Pertanika J. Soc. Sci. & Hum. 25 (2): 993 - 1018 (2017)

SOCIAL SCIENCES & HUMANITIES

Journal homepage: http://www.pertanika.upm.edu.my/

Special Issue Paper

Relationship between Participation Bank Performance and Its Determinants

Ali Nasserinia[1], Mohamed Ariff[2]*, and Cheng Fan-Fah[1]

[1]*Faculty of Economics and Management, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia*
[2]*Sunway University, 5 Jalan Universiti, 47500 Bandar Sunway, Selangor, Malaysia*

ABSTRACT

This paper reports significant new findings on banking performance by relating (i) 7 bank-specific measures, (ii) 3 non-bank-specific measures with (iii) time dummy variable as control for financial crisis in the test period. The findings concern the performance of a new type of bank called the 'participation bank'. Participation banks price their funding through profit-sharing contracts with customers, so deposit and lending costs are decided not on the basis of market interest rates as in the case of mainstream banks. A sample of 100 participation banks covering 25 countries were selected for this study over the financial years 2007-2015. We used a new measure equivalent to the net interest margin called 'profit share margin', which has not been previously used to study banks. In fact, no study using participation banks has been carried out as yet. The dynamic panel GMM procedure was applied to obtain robust estimators; this is a refined econometric method that is also seldom applied in banking studies. The results revealed that 6 bank-specific factors statistically significantly affected the performance of participation banks in the test period. The paper also reports that the practice of including non-bank-specific factors as possibly relevant for performance is questionable as these were not found to be significant. The findings were from both OLS and GMM panel regressions providing comparison statistics with some past studies.

Keywords: Bank performance, bank-specific factors, generalised method of moments, macroeconomic factors, participation banks, JEL Classification: G20, L20

ARTICLE INFO

Article history:
Received: 29 September 2016
Accepted: 19 April 2017

E-mail addresses:
naserinia@gmail.com (Ali Nasserinia),
chengfanfah@upm.edu.my (Cheng Fan-Fah),
ariff13@gmail.com (Mohamed Ariff)
* Corresponding author

ISSN: 0128-7702

INTRODUCTION

This paper reports interesting new results from a study of a different type of bank, the 'participation' bank, which prices bank deposit rates and bank lending rates not on prevailing interest rates in the market but on the profit rates offered by the participation bank to customers (depositors and borrowers). This new type of bank evolved over the last 50 years or so, and has managed to survive as the new type of banking in 76 countries, with total assets amounting to US$3,800 billion in 2015 (Ariff, Iqbal, & Mohamad, 2012)[1]. The predominant pricing method for loans by mainstream banks is to take bank deposits at a lower interest rate and then lend out money created from deposits made in the bank at higher interest rates to borrowers. The spread between a high lending rate and a lower borrowing rate is increasingly being used in recent studies as a popular bank 'performance measure' (Demirgüç-Kunt & Huizinga, 1999). This spread is termed the NIM (net interest margin), which has been shown to be an excellent market-related performance indicator. The other long-established performance indicators are the Return on Assets, ROA, and the Return on Equity, ROE (Akhtar, Ali, & Sadakat, 2011).

It is reasonable to infer from such studies that the NIM is a more market-responsive rubbery variable that shrinks and expands as liquidity of a banking system expands or contracts over time, for example, from money supply changes and/or portfolio rebalancing actions of economic agents. Money supply is known to have an impact on bank liquidity, which passes through the intermediation process, thereby significantly affecting bank asset prices (Badarudin, Ariff, & Khalid, 2013).

How do more smoothed[2] performance measures such as the ROA or ROE compare with the NIM as the market-relevant performance proxy? This is indeed another interesting research question, if we use the NIM (or its equivalent for particiaption banks). This is a question of some importance to the banking industry as it has not been adequately addressed in a comparative study to date.

Another new issue, which has still not been addressed is the manner in which banks price funding in ways different from using interest rate, therefore, using NIM in funding decisions. The use of interest rate as the pricing mechanism to determine lending and also borrowing rates is a well entrenched practice from ancient times and

[1] This is about 1.5% of the total assets of banks as reported in the BI.S, in Basel. Hence, this new type of bank is slowly taking root where it can find customers.

[2] Income smoothing is very heavily practiced by firms in order to convey more balanced information over time to investors. In years when a firm's incomes grow rapidly or when incomes decline rapidly, accountants choose standards of reporting to lower the earnings or increase the earnings in respective time periods. This practice is termed 'income smoothing' in accounting literature. ROA and ROE are smoothed numbers whereas the NIM is very largely dependent on market-based interest rates.

is now vastly expanded in modern banking practice, especially with widely used benchmarks such as the LIBOR etc. There is a new way of pricing funds as paractised by participation banks. The return to bank deposit holders is determined on the basis of pre-agreed profit-share so the amount of rewards to bank depositors is a share of the profits made by the bank through the process of money creation to lend on the basis of profit-shared contracts entered *ex ante* with the borrowers of money (see the Appendix for performance history of participation banks).

This method is different from that based on interest rate; it is based on a profit-shared-margin (PSM) on which time series information is now available from central bank sources[3]. This variable is equivalent to the NIM, which has historically dominated the banking sector. PSM-based pricing of bank funding relies upon the newer form of lending and borrowing conducted by particiaption banks. Participation banks hold an estimated total assets of US$3,800 billion, which is no more than 1.5% of the total assets of mainstream banks. Several researchers have used accounting profitability measures as the banking perfomance measure to study this new type of bank such as Akhtar et al. (2011) and Bashir (2003). As far as our search of literature showed, there has been no published paper using PSM as a measure of participation bank performance. There is also a need to investigate how the accounting profitability measures such as ROA compares with the PSM as an alternative measure.

