indicate that these four banks earned the lowest of what was available and therefore greater loss of opportunity to make higher profits despite the fact that they were utilising the same level of inputs compared to their peers.



Source: Authors' Own Calculations

Fig.3: Level of Profit Efficiency in the Bangladesh Commercial Banking Sector: By Banks

Determinants of Profit Efficiency

In essence, the results from the first stage identify the levels of profit efficiency of the Bangladesh banking sector for the specific years and banks. In what follows, we proceeded to identify the determinants that could improve the profit efficiency in the Bangladesh banking sector. To do so, the five panel regression models presented in columns I to V of Table 5 were estimated. For Model I, which is the baseline regression model, all six bank specific variables namely LN(LLR/GL), LN(E/TA), LN(NII/TA), LN(NIE/TA), LN(LOANS/TA) and LN(TA) were included. In regression model II, the macro and market conditions variables, namely LN(GDP), LN(INFL) and LN(CR3) were introduced, while the bank specific variables were retained in the regression model. In regression model III, the DUMCRIS variable was included to control for the global financial crisis period. The DUMSCB and DUMPCB were introduced in regression models IV and V respectively to examine the impacts of ownership on the profit efficiency of banks in Bangladesh.

TABLE 5
Second Stage Panel Regression Analysis

Explanatory Variables	Model (I)	Model (II)	Model (III)	Model (IV)	Model (V)
CONSTANT	-0.807***	0.291	0.174	0.066	0.148
	(0.421)	(1.207)	(1.305)	(1.257)	(1.194)
Bank Specific Characteristics					
LN(LLR/GL)	0.057**	0.062**	0.062**	0.057**	0.057**
	(0.026)	(0.029)	(0.028)	(0.031)	(0.030)
LN(E/TA)	-0.010	0.032	0.031	0.050	0.050
	(0.036)	(0.059)	(0.060)	(0.066)	(0.064)
LN(NII/TA)	-0.087***	-0.091***	-0.091***	-0.074***	-0.074***
	(0.032)	(0.030)	(0.032)	(0.039)	(0.038)
LN(NIE/TA)	-0.046	-0.047	-0.046	-0.042	-0.042
	(0.066)	(0.071)	(0.070)	(0.072)	(0.069)
LN(LOANS/TA)	0.488**	0.555**	0.556**	0.675**	0.674**
	(0.189)	(0.220)	(0.226)	(0.268)	(0.259)
LN(TA)	-0.023**	0.021	0.020	-0.017	-0.017
	(0.012)	(0.040)	(0.041)	(0.051)	(0.050)
Macroeconomic and Market Conditions					
LN(GDP)	–	-0.414	-0.394	-0.351	-0.351
		(0.376)	(0.403)	(0.388)	(0.376)
LN(INFL)	–	0.054	0.064	0.052	0.052
		(0.032)	(0.064)	(0.028)	(0.027)
LN(CR3)	–	-0.039	-0.013	-0.077	-0.077
		(0.141)	(0.217)	(0.135)	(0.131)
DUMCRIS	–	–	-0.004	–	–
			(0.023)		
Ownership					
DUMSCB	–	–	–	0.082	–
				(0.059)	
DUMPCB	–	–	–	–	-0.082
					(0.057)
No. of Obs.					
R^2	0.074	0.089	0.088	0.100	0.100
Adj. R^2	0.039	0.037	0.030	0.043	0.043
Durbin Watson	1.324	1.324	1.330	1.331	1.331
F-statistic	2.144	1.707	1.524	1.742	1.742
Hausman test χ^2	11.056*	11.437	11.015	7.722	7.722

Note: The dependent variable is the profit efficiency derived from the DEA method. LN(LLR/GL) is a measure of bank's credit risk, calculated as the log of loan loss reserves divided by total loans. LN(E/TA) is a measure of banks capitalization measured by banks total shareholders equity divided by total assets. LN(NII/TA) is a measure of bank's diversification towards non-interest income, calculated as log of total non-interest income divided by total assets. LN(NIE/TA) is a measure of bank management quality calculated as log of total non-interest expenses divided by total assets. LN(LOANS/TA) is a measure of bank's loans intensity calculated as the log of total loans to bank total assets. LN(TA) is the size of the bank's total asset measured as log of total bank assets. LN(GDP) is the log gross domestic product. LN(INFL) is the log of rate of inflation. LN(CR3) is the log of the three largest banks asset concentration ratio. DUMCRIS is a binary variable that takes a value of 1 for the global financial crisis period, 0 otherwise. DUMSCB is a binary variable that takes a value of 1 for the state-owned commercial bank, 0 otherwise. DUMPCB is a binary variable that takes a value of 1 for the private commercial bank, 0 otherwise.

Values in parentheses are standard errors.
***, **, and * indicates significance at 1, 5 and 10% levels.

Table 5 presents results from the panel regression analysis. Before proceeding with the regression results, the Hausman test was employed to choose between the Random Effects Model (REM) and Fixed Effects Model (FEM). The results from the Hausman test given at the bottom of Table 5 clearly indicate that REM is preferable compared to FEM for the analysis (as observed, the null hypothesis failed to be rejected at the 1% or 5% significance levels). Therefore, for the purpose of this study, the work was proceeded with the analysis based on REM.

Concerning the impact of credit risk, it is interesting to find that the coefficient of LN(LLR/GL) has consistently exhibited a positive sign (statistically significant at the 5% level in all regression models), suggesting that banks with higher credit risk tend to report higher profit efficiency. The result is in consonance with the *skimping* hypothesis. To recap, Berger and DeYoung (1997) suggested that under the *skimping* hypothesis, a bank maximising the long-run profits might rationally choose to have lower costs in the short run by skimping on the resources devoted to loans monitoring, but bear the consequences of greater loan performance problems.

The coefficient of NII/TA has consistently exhibited a negative sign (statistically significant in all regression models at the 1% level). The results imply that banks which derived a higher proportion of its income from non-interest sources such as fee based services tend to be relatively less efficient in their intermediation function. The finding is in consonance with the earlier studies by among others Stiroh (2006a), Stiroh (2006b), and Stiroh and Rumble (2006). To recap, Stiroh and Rumble (2006) found that diversification benefits of the U.S. financial holding companies are offset by the increased exposure to non-interest activities, which are much more volatile, but not necessarily more profitable than interest generating activities.

Referring to the impacts of bank's loan intensity, it was found that LN(LOANS/TA) is positively related to the profit efficiency of banks operating in the Bangladesh banking sector. The liquidity risk arises from the possible inability of banks to accommodate declining liabilities or to provide funds on the assets' side of the balance sheet. This is considered an important determinant of the banks' efficiency. Higher expected return is expected to be generated from the risky loan market (bank's asset). Thus, a higher liquidity is required to fund large loans in order to increase the profitability of the banks and this implies that liquidity has a positive relationship with banks' profit efficiency (Sufian, 2009). Within the context of the Bangladesh banking sector, the findings imply that banks with higher loans-to-asset ratios tend to be relatively more efficient in their intermediation activities. Thus, bank loans seem to be more highly valued than alternative bank outputs such as investments and securities.

It was also found that the coefficient of the DUMCRIS variable entered the

regression model with a negative sign, but is not statistically significant at any conventional levels. To some extent, the results provide support to the arguments that the impact of the global financial crisis has no significant influence on the profit efficiency of banks operating in the Bangladesh banking sector. Unlike the banking sectors in the western and developed countries which are more developed and are widely involved in financial engineering techniques and products, banks operating in the Bangladesh banking sector focus more on agricultural based financing activities and products.

The empirical findings given in column IV of Table 5 seem to suggest that the coefficient of DUMSCB exhibits a positive sign. To some extend, the empirical findings suggest that the state owned commercial banks tend to be relatively more profit efficient compared to their private and foreign owned commercial bank counterparts. However, the results need to be interpreted with caution since the coefficient of the variable is not statistically significant at any conventional levels. Similarly, it can be observed from column V of Table 5 that the coefficient of DUMPCB entered the regression model with a negative sign, but not statistically significant at any conventional levels.

CONCLUSION

To date, studies on bank efficiency are numerous. However, most of these studies have concentrated on the banking sectors of the western and developed countries. On the other hand, empirical evidence on the developing countries is relatively scarce and the majority of these studies focus on the technical, pure technical, and scale efficiency concepts. The present study attempts to fill in this demanding gap and provides new empirical evidence on the profit efficiency of the Bangladesh banking sector during the period of 2004 to 2011. The present study consists of two stages. In the first stage, the non-parametric Data Envelopment Analysis (DEA) method was employed to measure the level of profit efficiency of individual banks operating in the Bangladesh banking sector. In the second stage, panel regression analysis was used to examine the determinants of the profit efficiency of Bangladesh banks.

The empirical findings from the first stage indicate that the Bangladesh banking sector exhibited the highest profit efficiency level in 2004, while profit efficiency seemed to be at the lowest level during 2009. It was found that Bangladesh Commerce Bank, Export Import Bank of Bangladesh, Janata Bank, Mutual Trust Bank, Prime Bank, Sonali Bank, Southeast Bank, and Standard Bank have exhibited a perfect or 100% profit efficiency level. On the other hand, United Commercial Bank, National Bank, Arab Bangladesh Bank, and Dutch-Bangla Bank were shown to be the least profit efficient banks during the period under study.

The results from the panel regression analysis indicate that banks with higher credit risk tend to report higher profit

efficiency, which is in line with the *skimping* hypothesis. Similarly, a negative relationship was found between bank profit efficiency and the level of liquid assets held by the bank, implying that banks with higher loans-to-asset ratios tend to be relatively more efficient in their intermediation function. The empirical findings seem to suggest that banks which derived a higher proportion of its income from non-interest sources such as fee based services tend to be relatively less efficient in their intermediation function. It could be argued that non-interest activities may expose banks to excessive volatility, but may not necessarily be more profitable compared to interest generating activities.

The empirical findings from this study clearly call for regulators and decision makers to review the profit efficiency of banks operating in the Bangladesh banking sector. This consideration is vital because profit efficiency is the most important concept which could lead to higher or lower profitability of the banking sector. Hence, to improve the performance of banks, regulators may need to employ and exercise the same information technologies, skills, and risk management techniques which are applied by the most efficient banks.

The results could also provide better information and guidance to bank managers, as banks need to have clear understanding of the impact of profit efficiency on the performance of the banks. Thus, banks operating in the Bangladesh banking sector have to consider all the potential technologies which could improve their profit efficiency levels since the main motive of banks is to maximise shareholders' value or wealth through profit maximization.

Furthermore, the results from this study may have implications for investors whose main desire is to reap higher profit from their investments. By doing so, they could concentrate mostly on the potential profitability of the banks before investing. Therefore, the findings of this study may help investors plan and strategise on the performance of their investment portfolios. Thus, it is reasonable to suggest that wise decisions investors make today will significantly influence the level of expected returns in the future.

Finally, the findings of this study are expected to contribute significantly to the existing knowledge on the operating performance of the Bangladesh banking sector. Nevertheless, the study has also provided insights into the bank's specific management, as well as policymakers with regard to attaining optimal utilization of capacities, improvement in managerial expertise, efficient allocation of scarce resources, and the most productive scale of operation of commercial banks operating in the Bangladesh banking sector. This may also facilitate directions for sustainable competitiveness of the Bangladesh banking sector operations in the future.

Due to its limitations, the paper could be extended in a variety of ways. Firstly, future research could include more variables such as taxation and regulation indicators,

exchange rates, as well as indicators of the quality of the offered services. Secondly, in terms of methodology, the non-parametric Malmquist Productivity Index (MPI) method could be employed to investigate changes in productivity over time as a result of technical change or technological progress or regress could yet be another extension to the present paper. Finally, future research into the efficiency of the Bangladesh banking sector could also consider the production function along with the intermediation function.

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The US Exchange Rate Behavior: An Advanced Test on Price Parity Theorem

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ABSTRACT

We researched a significant topic on exchange rate behavior by restating the test procedures in a novel manner and applying an appropriate econometric methodology to re-examine exchange rate behavior of the US economy. The central research question is: Do inflation differences across two economies fully account for exchange rate changes, if controls for non-parity factors are embedded while controlling for interest rate differences? The results affirm, for the first time, that price parity factor holds well while other factors - interest rates *and* non-parity factors – also affect exchange rates significantly. Our tests also identifies the time to equilibrium to be 0.139 (13.9%) per quarter to adjust to equilibrium value. In our view, these findings extend our knowledge of how the US dollar behavior is consistent with parity *and* non-parity theorems. Prior tests have been inconclusive on parity factors. The Malaysian Ringgit is heavily dependent on the US dollar exchange rate, and our findings thus have monetary policy implications for the Malaysia's regulators.

Keywords: Price parity, Exchange rate, Speed of adjustment, Non-parity factors, Interest rates, ARDL
JEL Classification: F23, F31, G12

INTRODUCTION

This research report provides new findings that, for the first time, affirm strong evidence supporting the two parity theorems as affecting the exchange rate. That is, both prices and relative interest rates have significant effects on the nominal exchange rate of the United States (US) currency. We used a very long time series covering 213 quarters. The novel idea tested in this report is to incorporate recently-suggested non-parity factors (Ho

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& Ariff, 2012) as control variables in the test model using the traditional parity factors, namely, inflation and interest rates. Several theories that exist in international finance literature predict how exchange rates are determined, although, to-date, there is little support in almost all studies for the prediction that inflation has a significant effect on exchange rate: some writers have termed this a 'puzzle' (Bergin, Glick, & Taylor, 2006).

This then calls for a novel approach to re-examine the exchange rate pricing behavior using a long-length time series and more up-to-date appropriate methodology. This paper explains this new approach, the appropriate models and the resulting findings. Given the heavy dependence of the Ringgit Malaysia (RM) on US exchange rate behavior, identifying the factors that determine exchange rate has monetary policy implications for the local economy. RM has depreciated at the rate of 5.1 per cent per annum since the onset of the Asian Financial Crisis; this underlines the importance of how price and interest rate differences could affect any currency.

The focus of this paper is on two major theories on exchange rate determination: Purchasing Power Parity (1918) or PPP on inflation and International Fisher Effect (1930) or IFE on interest rates. Despite the fact that these theories have been studied and tested, as well as entrenched in practical policy decisions at macro and micro-levels in a variety of contexts, there is still a lack of support for the theory-predicted results. (i) Does PPP factor affect exchange rate; (ii) Does interest rate (IFE) affect exchange rate; and (iii) Do PPP and IFE hold if controls for the already-known non-parity factors are embedded in our tests? We added to the traditional factors of parity conditions, the recently theorized and tested non-parity factors in this research.

The rest of the paper is organized into five sections. The next section is a very brief statement of the theories on exchange rate behavior from the vast literature on this topic. The third section provides a quick summary of the empirical literature that appears to suggest that there is still lack of evidence to support the PPP theory predictions. The data sources and tests are explained in the fourth section. The findings are reported in the fifth section and the paper ends with a summary in section 6.

EXCHANGE RATE THEORIES

Existing literature and respected financial press reports suggest large variation in several currency exchange rates under the free-floating system, which started in earnest in 1973 after the breakdown of the 1946 Bretton Woods Agreement. Thus, researchers have begun to re-examine the exchange rate behavior again, especially after the 2008-9 Global Financial Crisis (GFC) after which event, the volume in currency trades has jumped almost 60 per cent to the US$5.3 trillion a day. There is renewed interest on exchange rate determination in both theoretical and empirical literature. Under the monetarist

approach of exchange rate determination, PPP (Cassel, 1918) and IFE (Fisher, 1930) are assumed to fully explain how currency exchange rates are determined. Recent researchers have added a few non-parity factors, as explained before, to the parity factors from the monetary theories.

No evidence is available that PPP holds in the short-run although using a novel approach, one study (Manzur & Ariff, 1995) provides support for just long-run equilibrium. Meanwhile, there is ample support in the literature for IFE effect on the exchange rate (Edison & Melick, 1999). Hence, the literature relevant to this study is on inflation and interest rate differences, as well as known non-parity factors. Our review of literature that follows is limited to these factors.

Purchasing Power Parity

PPP suggests that the exchange rate is periodically affected by the relative price differences in traded goods/services across any two trading partner countries (Cassel, 1918). PPP is often said to have originated in earlier Spanish literature on inflation during the periods of gold importation from the New World. The theory examines the relationship between exchange rates across different countries. It asserts that inflation, measured as price differentials across any two trading countries, should be offset by exchange rate changes: it does not specify the time to equilibrium. Hence, any two identical goods produced in any two countries are said to have a similar base price, as stated by *the law of one price* for the same basket of goods traded across any two economies with different currencies.

Scholars in international finance and macroeconomics have found PPP's potential for a wide range of applications especially in the post-Bretton Woods era. It also provides a basis for international comparison of income and expenditure under an equilibrium condition, given an efficient arbitrage in goods traded. Most importantly, it is a theory for short-run as well as long-run exchange rate determination, whereby the authorities would set or steer a nominal exchange rate that satisfies international competition.

The relative version of PPP states that a country's currency will be adjusted based on the ratio of the rate of inflation and the trading partner's inflation rate. Subject to periodic fluctuations of real exchange rates, there is a possibility for the relative PPP to hold in the long-run but not the short-run, some arg.

This study used the relative version of PPP as in the following equation:

$$\ln E_{jt} = a_j + b_j ln\left(\frac{P_t^d}{P_t^f}\right)_{jt} + \mu_{jt} \qquad (1)$$

where, E is the Exchange rate of country over time period, is the Domestic prices and Foreign prices.

International Fisher Effect

A linkage between interest rate and inflation is postulated in the so-called *theory of interest* (Fisher, 1930) which predicts that the nominal interest rate is equal to the summation of real interest and expected

inflation rates dubbed the Domestic Fisher Effect. There is a further prediction that such a behavior will also lead to the interest rate differences between any two nations as a corresponding change in the nominal exchange rate. The relationship between interest rates and inflation is one to one, assuming a world of perfect capital mobility with no transaction costs involved: this effect is normally considered instantaneous. This hypothesis plays a crucial role, given the fact that, subject to the correlation between real interest rate and inflation, the nominal interest rate will not be fully adjusted after a change in the expected inflation (Levich, 2011). A large number of studies have been conducted on the IFE theory. The early studies go back to the 1980s. Yet, there is evidence of several mixed results concerning IFE.

As a general rule, the law of one price in the PPP holds, when there is equilibrium in foreign exchange market, deposits of all currencies possess an identical rate of return. Any change in a country's interest rate will create disequilibrium in its currency requiring long-term adjustments of the other country's exchange rate to restore the new equilibrium. In other words, the ratio of changes in exchange rates is determined by the ratio of domestic (superscript d) to foreign interest rate (relative interest rate, superscript f), as shown in the following equation:

$$\frac{E_{t+1}}{Et} = \left(\frac{1 + i_t^d}{1 + i_t^f} \right) \qquad (2)$$

Accordingly, IFE states that the interest rate differences across countries are unbiased predictors of any future changes in the spot nominal exchange rates. Tests on this theorem suggest that the interest rate differences are correlated significantly with exchange rate changes, although most tests show that, due to under-specification of the relationship, the explained variation in such tests is very low as shown by low R-squared values, which is also due to variable specification issues. Hence, there is also a need to re-examine if such test results are due to simpler methodology used in prior research.

Non-Parity Factors

There have been several important studies exploring if one or more non-parity factors is/are also relevant for exchange rate movements, given the lack of explanatory power of the monetary theorems with two parity conditions. Frankel and & Rose (1996) suggested trade balances, while Canzoneri, Cumby, and Diba (1999) suggested productivity changes as significant exchange-rate-relevant factors. Several other such factors were tested in the study identifying three key non-parity factors as being relevant to theory-building on exchange rates. Hence, this study incorporated these and other already-identified significant non-parity factors as the control variables in the tests of parity theorems.

Thus, it is believed that the introduction of a more fully-specified model will lead to robust results on exchange rate behavior compared to the existing US studies that

are limited to only the parity factors. Obviously, the differences in the behavior of US exchange rate may well be due to the changes in the underlying non-parity factors. Hence, the resulting findings may provide fresh insights into the very old issue of parity factors.

EMPIRICAL EVIDENCE ON PARITY THEORIES

Purchasing Power Parity

A seminal paper (Baharumshah & Ariff, 1997) showed that the purchasing power parity does not hold in the case of few currencies, including that of Malaysia. That finding is similar to the findings in most of the literature to-date, which prompts the question why. As the nominal prices are unstable or may also be sticky (i.e., prices take time to change; Dornbusch, 1976) and the nominal exchange rates are subject to wide fluctuations as the result of volatilities in flows of capitals, goods and services, the short-run equilibrium is often explained as not likely to hold. However, several empirical concerns have risen about this position in the literature. For example, if interest rates, which are also subjected to other effects, are holding in short-run, why is there lack of evidence for similar behavior for inflation? The mixed evidence in support of PPP equilibrium can be attributed to the models used for exchange rate determination and perhaps also to the sources of disturbances to real exchange rate.

A large number of studies in the late 1970s failed to validate a significant PPP relationship, mainly due to the non-stationarity nature of the residuals, as we have come to discover since the 1980s, given the advances in econometrics that identified non-stationarity as a factor introducing biased estimates. In particular, while these studies failed to confirm the unit root or the stationarity property of the residuals, the relationship between the respective variables (nominal exchange rates and relative prices) was mis-measured resulting in spurious regression parameters. The basic empirical studies on PPP before the 1980s were mostly concerned about the tests on absolute PPP with results rejecting the PPP hypothesis. The most influential study of this type (Frenkel, 1976) obtained estimates of respective coefficients that would not suggest a rejection of the null hypothesis, even considering that the sampled countries in the study were among high inflation economies.

Accordingly in the early1980s, research began to test for stationarity using a newly developed unit root test (Dickey-Fuller's ADF test). The ADF test, despite its revolutionary resolution of the problem, still failed to strongly support the presence of significant PPP in nearly all studies of unit root tests using cross country data for the free floating period, except a few studies on long-run PPP behavior, given that the real exchange rate deviations from its mean value are only temporary in nature. Such a failure was basically attributed to the limited power of the tests employed, especially in small samples using the simulation exercises (Levin & Lin, 1992).