Thus, this paper reports findings from a large sample of participation banks that use PSM as the pricing mechanism in managing banking funds. The study covers this form of banking from 25 countries, where this type of banking has become well-entrenched over the several decades since the inception in 1963 of the first particiaption banks (Ariff et al., 2012). The findings reported in this paper are interesting and new for this new type of bank. While the accounting-based profitability is an excellent variable, it is also evident from our findings that PSM is a better alternative as well especially when an industry is not fully competitive as is likely to be the case with participation banks with small-sized and less experienced banks.

The rest of the paper is divided into five sections. An extensive literature review on what determines banking performance, using NIM or ROA or ROE, is sumamrised in the next section. The ensuing methodology section explains the data soources, variables and test models for our study of the association between PSM or ROA (performance measures) and the several determinants of bank performance already found in the literature.

[3] For details on the legal basis of participation or Islamic banking, see Ariff, et al. (2012). There is a growing body of literature that suggests that PSM-based pricing of funding by banks is closely related to the profitability of the banks themselves as well as the borrowers, who consider the profit-and-shared lending by banks aligns loan servicing with the performance of the economy, and therefore, promotes system-wide stability.

The findings are presented in three sub-sections: overall findings are presented first before showing the sub-group results for high-income and low-income economies. Performance persistence is discussed in another sub-section before the paper ends with a concluding section.

BANKING PERFORMANCE LITERATURE

Internal Factors

A number of models have been developed by researchers to investigate the relationship between bank performance and a large number of (i) bank-specific (ii) industry-level and (iii) macroeconomic variables as being significantly correlated. For bank performance, researchers have used NIM, ROA and ROE as indicators. For the factors that may be related to performance, many variables have been used. Among them are: average operating costs, competition, market risk and credit risk. In their paper, Ho and Saunders (1981) showed that the interest spread (NIM) is significantly correlated with the level to which bank managers seek to avoid risk, the magnitude of transaction operations undertaken, the structure of the bank market and changes in interest rates. There are several more factors.

Ho and Saunders' paper was expanded by McShane and Sharpe (1985), who included operating costs and a measure for competition. Allen (1988) introduced various types of loan and deposit, while Angbazo (1997) added credit risk to the model while Maudos and De Guevara (2004) incorporated operation costs. Saunders and Schumacher (2000) suggested that interest rates, opportunity cost, market power, the bank's capital-to-assets ratio and fluctuations in interest rates all have significant effects on the NIM. It should be noted that these are not, in our view, the main factors driving bank performance. We propose to divide the factors into internal (meaning bank-specific) and external (industry and economy-wide) factors in the ensuing discussion.

Liquidity risk. Deep and Schaefer (2004) devised a liquidity transformation measure termed by them as 'liquidity transformation gap'. This is computed as the difference between liquid liabilities and illiquid assets scaled by total assets. They argued that banks do not create much liquidity. Berger and Bouwman (2009) reported that capital is positively and significantly associated with liquidity in larger banks, but it is less important for average-sized banks while it is negative for small-sized banks. Distinguin, Roulet and Tarazi (2013) reported that European and American commercial banks decrease their regulatory capital coincidence as they create liquidity, meaning that they finance their assets with their liabilities. Shen, Chen, Kao and Yeh, (2009) showed a significant link between bank performance and risk of bank liquidity as the higher cost of funds may reduce a bank's profit but increases net interest margin. Bourke (1989) stated there is a positive relationship between liquidity and bank performance, but left out details found in Bouwman's paper.

Credit risk. Ahmad and Ariff (2007) stated that an increase in a bank's provision for loan losses is a significant determinant of potential credit risk, which means that credit risk is probably the most important risk for a bank. Athanasoglou, Bisimis and Delis (2008) suggested that the risks for banks have important effects on their profitability. Demirgüç-Kunt and Huizinga (1999) reported positive effects from credit risk on NIM, while Kasman, Tung, Vardar and Okan (2010) showed credit risk is positively linked to banks' NIM. Srairi (2009) worked on participation banks, showing that performance is correlated with capital adequacy and credit risk.

Capital adequacy. Based on recent capital provision theories, more capital makes for better bank performance and is more predictable; in fact, the post-2008 financial crisis reform efforts including Basel III are premised on this important fact about banking. Banks with more capital tend to have enhanced security so their assets are safer. Also, such banks monitor their borrowers strongly because they seek to reduce the probability of default. Demirguc-Kunt and Huizinga (1999) and Garcia-Herrero, Gavilá and Santabárbara (2009) both reported a positive correlation between bank performance and capital provision. Naceur and Goaied (2008) also reported a positive association between capital provision and bank performance measured as NIM and profitability. Beltratti and Stulz (2009) found that banks with relatively superior Tier-1 capital and more deposit financing capacity had higher returns in times of crisis. Capital is a prominent factor of bank profitability in the study of Athanasoglou et al. (2008). Naceur and Omran (2011) showed that a bank's NIM is affected by individual bank characteristics such as credit risk and capital provision. Bashir (2003), Sufian and Parman (2009) studied participation bank profitability and reported a positive relationship with the capital provision.

Asset quality. In some studies, assets quality was proxied in the same way as credit risk or loan-loss provision but asset quality was a factor that was achieved over time and through service. Thus, it is expected that older banks will have better-quality assets, resulting in a good reputation. Moreover, in some cases, loans are not key assets that create the main part of the income. A bank's profits may be determined by the quality of its loan portfolio and the risks that it carries. Therefore, non-performing loans being outweighed by sound loans indicate high quality of portfolio. It is the most obvious concern for banks to ensure a low level of impaired loans. Hassan Al-Tamimi (2006) studied UAE commercial banks and stated that bank portfolio combination and bank size are highly significantly correlated with bank performance. Australian banks' resilience is argued to arise from higher loan quality from responsible lending practices. Nazir (2010) applied CAMEL parameters to evaluate the financial performance of the two major banks operating in northern India. The banks have shown significant performance. They concluded that low non-performing loans to total loans are a sign of good health of the portfolio of a bank since lower ratio indicates better bank performance.