Towards the end of 1980s, researchers attempted to overcome the problem of low power of tests by taking advantage of long horizon data. By using an error-correction model (Edison, 1987) researchers analysed the dollar-Pound Sterling data over 1890-1978 and found slightly higher degree of significance for PPP. Consistent with that study, a large number of other studies in the early 1990s attempted to test for PPP reliability over longer time horizons (something we also did in this study), while also using a number of recently-developed yet applied new and sophisticated methods such as cointegration, variance decompositions, fractional integration, as well as error correction models. The results of these studies favoured the PPP predictions: these also supported the real exchange rate mean-reverting behavior (Rogoff, 1996). Mollick (1999), using data for Brazil, analysed long-time period data over 1885 to 1990. The results, however, were mixed; the unit root hypothesis was not rejected by the formal unit root tests, while the trends of time series favoured a stationarity of the variables. Autoregressive processes used in the model yielded robust and satisfactory estimation of the real exchange rate compared with regression methods.

Consistently, Lothian & Taylor (1996) applied the annual real exchange rate data of Franc-Sterling and Dollar-Sterling for a total of two centuries. The results over such a long time period were satisfactory, rejecting the null hypothesis of unit root test for PPP using both ADF and Phillips-Perron (PP) test (Phillips & Perron, 1988). Also, in a separate study, Lothian & Taylor (2000) supported their belief about the PPP reliability over long run and used a method of faster estimation of mean reversion speed for the real exchange rate. Meanwhile, Andersson & Lyhagen (1999) developed a panel unit root test, through which the null hypothesis of no co-integrating relationship between the domestic and foreign price levels was rejected for some of the sampled countries. Using a relatively similar small sample as the one applied by Andersson & Lyhagen (1999), with long-time horizon for real exchange rate data of 21 countries, Shively (2001) found evidence of consistent PPP relationship to add up another satisfactory result for longer time periods.

Concerning the results obtained supporting the PPP, after three decades of floating exchange rates, there is still evidence from various studies that the strong prediction of PPP is not borne out in tests for either short or long run. Failure to support PPP's predictive power has been termed the "PPP Puzzle" in a recent paper (Bahmani-Oskooee *et al*., 2009).

International Fisher Effect

The relationship between real interest and real exchange rates (that is after inflationary effect is removed) is highlighted in several studies using post-Bretton Woods data. One primary and yet well-known model of exchange rate is the sticky price model of Dornbusch (1976), which suggests that under a flexible exchange rate framework,

prices of goods in a country are subject to slower (stickier) adjustments than those of capital assets, thus initiating arbitrage opportunities in the short-run, as suggested by IFE (see Manzur & Ariff, 1995, identifying the time periods for stickiness).

Apart from these models, there is evidence of several important studies on the correlations of real interest and exchange rates with several different assumptions. Mishkin (1984) considers the equality of real interest rates across a sample of major economies unlike the finance theory which indicates that risk premium for comparable securities in different currencies of denomination may differ from each other. Likewise, Mark (1985) tests for the conditions of high capital mobility and equality of short term *ex ante* real interest rates and net of tax real rates among flexible and specific market-linked exchange rates. The results are consistent with those of Mishkin in that the IFE hypothesis of parity conditions was rejected considering its joint relationship with the *ex-ante* PPP.

Large number of critics made obvious conclusions that there is lack of support for some of the theories concerning their validity with a view that the cointegration of real returns are not tested in Mark & Mishkin's study. Other studies tried to control for the drawback by introducing tests of cointegration. Notably, the two-step method of Engle-Granger test of co-integration was applied in several preliminary studies in the late 1980s and in the early 1990s in order to examine how the real exchange rates are cointegrated with real interest rates. Examples include Edison & Pauls (1993), and Throop (1993), all of which failed to support a significant (possibly long-run) co-integrating relationship between the respective variables. After applying the maximum likelihood estimation method for the Johansen co-integration test, the results became somewhat more favourable supporting the theory (Johansen & Juselius, 1992; Edison & Melick, 1999).

Similar to PPP, there is evidence in several empirical studies that long-run relationship between exchange rate and interest rate difference appears to hold well (Hill, 2004). On the other hand, in the short-run, the IFE has not been proven to hold (Cumby & Obstfeld, 1981). Such mixed evidence motivated us to re-test the IFE hypothesis.

Non-parity Factors

While these theories are generally treated as general equilibrium conditions - known as parity theorems in monetary economics framework - researchers have recently identified, as mentioned earlier, a number of other-than parity factors as influencing exchange rates. Given the lack of strong evidence for a complete explanatory power of parity factors as determinants of exchange rate behavior, these so-called 'non-parity' factors are gaining significant popularity in recent years in exchange rate studies.

The level of international reserves of a country is one of the significant

determinants of exchange rates (Frankel & Rose, 1996); this comes from the Philip's Curve effect long observed in international economics studies. A country's currency is subject to movements as a result of unexpected changes in foreign reserves held by the central authority to service the trade bills arising from international trade and also from the use of reserves to defend currency during crisis periods. Hence, there is a direct relationship between the currency value and any sort of unexpected changes in the country's reserve or even the level of foreign currency debt. The relationship between level of international reserve and currency value has been tested by a number of scholars (Martínez, 1999; Marini & Piersanti, 2003). They showed a significant association between the respective variables.

The level of capital flows also plays a crucial role in determining the behavior of exchange rates. The accessibility to cash from capital markets has become easier because of new rules and regulations and general reduction of capital controls leading to improved globalisation of cash flows. This is partly relevant to exchange rates, given the freedom in global flows of capital. There are several studies that have identified significant relationship between the level of capital flows and exchange rate changes. Examples are the studies of Kim (2000), Calvo, Izquierdo, & Talvi (2003), and Rivera-Batiz & Rivera-Batiz (2001).

RESEARCH DESIGN, VARIABLES, HYPOTHESES AND MODELLING

This research was designed to investigate whether a relationship between exchange rates and parity variables exists, with and without controls for non-parity variables specified in the test models. The data series on variables (exchange rate, inflation, interest rate differences, non-parity factors) are from the US and UK data sources. In this study, a long period starting from the pre-floating era of 1960 to 2014 was used, with a 55-year data set. "What are the factors that had significant influences on the US$ rate" is the research question.

The test model was developed by specifying inflation and interest rate differences as parity factors on the right-hand side, and then in repeated tests introducing control variables, which are non-parity factors. In such a full model that was developed, a single regression could do for tests, while also re-estimating the effects of parity and non-parity factors.

We believe that this approach has yielded new insights into how: (i) exchange rates behave differently and (ii) the validity of non-parity factors for the US$ exchange rate. During the test periods, both US$ and the British pound (GBP) played significant roles as international currencies.

Data, Variable Transformation and Testing

The data employed in this study are Nominal Exchange Rate (NER), Consumer Price Index (CPI), short-term risk-free

(Treasury) interest rates, Total Reserve, Population, Total value of imports, Current Account Balance, GDP, and Total value of exports. The GDP data were used to standardise other variables. The series are quarterly dated from 1960 to 2014. Table 1 provides a summary of the variables, with their expected signs in the tests.

TABLE 1
Variable specification, definitions and expected signs

No.	Variables	Definition	Expected Sign
1.	LNER	Log of Nominal Exchange Rate over time periods	Dep Variablea
2.	LCPI	Log of Prices over time periods	+
3.	IFE	(1+ Short-term Domestic Interest Rate) / (1+Short-term Foreign Interest rate)	–
4.	CA/GDP	Current Account Balance / GDP	+
5.	TTrade/GDP	Total Exports and Imports / GDP	+
6.	Productivity	GDP / Population	+

Note: [a]Dep. Variable stands for Dependent Variable

The major sources of data included *the International Financial Statistics* (IFS) CD-ROM, *Thomson Reuters DataStream*, and the *Capital IQ* database. The Consumer Price Index (CPI) was used as a proxy for measuring the purchasing power parity. The CPI measured the prices of a basket of goods available in each country: the US and the UK. The theory of international Fisher Effect was measured according to short-term risk free interest rates (Treasury bills) for the US dividing by the corresponding interest rate for the UK as a measure for the foreign interest rate.

Hypotheses

The maintained hypothesis is that the two parity variables in the monetary economics theory should hold provided that: (a) the data series are long enough with appropriate specifications, (b) the parameter estimation is done with robust test methods, and (c) non-parity factors are embedded in the tests. Prior research has failed to satisfy these special conditions needed to measure and test the parity theorems.

H1: The null hypothesis is that the price differences across traded countries are not likely to affect the nominal exchange rate of a country. We expect to reject this null hypothesis to support the PPP theory;

H2: The null hypothesis is that the real interest rate differences across two countries are not likely to affect the exchange rate of a country. Rejection of this will support the IFE prediction; and

H3: The null hypothesis is that the non-parity factors recently found to affect nominal exchange rates are not significantly correlated with the nominal exchange rates of the US. Rejecting this null would suggest that the controls introduced in our tests are significant factors for exchange rate determination.

These three testable hypotheses will be verified by the usual t-tests on the parameters on those factors in the test models. There are other tests which will report on preparation of data series, and in assuring the assumptions of the tests are not violated.

Modelling

The first model for the exchange rate is based on a single equation which includes a number of parity and non-parity factors. The following equation was used to test the basic relationship among the variables, and to obtain base estimates, which will be later compared with more advanced tests.

$$ln\left(\frac{NER_t^d}{NER_t^f}\right)_t = \gamma_1\left(\frac{1+i_t^d}{1+i_t^f}\right)_t + \gamma_2 ln\left(\frac{CIP_t^d}{CIP_t^f}\right)_t + \gamma_3\left(\frac{TTrade}{GDP}\right)_t + \gamma_4\left(\frac{CA}{GDP}\right)_t + \gamma_4\ Prodty_t + \varepsilon_t \quad (3)$$

where NER represents the Nominal Exchange Rate, denotes the Domestic Interest Rate, is the Foreign interest rate, as in the Eq.(2), stands for the Consumer Price Index, as in the Eq. (1), $\frac{TTrade}{GDP}$ represents the total trade as a proxy of total trade (export and import) over Gross Domestic Product (GDP), is ratio of current account balance over GDP, and *Prodty* is Productivity measured as GDP over total population, over time.

As a general rule, the validity of co-integrating series is determined by investigating the order of the variable integration, which by definition, should be similar. One may note that an equilibrium long-run relationship exists between variables (say exchange rate and parity conditions) if the variables are integrated of the same order. Thus, two series are said to be co-integrated if they move in one direction over the long-run. One popular approach for this purpose is the Auto Regressive Distributed Lag (ARDL) with a bound test to examine the long-run and the short-run relationships among variables (Pesaran & Shin, 1997; Pesaran, Shin, & Smith, 2001). Under this approach, a number of variables with different orders of integration can also be applied.

In order to ascertain the existence of co-integration, a bound test was conducted. Using this approach, the simultaneous modelling of long-run and short-run dynamics in a conditional ARDL-ECM framework can be done. In order to verify the existence of long-run relationship, the critical values proposed by Pesaran *et al*. (2001) were used by comparing the calculated F-statistics from the pre-determined lower and upper bound measures. Finding the two series to be cointegrated in the long-run would indicate that there is error-correction (ECM) and convergence of the series in the long-run. The ECM estimate would therefore indicate the long-run dependence of the two series.

FINDINGS

In this section, the results are presented and the reasons why these results are significantly different from the published studies are discussed. The central research question is: Do relative prices *and* relative interest rates have significant impacts on nominal US$ exchange rate when controls for non-parity factors are embedded in the models applied?

Descriptive and Diagnostic Statistics

Table 2 is a summary of descriptive statistics on the variables used in this study. To confirm the order of the integration of time series, two unit root tests were conducted using the augmented Dickey-Fuller (ADF: Dickey & Fuller, 1979, 1981) and the Phillips & Perron (1988) (Henceforth PP) tests. The ADF model can be very useful in identifying higher order serial correlation in conjunction with higher order lags. The Phillips & Perron (1988) test allows for relatively weak assumptions regarding the distribution of the residuals in the equation.

TABLE 2
Descriptive statistics of the variables in the tests

Basic descriptive statistics of the variables are provided in this table. [a]'Mean' represents the average or the mean value; [b]SD represents standard deviation; [c]Skew represents skewness; [d]Kurt denotes kurtosis; [e]JB stands for Jarque-Bera test.

Quarterly Data Series	Mean[a]	SD[b]	Skew[c]	Kurt[d]	JB[e]
NER (Dependent)	0.6478	0.2312	0.3822	1.9122	15.6884
CPI	0.1812	0.2822	0.8585	1.9942	35.1404
RIFE	-0.0011	0.0112	1.7257	11.7569	786.2976
TTRADE	0.0351	0.0126	-0.0495	2.1574	6.3870
CAGDP	-0.0145	0.0180	-0.3762	1.8236	17.3051
Productivity	21,922.4	15,803.3	0.4275	1.8331	18.5710

These statistics suggest that the means of the variable are very close to zero in most cases because of data transformation, except for the variable, Productivity, which is a large value. The first two variables (Exchange rates: LNER) and the inflation (LCPI) are *ln* of the variables. The relative real interest rate is the ratio of two-country interest rates expressed as explained earlier. The non-parity variables are after standardization by GDP.

These statistics suggest that the variables are likely to be stationary. The JB tests show that one variable has issue (RIFE). Since the tests are going to be done with ARDL, this is not a problem for the reliability of the test results. The results reported in Table 3 suggest that

most of the series are integrated of order one and the degree of integration of all of the series are not identical. Examining the results in Panel B, it is observed that all the tests show stationarity of the series. The levels data are not stationary, except in the cases of interest rates (RIFE) and total trade (TTRADE). Hence, these series to be used for ARDL satisfies the necessary condition for reliable test results.

TABLE 3
Results on data transformation (unit root tests)

Table below reports the statistics on stationarity of data series. The statistics suggests that most of the data are stationary at first difference, which is judged by the respective ADF and PP tests of unit root.

	Augmented Dickey Fuller (ADF)		Phillips Perron (PP)	
Panel A	**Level**			
Variable	**Constant Without Trend**	**Constant With Trend**	**Constant Without Trend**	**Constant With Trend**
NER	-1.87	-2.26	-1.892	-2.45
	(14)	(14)	[3]	[4]
RIFE	-3.34**	-3.56**	-13.29***	-13.43***
	(14)	(14)	[10]	[10]
PPP	-1.96	-0.88	-2.20	-0.60
	(14)	(14)	[10]	[10]
TTRADE	-0.65	-4.09***	-0.58	-3.25*
	(14)	(14)	[8]	[6]
CAGDP	-1.36	-2.24	-1.40	-2.44
	(14)	(14)	[2]	[3]
Prodty	2.11	2.35	3.23	-2.47
	(14)	(14)	[9]	[8]
Panel B	**First Difference**			
NER	-11.39***	-11.38***	-12.68***	-12.65***
	(14)	(14)	[1]	[0]
RIFE	-10.84***	-10.82***	-43.85***	-43.72***
	(14)	(14)	[7]	[7]
PPP	-4.06***	-4.44***	-13.21***	-13.33***
	(14)	(14)	[11]	[10]
TTRADE	-9.26	-9.24	-10.05***	-10.23***
	(14)	(14)	[14]	[14]
CAGDP	-13.39***	-13.36***	-13.39***	-13.36***
	(1)	(1)	[1]	[1]
Prodty	-5.13***	-5.85***	-7.87***	-98.79***
	(14)	(14)	[7]	[6]

Note: *** and ** denote significant at 1% and 5% significant levels, respectively. The figure in parenthesis (…) represents optimum lag length selected based on Akaike Info Critirion. The figure in bracket […] represents the Bandwidth used in the KPSS test selected based on Newey-West Bandwidth criterion.

OLS Test Results

The first model tested is a multiple regression on the series using the dependent variable, the exchange rate, to examine its correlation with independent variables on the right-hand side. Table 4 provides a summary of the results for the set of data over the entire period of study. The OLS model is not fully appropriate because it does not take into account the distributed lag effects and the long-run effect can only be captured by alternative models such as ARDL. It is important to note that, unlike the other studies, the entry of one lag of the dependent variable is statistically significant.

TABLE 4
Ordinary least square result

Ordinary Least Square Dependent Variables = NER	Overall Sample 1960-2014	
Intercept	0.009	(0.31)
NER(-1)	0.877	(24.52)***
PPP	0.127	(3.27)***
RIFE	-0.607	(-1.89)*
TTRADE	1.864	(1.77)*
CAGDP	-0.327	(-0.84)
PRODTY	-0.0000001	(-1.55)
Observations	212	
Adjusted R-Squared	0.96	

Note: Figures in parentheses represent the t-statistics. *** Represents null hypothesis rejection at 1%; ** Represents null hypothesis rejection at 5%, and* Represents null hypothesis rejection at 10% degree of significance.

Since PPP is known to affect the dependent variable (given its stickiness), specifying the lag somewhat controls for this effect. Now, the long-run relationship of the exchange rate and the five independent (2 parity, and 3 non-parity factors) are tested. The computed F-value, the likelihood ratio and Lagrange multiplier are used for testing the long-run relationship. Pesaran, Shin and Smith (2001) provide critical values for the bound tests.

If the calculated F-statistics (F(6,186) = 3.94) reported in Table 5 is greater than the upper bound at 5 percent and 10 percent degree of significance, then we have support for the theory. These procedures satisfy (long-run) co-integrating relationship between the variables under consideration. The other parameters also affirm the model as relevant for a long-run relationship between the five independent variables on the exchange rate.

TABLE 5
Results of Bound tests

In this table, k is the number of variables; the maximum lag identified is 2; the tests identified the upper and lower bounds at three levels of significance as shown in the table.

NER = f (PPP, IFE, TTRADE, CAGDP, PRODTY)		**F-Statistic (6,186)** = 3.9359** k=5, n=55 Lag = 2	
Pesaran *et. al* (2001) Critical Value		Lower Bound I(0)	Upper Bound I(1)
	99% Level	3.41	4.68
	95% Level	2.62	3.79
	90% Level	2.26	3.35
Lagrange Multiplier Statistic		23.6585***	
Likelihood Ratio Statistic		25.1006***	

Table 6 provides a summary of the results from the ARDL tests. The model shows that the R-squared value is very high (96.38 per cent), indicating the extent to which the factors explain the variation in the exchange rate in the US; both parity factors are significant and one of the three non-parity factor is significant, while the other two are not significant.

Two parity variables (inflation from PPP and relative interest rate from IFE) were found to be significant. Note the PPP coefficient is close to -1 (-0.89) and the effect of real interest rate in the IFE is measured as 4.59. These are excellent estimates, consistent with the higher impact of IFE and lower impact of PPP on nominal exchange rate. Also note that, unlike in the prior tests, the real interest rate was used by subtracting inflation from interest rate in these tests; this helps to remove the inflation element embedded in the IFE variable. In the long run, the control variables appear to be insignificant.

Thus, with the necessary data transformation and appropriate modeling, *a full support was obtained for parity theorems (PPP and IFE) for the first time*. These results make sense as some scholars have discovered evidence of long-run relationship mostly for IFE, while only a scant number of studies (such as those on

TABLE 6
Long run Relationship and Diagnostics Tests

NER	**PPP**	**RIFE**	**TTRADE**	**CAGDP**	**PRODTY**	**Intercept**
-1.00	-0.893	4.586	-7.792	-0.160	0.000003	-0.270
	(-5.23)***	(1.95)*	(-1.09)	(-0.05)	(0.69)	(1.38)

Test	LM Version	P-Value	F-Version	P-Value
Serial Correlation	CHSQ(4) = 10.501	0.033**	(4, 197) = 2.5925	0.038**
Functionality	CHSQ(1) = 0.0009	0.976	(1, 200) = 0.0008	0.977
Normality	CHSQ(2) = 9.0478	0.011**		
Heteroskedasticity	CHSQ(1) = 3.4088	0.065**	(1, 208) = 3.4320	0.065**
	R-Squared = 0.9638		**DW-Statistic = 2.02**	

half-life; Divisia methods; long-interval data series) showed PPP to hold in the long run. The diagnostics tests provided in the Table 6 are seriously needed in order to obtain these results.

The ARDL framework has shown to be robust against any symptom of serial correlation among the residuals. Thus, it can be noted that the presence of serial correlation does *not* impact the estimators as long as our concern is about ARDL (Laurenceson & Chai, 2003). The functionality test or the stability test is supported by its critical value. The heteroskedasticity and non-normality are natural under the ARDL approach, given the fact that a combination of different orders of integration of variables is used.

The results were further tested using the error correction version of the model to provide a robustness test. Error correction estimation is presented in Table 7. This test is meant to identify the speed of adjustment for the variables on the exchange rate. Hence, this test will identify the time to revert to the equilibrium positively; the coefficient should be negative and significant.

TABLE 7
The error correction representation for the chosen ARDL model

NER	dNER1	dPPP	dIFE	dTTrade	dCAGDP	dPRODTY	Intercept	ecm(-1)
	0.171	0.124	-0.639	8.801	0.022	-0.53E-6	0.037	-0.139
	(2.49)**	(3.13)***	(-2.05)**	(3.87)***	(0.05)	(-0.69)	(1.31)	(-3.83)***
	R-Squared = 0.168							
	DW-Statistics = 2.02							

The empirical results can be based on the re-parameterization of the estimated ARDL (2, 0, 0, 1, 0, 0) model. According to this table, the lagged error-correction term (ecm) has the expected negative sign and is statistically significant at 1 percent level. Kremers, Ericsson, & Dolado (1992) found that a significant error-correction term is rather efficient in establishing cointegration between variables. The lagged differences in the model are used to capture short-term dynamics among the variables.

The long-run relationship between the exchange rate and its determinants was further verified using the CUSUM and CUSUM-squared tests (Brown, Durbin, & Evans, 1975). The aim of the tests was to check for the consistency of long-run parameters. This test was applied on the residuals of the model. The outcome of each test is in terms of plots showing the cumulative sum of recursive residuals and recursive squared residuals for a set of n observations. As a condition for the stability of the estimates, the CUSUM and CUSUM-squared should range within the 5 per cent level of significance.

Fig.1 is the plots of the respective tests. The data shown in the two figures fall within the specified range of acceptance (critical bounds), which is a requirement for this relationship to exist. Therefore,

the plots reveal evidence to support the significant relationship between exchange rates and parity as well as non-parity variables. This then confirms the existence of strong evidence to support the monetarist theorems on prices and interest rates, in our view, for the first time in one test.

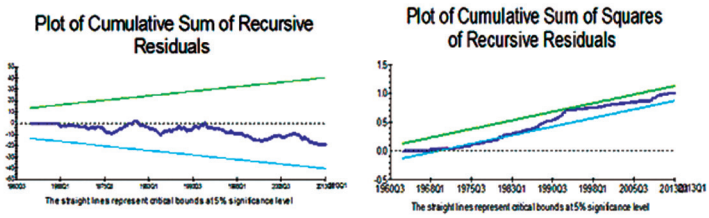

Fig.1. Plots of CUSUM and CUSUM-SQUARES values

This figure shows two plots of cumulative sum and cumulative sum of squared values of recursive residuals of the long-run relationship. The plots are within the bounds, showing there is significant relationship in the tests.

CONCLUSION

This paper conceived a novel way to re-state the often-tested parity theorems widely tested in monetary economics. There are some creative innovations in this paper. The reasons for this are: there is only a weak support to-date for these theorems, especially the price parity, despite lots of studies; and the literature suggests that a more appropriate econometric approach is needed to reveal the underlying behavior. The maintained hypotheses are that the relative prices (inflation) and relative interest rates of two trading economies are significant factors, *only* if controls for non-parity factors are embedded in a properly-specified full model with long-length time series.

The US and UK data were used since long-length data are readily available for these economies. The methods used range from OLS multiple regressions to ARDL bound testing, which in our view satisfies the long-length equilibrium for PPP already supported in some earlier studies. To understand the behavior of any local currency (for example, RM), it is pertinent to find evidence on price and interest rate differences affecting the US exchange rate.

The results reveal that both the PPP and IFE theorems are strongly supported, which is, in our view, a new finding reported in this paper to fully appreciate the idea that any price difference and interest rate differences - for example between the US and Malaysia - are likely to fully affect the US exchange rate over a long period of time. Non-parity factors as hypothesised are also significantly affecting the US exchange rate, which were used as the control factors. The econometric tests conducted in this study, in our view, have made these results reliable and robust compared to the earlier studies. Perhaps,

the research process followed in this study provides a new approach, which may be useful to study other economies to reveal if the parity theorems hold in more economies than in the United States of America.

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Muslim and Non-Muslim Fund Managers' Perception of Environmental Information

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ABSTRACT

The Islamic concept of accountability includes full disclosure of information to wider stakeholders, be it information on companies' financial or non-financial matters. The objective of this study was to examine the differences in perception between Muslim and non-Muslim fund managers regarding the usefulness of information on the environment in investment decision making. A questionnaire survey was used and 59 responses were received. No differences were found in perception between Muslim and non-Muslim fund managers related to several companies' environmental attributes and environmental information types. This implies that the Islamic worldview is not reflected in the perception of Muslim fund managers. This study makes a significant contribution to research in environmental reporting, particularly for companies and practitioners in Malaysia in the context of accountability in Islam. The study suggests some preliminary insights into the use of environmental information by Muslim and non-Muslim fund managers in Malaysia.

Keywords: environmental information, perception, fund managers, Islam, accountability

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INTRODUCTION

Many businesses are rethinking their responsibility to various stakeholders in the aftermath of wide-scale financial scandal involving top companies such as Enron, Worldcom and Nike (Ehsan & Kaleem, 2012). These corporate scandals indeed have served as a wake-up call for the entire

financial world to be more responsible to society (Janggu *et al*., 2007). Therefore, there is a growing trend of corporate social reporting (CSR) around the world. CSR practices are highly encouraged but they consume company time, energy and money (Saleh *et al*., 2011). In addition, CSR information should be useful to corporate preparers and stakeholders. Many studies on perceived usefulness of social information have been carried out for decades; however, the researchers have not been able to find even one study that specifically focuses on Muslim perception of social information. The Islamic concept of accountability is that of dual accountability (Mohamed Ibrahim, 2000): accountability to God and to God's creatures. Hence, it is important for companies to provide full disclosure of non-financial information to reflect transparency in information sharing and accountability to wider stakeholders. Thus, this study examined the difference in perceptions concerning the usefulness of environmental information in decision-making between Muslim and non-Muslim fund managers.

This study has one significant contribution, i.e. the role of Islam, and this is considered deficient in the present literature on environmental accounting. Kamla *et al*. (2006) only examined the idea of environment based on the Islamic principle and accounting but did not empirically test the need for environmental information disclosure from the Islamic perspective. Furthermore, literature on accountability in Islam is greatly lacking. In addition, the majority of prior studies were based on a Western worldview, which presents a different concept of accountability from that given in the Islamic point of view. Even though this study examined the usefulness of environmental information between Muslim and non-Muslim fund managers, it does not claim that non-Muslim stakeholders are less accountable than Muslim fund managers. The tests were only examined on the degree of importance as perceived by Muslim in comparison with non-Muslim stakeholders. This study expected that Muslims adopted a more comprehensive approach to decision-making by considering several types of information, financial as well as non-financial, which includes environmental information. According to Haniffa and Hudaib (2002), full disclosure of information conforms to the spirit of justice in Islam.

The following section discusses prior literature concerning differences between Muslim and non-Muslim stakeholders from various contexts. The paper continues with methodology used in this study, followed by the findings and analysis section. The last section presents the discussion and conclusion.

DIFFERENCES BETWEEN MUSLIM AND NON-MUSLIM STAKEHOLDERS

A few scholars (such as, Baydoun & Willett, 2000; Haniffa & Hudaib, 2002; Sulaiman & Willett, 2003) have proposed Islamic Corporate Reporting that can

fulfil the needs of wider stakeholders. Generally, the scholars agree that the main criteria in Islamic Corporate Reporting are social accountability and full disclosure of information. A number of studies examining Islam and corporate reporting have largely focused on the need for companies to be transparent in their disclosure policies (for example, Haniffa & Hudaib, 2007; Maali *et al*., 2006). Companies need to be transparent through reporting full disclosure of information to wider stakeholders. The information on social performance activities, which includes information about environmental management or protection is important to stakeholders, be they Muslims or non-Muslims, in assisting them to make economic and religious decisions (Haniffa & Hudaib, 2002).

In Islam, the concept of accountability is that of dual accountability: accountability to God and to God's creations (Mohamed Ibrahim, 2000). The Islamic accountability concept can be discussed from two different views. First, an organisation is a social partner in the wider society. The management of the company acts as a trustee of capital providers and, thus, is responsible to carry out business ethically in a manner that will not impair the well-being of the community. The responsibility of the management includes accountability to disclose information in assisting users to make decisions (Haniffa & Hudaib, 2002). Islam emphasises the notion of full information disclosure, that is, that information should be rightfully given to members of the community (Baydoun & Willett, 2000). Thus, financial as well as social information, including environmental information, should be reported to the users (Haniffa & Hudaib, 2002), which is in line with the Islamic concept of accountability. In addition, full disclosure of information conforms to the characteristic of justice in Islam.

Second, the Islamic concept of accountability indicates that each Muslim should realise his role as vicegerent in all situations. Man is not made without purpose and it is such purpose that gives meaning to God's creation (Sulaiman, 2005). Thus, man is accountable for his actions (inactions), which will be accounted for in the hereafter, and this includes every decision he makes.[1] Accountability of man is not restricted to the accountability to God but also accountability to God's other creatures including humankind, animals and the environment. Man is accountable to secure the welfare and sustainability of the environment as referred to by Samarai (1997) that the earth is for the betterment and development and not for misuse of God's given resources. Accountability also implies responsibility. According to Naqvi (1981) the concept of responsibility in Islam limits the freedom of man in what he does. Freedom in Islam explains that only *Allah* has the absolute right upon everything

[1]"Hold yourselves to account before you are held to account, for it is easier for your accounting, and measure your deeds before they are measured for you" (from Omar bin Al-Khattab (may *Allah* be pleased with Him)).

and man should exercise his freedom to ensure that the wider interests of the community are safeguarded.

A few studies were identified that examine the extent to which culture, race and religion influence decisions made by groups of stakeholders. Ramasamy *et al*. (2007) examined the relationship between corporate social performance and ethnicity. The results indicated that organisations with Malay[2] chief executives reflected higher corporate social performance levels than organisations with Chinese chief executives. The authors believe that religious upbringing may play an important factor that contributes to the difference. According to Abdullah and Lim (2001), among the three major ethnic groups in Malaysia, Malay managers have a more positive attitude towards religion and their work ethics are strongly attached to their religious beliefs. This indicates that Islam has a deep influence on the attitudes and behaviour of Muslims when their behaviour is guided to comply with the Islamic teachings (Lim, 2001).

Haniffa and Cooke (2002) examined the effect of culture and corporate governance mechanisms on voluntary disclosure of companies in Malaysia. In the study, culture was measured by race (Malay versus Chinese) and one of the voluntary disclosure items was information on environmental policy. The authors found that firms dominated by Malay directors have higher voluntary disclosure. They asserted that this is due to Islamic business ethics, which encourages transparency in business.

In 2005, Haniffa and Cooke further examined the influence of culture and corporate governance characteristics on the social reporting of companies. Similarly, culture is determined by ethnicity of the directors and shareholders. The authors asserted that companies with Malay finance directors, board of directors dominated by Malays and companies with a majority of Malay shareholders have greater social information disclosure. The authors found a significant relationship between Malay directors and Malay shareholders with corporate social disclosure practice in the annual reports of companies in Malaysia. Although the authors claimed that the results were primarily due to the legitimation strategy by companies in Malaysia in order to divert the attention of stakeholders concerning the government's economic discrimination on the basis of ethnicity, they also agreed that social disclosure by companies was not culture-free (Haniffa & Cooke, 2005).

The above studies imply that religion (in this particular case, Islam) as a cultural variable (Sulaiman, 1997) has, to some extent, influence on individual perceptions

[2]Article 160 of the Constitution of Malaysia defines Malay "as a person who professes the religion of Islam…" (Wikipedia, 2010). Accordingly, all Malays in the present study are presumed to be Muslims.

and behaviour, which subsequently affects their decisions. A Muslim who nurtures the Islamic principles of *Tawheed* (unity), *Khilafah* (vicegerency) and '*Adl* (justice) in life will acknowledge the importance of preserving the environment from corporate misconduct. For example, one would expect a Muslim fund manager not to invest in a company that harms the environment. Indeed, the importance of protecting the environment as stated in the UN Global Compact[3], according to Zinkin (2007), seems to follow the principles in Islam. Hence, disclosure on environmental information is considered as satisfying an Islamic society's need for full disclosure and social accountability (Sulaiman & Willett, 2003). Therefore, perception on disclosure between Muslim and non-Muslim stakeholders could be different. One would expect committed Muslims to perceive environmental information to be more useful than would non-Muslims. A Muslim fund manager who refers his doings at all times to *Shari'ah* (Islamic law) is likely to realise the importance of having complete corporate information before making investment decisions. This indicates his responsibility to all God's creation.

Accordingly, the following null hypotheses were developed:

Hypothesis 1: There is no difference in the perceived importance of company environmental attributes between Muslim and non-Muslim fund managers.

Hypothesis 2: There is no difference in the perceived importance of various types of environmental information between Muslim and non-Muslim fund managers.

RESEARCH METHOD

Fund managers were chosen because Deegan and Rankin (1997) asserted that they are one of the important stakeholders and were responsible for making related investment decisions (Fayers *et al*., 2000). The questionnaire consisted of two sections. In Section A, two questions to address two different variables on environmental information disclosure were included. The measurement scale included level of importance in which 1 indicated not important and 5 was extremely important. According to Salkind (2000), the Likert scale is suitable when questions require respondents to express an opinion or perception of an event, object or person. Question 1 required respondents to rate the degree of importance of various

[3]There are 10 principles in the UN Global Compact. Principles 7, 8 and 9 focus on the environment; Principle 7, on the implementation of a precautionary and effective programme for environmental issues, Principle 8, on initiatives that demonstrate environmental responsibility and Principle 9, on the promotion of the diffusion of environment-friendly technologies. Zinkin believes that Islamic principles are aligned with the modern views to enhance social, human and natural capital that are also emphasised in the UN Global Compact.

environmental attributes of a company when they make decisions. There were thirteen items, which were adapted and modified from Thompson and Cowton's (2004) instrument. Question 2 measured different types of environmental information that fund managers perceived as important in their decision making. The study used the checklist developed by Sumiani *et al*., (2007), which was developed based on prior studies and also the categories of social and environmental disclosures used by the Centre of Social and Environmental Research (CSEAR), UK as well as guidelines on performance indicators developed by the GRI. Seventeen out of 24 different types of environmental information were adapted. Section B required information about gender, age and religion. The questionnaire was piloted with academicians and fund managers using convenience sampling before being finalised. The questionnaire was then modified according to comments received from the pilot respondents.

There were 218 questionnaires sent to the respondents. However, only 59 useable responses were received, giving a response rate of 27%. Using the Mann-Whitney U test, no significant difference was found between early and late responses. Cronbach's alpha value had a minimum of 0.89 for all questions. The Cronbach alpha value indicated that the items set in the questionnaire had high internal consistency reliability. However, the test of normality revealed that the data were not normally distributed. Several attempts to normalise the data were carried out, yet the results of the normality tests remained the same. Accordingly, the non-parametric test of differences, that is, the Mann-Whitney U test, was applied to examine the developed hypotheses.

FINDINGS AND ANALYSIS

Demographic Analysis

The majority of the fund managers were male, which represented 71.2% of the total number of fund managers (28.8% were female). Half of the fund managers were in the age group of 31-40 (50.8%). Relatively few of the fund managers were below 30 years old or in the age group of 41-50 years old (20.3% and 23.7%, respectively). Interestingly, 3 fund managers were above 50 years old, which indicates their maturity working in fund management and investments. While 35 fund managers were Muslims (59.3%), the remaining included Christians, Buddhists and Hindus. The identification of the respondents' religions is necessary for analysing the differences in perception between Muslim and non-Muslim respondents.

Company's Environmental Attributes

TABLE 1
Differences in Perception of the Importance of Environmental Attributes when Making Investment Decisions Between Muslim and Non-Muslim Fund Managers

The company:	***Muslims***			***Non-Muslims***			***Mann-Whitney (Signif. test)***
	Mean	Std devn	Rank	Mean	Std devn	Rank	
exhibits a high standard of environmental awareness (e.g.: in terms of the use of natural resources and/or pollution control)	3.37	1.165	3	3.50	1.180	3	ns
has environmental liability insurance	3.46	1.197	2	3.17	0.917	8	ns
conducts an environmental audit	3.03	1.150	9	3.21	0.884	7	ns
has a formal environmental control unit	2.86	1.167	12	2.96	0.955	10	ns
uses clean technology	3.23	1.060	7	3.29	0.955	4	ns
holds ISO 14001 certification	2.97	1.098	10	2.79	0.779	12	ns
registers its products with an eco-label scheme	2.89	0.993	11	2.88	1.076	11	ns
promotes the recycling of its products, by-products and waste	3.11	1.078	8	3.25	1.113	5	ns
seeks to minimise energy consumption	3.49	1.095	1	3.92	1.100	1	ns
seeks to minimise the use of materials that harm the environment	3.29	1.152	5	3.25	1.294	6	ns
meets all known and likely future environmental control standards	3.31	1.183	4	3.54	0.977	2	ns
manufactures environment-friendly products	3.26	1.067	6	3.12	1.035	9	ns
involved in environmental consultancy	2.60	1.035	13	2.33	1.049	13	ns

1 = not important, 2 = quite important, 3 = important, 4 = very important, 5 = extremely important
ns = not significant

The results, as shown in Table 1, presented no statistical difference in the perceived importance of environmental attributes between Muslim and non-Muslim fund managers in Malaysia. Accordingly, there was not enough evidence to reject the null hypothesis.

Indeed, as to the mean rankings, both Muslim and non-Muslim fund managers perceived the importance of the company's environmental attributes equally. Though not in the same order, both groups ranked nine out of thirteen items in the list as important with seeking to minimise energy consumption before making investment decisions being ranked as the most important attribute by both groups. The four environmental attributes that were ranked as quite important (rated at 2) were: having a formal environmental control unit; securing ISO14001 certification; registering products with an eco-label scheme; and involving environmental consultancy.

Type of Environmental Information

TABLE 2
Differences in Perception of Various Types of Environmental Information as Being Important for Investment Decisions Between Muslim and Non-Muslim Fund Managers

	Muslims			***Non-Muslims***			***Mann-Whitney (Signif. test)***
	Mean	Std devn	Rank	Mean	Std devn	Rank	
Financial information on past and current environmental expenditure	3.20	1.132	5	3.42	1.176	4	ns
Financial information on future estimates of environmental expenditure	3.54	1.010	3	3.38	1.096	5	ns
Financial information on financing for environmental equipment	3.23	1.140	4	3.50	0.978	3	ns
Past and present litigation	3.57	1.170	2	3.92	1.139	2	ns
Potential litigation	3.69	1.157	1	4.08	1.018	1	ns
Environmental data on pollution abatement	2.83	1.175	13	3.04	1.042	11/12	ns
Control, installations, facilities or processes described	2.74	1.067	15	3.12	0.947	7/8	ns
Land rehabilitation and remediation	2.80	1.132	14	3.04	0.908	10	ns
Conservation of natural resources	2.86	1.167	12	3.04	1.042	11/12	ns
Departments or offices for pollution control	2.71	1.073	16	2.83	1.129	15	ns
Regulations and requirements	3.14	1.216	7	3.33	1.274	6	ns
Policies or company concern	3.17	1.098	6	3.12	1.116	9	ns
Goals and targets	3.11	1.132	8	3.12	0.947	7/8	ns
Awards	2.69	1.157	17	2.50	1.022	17	ns
Environmental audit	3.00	1.138	9	2.92	0.929	13	ns
Environmental management system	2.86	1.061	10	2.92	0.974	14	ns
Environmental end products/services	2.86	1.115	11	2.71	1.042	16	ns

1 = not important, 2 = quite important, 3 = important, 4 = very important, 5 = extremely important
ns = not significant

The results of the Mann-Whitney U tests as given in Table 2 show that there was not enough evidence to reject the null hypothesis. This implies that there was no difference in perception between Muslim and non-Muslim fund managers concerning the importance various types of environmental information on their investment decisions.

Both Muslim and non-Muslim fund managers ranked high questions related to environmental information linking to past, present and future litigation as well as environmental information on the company's past, present and future environmental expenditure. The results showed that both groups perceived environmental information as being important in their investment decision-making process. In addition, both groups ranked information about environmental awards compared to other types of environmental information as important for investment decisions as being the lowest.

In general, there was no evidence indicating that Muslims perceived environmental information as being more important compared to non-Muslims. The findings of this study indicated that there was no differences in perception between Muslim and non-Muslim fund managers for both variables tested.

A Muslim lives under *Shari'ah*, a general framework that guides the individual on how to operationalise Islamic attitude and behaviour in all doings (Al-Buraey, 1990). The ethical principles explained by Naqvi (1981) and Chapra (1992), if practised by everyone, can create a Muslim who will look into many important elements before making decisions. This includes the importance of environmental information in decisions. Environmental information disclosure fulfils the concept of full disclosure in Islam, which conforms to the spirit of justice in Islam (Haniffa & Hudaib, 2002). Unfortunately, this is not evident in the present study. A possible explanation is that the development of the capitalist world economy and educational curriculum in business related areas has emphasised financial aspects for so long. Meanwhile, ethical elements in education were put aside in many business studies.

DISCUSSION AND CONCLUSION

Man was created to be God's vicegerent (*Khilafah*) on earth and has been bestowed with spiritual and mental characteristics (Chapra, 1992). According to Chapra, one of the implications as God's vicegerent is that man must acknowledge God as the absolute owner of resources on earth and that man is merely a trustee. Thus, a Muslim is responsible to use the given resources in a manner that will benefit not only himself but also the wider society (Sulaiman, 1997). Furthermore, Muslims should always believe that they are answerable to their every single action and inaction, which will be taken into account in the Hereafter (Abu-Sway, 2002; Abdul Rahman, 2003). Accordingly, responsibility for all actions and inactions include Muslims' decisions concerning investment decisions.

Unfortunately, the results of the study did not support the argument. The results indicated that there were no differences in the perception of environmental information between Muslim and non-Muslim fund managers and, thus, none of the hypotheses can be rejected. This implies that the Islamic worldview is not reflected in the perception of Muslim fund managers. Additionally, the results were also inconsistent with prior studies on the difference in attitude concerning social issues between Malay and non-Malay top managers in companies (for example, Abdullah & Lim, 2001; Haniffa & Cooke, 2002, 2005; Ramasamy *et al*., 2007).

There are several possible explanations for these results. First, the world economic

system is built on capitalism, and the main objective of a capitalist economy is to maximise profit. The main feature of capitalism is economic rationalism (Weber, 1979 cited in Sulaiman, 1997). According to Weber, several assumptions are embedded in this type of economy. The first assumption is that humans are motivated by self-interest to increase financial gain. The second assumption is that the action that yields the greatest financial return to an individual is the one that is considered the most beneficial to society. This encourages competitive rather than cooperative behaviour in society. Finally, human progress is implied by higher levels of material output, leading to improvement in the well-being of society (Weber, 1979 cited in Sulaiman, 1997).

However, Islam's viewpoint is different. Islam clearly denies economic rationalism, in which the element of self-interest is claimed to indirectly offer benefit to society and to improve its well-being. The economic system from the Islamic perspective is developed according to *Shari'ah*, which explains the relationship between man and the Creator, man with other creatures and man with the environment, and where the goal is to achieve *falah* (success) for the people and the wider society (Abdul Rahman, 2003). These relationships may be represented by the four ethical principles described by Naqvi (1981), as unity, equilibrium, free will and responsibility. Islam emphasises collective interest rather than self-interest. In Islam, the pursuit of profit should be carried out within the freedom granted to humankind by *Allah* for the use of the resources so provided. Humankind should use the resources with responsibility to provide benefit to society with the intention of ensuring socio-economic justice and to *Allah*'s pleasure (Sulaiman, 1997). One of the major problems of Western economic rationalism is that it separates religion from economic activities. The implication of Western economic rationalism is that one would choose to invest in projects that can generate the highest returns with the lowest risk rather than a project that can provide benefit to society (Haniffa & Hudaib, 2002). This is consistent with the results of this study, which concerned Muslim perception of the importance of environmental information in decision making.

The second is the failure to highlight the importance of ethical issues in accounting-and business-related education. The accounting education that is presently being taught at institutions of higher learning is inconsistent with Islamic teachings (Haniffa & Hudaib, 2002). Many Western accounting concepts and principles, such as going concern, money measurement, business entity, historical cost, conservatism, matching and materiality concept that are currently applied in many countries,

including Malaysia, are irrelevant from the Islamic point of view (Adnan & Gaffikin, 1997). For example, Adnan and Gaffikin explained that in conventional accounting practice, a business is assumed to be in existence for the foreseeable future. However, this is criticised from the Islamic perspective as it implies that there is something else other than *Allah* that will live indefinitely. This is clearly unacceptable from an Islamic point of view. They further added that the concept of money in accounting has several limitations. Accounting information is limited to information expressed in monetary units, and monetary units are unstable over time. This implies that accounting information that cannot be expressed in monetary value, such as social and environmental information, should not be reported (Belkaoui, 1992). Indeed, the primary objective of accounting information should be to fulfil the obligation of accountability to the Creator, that, *Allah* (Adnan & Gaffikin, 1997). This is manifested through comprehensive disclosure of accounting information, which also promotes the spirit of justice and benevolence in Islam (Haniffa & Hudaib, 2002). The results of the study seem to show that Muslim fund managers are significantly influenced by Western accounting thought that was learnt in tertiary education.