Managerial efficiency. Numerous cases of bank failure in the last two decades have occurred. The empirical literature identified two main reasons for bank failure: a large number of impaired loans and an adverse situation regarding cost efficiency. A fundamental dispute is on whether or not poor administration increases the chances of bank collapse. Based on the assumption of poor-management, cost efficiency has an impact on impaired loans due to the lack of precise supervision of loans. In other words, low operational efficiency is a sign of poor management, and this will affect credit decisions. In order to enhance bank efficiency, it is necessary to have efficient cost control, along with a change in workplace culture, meaning that if banks meaningfully improve their managerial practices, they will benefit greatly.

Williams' (2004) findings supported poor-management theory. He explained that a decline in efficiency is usually followed by a decline in loan quality. Rossi, Schwaiger and Winkler (2005) also showed similar results over a longer time period. Goddard, Liu, Molyneux and Wilson (2013) reported that managerial efficiency appeared to be a more important determinant of bank performance while in another study (Athanasoglou et al., 2008), it was found that bank profit was closely but negatively related to operating expenses. Mokhtar, Abdullah and Alhabshi (2008) argued that participation banks were less efficient than conventional banks. Masood, Aktan and Chowdhary (2009) reported a significant effect of operational efficiency on bank profitability in Saudi Arabia for the period 1999-2007.

Bank size. In some studies, size and performance were closely but inversely related to each other. Essentially, it was anticipated that large banks would have a higher level of loan quality and be able to diversify their services more than smaller banks, which reduces their risk. In addition, banks benefitted from economies of scale. Therefore, a reduction in risk because of diversity and benefits from economy of scale due to larger size can lead to the enhanced performance of a bank. Moreover, the recent global financial crisis has shown that the size of a bank is connected to substantial risk regarding financing the activities of society. Conversely, once banks have become very large, due to some reasons such as an increase in overhead costs, they may experience negative performance.

Demirgüç-Kunt and Huizinga (2011) measured the size of banks using total assets and called it 'absolute size', while the other variable was called 'systemic size' as liabilities over GDP. They suggested that banks with a large absolute size are often much more profitable while, in contrast, banks with a large systemic size have less profit. Pasiouras and Kosmidou (2007) found a negative association with size.

Naceur and Goaied (2008) reported similar findings. Others have suggested a weak or non-existent correlation between size and bank performance (e.g. Goddard et al., 2004; Micco, Paniza & Yanez, 2007; Cornett, McNett & Tehranian, 2010). Akhtar et al. (2011), who studied participation banks in Pakistan in the period 2006-09, found that bank size affected performance negatively.

Income diversification. As a definition of non-interest revenue, we refer to the so-called non-traditional activities. Due to the changes in the banking industry and increased competition, non-interest income has been the centre of attention for banks. In most income-related studies, diversification has been considered as non-interest income that increases over time. Most importantly, it is assumed that income diversification can, logically, reduce bankruptcy. Busch and Kick (2009) analysed the determinants of non-interest income in Germany and argued for the impact of the cross-subsidisation of interest and fee-based business activities. Williams and Rajaguru (2007) examined the relationship between fee-based income and interest margin in Australia. Their results supported fee-based business income as being able to serve as an alternative when there is a decline in interest income. We expect a negative correlation between NIM and non-interest income.

It should be noted that most previous studies have tested only one or two factors connected with profitability. In our study, we aimed to test a large number of variables as direct factors in participation banks. Further, we intended to include external factors as explained in the next sub-section. These are annual data that are entered in a panel setting while the data on direct factors are used across the sample of banks in this study.

External Factors

The literature also suggested factors that are not bank-specific in nature: taxes, quality of industry service and so on. In our view, industry and macroeconomic factors have been studied by some researchers (Demirguc-Kunt & Huizingha, 1999). For the study of a single country, as in their study, it would be irrelevant to include these. However, in our panel setting, our model could include these external variables as control variables in order to ensure that the inclusion of these non-bank-specific factors improved the accuracy of our measures of the bank-specific factors.

Market structure. There are two well-known theories regarding the relationship between bank concentration and NIM, described as the structure-conduct-performance (market power) theory and as the efficient-structure (ES) theory. The first theory states that increased market power results in monopoly power, while the second theory attributes higher profitability to superior efficiency. Goddard et al. (2011) and Mirzaei, Liu and Moore (2013) showed findings in support of the first theory while the following studies showed no support for that theory: Staikouras and Wood (2004), Mamatzakis and Remoundos

(2003), Athanasoglou et al. (2008), Naceur and Goaied (2008) and Chortareas, Garza-García and Girardone (2012).

Growth in GDP. There are no conclusive findings regarding the effect of economic growth on bank performance. There are contrasting findings suggesting that higher-growth scenarios promote a greater demand for bank loans, which could lead to higher charges by banks for their loans, thus increasing competition stability expectations through a lowering of interest. However, Claeys and Vennet (2008) found that higher economic growth was associated with higher NIM in some countries whereas for some other countries there was no such link. Bank profitability was reported to be positively impacted upon by output growth by Kosmidou (2008) and Flamini, McDonald and Schumacher (2009). There were also reports of negative effect, for instance by Demirguc-Kunt, Laven and Levine (2003), Sufian (2009), Liu and Wilson (2010) and Tan (2012).

Inflation. The effect of inflation on bank performance depends on whether operating expenses and revenue increase at a higher rate than inflation rate. The impact of inflation on bank profitability depends on whether inflation is fully anticipated. Inflation is one of the main channels for performance where it is possible to affect the operations and margins of banks through inflation affecting the 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 banks the opportunity to adjust interest rates accordingly, consequently banks make higher profits. See Demirgüç-Kunt and Huizinga (1999) for a study of 80 countries.