In essence, the importance of environmental information disclosure that fulfils the full disclosure principle in Islam was not reflected in the perception of Muslim fund managers. In sum, despite the increasing trend of companies to report social and environmental information, its perceived importance in investment decisions to Muslim fund managers in Malaysia is still unclear. However, the small number of responses may impair the statistical findings. Perhaps a greater number of responses may give different results.

The findings imply that companies in Malaysia should be responsive and consider reporting both financial and environmental information to users. This study can also assist the relevant authorities like Bursa Malaysia to establish environmental information criteria as disclosure for companies perceived to be useful to stakeholders. The institution of higher learning can also play a role in enhancing students' understanding about the importance of responsibility and accountability concerning social issues such as environmental protection. In teaching business-related courses, accountability should also be emphasised as an important factor in making economic decisions.

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Ownership Structure, Independent Chair and Firm Performance

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ABSTRACT

The focus of this study was to examine the effect of ownership structure and the independent board chair as the moderating variable on the performance of companies in the finance industry of the Main Market of Bursa Malaysia. The study used a total of 185 observation data collected from 37 finance companies from the years 2007 to 2011. The results of the study showed that the independent board chair as the moderating variable had a negative relationship with the finance companies' Tobin's Q value. The literature advocates that the independent board chair has an influence on the monitoring of owner managers and in safeguarding minority shareholders' economic interest. On the other hand independent chair control and monitoring of company decisions can be affected by the dominant voice of the CEO, the majority presence of executive directors, the presence of owner manager and leverage.

Keywords: ownership structure, board of directors, independent board chair, firm performance, moderating variable

INTRODUCTION

The importance of studying corporate governance and its impact on the performance of companies has been re-emphasised by the recent crisis and bankruptcies of big finance companies, which indicates the impact of poor governance on the performance of companies (Westman, 2009). Brennan and Solomon (2008) defined corporate governance as the process of ensuring that the management is managing the affairs of the company in such a way that the interest of the stakeholders is protected and they do this by supervising and controlling the actions of the management. Corporate governance was developed to oversee how the board is discharging its functions and

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to provide guidance to the board on how to discharge those responsibilities more effectively (Brown, Beekes & Verhoeven, 2011). In the case of finance companies, good practices of corporate governance mechanism are essential to oversee the activities of the companies are carried out with due care on the risk management (McConnell, 2012). Stakeholders' confidence on the companies' commitment to manage the business responsibly has been linked with the nature and structure of a corporate governance mechanism being set up (Jansson, 2005; Kim & Rasiah, 2010).

It is important that conduct related to corporate governance of banks is monitored due to the dominant role of the institutions in the management of the payment system (Capriglione & Casalino, 2014; Dermine, 2013). Loss of confidence in the soundness of the banking system could bring a negative effect to investment in the sector, severe problems to the accomplishment of the government's macroeconomic policy and great impact on the economic living of the depositors. Good corporate governance in financial institutions will ensure that small depositors and less informed investors are protected through continuous healthy existence of the financial system (Arun & Turner, 2004). For this role, the board of directors of a company has an important responsibility to the stakeholders to ensure that business activities are performed in a socially responsible manner (Jamali, Safieddine & Rabbath, 2008). The recent collapse of big firms in different economies has questioned the effectiveness of the board of directors in properly discharging its role in leading companies and monitoring the activities of the management.

For instance, crises in the finance sector has affected economies of different countries at different times such as in Brazil, Mexico, Russia, Malaysia, Thailand and Indonesia (Bazdresh & Werner, 2000). These crises have emphasised the need for countries to support a sound financial system with good corporate governance practices. These corporate failures and financial crises increased the need for closer monitoring of financial institutions and for the regulatory authorities to reform their corporate governance. Some have undertaken the reform by issuing Sarbanes Oxley's Act of 2002 in the United States and in the United Kingdom by forming several committees such as Cadbury (1992), Greenbury (1995), Hampel (1998), Higgs (2003) and Smith committee (2003), whose recommendations were later harmonised into a combined code, to deal with several aspects of corporate governance (Leuz & Wysocki, 2008). One of the requirements of most corporate governance movements such as the combined codes (1998, revised in 2003, 2006, 2012), Kings report (1994, 2002) and the Sarbanes Oxley's Act of 2002, is the need for the strengthening of the role of the board in monitoring, particularly through board substructure. As a result of corporate fraud and the various economic and financial crises that led to companies'

failures and bankruptcy in different parts of the world, regulatory authorities and the accounting profession developed and improved corporate governance codes to strengthen corporate governance practice and establish measures to ensure compliance by companies (Ghazali, 2010).

The recent global financial crisis which affected economies of the world provided evidence of the various impact that can range from reduction in international trade, foreign direct investment, collapse of capital market, fall in value of currencies, increase in unemployment, large expenditure by the authorities to rescue the affected companies and ultimately a decrease in economic growth (Atik, 2009). The nature of ownership structure of a company which provided little incentive for monitoring by the dispersed shareholders and poor governing performance by the board of directors hasbeen identified to contribute to the crisis (Westman, 2009). Poor performance of finance companies because of poor management could cause a liquidity problem in the financial system that in turn could lead to crisis in the economy and the eventual loss of confidence in finance firms (Htay, Ab. Rashid, Adnan, & Meera, 2011). According to Turlea, Mocanu & Radu (2010) stakeholders of finance companies have divergent goals and objectives. Equity holders, for example, are concerned about the value of their investment which could decrease if there was poor performance while debt holders and depositors, on the other hand, are interested in ensuring their investments and deposits are safeguarded.

The importance of relevant corporate governance in finance companies also relates to the fact that finance companies are closely related to each other and are transforming into one financial institution that offers similar services through its different subsidiaries (Gopinath, 2008). It is becoming difficult to differentiate between commercial and investment banks and insurance firms as banks diversify into finance firms that provide both retail and investment banking services as well as other finance-related services (Walter & Saunders, 2011). These changes in the nature of the business of the finance sector and the high level of risk involved as a result of expanding the scope of their business are requiring regulators to update and revise their regulation requirements regularly to enforce effective monitoring (Brighi & Venturelli, 2014).

Although finance firms in Malaysia were not seriously affected by the global financial crisis, some still felt the impact with regards to stock prices and profitability (Wasiuzzaman & Gunasegava, 2013). The recent global financial crisis has shown how connected and interrelated companies in the finance sector are and how governance problems in one part of the sector could have an impact on the entire economy (Erkens, Hung & Matos, 2012). This closeness in the companies could create problems since poor governance in one part of the sector could lead to its collapse and in turn affect the financial system and the economy at large (Becht, Bolton & Roell, 2012). This was evidenced from the recent

financial crisis, which started from one segment of the finance sector and spread to other segments and affected the economy of countries in the world such as US, UK, Belgium, The Netherlands, Austria, Spain, Germany, Ireland, Greece and Sweden (Becht *et al*., 2012).

These and similar events have prompted the regulatory authorities to institute more safeguards on the governance of financial institutions in the form of guidance on board composition and appointments, establishment of committees, for example the risk management committee, and monitoring of risks of the entities (Becht *et al*., 2012). Furthermore, governance of finance companies is unique due to the higher information asymmetry in such institutions, which requires greater monitoring to reduce the asymmetry (Zulkafli & Abdul Samad, 2007). The banking segment of the finance industry is very important to the economies of developing countries because it is the main channel for raising finance by private investors (Sufian & Habibullah, 2010). Another factor that makes the finance companies more important in Malaysia is due to the over protection of the banking industry, which made other non-bank financial institutions less developed, and under development of the capital market and risk management exercise (Thillainathan, 1999).

The high information asymmetry in finance firms could arise due to the difference in the interest of shareholders, depositors, investment account holders, managers and other stakeholders. Corporate governance of finance companies is very important because they are the main depository of the economy, due to complexity of their operations, interest of different stakeholders and their roles in an economy, which makes them subject to stringent regulations (Arun & Turner, 2004; Turlea *et al*., 2010). The effectiveness of corporate governance mechanisms aimed at enhancing performance in finance companies is of interest to people because of the interest of different stakeholders and the extent of losses suffered by investors and the general public from the global financial crisis, the Asian financial crisis and the various corporate failures and crises in the finance sector. which seem to be a recurring event with crises occurring about 11 times in 30 years (Dermine, 2013). The difference in objectives and interest of stakeholders exists, for example, between shareholders, debt holders and regulators. Shareholders may be short-term focused and prefer investment that are risky but have high returns while debt-holders and regulators have long-term focus and may prefer low risk and stable investment (Mehran, Morrsion & Shapiro, 2011). The depositors are interested in safeguarding their deposits, the investors are concerned about their investments and the management is concerned about their employment while the government is interested in continued existence and health of the finance sector and the economy in general.

The finance sector provides an intermediary role in the economy by channelling funds from surplus sectors to deficit sectors, therefore corporate governance in such sectors is important since poor corporate governance could lead to poor management of the business of the firms in the sector, thereby affecting their performance and the performance of other sectors that depend on them for financing (Htay *et al*., 2011). People are concerned about corporate governance mechanisms aimed at protecting stakeholder interest as a result of the extent of losses suffered by investors and the general public from the global financial crisis, the Asian financial crisis and the various corporate failures and crises in the banking sector (Dermine, 2013). The study of finance companies in Malaysia is important because these companies play an important role in the implementation of government economic programmes and policies such as the national economic programme (National economic policy, 1971(NEP)/National development policy 1991 (NDP) "by channelling resources and loans through the banks to the desired economic sector" (Kim & Rasiah, 2010, p.16). In addition, the government has a significant investment in the sector and the sector makes the largest contribution to GDP after the manufacturing, trade and service sectors (Economic Planning Unit, 2011).

Prior studies have found that the relationship between corporate governance mechanisms and performance is inconclusive and is influenced by the firm's characteristics and other factors beyond the firms' control, implying that the relationship between governance mechanisms and performance is not clear and differs within industries/sectors and between companies (Brown *et al*., 2011). In addition, prior studies on the impact of ownership structure, independent chair and firm performance have reported varying results. This contradictory evidence on the impact of ownership structure and independent chair suggests that ownership structure and independence of board chair may not have direct effect on firm performance. In addition, from the agency theory perspective, duality may harm firm performance since the chair will perform roles both as CEO and board chair, which could hinder effective monitoring especially in firms with dispersed ownership. From another perspective, the stewardship theory suggests that combining board chair and CEO position will enhance coordination and speed in decision making since there will not be conflict of interest between CEO and board chair. Furthermore, combining the positions is more beneficial in firms with concentrated ownership since owners usually participate actively in managing the firms. This suggests that further study is needed. It further means that the independent chair may have a different effect on performance. Furthermore, previous studies did not give adequate attention to the moderating effect of the independent chair on the relationship between ownership structure and firm performance (Hsu, Wang &

Hsu, 2012). If the moderating role is not examined, the influence of both ownership and board attributes on firm performance may not be fully considered. This could explain the reason why prior studies are inconsistent since the impact of ownership and board attributes on performance may be dependent on other factors. Therefore this study included the moderating variable in order to put the moderating role of the independent chair in the relationship between ownership structure and firm performance in proper context.

The study contributes to literature by examining the moderating role of the independent board chair in the relationship between ownership structure and firm performance in finance companies. The study will enable investors to make informed decisions on the nature of governance in the firm in which they want to invest. The study provides policy makers and practitioners with a better understanding of the role of the independent chair in governance based on the nature of ownership in a firm. The study provides directors with information on the appropriateness of board leadership structure that is suitable to the nature of ownership structure in their company and enables them to organise their board according to the nature of ownership in the company. In addition, the study will enhance our understanding of the impact of board attributes on the performance of companies. Finally, the findings will enable regulators to know the appropriate mechanism to recommend for companies based on the ownership structure of a particular company. The rest of the paper is organised as follows: Section 2 contains a review of literature and hypotheses development; Section 3 presents the research methodology; Section 4 contains the results of the study and Section 5 presents results from additional analyses while section 7 concludes the paper.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Ownership structure as a monitoring mechanism is both the internal and external monitoring mechanism of corporate governance. This is determined based on who owns controlling shares in a firm by either management/directors, founding family, institutional shareholders or government (Ghazali, 2010; Aguilera, Desender & De Castro, 2011). Prior studies have reported that the dispersed ownership structure is associated with poor performance in Western countries due to the high cost and low benefit associated with monitoring by dispersed shareholders (Haniffa & Hudaib, 2006; Mokhtar *et al*., 2009). Furthermore, ownership structure determines the extent of monitoring of the company's affairs. Where there is concentration of ownership in the hands of a small number of shareholders, these shareholders or their representatives on the board are likely to be actively involved in performing control and service functions, thereby reducing agency problems and enhancing performance (Zahra & Pearce, 1989; Shan & Mclver, 2011). On the contrary, Adnan, Htay,

Ab Rashid and Meera (2011) found that the concentration of shares is negatively related with performance especially where it is in the hands of insiders or institutional shareholders while Zulkafli and Abdul Samad (2007) found that all the types of ownership are negatively related with firm performance.

Institutional shareholders enhance firm performance due to their expertise and high monitoring of the companies (Aguilera *et al*., 2011). Their main concern is to maximise financial gain from their investment. According to Haat Abdul Rahman and Mahenthiran (2008) investment by foreign institutional shareholders increases competition in the market and make firms improve their governance in order to attract those foreign investors. Thus, monitoring of managers by institutional investors helps to reduce agency problem (Gul, Sajid, Razzaq & Afzal, 2012). Praptiningsih (2009) found foreign institutional ownership is negatively related with firm performance. The ownership structure of finance firms in Malaysia is characterised by concentration of ownership with institutional shareholders, family or government as the controlling shareholders (Thillainathan, 1999). Mangena, Taurigana and Chamisa (2012) found that concentrated ownership is positively related with firm performance in a sample of 79 Zimbabwean firms.

The agency theory deals with the agency problem that emanates from the relationship between the agent and the principal that appoints him. The agency problem results from the divergence of interest between the principal and the agent and the majority and the minority shareholders (Boyd, Haynes & Zona, 2011). From the agency theory perspective, duality indicates combination of decision making and control, which means the board will not be able to monitor the CEO effectively, especially in firms with dispersed ownership, thereby leading to poor performance. On the contrary, the stewardship theory suggests that managers are concerned about the welfare of the owners and overall performance of the company, and this contradicts the agency theory, which believes that agents are self-centred and individualistic (Donaldson & Davis, 1991). The theory suggests that managers will work hard towards the attainment of the goal of the owners (Boyd *et al*., 2011).

Based on the stewardship theory, duality creates unity of command at the top of the firm thereby reducing problems since authority is concentrated in one person, therefore facilitating timely and effective monitoring. This is particularly applicable to firms in developing countries where ownership is concentrated and the owners participate actively in management of the firm. Therefore, as suggested by the assumptions of the stewardship theory, firm performance will be enhanced if the executive have more powers and are trusted to run the firm. The theory believes that the combination of board chair and CEO will increase effectiveness and produce superior results than would the

separation of the roles (Al Mamun, Yasser & Rahman, 2013). A study by Donaldson and Davis (1991) found that a company that has a unitary leadership structure has better performance, which is depicted by an improvement in the return on equity compared to a company that separates the two functions. This could be as a result of absence of conflict in positions of responsibility and authority, which could result if the two roles are separated.

Hypotheses development

Moderating role of independent board chair

The requirements of the Malaysian Code on Corporate Governance (MCCG) and the governance guide issued by the Central Bank requires the board chair to be separate from the CEO. In addition, the MCCG requires that the board should be independent and, where the chair is not independent, the majority of the board must be independent directors. Several studies have examined the impact of board attributes on the performance of companies (e.g. Pfeffer & Salancik, 1978; Pearce & Zahra, 1991; Abdul Kadir, 1999; Ghazali, 2010; Adnan *et al*., 2011; Shan & Mclver, 2011). However, the specific role of independent board chair in moderating the relationship between corporate governance mechanisms and firm performance has been given less attention (Hsu, Wang & Hsu, 2012). In addition, the results of prior studies, some of which will be discussed below, have also reported mixed results indicating that more research is needed to test the indirect impact of the independent board chair in the relationship between ownership structure and firm performance. Therefore, this study examines the moderating role of the independent board chair in the relationship between ownership structure and firm performance.

The Malaysian code on corporate governance requires companies to have a separate board chair and CEO and where the roles are combined explanation should be given in the accounts (MCCG, 2007). The separation of the roles will ensure that no one person or group will dominate the board. The separation or combination of the role influences the speed and quality of directors' decisions and the potential board contribution to company performance (Zahra & Pearce, 1989). There is mixed opinion from the theoretical perspective and evidence reported by researchers on the impact of combining or separating the role of chair and chief executive of a company. Some argue that by combining the roles, management will be better monitored and efficiency will be enhanced due to the reduction in information asymmetry (Haniffa & Cooke, 2005). According to Ghazali (2010) separation of board leadership and management of the company may not be an efficient corporate governance mechanism especially in developing countries where the owners are involved actively in the day-to-day operations of the companies. In his experience as board of director members holding influential positions such as board chairman, CEO and both chairman and

CEO, William (2013), when observing the board of director as someone outside of the company, found that it is important to assess the conduct of independent directors, leaders of the board when the chairman and CEO positions were combined, leader of the board when the chairman position was distinct from CEO and CEO when the chairman position was distinct from CEO to understand how the board of directors managed and governed the company to achieve results. Evaluating their leadership responsibilities and their actions in determining what worked for the company, it was found that their knowledge, skills and experience contributed strategically to company value and helped in managing internal and external challenges facing the company. Succession planning can explain a lot about how the company benefitted from all these efforts. On the other hand, Gerrish (2014) analysed the board of chairmen of banks based on their types and traits to understand their management approach and leadership contribution to the company. He revealed that when the bank chairman was an independent member not holding an executive position in the bank, there was micro-management of the bank as the day-to-day operation of the bank was managed by the executives of the bank. On the other hand, if the bank chairman was its CEO, decisions at board level were vetted by the CEO. In terms of what needed to be done to improve the situation in banks, Pozen (2010) and Krawcheck (2012) consented for the bank's board of directors to be smaller in size; for the board to be led by professional board members recruited on full-time basis so that they would commit their time to board responsibilities and for the bank executive's compensation to be tied to the bank's fixed earnings to align and manage their actions in accordance with the bank's risk sensitivity.

Listed firms in Malaysia categorise shareholdings by directors into direct and indirect ownership. Direct ownership is stake owned by a director directly in his name while indirect ownership is through a firm or firms controlled by the director. Prior studies examining impact of director ownership have examined such relationships based on proportion of ownership by directors without classifying it into direct and indirect ownership. Direct ownership by a director means he has a direct stake in the company while indirect ownership is shares owned by a director through the firm he controls or through the shareholders he represents. From the agency theory perspective, when a director has direct ownership he will be more interested in monitoring the firm because of the monetary loss he could suffer in the event the company runs into problems.

Ownership by institutional shareholders enhances performance through increased monitoring of the management (Brown *et al*., 2011). Thus, monitoring of managers by institutional investors helps to reduce agency problem (Gul *et al*., 2012) and encourages investment by outsiders. Conversely, monitoring by institutional investors could put a constraint on top executive decision-making because close monitoring may suppress a manager's

ability to make decisions (Aguilera *et al*., 2011). In addition, institutional ownership may promote further problems between the majority and minority shareholders when the interest of the institutional shareholders differs from that of the minority shareholders and leads to poor performance since the majority shareholders will promote their own interest at the expense of the interest of the minority, thereby appropriating firm assets to themselves (Park & Jang, 2010). Institutional investors have access to better information compared to ordinary shareholders due to their quality research and analytical skills (Borisova, Brockman, Salas & Zagorchev, 2012). Zulkafli and Abdul Samad (2007) also found that ownership by large shareholders has a negative impact on performance of banks and non-finance firms while Praptiningsih (2009) found no relation in a sample of banking firms in some selected Asian countries.

Government owned companies have better governance practices because of the comprehensive supervision by the government that reduces the problem of information asymmetry and controls the actions of the managers (Samaha & Dahawy, 2010). On the contrary, Berger, Clarke, Cull, Klapper and Udell (2005), D'Souz Megginson and Nash (2007) and Praptiningsih (2009) argued that state ownership does not enhance firm value and the government is not an efficient monitoring mechanism. Karas, Schoors and Weill (2008) reported that domestic public banks had better performance than domestic private banks in Russia. Demirguc-Kunt and Detragiache (2002) and Westman (2009) also found that state ownership is significantly related to profitability. Although state ownership is expected to enhance performance through enhanced governance in companies, their ownership in companies could affect performance due to the divergence in their interest and the shareholder value maximisation; government may, for example, employ more people to reduce unemployment even if the employment will not add value to the firms (Megginson, 2005). Borisova *et al*. (2012) found that state ownership reduced the number of committees in a company, increasing CEO power thereby reducing the monitoring mechanisms in the firm, while the presence of golden shares usually owned by the government caused damage to the governance of companies.

Bhagat and Bolton (2013) found that director ownership and CEO duality were positively and negatively related to operating performance while both did not have a significant relationship with market based measures of performance. In addition, Chhaochharia, Kumar and Niessen-Ruenzi (2012) examined the impact of foreign and local institutional investors on corporate governance in firms and found that firms with high ownership by local institutions had better governance and performed better due to the enhanced monitoring by the

local investors who had better access to information compared to the foreign investors. Gul, Sajid, Razzaq and Afzal (2012) investigated the role of ownership structure and corporate governance in mitigating agency cost based on a sample of 50 listed firms in Pakistan for the period 2003 to 2006. The result of the regression analysis showed that director ownership, institutional ownership and separate board leadership lower agency cost.

Ponnu (2008) found no significant relationship between duality and firm performance. Praptiningih (2009) and Zulkafli and Abdul Samad (2007) both reported negative relationship between duality and firm performance in both finance and non-finance companies. They added that CEO duality was harmful to the performance of a company. Unitary leadership structure made it difficult for the board to monitor and evaluate executive performance (Zahra & Pearce, 1989). Leadership of the board should ensure that the board carried its activities in the most effective way and that the board was provided with the necessary information on a timely basis (Brown *et al*., 2011). On the other hand, the chief executive officer was the head of management of a company and was in charge of the day-to-day operations of the company as well as overall strategy and investment. Therefore, most corporate governance codes require the separation of the leadership roles in a company to ensure a balance of power and authority and proper monitoring of activities of the management (MCCG, 2007). Based on these arguments, the following hypotheses were tested:

H1: Independent board chair positively moderates the relationship between direct director ownership and firm performance.

H2: Independent board chair positively moderates the relationship between indirect director ownership and firm performance.

H3: Independent board chair positively moderates the relationship between institutional ownership and firm performance.

H4: Independent board chair positively moderates the relationship between state ownership and firm performance.

METHODOLOGY

The population of the study comprised firms listed under the finance sector of the main market of Bursa Malaysia. The number of firms listed on the main market of Bursa Malaysia as at the time of data collection (2012) was 822, out of which 37 were finance firms. Since the number of finance companies listed on the main market was only 37, all the companies were used as the sample for this study. This comprised companies involved in commercial, investment and Islamic banking, Insurance, Takaful and other finance-related services. A summary of the distribution of the sample firms

according to segments of the industry is given in Table 1 below. The companies listed under the Ace market are not included due to their small number and because they are subject to different listing requirements.

The study used secondary data extracted from the annual reports of companies listed on the main market of Bursa Malaysia. The annual reports were downloaded from the website of Bursa Malaysia or company website. The data comprised corporate governance and finance data. The corporate governance data were manually extracted from the annual reports of the companies while the financial information was obtained from the Bloomberg data base. The unit of observation involved 37 finance companies and the observation period covered year end 2007 to 2011. Many finance firms around the world were affected by the impact of the global financial crisis. However, Malaysian finance firms felt the impact in the form of falling share prices, loan applications and low inflow of capital (Khoon & Mah-Hui, 2010). This study used both accounting (ROA) and market measure of performance (Tobin's Q) similar to prior studies such as Abdullah, (2004), Mokhtar *et al*., (2009) and Zulkifli and Abdulsamad (2007). This is to ensure that one complemented the other since both had strengths and weaknesses. Although market measures of performance "are more objective than accounting based measures," they are "also affected by some factors beyond control of the management" (Gani & Jermias, 2006; p.303).

TABLE 1
List of Sample Firms According to Segments of the Finance Industry

Segment	No of firms
Commercial banking	2
Islamic banking	1
Investment banking	6
Universal banking	10
Insurance	6
Takaful	3
Others	9
Total	37

Accounting based measures are preferable in the context of a corporate governance study because they reflect the ability of the management to add value to the firm (Hutchinson & Gul, 2004). According to Westman (2009), the starting point for evaluating the performance of banks is the efficiency of their operations. Similar to prior studies, in order to reduce the possibility of wrong conclusions that could result from omitting variables that can predict performance and also to reduce omitted variable bias and endogeneity problem, two control variables (firm size and leverage) were added to the regression model (Pathan, 2009; Praptiningsih, 2009; Tao & Hutchinson, 2012). Multiple regression analysis was used to test the relationship. The hypotheses developed above were examined by the following model:

$$FP_{it} = a_0 + \beta_1 DDO_{it} + \beta_2 IDDO_{it} + \beta_3 IO + \beta_4 GO_{it} + \beta_5 DDO*IDB_{it} + \beta_6 IDDO*IDB_{it} + \beta_7 IO*IDB_{it} + \beta_8 GO*IDB_{it} + \beta_9 FSIZE_{it} + \beta_{10} LEV_{it} + YD + \varepsilon_{it}$$

The variables in the research model were operationalised as follows:

FP = firm performance (ROA and Tobin's Q)
IDB = dummy variables of 1 if board chair is separate and independent zero other wise
DDO = percentage of direct ownership by directors
IDDO = percentage of indirect ownership by directors
IO = percentage of ownership by institutional shareholders
GO = percentage of ownership by government
SIZE = log of total assets
LEV = total debt over equity
YD = year dummies

EMPIRICAL RESULTS AND DISCUSSIONS

Descriptive statistics

The descriptive statistics presented in Table 2 below indicates that the data was normally distributed since the skewedness and kurtosis values were less than ±3.00 and ±10.00 (Kline, 1998). In addition to the test of normality based on skewedness and kurtosis for individual variables, a group normality test was performed for the model and the result indicated that there was no normality problem. Furthermore, a heteroskedasticity test was performed and the heteroskedasticity and autocorrelation problem were addressed using the heteroskedasticity-consistent standard errors and white diagonal method for heteroskedasticity and autocorrelation respectively. The result of the descriptive statistics indicated that only 26% of the firms had an independent board chair, implying that the majority of the firms did not comply with regulatory requirement for independent board chair.

TABLE 2
Summary of Results of Descriptive Statistics

	ROA	DV	DDO	IO	GO	FS	LEV	CINED
Mean	0.024	0.007	0.030	0.503	0.117	0.043	0.064	0.260
Median	0.015	0.010	0.001	0.520	0.004	0.038	0.040	0.000
Maximum	0.079	0.013	0.240	0.900	0.845	0.088	0.310	1.000
Minimum	0.002	0.009	0.000	0.000	0.000	0.025	0.025	0.000
Std. Dev.	0.019	0.004	0.059	0.276	0.197	0.012	0.056	0.440
Skewedness	1.253	-1.134	2.106	-0.209	1.924	0.737	1.183	1.090
Kurtosis	3.265	2.362	6.144	1.675	5.916	2.675	4.725	2.190
Obs.	185	185	185	185	185	185	185	185

Note: ROA= return on assets, DV=Tobin's Q, DDO=direct director ownership, IDDO=indirect director ownership, IO=institutional ownership, GO=government ownership, FS = firm size, LEV = leverage, CINED=independent board chair

The linearity assumption of the OLS regression is also fulfilled since the values based on the Q-Q plot were within ±3.00 range. Furthermore, the variables in the model showed no indication of a multicollinearity problem since none of the bivariate correlation is greater than 0.7 as presented in Table 3 below (Pallant, 2005).

TABLE 3
Results of Correlation Analysis

	ROA	DV	DDO	IO	GO	FS	LEV	CINED
ROA	1.000							
DV	-0.048	1.000						
DDO	-0.024	0.167	1.000					
IDDO	0.284	-0.228	0.070					
IO	-0.138	0.164	0.042	1.000				
GO	-0.182	-0.142	-0.195	-0.332	1.000			
FS	-0.003	0.064	-0.099	0.208	0.062	1.000		
LEV	-0.468	-0.356	-0.162	-0.138	0.445	0.082	1.000	
CINED	0.181	0.084	-0.206	0.060	-0.019	0.008	-0.132	1.000

Note: ROA= return on assets, DV=Tobin's Q, DDO=direct director ownership, IDDO=indirect director ownership, IO=institutional ownership, GO=government ownership, FS=firm size, LEV=leverage, CINED=independent board chair

Multivariate regression analyses

Results of regression analysis based on ROA

The result of Hausman's test indicated that the random effect model was the most appropriate model and the results presented in Table 4 indicate an adjusted R2 of 8.6%. The f-statistics (f=2.722) obtained was large and the corresponding p-value was significant. However, none of the individual variables was significant while control variable leverage was significant but negatively related with ROA. The results indicated that none of the hypotheses was supported.

TABLE 4
Summary of Multivariate Regression Based on ROA

	OLS	REM	FEM
Constant	2.419(2.552)***	2.654(2.566)***	2.426(2.123)**
DDO	-0.003(-0.155)	0.018(0.414)	-0.004(-0.219)
IDDO	0.034(3.385)***	-0.035(-1.073)	0.034(3.134)***
IO	-0.007(-1.335)	-0.029(-1.175)	-0.007(-1.362)
SO	0.003(0.435)	0.042(1.276)	0.003(0.411)
DDO*CINED	11.9090.406)	-8.514(-0.377)	-14.73(-0.638)
IDDO*CINED	0.294(0.113)	0.040(0.010)	-8.365(-1.000)
IO*CINED	-1.249(-1.313)	-0.239(-0.188)	0.749(0.430)
GO*CINED	4.688(1.963)*	5.551(1.580)	11.086(1.864)*
Firm size	27.558(1.491)	11.755(0.621)	7.762(0.361)
Leverage	-23.825(-6.116)***	-18.822(-3.689)***	-13.618(-2.008)**
Year dummies	0.283(0.397)	0.287(0.580)	0.274(0.553)
Year dummies	0.376(0.526)	0.339(0.682)	0.329(0.659)
Year dummies	0.312(0.436)	0.354(0.708)	0.380(0.752)
Year dummies	1.516(2.098)**	1.581(3.134)***	1.638(3.236)***
R2	0.209	0.136	0.698
Adjusted R2	0.163	0.086	0.596
F-statistics	4.560***	2.722***	6.842***
Durbin-Watson	0.871	1.794	2.268
Hausman's Test	NA	16.129(0.096)	NA

NOTE: ***, **, * indicates significance at 1%, 5% and 10% respectively. DDO*CINED=interacting variable for direct director ownership and independent chair, IDDO*CINED=interacting variable for indirect director ownership and independent chair, IO*CINED=interacting variable for institutional ownership and independent chair, GO*CINED=interacting variable for government ownership and independent chair. CINED=independent board chair

Results of regression analysis based on Tobin's Q

The results presented in Table 5 indicate an adjusted R2 of 11% based on Tobin's Q for the model that tests the moderating role of the independent chair in the relationship between ownership and firm performance. The f-statistics (f=3.360) obtained was large and the corresponding p-value was significant. The result indicated that institutional ownership was negatively related with firm performance while independent board chair significantly ($p<0.01$) moderated the relationship between indirect director ownership and Tobin's Q although negatively. The negative association was theoretically contrary to the agency theory, which suggests that presence of an independent chair is a good monitoring mechanism since the independent chair would ensure that the interest of directors who are the majority shareholders was aligned with the interest of other shareholders (Jensen & Meckling, 1976). In addition, the result is theoretically in line with arguments based on the stewardship theory, which suggests that separating the role of CEO and chair could stifle the CEO's innovativeness, lead to lack of coordination and cause delay in decision-making (Donaldson & Davis, 1991).

This shows that with majority shareholdings by directors, independent dual board leadership may not enhance market performance. This is supported by the stewardship theory, which suggests that dual board leadership may not be an efficient monitoring mechanism as independent directors may lack experience about the business or industry (Donaldson & Davis, 1991). The control variable leverage was significant but negatively related with Tobin's Q while the remaining variables were insignificant.

TABLE 5
Summary of Multivariate Regression Based on Tobin's Q

	OLS	REM	FEM
Constant	0.008(6.903)***	0.008(6.575)***	0.010(6.320)***
DDO	0.007(1.716)*	-0.000(-0.392)	0.001(0.262)
IDDO	-0.008(-3.473)***	-0.000(-0.359)	-0.005(-2.216)**
IO	-0.000(-0.279)	-0.002(-2.066)**	0.000(0.446)
SO	-0.001(-0.904)	-0.001(-0.845)	-0.002(-1.21)
DDO*CINED	0.013(0.347)	0.004(0.130)	0.001(0.045)
IDDO*CINED	-0.006(-1.970)*	-0.008(-1.869)*	-0.023(-1.944)*
IO*CINED	6.61E(0.053)	-0.000(-0.482)	-0.001(-0.843)
GO*CINED	0.005(1.928)*	0.004(0.906)	-0.000(-0.035)
Firm size	0.030(1.298)	0.026(1.042)	0.019(0.642)
Leverage	-0.030(-6.030)***	-0.032(-4.841)***	-0.035(-3.678)***
Year dummies	7.94E-(0.087)	0.000(0.188)	0.000(0.277)
Year dummies	0.001(1.099)	0.001(1.457)	0.001(1.503)
Year dummies	-0.000(-0.217)	-0.000(-0.329)	-0.000(-0.574)
Year dummies	-0.000(-0.725)	-0.000(-1.049)	-0.000(-1.128)
R2	0.212	0.162	0.623
Adjusted R2	0.167	0.114	0.497
F-statistics	4.676***	3.360***	4.940***
Durbin-Watson	0.815	1.335	1.748
Hausman's Test	NA	10.025(0.438)	NA

NOTE: ***, **, * indicates significance at 1%, 5% and 10% respectively. DDO*CINED=interacting variable for direct director ownership and independent chair, IDDO*CINED=interacting variable for indirect director ownership and independent chair, IO*CINED=interacting variable for institutional ownership and independent chair, GO*CINED=interacting variable for government ownership and independent chair. CINED=independent board chair

ADDITIONAL ANALYSIS

Evidence presented in the literature shows that there is time difference between the time a corporate governance mechanism is instituted and the time it creates impact on the performance of a company (Haniffa & Hudaib, 2006; Ntim, 2009). Therefore, similar to previous studies (Arellano & Bond, 1991) and in order to control for the potential problem of endogeneity, the model was re-estimated using generalised methods of moment to determine the extent to which the result presented was robust to any potential endogeneity problem. Estimating a model based on the generalised method of moments (GMM) is one of the ways in which endogeneity might be addressed. The results of the estimation based on the GMM model are presented side by side with the results based on the FEM model in order to enable comparison. The results of the estimation based on least squares for ROA and Tobin's Q are presented in column 2 and 3 while the results based on GMM model are presented in column 4 and 5 respectively.

The results obtained from the least squares model were similar to the results presented in Table 6 for the GMM except for small cases of sensitivities. The coefficient of interaction between direct ownership by directors and the independent board changed from insignificant to statistically significant under ROA and from positive to negative under Tobin's Q. The coefficient for interaction between indirect ownership and board chair changed from positive to negative under ROA and from significant to statistically insignificant under Tobin's Q while the coefficient of interaction between institutional ownership and board chair changed from negative to positive under Tobin's Q but remained insignificant. The coefficient of firm size changed from positive to negative under ROA. Lastly, the coefficient of leverage changed from statistically significant to insignificant under Tobin's Q but remained in the same direction.

TABLE 6
Summary of Estimation Based on Generalised Method of Moments

	least squares models		**Generalised method of moments**	
	ROA(FEM)	Tobin's Q (FEM)	ROA	Tobin's Q
Constant	2.654(2.566)***	0.008(6.575)***	-	-
DDO*CINED	-8.514(-0.377)	0.004(0.130)	-0.187(-1.699)*	-0.037(-1.274)
IDDO*CINED	0.040(0.0105)	-0.008(-1.869)*	-0.126(-1.499)	-0.005(-0.485)
IO*CINED	-0.239(-0.188)	-0.000(-0.482)	-0.017(-0.919)	0.003(0.685)
GO*CINED	5.551(1.580)	0.004(0.906)	0.016(0.5377)	0.015(1.627)
Firm size	11.755(0.621)	0.026(1.042)	-0.011(-0.0759)	0.023(1.051)
Leverage	-18.822(-3.689)***	-0.032(-4.841)***	-0.038(-1.720)*	-0.012(-1.580)
2007	0.287(0.580)	0.000(0.188)	-	-
2008	0.339(0.682)	0.001(1.457)	-0.002(-0.6953)	0.000(0.814)
2009	0.354(0.708)	-0.000(-0.329)	-0.001(-0.5266)	-0.000(-0.419)
2010	1.581(3.134)***	-0.000(-1.049)	0.005(1.235)	-0.000(-1.632)
R2	0.136	0.162	-	-
Adjusted R2	0.086	0.114	-	-
F-statistics	2.722***	3.360***	-	-
Durbin-Watson	1.794	1.335	-	-
Hausman's Test	16.129(0.096)	10.025(0.438)	-	-
J-statistics	-	-	2.279(0.1311)	0.073(0.786)
Wald test	-	-	87.574***	51.294***

NOTE:*, **. *** Significance at 10%, 5% and 1% level. Coefficient presented first and t-statistics in parenthesis. ROA=return on asset, REM=random effect method, fixed effect method. DDO=direct director ownership, IDDO=indirect director ownership, IO=institutional ownership, GO=government ownership, FS=firm size, LEV=leverage, CINED=independent board chair

Finally, although some variables were sensitive to the estimation of GMM model, overall, the results showed that the majority of the variables in the model were robust for estimation based on the GMM model and robust to potential endogeneity problem. The sensitivity could be explained by the time lag between the time the mechanism was instituted and the time it took to create impact on the relationship between the independent board chair and firm performance. It could also be the result of the reduction in the number of periods of observation and lastly, the problem in the model such as omitted variable bias could have accounted for the sensitivities.

CONCLUSION

Previous studies examining the impact of corporate governance on firm performance have only examined the direct influence of corporate governance mechanisms on firm performance while the moderating effect was not examined. This has led to conflicting and inconsistent findings on the impact of corporate governance mechanisms on firm performance. Absence of research on the moderating role of the independent chair means that the role of the independent chair has not been fully explored and understood. This paper examined the moderating role of the independent board chair in the relationship between ownership structure and firm performance. The study used a sample of 37 finance companies listed on the main market of Bursa Malaysia from 2007 to 2011 and yielded results indicating that an independent board chair negatively moderated the relationship between indirect ownership by directors and Tobin's Q. The study provided evidence for the interacting role of the independent board chair in the relationship between ownership structure and firm performance. The findings suggested that the independent board chair influences the strength and direction of the relationship between ownership structure and firm performance. The findings implied that the recommendation of the central bank for companies to have an independent board chair may not be appropriate for companies with high director ownership if the companies want to get high market valuation.

The study highlighted the fact that although corporate governance mechanisms may enhance performance, their impact on performance may be indirect and could be influenced by the nature of ownership in the firm. The study was robust to the potential problem of endogeneity since the results obtained based on GMM model estimation are similar to the estimation based on the least squares model with the exception of a few cases of sensitivities. The study was limited to only finance companies and based on data related to a five-year period from 2007 to 2011. Future studies could increase the sample and observation period. Inclusion of unlisted companies and taking a sample from other sectors and economies could provide more evidence and enhance generalisability of the findings.

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Making the Most of Activity-Based Costing: Case of Compensation Management at a Korean Public University

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ABSTRACT

Activity-based costing (ABC) has been touted as being able to provide insights into profitability by segregating revenues and costs into the various activities that give rise to them. However, empirical findings on the performance benefits of ABC are mixed. This paper demonstrates how to make the most of ABC in evaluating costs of flexible, part-time versus committed, full-time teaching resources at a Korean public university. Unattractive compensation packages in academia is an issue of concern that leads to a range of problems from shortage of staff in academia to street protests and even suicides in South Korea. The structured, cause-and-effect approach of ABC provides insights into various avenues for improvement in the university's performance evaluation system and compensation packages to facilitate better deployment of flexible and committed teaching resources.

Keywords: activity-based costing (ABC) application, compensation, public institution, flexible resources, committed resources

INTRODUCTION

Compared with the traditional costing system, activity-based costing (ABC) has been found to provide more relevant information, which is beneficial in a variety of ways ranging from making more accurate product-pricing and make-or-buy decisions to improved performance monitoring and evaluation (e.g. Ittner *et al*., 2002; Maiga & Jacobs, 2007; Mishra & Vaysman, 2001). In the traditional costing system, indirect, overhead costs are typically allocated to products and/or services in an arbitrary manner, resulting in distortion of cost information. By contrast, ABC identifies the costs associated with

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the activities performed throughout the value chain from production to after-sales services. Costs are traced from the activities to the final products and/or services based on the products and/or services consumption of the activities performed. ABC facilitates detection of the actual costs of activities and resources consumed in producing, marketing, selling, delivering and after-sales services of products and/or services based on the cause-and-effect relationships throughout the value chain.

Extant literature records mixed findings on the benefits of ABC (e.g. Carli & Canavari, 2013; Cooper & Kaplan, 1991; Eldenburg *et al*., 2010; Maher & Marais, 1998; Pike *et al*., 2011; Sarokolaei *et al*., 2013). While ABC constitutes a simple yet structured costing approach (e.g. Carli & Canavari, 2013), ABC does not necessarily result in more accurate and useful costs information (e.g. Cooper & Kaplan, 1991; Maher & Marais, 1998). As ABC assumes linear relationships between costs and activities that drive costs, ABC has been found to require modifications to accomodate the ambiguous, non-linear aspect of costs (Sarokoleai *et al*., 2013). Further, getting the support of top management and being embedded in an organisation's employee compensation system do not necessarily guarantee acceptance and use of ABC (Pike *et al*., 2011). Participation of all users in the design and implementation phase of ABC has been found to be pertinent for ABC to gain acceptance before the full potential of the costing system can be realised (Eldenburg *et al*., 2010).

Given the benefits and limitations of ABC, the objective of this study is to demonstrate how to make the most of ABC in the context of compensation management at a Korean public university. Extant literature suggests that compensation management in academia is an issue of concern (e.g. Campos-Arceiz *et al*., 2013; Rivkees & Genel, 2008; White *et al*., 2014). More specifically, compensation has been identified as one of the key reasons for a career in academia to be the least attractive among graduates (White *et al*., 2014). Academics have been found to work long hours; academics tend to work after office hours and even over weekends (Campos-Arceiz, 2013). Expertise retained in academia is not only pertinent for traditional, basic research but also for major scientific breakthroughs and innovations (Ivinson *et al*., 2008). Yet, such expertise is dwindling as academics are leaving for more attractive compensation packages beyond academia (Rivkees & Genel, 2007). Concerns about compensation management in academia are particularly acute in South Korea where poor compensation packages not only drive academics away but also give rise to social ills such as street protests and even suicides (Kim, 2012; Park, 2010).

As compensation management in academia is particularly acute in South Korea, this study applies ABC to assess costs of flexible, part-time and committed, full-time resources at a public university in the country, especially when part-timers have claimed to

have been exploited (Park, 2010). This paper demonstrates the ability of ABC in providing a simple yet structured comparison of costs between part-time and full-time resources. The results revealed various avenues for improvement in the institution's performance evaluation system and compensation packages for better deployment of both full-time and part-time resources.

The remainder of this paper is organised as follows: the second section describes the mechanism that underlies how costs are assigned using ABC; the third section discusses the research setting and compensation as an issue of concern at a public university of interest in South Korea; the fourth section evaluates the compensation issue using ABC; and the final section summarises the paper and concludes the discussion.