In developing a test model for participation banks in our study, we made an *a priori* assumption that both the internal and external factors are relevant for sound performance of participation banks. Both types of bank operate in the chosen countries to provide intermediation services to the economies. Despite the differences in pricing of funds, participation banks compete with other types of bank, so in a sense, both types of bank serve the same market for funds. Hence, our assumption is not far off the mark that the variables affecting performance could well be the same set of factors for both types of bank.

DATA, HYPOTHESES AND METHODOLOGY

Data and Variables

The data for this study were accessed from the following sources: bank balance sheet and income statements as bank-specific observations from the BankScope database provided by the Fitch-IBCA and available at University Putra Malaysia. The data in the fields were checked for accuracy as data relating to participation banks only. The data were annual data as reported or as computed from details in the database. The final sample consisted of 100 participation banks in 25 countries that use this new type of banking. The profit rate margin (PSM) was equivalent to the NIM for mainstream banks using interest rates.

In Table 1, we provide the short-form notations of the variables used and define the variables.

Table 1
Variables, symbols and descriptions

Symbols	Variables	Description
Dependent variables		
ROA	ROA	The return on average total assets of the bank
ROE	ROE	The return on average total equity of the bank
NIM	NIM	The net interest margin of the bank
Bank-specific determinants (internal factors)		
LR	Liquidity risk	Ratio of financing gap (difference between bank loan and customer deposit) to total assets
CR	Credit risk	Loan loss provisions over total loans
CA	Capital adequacy	Equity capital to total loans
AQ	Asset quality	Non-performing loans to total loans
ME	Managerial efficiency	Operating expenses to total assets
ID	Income diversification	Non-interest income over total assets
LTA	Size	Natural logarithm of total assets
Non-bank-specific factors		
CONCEN	Concentration	5-Bank asset concentration
GDPG	GDP growth	Real GDP growth
INF	Inflation	Annual inflation rate

We collected data to ensure that we had a balanced panel over eight years ending in 2014 for all 100 banks. The variables were either taken as reported in the database or computed from other items of data in the database. Data on concentration, inflation and GDP growth were computed from the world development indicator reports in the World Bank web site. Our final sample covered 100 banks over eight years from 25 countries. The variables related to 100 banks i=100 over eight years t=8. t=8 and banks i=100.

The dependent variables were PSM (as appropriate for this type of bank) and ROA, both being annual numbers relating to each bank in the sample. Summary statistics for the variables are presented in Table 2.

The average ROA for all the banks in the test period was 1.08 (while the ROE was 10.08%) per year. These numbers suggest two things. First, the ROA is substantially lower than the corresponding figure reported in the literature for developed country banks as being about 1.8. This is due to the larger capital provisions found in participation banks. Second, the ROE reported for Basel-registered banks in the Basel webpage is 13 to 31% per year over a 25-year period. However, our figures were for the period

Table 2
Summary statistics of 100 banks from 25 countries

	Pooled				High income country				Low income country			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
PSM (NIM)	3.70	1.58	-4.06	8.77	3.47	1.49	-4.06	7.85	4.54	1.73	0.23	10.75
ROA	1.08	1.56	-13.91	6.21	1.15	1.61	-13.91	7.30	0.81	1.48	-8.72	4.05
ROE	10.08	11.15	-69.49	63.15	9.80	11.22	-69.49	63.15	11.47	10.85	-21.63	36.22
LR	-6.20	26.03	-78.93	98.48	-2.43	25.08	-59.31	98.48	-18.36	26.26	-78.93	64.22
CR	0.96	2.44	-45.11	12.38	1.00	1.25	-2.39	12.38	1.10	1.46	-0.77	9.34
CA	26.79	38.89	-19.85	524.18	24.53	22.30	5.31	197.02	20.91	18.64	-41.75	96.81
AQ	6.08	8.12	0.02	80.42	5.60	7.41	0.02	54.44	6.99	8.69	0.17	61.60
ME	2.15	1.25	0.15	9.06	1.88	0.97	0.15	8.35	2.92	1.64	0.84	8.20
ID	1.22	1.10	-0.35	11.00	1.12	1.00	-0.18	8.13	1.37	0.88	-0.35	4.55
LTA	15.08	1.35	10.65	18.22	15.53	1.11	11.99	18.22	13.84	1.06	11.37	15.91
CONCEN	83.82	16.82	40.00	100.00	88.67	9.42	57.08	100.00	68.44	23.74	40.00	100.00
GDPG	4.36	3.54	-15.09	17.99	4.43	3.86	-7.08	17.99	4.46	2.51	-15.09	8.40
INF	5.87	5.50	-4.86	39.27	4.44	4.86	-4.86	39.27	9.79	4.84	3.96	36.91
No. of observations				497	No. of observations			368	No. of observations			123

2008-2014, that is, in the years after the Global financial crisis, which were noted for low profitability. Lower return means that the 10.8% for participation banks was due to the small size of the banks and the requirement that participation banks have more capital provision, which lowers the ROA. This result is thus expected as participation banks also operate as small-sized banks in more risky countries with profit-sharing basis. Over the test period, the average gross domestic product growth rate was 4.36% while inflation was 5.87%, which is high.

A correlation coefficient between two explanatory variables exceeding the value of 0.8 indicates a potential problem among variables. The results given in the table give support to our conclusion that there was no problem of cross-correlation introducing errors in the estimated parameters or on test results.

NIM is the net interest rate margin defined as the interest rate income minus interest rate expenses over average total earning assets; ROA is the return on average total assets; ROE is the return on average total shareholder equity; 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; and TA is total asset; CONCEN is 5-Bank asset concentration for each country that has assets of its five largest banks as a share of total banking asset; GDPG is GDP growth (annual %); INF is inflation, end of period consumer prices (percent change).

Table 3 is a summary of cross-correlations among independent variables. It shows the dependence between variables and describes how strongly variables in the same group resemble each other. The correlation coefficients between each variable for many of them is almost low and none of the cross-correlation values are 0.8 or more to seriously bias the results.