Activity-Based Costing Model

ABC has been touted as a powerful costing model for a thorough understanding of profitability (e.g. Cooper & Kaplan, 1991). ABC is able to reveal how products, customers, facilities, regions or distribution channels consume resources. Using a two-stage approach, first, ABC identifies activity cost pools, i.e. activities and the costs required to perform the activities, in an organisation. In this study, the cost pools are salaries of individual academic staff, both full-time and part-time staff. Next, costs at each activity cost pool are assigned to teaching, research and other contributions using appropriate cost driver rates as per consumption of the resources. In this manner, not only direct costs such as costs of flexible, part-time resources are accurately assigned. Indirect costs such as costs of committed, full-time resources are also accurately assigned to teaching, research and other contributions. Being able to assign costs, both direct and indirect costs, as per consumption of resources faciliates understanding whether organisational resources are utilised efficiently and effectively. Fig.1 summarises how ABC assigns costs in the context of this study.

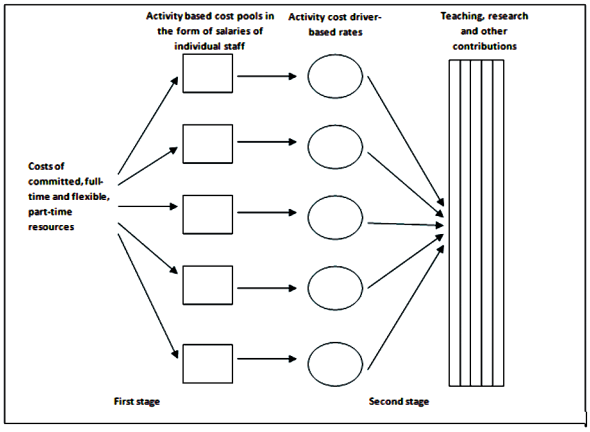

Fig.1. ABC's two-stage approach in assigning costs.

While the ABC approach in assigning costs better reflects consumption of resources, an indepth understanding of the activities and corresponding resources consumed is required to ensure appropriate choice of activity cost drivers and other assumptions that underlie cost assignment. Interviews with academic as well as administrative staff responsible for staff payroll and compensation management at the public university in South Korea were conducted to determine activity cost drivers and other assumptions that underlie cost assignment. As all manuals and documentation are in Korean, data were collected primarily via interviews, formal and informal, with academic and administrative staff who were comfortable conversing in English. Some of the written materials, which the university provided, were translated into English with the assistance of the administrative staff. Interview findings and details of how costs are assigned are discussed in the next section.

The Research Setting

The research site is a public university in South Korea established over 60 years ago. The university is one of the 10 flagship public universities in the country. The university consists of 13 faculties, namely humanities, social sciences, natural sciences, economics and management, engineering, agriculture and life sciences, law, pharmacy, medicine, human ecology, fine arts and music, veterinary medicine and bioscience and technology.

At the faculty of economics and management from which data for this research was primarily collected, part-time staff fulfilled approximately 40% of the faculty's teaching needs e.g. lectures, seminars, tutorials etc. at any point in time. Recruitment of part-timers to fulfil close to half of the teaching needs is a common practice across public universities in South Korea in line with shortage of full-time staff in academia. Besides delivering lectures, seminars and tutorials, part-time teaching staff are also expected to assess student coursework and set and mark examinations.

Full-time academic staff, who fulfil approximately 60% of the faculty's teaching needs, are responsible for not only teaching, assessing student coursework and setting and marking examinations. Their teaching responsibilities also include developing and implementing new methods of teaching to reflect changes in research, reviewing and revising curriculum to reflect latest development in research and practice and supporting students via their pastoral, advisory role as teachers and mentors.

Besides teaching responsibilities, full-time academic staff are required to undertake research, get their research published and actively contribute to the university's research profile. Full-time academic staff's research responsibilities also include supervising research students particularly at the postgraduate level, i.e. master's and doctoral level.

In addition to teaching and research, full-time academic staff are required

to juggle other activities especially administrative tasks related to student admissions and induction programmes, representing the faculty and/or university and contributing when deemed necessary at meetings, professional as well as research conferences and seminars, establishing collaborative connections with outsiders (e.g. industrial, commercial as well as public organisations), consistently engaging in continuous professional development and participating in staff training activites. Full-time academic staff with formal leadership roles and/or positions, such as course coordinator, head of department, deputy dean and dean, are required to manage and supervise staff who report to them.

The compensation issue

At the public university of interest, despite the wide range of duties and responsbilities full-time academic staff are expected to fulfil, their performance is broadly evaluated in terms of three components, i.e. teaching, research and other contributions. The weight assigned to each of the three components of performance are 6:3:1 for teaching, research and other contributions, respectively. Full-time academic staff have the privilege of flexible working hours. There is little information about how much of the individual resources are devoted to teaching, research and other contributions, respectively. However, individuals are expected to devote their resources based on the weight assigned to teaching, research and other contributions, respectively. Hence, the weight was used as a basis to assign costs of full-time academic resources to the three activities, i.e. teaching, research and other contributions.

Of the three components of performance, teaching is the most structured and comparable across individuals; research and other duties and responsibilities are more diverse, less structured and vary to a greater extent across individuals. In terms of teaching, each full-time academic staff is required to teach three courses per academic year. Each course typically involves three hours of teaching per week (i.e. three credit-hour courses) and requires four weeks to complete. The base pay of full-time academic staff for each salary class is summarised in the first two columns of Table 1.

At the public university of interest, part-timers are paid an hourly rate of 42,500 won. As part-timers are involved in teaching alone, costs of flexible, part-time resources are direct costs, i.e. directly traceable to teaching.

Part-time teaching staff are claimed to be underpaid in South Korean public universities, where part-timers are believed to receive approximately one third of their full-time counterparts' pay (Park, 2010). Beyond public universities, part-timers are believed to receive approximately half of their full-time counterparts' pay. The widespread belief that part-timers are underpaid and exploited is a source of distress not only to the part-timers but also to the South

Korean government and policy makers. The belief that part-timers are underpaid and exploited is also claimed to be the cause of a series of suicide cases that has involved part-time teaching staff at public universities since 1999 (Park, 2010).

The widespread belief that part-time teaching staff are underpaid and exploited coupled with a series of suicide cases prompted the National Assembly of the Republic of Korea to consider revising the compensation scheme for part-time teaching staff at public universities in 2007 (Park, 2010). Two proposed revisions are believed to be relevant in ensuring fair compensation for part-time teaching staff. The first proposed revision is to raise the part-time hourly pay rate from 42,500 won to approximately 60,000 to 70,000 won. The second proposed revision is to include insurance coverage in part-timers' compensation scheme, i.e. pension, health, unemployment and industrial disaster insurance. However, part-timers have yet to see improvement in their compensation package despite living on the street for years since 2007 in protest (Park, 2010).

Unfair Compensation For Part-Time Teaching Staff?

This study applies ABC to assess whether part-time teaching staff are indeed underpaid and exploited. Teaching is the only common activity that both part-time and full-time staff perform. To ensure a fair comparison between costs of full-time versus part-time teaching resources, first, the teaching component of full-time staff's salary was extracted. Based on the university's performance evaluation system, full-time academic staff are expected to dedicate 60% of their resources towards teaching consistent with the weight assigned to the three components of performance, i.e. 6:3:1 for teaching, research and other contributions, respectively. Hence, 60% of full-time staff's salary is deemed to compensate for teaching activities. Next, salary for the teaching component was converted to an hourly activity driver rate. Each full-time staff is required to teach three courses per academic year. Each course involves three hours of teaching per week and requires four weeks to complete.

Table 1 summarises the results of the calculation and comparison of hourly pay rate for teaching between full-time and part-time staff. Across the 33 salary classes, the part-time hourly pay rate of 42,500 won is higher than or close to two thirds of the salary classes' (full-time) hourly pay rate, i.e. salary class 1 to 21. At salary class 21, full-time academic staff have already established a reasonably steady track record of teaching, research and other contributions, not to mention the extra duties and responsibilities associated with teaching that their part-time counterparts are relieved of, such as reviewing and revising curriculum and guiding students in their position as mentors. Yet, these full-timers are compensated less on an hourly basis for teaching compared with their part-time counterparts.

TABLE 1
Compensation for Teaching

Salary class[a]	Base salary[b] (won)	Salary for teaching component[c] (won)	Full-time hourly pay rate[d] (won)	Ratio of hourly pay rate: Part-time to full time[e]
1	1,208,400	725,040	20,140.00	2.11
2	1,250,300	750,180	20,838.33	2.04
3	1,292,400	775,440	21,540.00	1.97
4	1,334,300	800,580	22,238.33	1.91
5	1,376,500	825,900	22,941.67	1.85
6	1,422,500	853,500	23,708.33	1.79
7	1,468,600	881,160	24,476.67	1.74
8	1,515,000	909,000	25,250.00	1.68
9	1,584,200	950,520	26,403.33	1.61
10	1,663,700	998,220	27,728.33	1.53
11	1,723,200	1,033,920	28,720.00	1.48
12	1,792,400	1,075,440	29,873.33	1.42
13	1,861,400	1,116,840	31,023.33	1.37
14	1,930,500	1,158,300	32,175.00	1.32
15	2,011,500	1,206,900	33,525.00	1.27
16	2,092,500	1,255,500	34,875.00	1.22
17	2,173,000	1,303,800	36,216.67	1.17
18	2,253,500	1,352,100	37,558.33	1.13
19	2,334,600	1,400,760	38,910.00	1.09
20	2,414,800	1,448,880	40,246.67	1.06
21	2,495,300	1,497,180	41,588.33	1.02
22	2,575,600	1,545,360	42,926.67	0.99
23	2,680,600	1,608,360	44,676.67	0.95
24	2,785,200	1,671,120	46,420.00	0.92
25	2,889,600	1,733,760	48,160.00	0.88
26	2,994,200	1,796,520	49,903.33	0.85
27	3,098,600	1,859,160	51,643.33	0.82
28	3,203,200	1,921,920	53,386.67	0.80
29	3,282,600	1,969,560	54,710.00	0.78
30	3,362,300	2,017,380	56,038.33	0.76
31	3,441,700	2,065,020	57,361.67	0.74
32	3,521,100	2,112,660	58,685.00	0.72
33	3,600,600	2,160,360	60,010.00	0.71

NOTES:

a The 33 salary classes apply to all full-time academic staff from the most junior entry level to the most senior professor level. There are four additional classes above class 33. The four additional classes are called "special classes". The "special classes" are applicable to departmental heads, deputy deans and deans. As departmental heads, deputy deans and deans have more non-teaching related duties and responsibilities, the four special classes were excluded from analysis.

b Base salary of full-time academic staff compensates for teaching, research and other contributions for each academic year.

c Salary for the teaching component constitutes 60 % of base salary in line with the weight assigned to each component of performance, i.e. 6:3:1 for teaching, research and other contributions.

d Full-time hourly pay rate is the salary for the teaching component divided by 36 hours of teaching per academic year. Each full-time staff teaches three courses with 3 teaching hours per week for 4 weeks (3 courses x 3 hours per week x 4 weeks = 36 hours per academic year).

e Ratio of hourly pay rate is full-time hourly pay rate divided by part-time hourly pay rate of 42,500 won.

Revising the part-time hourly pay rate to approximately 60,000 to 70,000 won as proposed will lead to part-timers' pay for teaching to be equivalent to that of a typical full professor at the highest salary class of 33, who is not holding formal leadership roles and/or positions such as departmental heads, deputy deans and deans. If all part-timers who fulfil 40% of the teaching needs of the institution were in a position to provide insights into teaching in a manner equivalent to or better than those of a typical full professor at the highest salary class, then it would be worth considering revising part-time hourly pay rate to approximately 60,000 to 70,000 won.

The existing hourly part-time pay rate of 42,500 won is more than one-half of a typical full professor's hourly pay rate for teaching of 60,010 won. The claim that part-time teaching staff are underpaid and exploited when they receive approximately one third of their full-time counterparts' pay is not supported.

Further, part-time teaching resources are flexible resources whereas full-time teaching resources are committed resources. Increase in part-time hourly pay rate will immediately translate into increase in costs if the institution continues to rely on part-time resources to fulfill 40% of its teaching needs. By constrast, full-time academic staff will continue to receive the same salary in the short run, if it is not against the institution's policies to allocate some of the teaching needs traditionally fulfilled with part-time teaching resources to full-time staff.

DISCUSSION AND CONCLUSION

ABC is capable of identifying costs associated with the various activities performed across the value chain, which facilitates performance monitoring and encourages efficient and effective use of resources. This paper capitalises on this very benefit of ABC in assessing a staffing and compensation issue that plagues South Korean public universities. More specifically, this paper applies ABC to evaluate costs of teaching resources when committed, full-time versus flexible, part-time teaching resources are used. Results suggest that when teaching costs are converted into hourly activity driver rate, part-timers are not paid approximately one third of their full-time counterparts' pay as claimed. Instead, part-timers are paid more than one half of a typical full professor's hourly pay rate for teaching. Further, part-timers have fewer duties and responsibilities associated with teaching compared with their full-time counterparts. In short, results of this study provide little support to the claim that part-timers are underpaid and exploited.

While full-time academic staff are compensated with pay rates that vary depending on their qualifications, prior experiences and track records, part-timers are compensated at a constant pay rate regardless of their qualifications, prior experiences and track records. Being compensated at a constant pay rate without taking into consideration the varying degrees of expertise and contributions across individuals can be a source of

dissatisfaction and distress resulting in the feeling of being exploited. Future research can consider exploring the feasibility of having varying pay rates for part-timers to reflect differences in expertise and contributions especially when the participation of practitioners in academic teaching is becoming increasingly common to ensure alignment of education with practice (Clinebell & Clinebell, 2008).

While evaluating pay rate for teaching, use of ABC also reveals other avenues for improvement. For instance, the weight assigned to the three components of performance,i.e. 6:3:1 for teaching, research and other contributions, respectively, appear to encourage a focus on teaching among full-time academic staff. Recent developments suggest that making academic institutions and university degrees relevant to practice and the world beyond academia requires more active involvement in non-teaching related activities (e.g. see Clinebell & Clinebell, 2008; Pfeffer & Fong, 2002; Starkey & Madan, 2000). Further, research typically involves long working hours; it is a common practice for researchers to work after office hours and over weekends (Campos-Arceiz *et al*., 2013). A performance evaluation system that assigns less than one third of the weight to research may not be sufficient to encourage investment of time and other resources into development of research expertise pertinent for scientific breakthroughs and innovations. Further, while street protests and suicides attributable to poor compensation among part-timers have received press coverage (e.g. Park, 2010), full-timers have been found to be leaving academia for greener pastures (e.g. Kim, 2012; Rivkees & Genel, 2007; White *et al*., 2013), which provides a preliminary indication of how satisfied full-timers are with their compensation packages. Future research can consider exploring whether the performance evaluation system and compensation packages for full-time academic staff are appropriate and well-aligned.

This paper presents the ABC approach in evaluating the staffing and compensation issue that South Korean public universities grapple with. Findings of this study have to be interpreted with caution in light of two limitations. First, instead of assigning costs of committed, full-time resources based on actual consumption of resources, this study assigns the costs based on expected consumption of resources as per the weight assigned to the three components of performance, i.e. teaching, research and other contributions. Nevertheless, findings of this study, which shed light on the cause-and-effect relationships between teaching activities and costs of full-time versus part-time resources consumed help policy makers in South Korea to explain their continued inaction on the compensation issue (Park, 2010). Second, this study, which applies a structured ABC approach, does not accomodate for less structured aspects of the staffing and compensation issue, such as differences in quality of teaching between full-time and part-time staff as

well as social and emotional well-being of staff. Further, unlike private institutions, public universities have social and political obligations in addition to the conventional economic goal of maximising profit, which can be a reason for public universities' incompetence in terms of compensation packages offered (e.g. Lau, 2013). Future research can consider bringing together the various perspectives in evaluating the staffing and compensation issue while taking into consideration the institution's social, political and eonomic goals for a more complete picture and comprehensive solutions.

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Syari'ah-Based Accounting (sbA) : Awareness of Accounting Academicians in Malaysia

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ABSTRACT

Financial reporting based on *Syari'ah* is very important to ensure reliability and usefulness of information. The Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI) has developed various accounting and auditing standards to ensure the quality of financial reports produced by institutions involved in Islamic products. The Malaysian Accounting Standards Board (MASB) has also taken the effort to come out with FRS-i-1, *Presentation of Financial Statements of Islamic Financial Institutions* (formerly known as MASB-i-1), to follow in the footsteps of AAOIFI. The education sector could take part in this caravan by updating the curriculum to incorporate the changes that are happening to better prepare the future workforce. However, very few institutions of higher learning in Malaysia offer *Syari'ah*-based Accounting (SbA) courses in their accounting programmes. The purpose of this study is to identify the level of awareness and knowledge of accounting academicians on SbA and to determine whether there is a need to offer SbA courses in institutions of higher learning so as to equip future accountants with SbA knowledge. Therefore, the objective of this study is to examine the level of awareness of SbA amongst accounting academicians and to understand reasons for higher learning institutions in Malaysia to offer SbA courses in their accounting programmes in the future. The respondents of this study were 40 accounting lecturers from selected Malaysian public institutions of higher learning. This study showed that there was a high degree of awareness among the academicians who agreed that SbA is needed to account for Islamic products and the majority agreed that SbA should be offered at institutions of higher learning. This study has several implications for society, government policies and education sectors. The academicians foresee the

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future needs of SbA in order to meet the demand in the Islamic Capital Market.

Keywords: *Syari'ah*-based accounting, level of awareness, academicians

INTRODUCTION

The Islamic banking industry in Malaysia has been growing at the rate of 19% per annum in terms of assets since the year 2000. In the Economic Report 2012/2013 by the Ministry of Finance, the Islamic banking business was stated to have continued to expand in the first seven months of 2013 with total assets increasing by 20.6% to RM469.5 billion. This alone represents 24.2% of the assets of the country's banking system (Borneo Post online, 2013).The need for accounting system based on *syari'ah* principles to cater for Islamic Capital Market (ICM) is escalating and this is evidenced by the issuance of the accounting standard on Presentation of Financial Statements of Islamic Financial Institutions (FRSi-1) and the Accounting and Auditing Organisation of Islamic Financial Institutions (AAOIFI) standards.

Syari'ah is the code of law based on the *Quran* (American Heritage Dictionary, 2005). *Syari'ah* covers not only religious rituals, but also many aspects of day-to-day life, politics, economics, banking, business or contract law and social issues. *Syari'ah*-based Accounting (SbA) is a term used to capture the nature and orientation of Islamic accounting that is based on Islamic principles. SbA includes accounting for Islamic products built on FRSi-1 and AAOIFI standards. Individual Muslims generally and entrepreneurs specifically are concerned with the development and implementation of accounting books, systems and recording procedures.

This interest is inspired by the need to comply with the requirements of *syari'ah* principles as stated in the Muslims' divine laws, Al-Quran and *As-Sunnah*. Verses 282[1] and

[1]O ye who believe! When ye deal with each other, in transactions involving future obligations in a fixed period of time, reduce them to writing. Let a scribe write down faithfully as between the parties: let not the scribe refuse to write: as *Allah* Has taught him, so let him write. Let him who incurs the liability dictate, but let him fear His Lord *Allah*, and not diminish aught of what he owes. If the party liable is mentally deficient, or weak, or unable himself to dictate, Let his guardian dictate faithfully, and get two witnesses, out of your own men, and if there are not two men, then a man and two women, such as ye choose, for witnesses, so that if one of them errs, the other can remind her. The witnesses should not refuse when they are called on *(For evidence)*. Disdain not to reduce to writing *(your contract)* for a future period, whether it be small or big: it is juster in the sight of *Allah*, More suitable as evidence, and more convenient to prevent doubts among yourselves but if it be a transaction which ye carry out on the spot among yourselves, there is no blame on you if ye reduce it not to writing. But take witness whenever ye make a commercial contract; and let neither scribe nor witness suffer harm. If ye do *(such harm)*, it would be wickedness in you. So fear *Allah*; For it is Good that teaches you. And *Allah* is well acquainted with all things. If ye are on a journey, and cannot find a scribe, a pledge with possession *(may serve the purpose)*. And if one of you deposits a thing on trust with another, let the trustee *(faithfully)* discharge his trust, and let him Fear his Lord conceal not evidence; for whoever conceals it, - his heart is tainted with sin. And *Allah* knoweth all that ye do. (*Al-Baqarah* : 282)

283[2] of *Surah Al-Baqarah* (second chapter) in the *Quran*, for instance, specifically require the writing and recording of debts and business transactions (Yusof Ali, 1946). The importance of recording of business deals according to specific requirements in Islam is strengthened further by the fact that verse 282 is the longest verse in the *Quran*.

There are urgent calls for the Islamic financial markets in Malaysia to have, amongst others, knowledge and expertise, if Malaysia wants to realise her aspiration to become the international Islamic financial hub for Asia. The Financial Sector Master Plan (FSMP) issued by the Bank Negara Malaysia in 2001 has outlined the general objectives of the Islamic banking and *takaful* industry, which is to create an efficient, progressive and comprehensive Islamic financial system that contributes significantly to the effectiveness and efficiency of the Malaysian financial sector. Among the steps that have been mentioned by the master plan to meet these objectives is to enhance knowledge and expertise in the banking and *takaful* industries under the institutional capacity enhancement strategy. Moreover, FSMP specifically outlined the need to enhance the teaching of Islamic banking and *takaful* in the school curriculum and in institutions of higher learning as part of its complimentary measures (Financial Sector Master Plan, 2001). The authors are of the opinion that even though SbA was not mentioned in this FSMP directly, SbA treatments are important to cater for Islamic banking and *takaful* operations.

This study is further initiated by the existence of a gap between the ICM requirements above and the offerings of the education system. We discovered that only the International Islamic University Malaysia (IIUM) offers SbA courses in its accounting programme. SbA courses are not specifically mentioned or emphasised to be offered or to become core courses under the Criteria and Standards for Programmes Offered in the Field of Accounting in Public Universities in Malaysia. As part of the Malaysian National Education Philosophy, effort is needed to produce Malaysian citizens who are knowledgeable and competent, who possess high moral standards and who are responsible and capable of achieving a high level of personal well-being and who are able to contribute to the harmony and betterment of the family, the society and the nation at large.

Based on the above perspectives, it is believed that accounting academicians should be aware of the importance and the need of SbA exposure to future accountants. As far as we are concerned,

[2]If ye are on a journey, and cannot find a scribe, a pledge with possession (may serve the purpose). And if one of you deposits a thing on trust with another, Let the trustee (Faithfully) discharge His trust, and let him fear his Lord. Conceal not evidence; for whoever conceals it,- His heart is tainted with sin. And Allah Knoweth all that ye do. (Al-Baqarah: 283)

the level of SbA understanding among the accounting academicians in Malaysia is still low.