Table 3
Correlation coefficients between independent variables

	LR	CR	CA	AQ	ME	ID	LTA	CONCEN	GDPG	INF
LR	1									
CR	0.03	1								
CA	0.00	0.25	1							
AQ	-0.06	0.33	0.39	1						
ME	-0.06	0.34	0.35	0.34	1					
ID	0.00	-0.16	0.22	0.10	0.21	1				
LTA	0.03	-0.07	-0.17	-0.26	-0.31	-0.02	1			
CONCEN	-0.05	-0.01	0.14	0.04	0.00	-0.10	0.10	1		
GDPG	0.08	-0.06	0.00	-0.08	-0.08	0.00	0.07	-0.07	1	
INF	-0.03	-0.01	0.01	0.02	0.13	0.25	-0.24	-0.15	-0.20	1

Test Models

The appropriate model to use based on the available information, balanced panel of time series data (T=8) and subjects (N=100), was the Generalised Methods of Moments (GMM). To enable the across-time dependence of banking performance on the prior year's performance, we specified the lagged dependent variable to make the GMM estimate the dynamic coefficient to the lagged variable. The data were transformed to be stationary using the usual tests.

The independent variables identified as explained in this section were entered as directly relevant bank-specific factors (there were seven items here). The non-bank-specific variables with one datum per year were control variables to ensure that the bank-specific variables were estimated *after* controlling for the effects of these variables on performance. There were three (CONC; GDP; INF) such variables. In presenting the results, we provide the usual test statistics such as Wald tests as the measure of model fitness (in the case of OLS results, the F-Tests and R-squared values). To see how the balanced panel regression with dynamic GMM results were derived, see the following: Arellano and Bond, 1991; Arellano and Bover, 1995; and Blundell and Bond, 1998. The estimators usually differed from the OLS estimators. We also provide the OLS estimates for comparison.

Empirical work on the determinants of bank performance potentially includes three sources of potential estimation errors: very persistent profits, endogeneity and omitted variables. Dynamic modelling corrects these problems. Using a fixed and/or random effect model within a panel setting causes some minor difficulties when lagged dependent or independent variables may influence especially in certain time periods or across a few banks. We have no solution to this problem, and it is not expected to alter the results very much.

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

$$PERF_{it}=c+\ \delta PREF_{(it-1)}+\sum^{j}_{(j=1)}\beta_j\ X^{j}_{it}\ +\sum^{k}_{(k=1)}\beta_k Y^{k}_{it} +\sum^{L}_{(l=1)}\beta_l\, Z^{l}_{it}+\varepsilon_{it}\qquad \varepsilon_{it}=v_i+u_{it} \tag{1}$$

where, $PREF_{(it-1)}$ is the one-period lagged dependent variable and δ the speed of adjustment to equilibrium because of performance persistence. $PERF_{it}$ is performance of bank i at time t, with i=1,. . .,N, t=1,. . .,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 the unobserved bank-specific effect while u_{it} are the idiosyncratic errors. This is a one-way error component regression model, where $v_i \sim (IIN(0, \delta^2_v))$ are independent of $u_i \sim (IN(0, \delta^2_u))$.

Placing the lagged dependent variable on the right-hand side of the equation assumes this variable is correlated with the error term, ε_{it} , which is a function of the bank specific effect, v_i. Due to this, the dynamic panel data estimates of Equation (1) suffer a slight bias. The estimator option in this case is the GMM proposed by Arellano and Bond (1991), which is a modification to eliminate the effects of a bank specific, or any time invariant bank specific variables, and endogeneity. In addition to this we are sure that we had stationary regresses. GMM uses the orthogonal condition between different errors and lagged dependent variable. This is valid under the assumptions that the error term is serially uncorrelated and the lag of the explanatory variables is weakly exogenous.

Consistency of GMM estimators relies on two test specifications. First is the Hansen test, which is a test of over-identification restrictions. The GMM estimation of the dynamic panel data increases the number of conditions. Therefore, the Hansen test is conducted to test the of over-identification restrictions. The second test is the Arellano–Bond order 2 test for second-order serial correlation in the disturbance term. Failure to reject the null hypothesis of both tests gives support to the accuracy of estimations.

The GMM estimators are typically used in the one-step and two-step procedure. The one-step procedure uses a weighted matrix independent of the parameters estimated. The two-step GMM using the optimal weighting matrix is weighted by a consistent covariance matrix. Because of this, the two-step estimator is more efficient than the one-step estimator. Using the two-step estimator has many problems because it easily generates instruments that are numerous. 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 Windmeijer's (2005) correction procedure, which we adopted, and that reduced this problem. In this study we implemented this correction procedure and got robust results.

Hypotheses Development

The central hypothesis was for the existence of a significant relationship between performance and a set of determinants from the literature. We tested this central issue and the hypotheses were:

> Hypothesis 1. There is no significant relationship between the PSM (and then repeated with ROA in a second run) as dependent variable and the nine independent factors in the regressions. We expected to reject this hypothesis based on prior findings, so we hoped to have the model fit to be significant using F-ratio and R-squared values.
>
> Hypothesis 2: There is no relationship between PSM (and then repeated with ROA in a second run) and the nine independent factors using the dynamic GMM estimation procedure. We expected, given the superior estimation property of GMM, to have a significant relationship between the performance and determining factors. We tested this using the Wald tests. As explained earlier in this section, results were taken from different runs of the GMM to verify the superiority of the two versions of the procedure.
>
> Hypothesis 3: There is no significant effect from any of the nine determining factors on bank performance. Obviously this null hypothesis was expected to be rejected for most, if not all, the independent variables. Prior research suggested a majority of the factors would have a significant influence on performance measures (ROA; PSM).

FINDINGS ON THE RELATIONSHIP BETWEEN PERFORMANCE AND DETERMINANTS

This section summarises the findings of this study. First, we present the results for the whole sample of 100 banks over eight years. In the next sub-section are the results from testing the relationship separately for two samples of banks in high-income and low-income countries.