The purpose of this study are to identify the level of awareness and knowledge of accounting academicians of SbA and to determine whether there is a need to offer SbA courses in the institutions of higher learning so as to equip future accountants with SbA knowledge. The paper is organised as follows: first, the comparison between SbA and conventional accounting; second, the need of SbA in business and economic practice; third, the importance of SbA education; fourth, the research method used; fifth, the results and discussion of the findings; and finally, the conclusion and some recommendations for future research.

LITERATURE REVIEW

Syari'ah based Accounting (SbA) vs. Conventional Accounting

The concept of *Syari'ah*-based Accounting (SbA) or, as it is widely known, Islamic accounting, is very different from the capitalist accounting or conventional accounting system.

According to Hameed (2003), Islamic accounting is "the accounting process which provides appropriate information to stakeholders of an entity to ensure that entity is continuously operating within Islamic *shari'ah* boundary and delivering on its socioeconomics objectives."

On the contrary, conventional accounting is defined as "the identification, recording, classification, interpretation and communication of economic events to permit users to make informed decision" (AAA, 1966). Conventional accounting aims to permit informed decisions for allocating scarce resources to their most efficient and profitable uses (FASB, 1978).

The Islamic accounting definition stands on the concept of *syari'ah* based on Islamic principles whereas conventional accounting is based on capitalist interpretation. It is solely based on economic events without any reference to religious belief. Islamic accounting ensures that Islamic organisations abide by the principles of *syari'ah* or Islamic law in their dealings and enable the assessment of whether the objectives of the organisation are being met (Hameed, 2003). *Syari'ah* law is a broad concept comprising divine law governing the life of individual Muslims in their relationships with Allah, individual human beings and others. The rule in *Syari'ah* law is based on the *Quran*, *Hadith*, *Ijma*' and *Qiyas*. Theoretically, SbA is designed to be consistent with the *Syari'ah* law underpinning the main principles from the *Quran* and *Hadith*.

The need for Syari'ah-based Accounting or Islamic Accounting

Much of the literature discusses the importance of and the need for Islamic Accounting. Gambling and Karim (1986), for example, emphasised the possible impact of Islamic user needs on financial reporting, especially on the prohibition of *riba* (usury) and the obligation to pay *zakat*. The essential Islamic characteristics in accounting must be based on the *Quran* and *Hadith*. The *Quran* is often quite specific in the obligations and prohibitions it lays upon followers of Islam regarding matters that impinge upon commercial and financial affairs (Baydoun & Willet, 2000).

The insistence of Islam on the moral code of *syari'ah* in commercial dealings is similar to the application of medieval canon law in Western European society, which was circumvented by the rise of capitalism (Gambling & Karim, 1991).

The explanation of the prohibition of *riba* related to the Islamic attitude to the time value of money is discussed by Abdel Karim (1995). Some Muslim scholars such as Gambling and Karim (1991) argued that the law against the charging of interest makes the time value of money an unacceptable concept to a Muslim. On the other hand, Abdel Karim (2005) argued that the acceptance of the concept of the time value of money might simply provide another avenue by which the prohibition on usury could be avoided. Baydoun and Willet (2000) viewed that the time value of money concept is central to the approach to valuation used in many Western accounting measurement theories and it would seem to prevent the kind of theoretical support for theories of asset and liability valuation often presumed by Islamic writers.

Hameed (2000) identified the need for Islamic accounting based on two dimensions: push factors and pull factors. The push factors resulted from the critique of conventional accounting; problems of decision-usefulness framework, social and environmental issues, public interest arguments, etc. The pull factors are motivated from the inappropriateness of conventional accounting objectives from Islamic perspectives. This was agreed by Rahman (2000), who stated that conventional accounting rules are inappropriate for *zakat* purposes, referring specifically to valuation of inventories, account receivables and the concept of conservatism and prudence.

The importance of education on Syari'ah-based Accounting

Previous study by Hamid and Nordin (2001) revealed that only 27.3% of the Malaysian Muslim population completely understood the differences between Islamic banks and conventional banks although almost 100% of the Muslim

population was aware of the existence of Islamic banks. More than 70% of the Muslim population did not understand the difference between Islamic banks and conventional banks due to lack of understanding contributed by minimal emphasis on *mua'malat* principles (daily transaction activities according to Islam) in the Malaysian education system. This implied that even if the Malaysian Muslim population were aware of the existence of Islamic institutions, understanding of Islamic accounting for Islamic product is minimal among the practitioners (Abdullah, Maswati, & Asna, 2005).

Amin, Rahman and Ramayah (2009) study the undergraduate students' acceptance level of an Islamic accounting course using the theory of reasoned action (TRA) and emphasise the factors affecting the acceptance of students into an Islamic accounting course in Malaysian universities. Muslims' understanding of Islamic accounting and *syari'ah* law in business and financial dealings needs to be further enhanced through the education system, training and development and greater publicity. Elgari (1999) asserted that, "It is part of our Islamic belief that our *syari'ah* is capable of accommodating all our legitimate needs. If we fail to catch with others, it is due to lack of effort on our part."

Altarawneh and Lucas (2012) contributed to the understanding of the neglect of Islamic accounting in Islamic countries and provided insight into the prospects for and barriers to wider adoption of Islamic accounting in future. According to Sarea and Hanifah (2013) there is a need for Islamic Accounting Standards for Islamic financial institutions (IFIs). It is argued that the neglect of Islamic accounting in Islamic countries could be attributed to Islamic accounting not meeting the needs of users rather than acculturation or economic dependency (Velayutham, 2014). This is further emphasised by Karim (2005) that one of the challenges ahead for the Islamic financial services industry (IFSI) is the development of talent and human capital. Adequate and qualified human resource is needed to strengthen the industry through innovation and sophistication. Shortage of skilled, well-trained and a high-calibre workforce are major impediments to its future growth. An insufficiently equipped pool of scholars of both Islamic laws and modern finance to serve on the *Syari'ah* supervisory board of International Islamic Financial Services (IIFS), for instance, may hinder the proper development of the market. Therefore, in this case, the Islamic Development Bank (IDB) and Islamic Financial Services Board (IFSB) have made a joint effort to produce a 10-year

Master plan for the IFSI to incorporate one of the challenges, which is human capital and talent development.

SbA courses are proposed to enhance the knowledge of accounting students and accounting practitioners in preparation of accounting reports and financial statements of the Islamic institutions, in particular, Islamic Banking and Finance, *Takaful* (Insurance), *Zakat* (Obligatory Levy) and Ar Rahnu (Islamic Pawn). Such SbA courses will include, among others, zakat accounting, muamalat and *syari'ah* law, property valuation from the Islamic perspective, the current value concept on Income Statement and the Balance Sheet, *Syari'ah*-based auditing concept, Islamic business ethics, Islamic Contracts and Islamic accounting theory based on the *Quran*, *Hadith*, *Ijmak* and *Qias*.

Several authors have explained the importance and implications of Islamic accounting to account for Islamic products. However, the level of SbA awareness among academicians has yet to be examined in the context of Malaysian institutions of higher learning.

RESEARCH METHOD

Questions on the level of awareness were measured on a 5-point Likert scale, ranging from strongly disagree (1) to strongly agree (5). There were 9 items measuring the level of awareness of accounting academicians on the need of SbA in the industry, particularly on institutions offering Islamic financial services. The survey was carried out from August 2005 to October 2005. Due to time constraints, a total of 100 questionnaires were personally administered and sent out to academic staff of selected Malaysian public institutions of higher learning. The respondents were given between two and three weeks to return the surveys to the researcher.

A total of 40 questionnaires were returned and used for analysis. This represented a response rate of 40%. A series of peer discussions was also carried out to get more detailed explanation of the respondents' opinion regarding SbA awareness and the need for offering this subject in the Malaysian institutions of higher learning. The frequency analysis and parametric test on correlation analysis were carried out since the frequency distribution of this data was normal and the size of the sample cases in the population was more than 30. The questionnaire consisted of three sections: the first section was designed to collect information about the respondents' background as shown in Table 1.

TABLE 1
Profiles of Respondents

Age	Frequency	%
30 years and below	7	17.5
31-35 years	13	32.5
36-40 years	6	15
41-45 years	6	15
46-50 years	7	17.5
51 years and above	1	2.5
Gender		
Male	12	30
Female	28	70
Current employment—academicians in public institutions of higher learning		
UPM	10	25
UKM	4	10
UIAM	9	22.5
UITM	16	40
UM	1	2.5
Qualification		
Master's & Degree in Accounting	19	47.5
PhD in Accounting	5	12.5
Master's in other than accounting	8	20
Professional Qualification & Academic Accounting Qualification	8	20
Academic experience in Accounting		
1 year and below	1	2.5
2-5 years	10	25
6-10 years	13	32.5
11-15 years	4	10
16 years and above	12	30
Practical experience in Accounting		
1 year and below	25	62.5
2-5 years	13	32.5
6-10 years	1	2.5
11-15 years	1	2.5

About 47.5 % of the respondents held a master's degree in accounting while 20% held a master's degree in other than accounting. Another 12.5 % held a PhD in accounting. About 20% had a combination of professional qualification and academic qualification. Thus, more than 80 % of the respondents had a strong accounting background. Age-wise, about 65 % of the respondents came from the age group of 40 years and below. In addition, about 72.5 % of the respondents had more than 6 years' academic experience in accounting. In terms of industry exposure, about 32.5 % had2 to 5 years of practical experience.

The second section of the questionnaire was designed to measure the awareness of the respondents of SbA. The respondents were asked to indicate their perceptions and awareness of the nature and orientation of Islamic Accounting, which is based on Islamic principles. In the third or final section of the questionnaire, the respondents were asked to indicate the relevance of SbA knowledge to the industries and the need to offer SbA courses in the tertiary level of education in Malaysia. They were also asked for suggestions on the possible courses to be offered in these institutions.

The Cronbach Alpha reliability test had also been carried out on the items to measure the level of awareness of SbA among the respondents, their perception of relevancy of SbA knowledge to the industry and the need to offer SbA courses in institutions of higher learning. It is a measure based on the internal consistency of the items. The Alpha values were 0.726 (for the items measuring the level of awareness), 0.887 (for items measuring relevance of SbA knowledge to industries) and 0.917 (for courses perceived to be of high benefit to the industry). By rule of thumb, an Alpha value between 0.7 and 0.79 is acceptable while an Alpha value greater than 0.8 is considered good (George & Mallery, 2001). Thus, these items were considered reliable for further analysis.

RESULTS AND DISCUSSION

Awareness and perceptions of Syari'ah-based Accounting (SbA)

The results of respondents' perceptions and awareness of SbA knowledge and Islamic accounting standard requirements are shown in Table 2.

TABLE 2
The frequency of Respondents' Awareness of SbA

Item	Agree and strongly agree %	Disagree and strongly disagree %
1. SbA standards are needed to account for Islamic Instrument	100%	-
2. The growth of ICM leads to the need to have different accounting requirements for different types of Islamic products.	90%	10%
3. SbA standards can facilitate the need of accounting users.	92.5%	7.5%
4. Proper development of ICM requires proper accounting regulation.	97.5%	2.5%
5. Accountants should provide information to enable society to follow God's commandments.	95%	5%
6. SbA standards need to be complied with to enable Islamic institutions to perform their roles effectively.	95%	5%
7. Accountability of SbA is that the management need to be accountable within and outside the firm.	95%	5%
8. Accounts should disclose everything that important to users for serving God.	92.5%	7.5%
9. SbA must be adopted as mandatory requirement for every Islamic institution.	90%	10%

All respondents (100%) agreed that SbA was needed to account for Islamic Financial Instruments. This is consistent with the *Syariah* Advisory Council (SAC) requirements and provisions for the existing Islamic Accounting Standards such as AAOIFI and FRSi-1. About 92.5% of the respondents were agreed and strongly agreed that SbA could facilitate the need of the accounting users and the accounts should disclose everything that is important to users for serving God.

About 95% of the respondents also agreed and strongly agreed that accountants should provide information to enable society to follow God's commandments. SbA standards need to be complied with to enable Islamic institutions to perform their roles effectively while management need to be accountable within and outside the firm by providing proper accounting records to the users. These are among the important criteria for corporate governance principles, the code of business conduct in Malaysia. Consistently, 92.5% respondents agreed and strongly agreed that the transparency of financial reporting could be achieved when accounts disclosed everything that was important to users for serving God.

In view of the ICM, 90% agreed that the growth of ICM leads to the need to have different accounting requirements for different types of Islamic products and SbA must be adopted as mandatory requirement for every Islamic institution. As a result, 97.5% perceived that a proper development of ICM requires a proper accounting regulation. These findings indicate that the level of awareness and perception of the respondents of SbA was high. This is consistent with the findings on practitioners' level of awareness on SbA (Abdullah, Maswati, & Asna, 2005).

The need for Syari'ah-based Accounting

Nevertheless, Table 3 demonstrates the respondents' awareness of the existence of SbA standards.

TABLE 3
The Frequency of Respondents' Awareness of the Existence SbA standards

Item	Aware (%)	Unaware (%)
1. Have you heard of FRSi?	55.0	45.0
2. Have you heard of AAOIFI?	52.5	45.0

The respondents' awareness on the existence of FRSi-1 is 55 %, which represents 22 respondents. A level of awareness of AAOIFI existence is 52.5 % representing 21 respondents. However, one respondent did not answer the question on AAOIFI. We perceived that the respondents' level of awareness of FRSi-1 and AAOIFI existence was

moderate. However, all the respondents (100%) agreed that there was a need to have SbA standard. This is consistent with the views of accounting practitioners in a study by Abdullah, Maswati and Asna (2005), which showed that 91.3 % of respondents agreed that there was a need for SbA to account for Islamic products as well as other products. Among the reasons given were:

- The existing conventional systems are not really efficient for certain transactions. There is also the need to educate people who are used to the existing conventional system.
- It is important for Muslims to apply SbA for the purpose of serving *Allah*.
- SbA is needed to standardise the accounting report for Islamic products or services.
- It is important to ensure that Islamic financial institutions comply with Islamic or *syari'ah* law.

In this study, the academicians gave reasons for the need for SbA to account for Islamic products as follows:

- It encompasses Islamic principles and guidelines for accounting.
- It is appropriate and consistent in presenting true and fair view of accounting information.
- It upholds justice and *halal* practices in accounting measurement because some of the Islamic products are different in measurement.
- It presents uniformity in accounting treatment and is necessary for comparison purposes.

This result proves that, besides the availability of conventional accounting method, SbA was also believed by the respondents to be important and necessary to account for Islamic financial products and other related *Syari'ah*-based products or operations.

In Malaysia, Islamic institutions are required to comply with the requirements of the Islamic Accounting Standard, Company Law, Securities Act and other statutory regulations. However, the application of the Islamic Accounting Standard is still an option for other institutions, which have Islamic products or operations.

The importance of Syari'ah-based Accounting education

The survey also found that 90 % of the respondents both agreed and strongly agreed that accountants should be equipped with SbA knowledge. They also expressed their agreement on the importance of SbA course(s) to the industry. The details are shown in Table 4 below:

TABLE 4
The Importance of SbA Courses

	Important & Very important %	Neutral %	Not important & Not important at all %
1. SbA course is needed for business sector	92.5	2.5	5
2. SbA course is needed for ICM	97.5	2.5	-
3. SbA course is needed for Islamic Financial Institutions (e.g. Islamic banks & takaful)	97.5	2.5	-
4. SbA course is needed for Islamic Institutions (e.g. Pusat Zakat, Tabung Haji)	92.5	5	2.5

More than 90 % of the respondents perceived the importance of future accounting and finance graduates pursuing SbA courses in order to fulfil the human resource needs of the business sectors (e.g. commercial, professional services), Islamic capital market, Islamic Financial Institutions (e.g. Islamic banking, *takaful*) and other institutions offering Islamic Financial Services (e.g. *Pusat Zakat*, *Tabung Haji*). Among the reasons given were:

- To increase the SbA expertise and knowledge of future accounting graduates in dealing with Islamic products or operations
- It is relevant to the industry and the business today.

This finding is consistent with the earlier study by Abdullah, Maswati and Asna (2005). It revealed that 87 % of the responding practitioners agreed that teaching of SbA courses in the institutions of higher learning was relevant to the industries.

Table 5 below shows that respondents' perception that accountants should be equipped with SbA knowledge was positively correlated with the perceived importance that an SbA course was needed for the business sector ($r = .631, p < 0.01$), positively correlated with SbA course was needed for ICM ($r = .686, p < 0.01$) and Islamic Financial Institutions ($r = .430, p < 0.01$), respectively. The number is 37 out of 40 respondents. This shows that the level of awareness was high among the academicians at higher institutions in Malaysia and their perception of the importance of an SbA course for the business sector, Islamic financial Institutions and eventually for the Islamic Capital Market.

TABLE 5
Pearson Correlations on SbA

		Accountants should be equipped with SbA knowledge.	An SbA course is needed for the business sector	An SbA course is needed for the Islamic capital Market	An SbA course is needed for financial institutions (e.g. Islamic banking, *Takaful*)	An SbA course is needed for Islamic institutions (e.g. *Pusat Zakat*, *Tabung Haji*)
Accountants should be equipped with SbA knowledge.	Pearson Correlation Sig. (2-tailed) N	1 37	.631** .000 37	.686** .000 37	.430** .008 37	.305 .066 37
An SbA course is needed for the business sector	Pearson Correlation Sig. (2-tailed) N	.631** .000 37	1 40	.526** .000 40	.392* .012 40	.620** .000 40
An SbA course is needed for the Islamic Capital Market	Pearson Correlation Sig. (2-tailed) N	.686** .000 37	.526** .000 40	1 40	.699** .000 40	.592* .000 40
An SbA course is needed for financial institutions (e.g. Islamic banking, Takaful)	Pearson Correlation Sig. (2-tailed) N	430** .008 37	.392* .012 40	.699** .000 40	1 40	.647** .000 40
An SbA course is needed for Islamic institutions (e.g. Pusat Zakat, Tabung Haji, oundations)	Pearson Correlation Sig. (2-tailed) N	.305 .066 37	.620** .000 40	.592* .000 40	.647** .000 40	1 40

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

All respondents' perception that an SbA course is needed for the business sector was also positively correlated with the perceived importance that an SbA course was needed for ICM, ($r = .526, p< 0.01$), Islamic Financial Institutions ($r =.392, p < 0.05$), and other Islamic institutions ($r = .620, p< 0.01$)

Similarly, all respondents' perception that an SbA course was needed for ICM was also positively correlated with the perceived importance that an SbA course was needed for Islamic Financial Institutions ($r =.699, p < 0.01$) and other Islamic Institutions ($r = .592, p< 0.05$). SbA course needed for Islamic Financial Institutions was also positively correlated with SbA course needed for other institutions ($r =647, p< 0.01$) .

This result proves that, besides the availability of conventional accounting method, SbA course is also believed to be important and needed to account for the business sector and Islamic institutions, in particular. These courses should be taught at the higher level of education and in universities in order to advance the knowledge of accounting students with Islamic principles.

Respondents were also asked to select courses they think are of high benefit to the industry and should be offered in the accounting programme. The majority of the respondents (94.4%) agreed that SbA or Islamic accounting should be offered in the accounting programme while 87.5% of the respondents agreed that both Islamic finance and Islamic banking courses should be offered in the accounting programme. The majority of respondents also agreed that Islamic economics, Islamic ethics, *Syari'ah*-based auditing, *zakat*, *takaful* and Islamic contracts should also be offered.

From the survey, it was found that among the factors resulting in other institutions not yet offering SbA were: SbA was not in the current curriculum, and lack of teaching expertise in SbA. This suggests that there is no 'push' factor from the regulators and higher authority to offer SbA courses despite there being a need for SbA knowledge for future accountants and other related parties in the ICM environment.

RECOMMENDATION AND CONCLUSION

This study showed that there was a high degree of awareness among the academicians who agreed that SbA was needed to account for Islamic products and the majority agreed that SbA should be offered at the institutions of higher learning. Most of the respondents strongly agreed that the future accountants should be equipped with SbA knowledge in order to be more competent and competitive in the job market.

This study has several implications to society, government policies and the education sector. The academicians foresaw the future needs of SbA in order to meet the demand in the Islamic Capital Market. Currently, the practitioners' lack of knowledge in SbA may deteriorate public

confidence in business and financial services, especially those dealing with Islamic transactions. The data can be improved further by overcoming some of the limitations by increasing the number of respondents to include others from other universities and conducting face-to-face interviews to collect better views and to reduce the respondents' resistance to answering questionnaires.

The future study is to explore the government and policy makers' views on the SbA courses and the mechanism on how these courses could be offered to existing Bachelor Accounting programmes at university level. It is hoped that Islamic accounting (SbA) knowledge will reinforce the current accounting curriculum thus, facilitating the industry with more competent accounting graduates.

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APPENDIX

SECTION 1: RESPONDENTS BACKGROUND

The answer to the following questions would enable us to classify and analyse the respondents in a statistical manner. Please be assured that any information you provide in this section is *strictly confidential* and will only be used for the purpose of this research. (For each question please tick the appropriate box or state in the space provided)

1. Please state your age:

(a) 30 years and below	☐
(b) 31 – 35 years	☐
(c) 36 - 40 years	☐
(d) 41 - 45 years	☐
(e) 46 - 50 years	☐
(f) 51 years and above	☐

2. Please state your gender:

(a) Male	☐
(b) Female	☐

3. Please state your present employment:
Academician in:

(a) Public University	☐
(b) Private University	☐
(c) Private College	☐
(d) Foreign University	☐
(e) Others, please specify_____	☐

4. Please state your educational background and qualifications (Tertiary level) – If relevant, please tick more than one box.