Whole Sample

The results of the regression runs are summarised as shown in Table 4 for the whole sample. First, we examined the results from OLS regressions first for PSM and then for ROA before interpreting the more accurate GMM results. The OLS test results and parameters were biased estimates of the more accurate estimators to be found in the four columns marked as GMM for the PSM and ROA runs. The model fitness statistics are shown in the bottom panel of the table.

We first examined the bottom panel of the table. The R-squared values were above 50% in the OLS regressions for both PSM and ROA performance measures. This means there was a significant relationship between bank performance and the nine determining factors. The fact that more than half the variations in the PSM and ROA were explained by the nine significant variables gives strong support to reject the null of H1 and accept the alternative explanation.

Examining the individual factor effect on the performance from among the nine factors, one factor, LR, and another, CONCEN, were found to not significantly influence the PSM or the ROA. For these two non-significant factors, the probability values were larger than 0.10 so we accepted the null hypotheses, that there was no effect.

The reason for including the GMM estimators shown in the GMM-results columns was to see if the corrections for possible errors known to exist in the OLS regressions would lead to more accurate estimators. It can be seen that there was improvement in the overall results. The Wald statistics are all significant, which is evidence of a relationship between performance and the identified factors. An examination of the GMM results showed that the statistics from the Wald tests were all significant. That shows that there was a significant relationship between bank performance and the set of nine determining factors for our tests on participation banks. This was true for both runs using the PSM and ROA. Further, the PSM and ROA results also showed significant relationship for these banks over the eight-year period tested.

A number of findings on the individual factor effects on performance are reported in the table. First, the non-bank-specific factors, which were shown as significant in the OLS estimates, were not significant in the GMM tests. Obviously, the coefficients suggested that the bank-specific factor results were all significant, except for the one for LTA (size). Further, the size of banks was not significant; neither was capital adequacy (CA) although the latter was significant in the OLS regression. The important finding in the GMM result was the more accurate estimations by the dynamic GMM runs; only the bank-specific factors had an influence on performance (except for size and capital). Second, unlike in previous research findings found in the literature, industry concentration as well as macroeconomic factors were not important for performance over the eight-year test period for the participation banks.

The overall results supported a strong relationship between banking performance and five bank-specific variables. These variables were: liquidity risk (LR), credit risk (CR), asset quality (AQ), management efficiency (ME) and income diversification (ID). All other factors were not relevant for

Table 4
Correlation coefficients between independent variables

	PSM		ROA		PSM OLS	ROA OLS
	Two-step system GMM	Two- step system GMM with SE	Two-step system GMM	Two-step system GMM with SE		
Lag Dependent Variables for Dynamic Modelling						
PSM L1	0.606***	0.606***				
	(10.52) (0.058	(4.120) (0.147)				
ROA L1			0.246***	0.246**		
			(7.140) (0.034)	(2.320) (0.106)		
Bank-Specific Variables						
LR	0.012***	0.012*	-0.001	-0.001	0.003	0.000
	(2.880) (0.004)	(1.830) (0.007)	(-0.200) (0.003)	(-0.110) (0.005)	(0.890) (0.003)	(-0.150) (0.003)
CR	-0.084***	-0.084**	-0.312***	-0.312***	0.018	-0.173***
	(-5.120) (0.016)	(-2.430) (0.035)	(-9.320) (0.034)	(-2.780) (0.112)	(0.910) (0.020)	(-9.760) (0.018)
CA	0.003	0.003	0.002	0.002	0.004***	0.008***
	(1.560) (0.002)	(0.760) (0.005)	(1.180) (0.002)	(0.480) (0.005)	(3.670) (0.001)	(7.730) (0.001)
AQ	-0.022	-0.022	-0.069***	-0.069	-0.035***	-0.078***
	(-1.400) (0.016)	(-0.650) (0.033)	(-4.690) (0.015)	(-1.320) (0.052)	(-4.120) (0.008)	(-10.430) (0.007)
ME	-0.303***	-0.303***	-0.509***	-0.509***	0.096**	-0.587***
	(-8.640) (0.035)	(-3.400) (0.089)	(-13.00) (0.039)	(-3.110) (0.164)	(1.980) (0.048)	(-13.730) (0.043)
ID	0.061	0.061	0.852***	0.852***	-0.167**	0.685***
	(0.650) (0.095)	(0.320) (0.192)	(9.760) (0.087)	(5.140) (0.166)	(-2.370) (0.070)	(11.300) (0.061)
LTA	-0.707***	-0.707**	0.245	0.245	-0.077	0.175***
	(-4.670) (0.151)	(-2.390) (0.296)	(1.200) (0.205)	(0.650) (0.375)	(-1.110) (0.069)	(2.860) (0.061)
Non-Bank-Specific Variables						
CONCEN	-0.008*	-0.008	-0.002	-0.002	-0.008	0.004
	(-1.680) (0.005)	(-0.930) (0.008)	(-0.890) (0.003)	(-0.800) (0.003)	(-1.510) (0.005)	(0.840) (0.005)
GDPG	-0.011	-0.011	0.011	0.011	0.026	0.055***
	(-0.950) (0.012)	(-0.700) (0.016)	(1.040) (0.011)	(0.600) (0.019)	(1.080) (0.024)	(2.590) (0.021)
INF	-0.030	-0.030	-0.016	-0.016	0.074***	0.068***
	(-1.310) (0.023)	(-0.880) (0.034)	(-1.310) (0.013)	(-0.730) (0.023)	(4.320) (0.017)	(4.470) (0.015)
Dum-	0.122	0.122	0.287	0.287	0.628***	0.477**
time	(0.410) (0.297)	(0.300) (0.402)	(1.600) (0.179)	(1.000) (0.286)	(2.650) (0.237)	(2.280) (0.210)
R-squared					0.540	0.660
F-statistic					7.530***	92.890***
Wald test	828.100***	119.530***	27360.570***	1178.730***		
Sargan test	22.869		25.207			
(P-Value)	(0.117)	-2.342	(0.066)	-1.574		
AR(1) test	-2.812	(0.019)	-1.705	(0.115)		
(P-Value)	(0.005)	-1.783	(0.088)	-0.436		
AR(2) test	-1.926	(0.075)	-0.480	(0.663)		
(P-Value)	(0.054)		(0.632)			

Note: ***, ** and * indicate significance at 1, 5 and 10% levels, respectively. Values in the parentheses are Z-statistics and standard error, respectively. The Hansen test is a test of over-identification restrictions. Arellano–Bond orders 1 and 2 are tests for first- and second-order correlation, respectively, which asymptotically N (0, 1), test first-difference residuals in the system's GMM estimation. Two-step errors are computed according to Windmeijer's (2005) finite-sample correction

performance, as were the macroeconomic and industry factors.

Findings on Sub-Samples

The results of repeating the regressions with data from two separate samples are presented in this sub-section (See Tables 5 and 6). The two samples were created by dividing the whole sample into high-income-country banks and low-income-country banks. Income per capita was used to classify the two samples. The results were obtained using the same software and are summarised in the same manner as in the case of the whole sample.

A priori, it is reasonable to assume that the banking systems in low-income economies are likely to experience greater demand for bank-related intermediation than would be the case for high-income economies. It is well known that high-income economies tend to be less bank-dependent for funding needs because borrowers resort to direct markets for funds more so than in low-income economies. Low-income economies have greater cyclicality in demands for funds as their GDP growth is more volatile. Hence, banks in low-income economies more so than those in high-income economies may experience influence from non-bank-specific factors, and these factors may help to produce statistically significant coefficients. The summary results relating to high-income economies in the sample are given in Table 5.

As in the case discussed in relation to the whole sample, it is evident there is a significant relationship between individual bank performance and the set of independent factors for the high-income sample results. The F-ratios from OLS regressions and the Wald test values for the GMM runs are all statistically significant (See the bottom panel of the table). Further, in the case of the OLS results, the R-squared values were more than 50%, so more than 50% of the variations in the performance variables are explained by the models.

The results of the GMM runs indicated that non-bank-specific factors did not have a significant influence on bank performance. Almost all the coefficients on non-bank-specific factors were insignificant with probability values higher than 0.10. However, the OLS regression results had probability values on half the tests below the 0.10 levels. It is possible to recall and thus infer from the discussion in the methodology section that these OLS results may not be reliable given the potential biases in estimations. Thus, we accepted the GMM-based statistics as suggesting that the non-bank-specific factors were unlikely to have a material influence on performance. Out of the 16 cells of test results on non-bank-specific factors from GMM runs, only two (GDP and CONCEN) were slightly significant, so we disregarded the two sets of acceptable statistics to conclude that those factors did not add materially to bank performance.

Table 5
Regression results for panel data model (GMM) and OLS, using NIM and ROA as dependent variable – high-income Countries

	PSM		ROA		PSM OLS	ROA OLS
	Two-step system GMM	Two- step system GMM with SE	Two-step system GMM	Two-step system GMM with SE		
Lag Dependent Variables for Dynamic Modelling						
PSM L1	0.728***	0.728***				
	(16.97) (0.043	(7.340) (0.099)				
ROA L1			0.273***	0.273*		
			(7.750) (0.035)	(1.880) (0.145)		
Bank-Specific Variables						
LR	0.011***	0.011*	0.005*	0.005	0.008**	0.007*
	(3.580) (0.003)	(1.680) (0.007)	(1.840) (0.003)	(0.580) (0.008)	(2.05) (0.039)	(1.840) (0,004)
CR	-0.064***	-0.064***	-0.201***	-0.201*	0.030	-0.155***
	(-5.770) (0.011)	(-2.730) (0.024)	(-6.790) (0.029)	(-1.780) (0.113)	(1.45) (0.021)	(-7.890) (0.019)
CA	0.003*	0.003	0.005***	0.005	0.006***	0.007***
	(1.670) (0.002)	(0.800) (0.003)	(3.600) (0.002)	(0.700) (0.008)	(4.710) (0.001)	(6.080) (0.012)
AQ	-0.011	-0.011	-0.110***	-0.110**	-0.036***	-0.077***
	(-1.230) (0.009)	(-0.460) (0.023)	(-13.600) (0.008)	(-2.090) (0.053)	(-3.04) (0.012)	(-6.820) (0.113)
ME	-0.372***	-0.372***	-0.605***	-0.605***	-0.074	-0.646***
	(-19.31) (0.019)	(-9.840) (0.038)	(-14.540) (0.042)	(-3.270) (0.185)	(-1.32) (0.056)	(-12.23) (0.053)
ID	0.242***	0.242	0.999***	0.999***	-0.153*	0.747***
	(2.830) (0.086)	(1.160) (0.308)	(14.140) (0.071)	(5.890) (0.169)	(-1.90) (0.080)	(10.10) (0.074)
LTA	-0.030	-0.030	0.162	0.162	0.293***	0.333***
	(-0.230) (0.132)	(-0.080) (0.365)	(0.890) (0.182)	(0.390) (0.418)	(2.970) (0.099)	(3.580) (0.093)
Non-Bank-Specific Variables						
CONCEN	0.008	0.008	0.027**	0.027	0.028**	0.017
	(0.960) (0.009)	(0.590) (0.014)	(2.060) (0.013)	(1.250) (0.022)	(2.440) (0.012)	(1.540) (0.011)
GDPG	-0.020*	-0.020	0.009	0.009	-0.011	0.057**
	(-1.900) (0.010)	(-1.270) (0.016)	(1.030) (0.009)	(0.530) (0.017)	(-0.40) (0.027)	(2.290) (0.025)
INF	-0.035	-0.035	-0.016	-0.016	0.035	0.031
	(-1.630) (0.022)	(-0.830) (0.042)	(-1.310) (0.012)	(-0.620) (0.025)	(1.550) (0.023)	(1.460) (0.021)
Dum-	0.463**	0.463	0.271	0.271	1.278***	1.007***
time	(1.960) (0.236)	(0.980) (0.470)	(1.360) (0.199)	(0.680) (0.398)	(4.450) (0.287)	(3.730) (0.270)
R-squared					0.560	0.660
F-statistic					6.740***	68.690***
Wald test	1204.550***	372.110***	293462.240***	5626.840***		
Sargan test	18.713		25.385			
(P-Value)	(0.284)		(0.063)			
AR(1) test	-2.000	-1.941	-1.388	-1.249		
(P-Value)	(0.046)	(0.052)	(0.165)	(0.212)		
AR(2) test	-1.032	-0.962	-0.087	-0.074		
(P-Value)	(0.302)	(0.336)	(0.931)	(0.941)		