Qualifications	Tick
Diploma in Accounting	
Diploma in Other than Accounting: (Please specify) _____	
Advance Diploma in Accounting	
Advance Diploma in Other than Accounting: (Please specify) _____	
Bachelor Degree in Accounting	
Bachelor Degree in Other than Accounting: (Please specify) _____	
Masters Degree in Accounting	
Masters in Business Administration (specialising in Accounting)	
Masters Degree in Other than Accounting:(Please specify)_____	
PhD/Doctorate in Accounting	
PhD/Doctorate in Other than Accounting:(Please specify) _____	
Professional Accounting Qualification (Please specify):_____	
Other qualification (Please specify): _____	

2

5. Please state your religion:

(a)Islam	☐	(d)Budhism	☐	(g) Others,	☐
(b)Christianity	☐	(e)Hinduism	☐	Please specify_____	
(c)Sikhism	☐	(f)None	☐		

6. Please state your years of working experience as an academician (lecturer/tutor) in the area of:

(i) Accounting

1 year and below	☐
2 - 5 years	☐
6 - 10 years	☐
11 - 15 years	☐
16 years and above	☐

(ii) Other than accounting: (Please specify) _____

1 year and below	☐
2 - 5 years	☐
6 - 10 years	☐
11 - 15 years	☐
16 years and above	☐

7. Please state your years of working experience in accounting practice other than academic:

1 year and below	☐
2 - 5 years	☐
6 - 10 years	☐
11 - 15 years	☐
16 years and above	☐

SECTION 2: LEVEL OF AWARENESS

The objective of this section is concerned with establishing the perception and awareness of academicians on the nature and orientation of Islamic Accounting which is based on Syari'ah principles. In this survey, we will use the term **Syari'ah based Accounting (SbA)** to capture the nature and orientation of Islamic Accounting which is based on Syari'ah principles. SbA basically refers to accounting for Islamic Products built on MASB-i standard/AAOFI standards. Please be assured that any information you provide in this section is *strictly confidential* and will only be used for the purpose of this research. (For each question please tick the appropriate box or state in the space provided)

1. Knowledge of Syari'ah based Accounting

(a) Are you aware of MASB-i (Accounting standard on *Presentation of Financial Statements of Islamic Financial Institutions*) ?

(i)Yes, please go to question 1(b) ☐ (ii) No, please go to question 4 ☐

(b) When did you first heard of Syari'ah based Accounting standards?

(i) 1 year and below ☐
(ii) 2 - 3 years ☐
(iii)4 - 5 years ☐
(iv)6 - 10 years ☐
(v) 11 years and above ☐

(c) Have you heard of AAOIFI (Accounting and Auditing Organisation of Islamic Financial Institutions)

(i)Yes ☐ (ii) No ☐

(d) Do you think that there is a need for Syari'ah based Accounting standard to account for Islamic Products (IP)?

(i)Yes ☐ (ii) No ☐

Why?

_____

_____

_____

2. Have you heard of any training institutions for Islamic capital market?

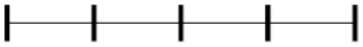
(i)Yes, please specify ☐ (ii) No ☐

(a) _____
(b) _____
(c) _____

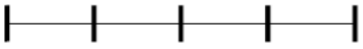
3. The questions below are using the Likert scale. Please respond to the following questions by circling the best answer according to the number given.

1= strongly disagree
2= disagree
3= neutral
4= agree
5= strongly agree

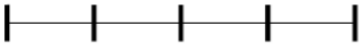
(i)Syari'ah based Accounting standards are needed to serve Islamic financial instruments.



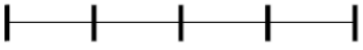
(ii) MASB-i was established from syari'ah requirement.



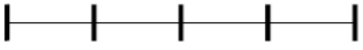
(iii)The growth of Islamic capital market leads to the need to have different accounting requirements for different types of Islamic Products.



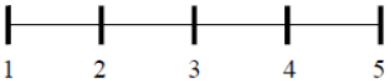
(iv)Syari'ah based Accounting standards can facilitate the needs of the users of accounting information.



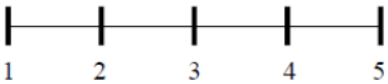
(v)Proper development of Islamic capital market requires a proper accounting regulation.



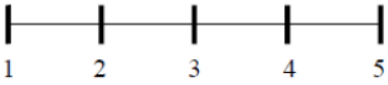
(vi)Accountants should discharge their accountability by providing information to enable society to follow God's commandments.



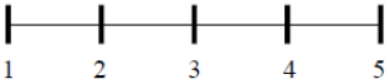
(vii)Syari'ah based Accounting standards need to be developed and complied with to enable Islamic institutions to perform their roles effectively.



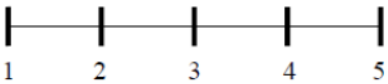
(viii)Historical cost concept is acceptable in Syari'ah based Accounting.



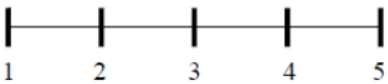
(ix)Accrual basis of income recognition meets the requirement of Islamic objectives to determine the real wealth of an entity.



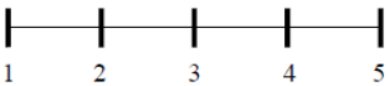
(x) Matching principles meet the requirement of Islamic objectives to provide fairness and justice to shareholders.



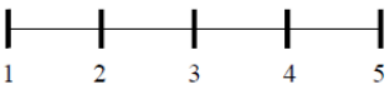
(xi) Matching principles meet the requirement of Islamic objectives to provide fairness and justice to stakeholders.



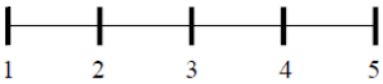
(xii) Accountability in Syari'ah based Accounting is that the management and providers of capital need to be accountable for their actions both within and outside the firm by providing proper accounting and reporting.



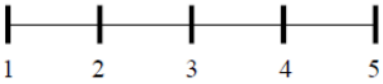
(xiii)Accounts should disclose everything that is believed to be of importance to users for the purposes of serving God.



(xiv)Syari'ah based Accounting standards must be adopted to become a mandatory requirement for every Islamic Financial Institution.



(xv)Syari'ah based Accounting standards are needed to serve all types of financial instruments.



4. Do you agree/ disagree that Financial reporting based on Syari'ah principles is necessary to account for Syari'ah based transactions/ products / operations?

(i) Agree ☐ (ii) Disagree ☐

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Pertanika accepts submission of mainly four types of manuscripts. Each manuscript is classified as **regular** or **original** articles, **short communications**, **reviews**, and proposals for **special issues**. Articles must be in **English** and they must be competently written and argued in clear and concise grammatical English. Acceptable English usage and syntax are expected. Do not use slang, jargon, or obscure abbreviations or phrasing. Metric measurement is preferred; equivalent English measurement may be included in parentheses. Always provide the complete form of an acronym/abbreviation the first time it is presented in the text. Contributors are strongly recommended to have the manuscript checked by a colleague with ample experience in writing English manuscripts or an English language editor.

Linguistically hopeless manuscripts will be rejected straightaway (e.g., when the language is so poor that one cannot be sure of what the authors really mean). This process, taken by authors before submission, will greatly facilitate reviewing, and thus publication if the content is acceptable.

The instructions for authors must be followed. Manuscripts not adhering to the instructions will be returned for revision without review. Authors should prepare manuscripts according to the guidelines of *Pertanika*.

1. Regular article

Definition: Full-length original empirical investigations, consisting of introduction, materials and methods, results and discussion, conclusions. Original work must provide references and an explanation on research findings that contain new and significant findings.

Size: Should not exceed 5000 words or 8-10 printed pages (excluding the abstract, references, tables and/or figures). One printed page is roughly equivalent to 3 type-written pages.

2. Short communications

Definition: Significant new information to readers of the Journal in a short but complete form. It is suitable for the publication of technical advance, bioinformatics or insightful findings of plant and animal development and function.

Size: Should not exceed 2000 words or 4 printed pages, is intended for rapid publication. They are not intended for publishing preliminary results or to be a reduced version of Regular Papers or Rapid Papers.

3. Review article

Definition: Critical evaluation of materials about current research that had already been published by organizing, integrating, and evaluating previously published materials. Re-analyses as meta-analysis and systemic reviews are encouraged. Review articles should aim to provide systemic overviews, evaluations and interpretations of research in a given field.

Size: Should not exceed 4000 words or 7-8 printed pages.

4. Special issues

Definition: Usually papers from research presented at a conference, seminar, congress or a symposium.

Size: Should not exceed 5000 words or 8-10 printed pages.

5. Others

Definition: Brief reports, case studies, comments, Letters to the Editor, and replies on previously published articles may be considered.

Size: Should not exceed 2000 words or up to 4 printed pages.

With few exceptions, original manuscripts should not exceed the recommended length of 6 printed pages (about 18 typed pages, double-spaced and in 12-point font, tables and figures included). Printing is expensive, and, for the Journal, postage doubles when an issue exceeds 80 pages. You can understand then that there is little room for flexibility.

Long articles reduce the Journal's possibility to accept other high-quality contributions because of its 80-page restriction. We would like to publish as many good studies as possible, not only a few lengthy ones. (And, who reads overly long articles anyway?) Therefore, in our competition, short and concise manuscripts have a definite advantage.

Format

The paper should be formatted in one column format with at least 4cm margins and 1.5 line spacing throughout. Authors are advised to use Times New Roman 12-point font. Be especially careful when you are inserting special characters, as those inserted in different fonts may be replaced by different characters when converted to PDF files. It is well known that 'μ' will be replaced by other characters when fonts such as 'Symbol' or 'Mincho' are used.

A maximum of eight keywords should be indicated below the abstract to describe the contents of the manuscript. Leave a blank line between each paragraph and between each entry in the list of bibliographic references. Tables should preferably be placed in the same electronic file as the text. Authors should consult a recent issue of the Journal for table layout.

Every page of the manuscript, including the title page, references, tables, etc. should be numbered. However, no reference should be made to page numbers in the text; if necessary, one may refer to sections. Underline words that should be in italics, and do not underline any other words.

We recommend that authors prepare the text as a **Microsoft Word** file.

1. Manuscripts in general should be organised in the following order:

    - **Page 1: Running title.** (Not to exceed 60 characters, counting letters and spaces). This page should **only** contain the running title of your paper. The running title is an abbreviated title used as the running head on every page of the manuscript.

      In addition, the **Subject areas m**ost relevant to the study must be indicated on this page. Select the appropriate subject areas from the Scope of the Journals provided in the Manuscript Submission Guide.

    - A **list** of n**umber of black and white / colour figures and tables** should also be indicated on this page. Figures submitted in color will be printed in colour. See "*5. Figures & Photographs"* for details.

    - **Page 2: Author(s) and Corresponding author information**. This page should contain the **full title** of your paper with name(s) of all the authors, institutions and corresponding author's name, institution and full address (Street address, telephone number (including extension), hand phone number, fax number and e-mail address) for editorial correspondence. The names of the authors **must** be abbreviated following the international naming convention. e.g. Salleh, A.B., Tan, S.G., or Sapuan, S.M.

      Authors' addresses. Multiple authors with different addresses must indicate their respective addresses separately by superscript numbers:

      George Swan[1] and Nayan Kanwal[2]
      [1]Department of Biology, Faculty of Science, Duke University, Durham, North Carolina, USA.
      [2]Office of the Deputy Vice Chancellor (R&I), Universiti Putra Malaysia, Serdang, Malaysia.

    - **Page 3**: This page should **repeat** the **full title** of your paper with only the **Abstract** (the abstract should be less than 250 words for a Regular Paper and up to 100 words for a Short Communication). **Keywords** must also be provided on this page (Not more than eight keywords in alphabetical order).

    - **Page 4 and subsequent pages**: This page should begin with the **Introduction** of your article and the rest of your paper should follow from page 5 onwards.

Abbreviations. Define alphabetically, other than abbreviations that can be used without definition. Words or phrases that are abbreviated in the introduction and following text should be written out in full the first time that they appear in the text, with each abbreviated form in parenthesis. Include the common name or scientific name, or both, of animal and plant materials.

Footnotes. Current addresses of authors if different from heading.

2. **Text.** Regular Papers should be prepared with the headings **Introduction**, **Materials and Methods**, **Results and Discussion, Conclusions** in this order. Short Communications should be prepared according to "*8. Short Communications."* below.

3. **Tables.** All tables should be prepared in a form consistent with recent issues of *Pertanika* and should be numbered consecutively with Arabic numerals. Explanatory material should be given in the table legends and footnotes. Each table should be prepared on a separate page. (Note that when a manuscript is accepted for publication, tables must be submitted as data - .doc, .rtf, Excel or PowerPoint file- because tables submitted as image data cannot be edited for publication.)

4. **Equations and Formulae.** These must be set up clearly and should be typed triple spaced. Numbers identifying equations should be in square brackets and placed on the right margin of the text.

5. **Figures & Photographs.** Submit an original figure or photograph. Line drawings must be clear, with high black and white contrast. Each figure or photograph should be prepared on a separate sheet and numbered consecutively with Arabic numerals. Appropriate sized numbers, letters and symbols should be used, no smaller than 2 mm in size after reduction to single column width (85 mm), 1.5-column width (120 mm) or full 2-column width (175 mm). Failure to comply with these specifications will require new figures and delay in publication. For electronic figures, create your figures using applications that are capable of preparing high resolution TIFF files acceptable for publication. In general, we require **300 dpi or higher resolution for coloured and half-tone artwork** and **1200 dpi or higher for line drawings**.

   For review, you may attach low-resolution figures, which are still clear enough for reviewing, to keep the file of the manuscript under 5 MB. Illustrations may be produced at extra cost in colour at the discretion of the Publisher; the author could be charged Malaysian Ringgit 50 for each colour page.

6. **References.** Literature citations in the text should be made by name(s) of author(s) and year. For references with more than two authors, the name of the first author followed by *'et al*.' should be used.

   Swan and Kanwal (2007) reported that …
   The results have been interpreted (Kanwal *et al.,* 2009).

   - References should be listed in alphabetical order, by the authors' last names. For the same author, or for the same set of authors, references should be arranged chronologically. If there is more than one publication in the same year for the same author(s), the letters 'a', 'b', etc., should be added to the year.

   - When the authors are more than 11, list 5 authors and then et al.

   - Do not use indentations in typing References. Use one line of space to separate each reference. The name of the journal should be written in full. For example:

     - Mellers, B. A. (2006a). Choice and the relative pleasure of consequences. *Psychological Bulletin, 126,* 910-924.
     - Mellers, B. A. (2006b). Treatment for sexually abused children and adolescents. *American Psychologist, 55,* 1040-1049.
     - Hawe, P. (2005). Capturing the meaning of "community" in community intervention evaluation: Some contributions from community psychology. *Health Promotion International, 9,*199-210.
     - Braconier, H., & Ekholm, K. (2006). Swedish multinationals and competition from high and low wage location. *Review of International Economics, 8,* 448-461.

   - In case of citing an author(s) who has published more than one paper in the same year, the papers should be distinguished by addition of a small letter as shown above, e.g. Jalaludin (1997a); Jalaludin (1997b).

   - Unpublished data and personal communications should not be cited as literature citations, but given in the text in parentheses. 'In press' articles that have been accepted for publication may be cited in References. Include in the citation the journal in which the 'in press' article will appear and the publication date, if a date is available.

7. **Examples of other reference citations**:

   Monographs: Kalimapour, Y.R. (2004). *Images of the U.S. Around the World: A Multicultural Perspective*. Albany, NY: State University of New York Press.

   Chapter in Book: Bjork, R. A. (2007). Retrieval inhibition as an adaptive mechanism in human memory. In H. L. Roediger III & F. I. M. Craik (Eds.), *Varieties of memory & consciousness* (pp. 309-330). Hull: Hull University Press.

   - ***Proceedings***: Amir Awang. (2006). Counseling, human resources development and counseling services. In Sulaiman M. Yassin, Yahya Mat Hassan, Kamariah Abu Bakar, Esah Munji and Sabariah Mohd. Rashid (Eds.), *Proceedings of Asia Pacific Conference on Human Development* (p. 243-246). Serdang: Universiti Putra Malaysia.

8. **Short Communications** should include **Introduction, Materials and Methods, Results and Discussion, Conclusions** in this order. Headings should only be inserted for Materials and Methods. The abstract should be up to 100 words, as stated above. Short Communications must be 5 printed pages or less, including all references, figures and tables. References should be less than 30. A 5 page paper is usually approximately 3000 words plus four figures or tables (if each figure or table is less than 1/4 page).

   *Authors should state the total number of words (including the Abstract) in the cover letter. Manuscripts that do not fulfill these criteria will be rejected as Short Communications without review.

STYLE OF THE MANUSCRIPT

Manuscripts should follow the style of the latest version of the Publication Manual of the American Psychological Association (APA). The journal uses American or British spelling and authors may follow the latest edition of the Oxford Advanced Learner's Dictionary for British spellings.

SUBMISSION OF MANUSCRIPTS

All articles should be submitted electronically using the ScholarOne web-based system. ScholarOne, a Thomson Reuters product provides comprehensive workflow management systems for scholarly journals. For more information, go to our web page and click "**Online Submission**".

Alternatively, you may submit the electronic files (cover letter, manuscript, and the **Manuscript Submission Kit** comprising *Declaration* and *Referral* form) via email directly to the Executive Editor. If the files are too large to email, mail a CD containing the files. The **Manuscript Submission Guide** and **Submission Kit** are available from the *Pertanika*'s home page at http://www.pertanika.upm.edu.my/home.php or from the Chief Executive Editor's office upon request.

All articles submitted to the journal **must comply** with these instructions. Failure to do so will result in return of the manuscript and possible delay in publication.

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All submissions must be accompanied by a cover letter detailing what you are submitting. Papers are accepted for publication in the journal on the understanding that the article is original and the content has not been published or submitted for publication elsewhere. This must be stated in the cover letter.

The cover letter must also contain an acknowledgement that all authors have contributed significantly, and that all authors are in agreement with the content of the manuscript.

The cover letter of the paper should contain (i) the title; (ii) the full names of the authors; (iii) the addresses of the institutions at which the work was carried out together with (iv) the full postal and email address, plus facsimile and telephone numbers of the author to whom correspondence about the manuscript should be sent. The present address of any author, if different from that where the work was carried out, should be supplied in a footnote.

As articles are double-blind reviewed, material that might identify authorship of the paper should be placed on a cover sheet.

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Pertanika follows a **double-blind peer-review** process. Peer reviewers are experts chosen by journal editors to provide written assessment of the **strengths** and **weaknesses** of written research, with the aim of improving the reporting of research and identifying the most appropriate and highest quality material for the journal.

In the peer-review process, three referees independently evaluate the scientific quality of the submitted manuscripts. Authors are encouraged to indicate in the **Referral form** using the **Manuscript Submission Kit** the names of three potential reviewers, but the editors will make the final choice. The editors are not, however, bound by these suggestions..

Manuscripts should be written so that they are intelligible to the professional reader who is not a specialist in the particular field. They should be written in a clear, concise, direct style. Where contributions are judged as acceptable for publication on the basis of content, the Editor reserves the right to modify the typescripts to eliminate ambiguity and repetition, and improve communication between author and reader. If extensive alterations are required, the manuscript will be returned to the author for revision.

The Journal's review process

What happens to a manuscript once it is submitted to *Pertanika*? Typically, there are seven steps to the editorial review process:

1. The executive editor and the editorial board examine the paper to determine whether it is appropriate for the journal and should be reviewed. If not appropriate, the manuscript is rejected outright and the author is informed.

2. The executive editor sends the article-identifying information having been removed, to three reviewers. Typically, one of these is from the Journal's editorial board. Others are specialists in the subject matter represented by the article. The executive editor asks them to complete the review in three weeks and encloses two forms: (a) referral form B and (b) reviewer's comment form along with reviewer's guidelines. Comments to authors are about the appropriateness and adequacy of the theoretical or conceptual framework, literature review, method, results and discussion, and conclusions. Reviewers often include suggestions for strengthening of the manuscript. Comments to the editor are in the nature of the significance of the work and its potential contribution to the literature.

3. The executive editor, in consultation with the editor-in-chief, examines the reviews and decides whether to reject the manuscript, invite the author(s) to revise and resubmit the manuscript, or seek additional reviews. Final acceptance or rejection rests with the Editorial Board, who reserves the right to refuse any material for publication. In rare instances, the manuscript is accepted with almost no revision. Almost without exception, reviewers' comments (to the author) are forwarded to the author. If a revision is indicated, the editor provides guidelines for attending to the reviewers' suggestions and perhaps additional advice about revising the manuscript.

4. The authors decide whether and how to address the reviewers' comments and criticisms and the editor's concerns. The authors submit a revised version of the paper to the executive editor along with specific information describing how they have answered' the concerns of the reviewers and the editor.

5. The executive editor sends the revised paper out for review. Typically, at least one of the original reviewers will be asked to examine the article.

6. When the reviewers have completed their work, the executive editor in consultation with the editorial board and the editor-in-chief examine their comments and decide whether the paper is ready to be published, needs another round of revisions, or should be rejected.

7. If the decision is to accept, the paper is sent to that Press and the article should appear in print in approximately three months. The Publisher ensures that the paper adheres to the correct style (in-text citations, the reference list, and tables are typical areas of concern, clarity, and grammar). The authors are asked to respond to any queries by the Publisher. Following these corrections, page proofs are mailed to the corresponding authors for their final approval. At this point, only essential changes are accepted. Finally, the article appears in the pages of the Journal and is posted on-line.

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Pertanika **emphasizes** on the linguistic accuracy of every manuscript published. Thus all authors are required to get their manuscripts edited by **professional English language editors**. Author(s) **must provide a certificate** confirming that their manuscripts have been adequately edited. A proof from a recognised editing service should be submitted together with the cover letter at the time of submitting a manuscript to Pertanika. **All costs will be borne by the author(s)**.

This step, taken by authors before submission, will greatly facilitate reviewing, and thus publication if the content is acceptable.

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AUTHOR SERVICES: We provide a rapid response service to all our authors, with dedicated support staff for each journal, and a point of contact throughout the refereeing and production processes. Our aim is to ensure that the production process is as smooth as possible, is borne out by the high number of authors who prefer to publish with us.

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LAG TIME: The elapsed time from submission to publication for the articles averages 4 to 5 months. A decision on acceptance of a manuscript is reached in 3 to 4 months (average 14 weeks).

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About the Journal

Pertanika is an international multidisciplinary peer-reviewed leading journal in Malaysia which began publication in 1978. The journal publishes in three different areas — Journal of Tropical Agricultural Science (JTAS); Journal of Science and Technology (JST); and Journal of Social Sciences and Humanities (JSSH).

JTAS is devoted to the publication of original papers that serves as a forum for practical approaches to improving quality in issues pertaining to **tropical agricultural research-** or related fields of study. It is published four times a year in **February**, **May**, **August** and **November**.

JST caters for **science and engineering research-** or related fields of study. It is published twice a year in **January** and **July**.

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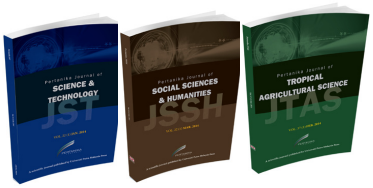

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