Note: ***, ** and * indicate significance at 1, 5 and 10% levels, respectively. Values in the parentheses are Z-statistics and standard error, respectively. The Hansen test is a test of over-identification restrictions. Arellano–Bond orders 1 and 2 are tests for first- and second-order correlation, respectively, which asymptotically N (0, 1), test first-difference residuals in the system's GMM estimation. Two-step errors are computed according to Windmeijer's (2005) finite-sample correction

That leaves the interpretation of the results on the seven bank-specific factors in the upper panel of the table. Of the 32 cells with GMM-derived statistics on bank-specific factor effects, all but the LTA (size) have probability values below 0.10. That means the GMM model results helped to identify that six of the seven bank factors were significantly correlated with the bank performance in the high-income countries.

The results from OLS runs – though with some errors in estimations – also suggested that six of the seven variables significantly influenced bank performance as INF for inflation was not significant in the OLS runs. It can thus be concluded that all except one bank-specific factor appeared to have significant correlation with PSM and ROA as two performance measures.

The results for the low-income countries are summarised in Table 6. Similar to the results for high-income countries, the low-income country banks appeared to have a significant influence from the independent variables on their performance outcomes as measured by the GMM regressions. One variable, namely LTA (size of banks), out of the 10 right-hand side variables was not at all statistically relevant for performance. LTA coefficients all have probability values higher than 0.10, so this factor did not influence performance. The results from OLS regressions appeared to contradict the more accurate statistics from GMM runs: the LTA factor was significant, but the LR (liquidity risk) was not significant for performance. Pushed to make a choice, the OLS results were decided as being biased, so we accepted the GMM results that 'size of bank' was not relevant for performance.

As for the non-bank-specific factors, just as we had reasoned, some had coefficients that were statistically significant. They were CONCEN (industry concentration) and INF (inflation) factors. For the low-income country banks, these two factors significantly affect bank performance. For example, a 1% change in inflation would affect performance by 0.51 to 0.62%. The GDP (income) variable was not significant, although the low-income countries did have higher volatility in GDP growth, and this may, in fact, be thought to be a relevant factor. Perhaps GDP's insignificant effect was due to the period of our tests over the recent eight years. The low-income countries did not experience high GDP growth in that period.

Bank Performance Persistence

Impact of lagged dependent variables is frequently used to ensure that performance persistence is taken into account in performance study models (See Goddard et al., 2011). Researchers specify the lagged dependent variable in the GMM models used in recent years in order to enable a dynamic estimation of the model as is also done in this study. The overall results suggest that there is persistence in performance (Please refer to Table 4 for the whole sample). The previous year's performance values on PSM and ROA variables were statistically significant, so a dynamic relationship was taken into account.

Table 6
Regression Results for Panel Data Model (GMM) and OLS, Using NIM and ROA as Dependent Variable – Low-Income Countries

	PSM		ROA		PSM OLS	ROA OLS
	Two-step system GMM	Two- step system GMM with SE	Two-step system GMM	Two-step system GMM with SE		
Lag Dependent Variables for Dynamic Modelling						
PSM L1	0.009	0.009				
	(0.090) (0.096)	(0.040) (0.198)				
ROA L1			0.174***	0.174		
			(5.960) (0.029)	(1.400) (0.124)		
Bank-Specific Variables						
LR	0.010***	0.010***	0.002	0.002	0.002	-0.004
	(5.460) (0.002)	(3.290) (0.003)	(0.530) (0.003)	(0.250) (0.007)	(0.370) (0.006)	(-0.780) (0.005)
CR	0.047	0.047	-0.418***	-0.418**	0.044	-0.461***
	(1.190) (0.039)	(0.460) (0.101)	(-7.060) (0.059)	(-1.970) (0.212)	(0.530) (0.083)	(-7.080) (0.065)
CA	0.019***	0.019*	0.015***	0.015**	0.007***	0.011***
	(3.680) (0.005)	(1.750) (0.011)	(4.280) (0.004)	(2.100) (0.007)	(3.110) (0.002)	(5.870) (0.002)
AQ	-0.024**	-0.024	-0.030***	-0.030	-0.012	-0.043***
	(-2.010) (0.012)	(-0.870) (0.028)	(-3.720) (0.008)	(-1.150) (0.026)	(-0.930) (0.013)	(-4.160) (0.010)
ME	0.747***	0.747**	-0.110	-0.110	0.747***	-0.393***
	(7.300) (0.102)	(2.060) (0.363)	(-1.020) (0.108)	(-0.450) (0.246)	(8.780) (0.085)	(-6.030) (0.065)
ID	-0.420***	-0.420*	0.706***	0.706***	-0.101	0.729***
	(-3.370) (0.125)	(-1.830) (0.230)	(9.010) (0.078)	(3.010) (0234)	(-0.720) (0.141)	(7.410) (0,098)
LTA	-0.276	-0.276	0.750*	0.750	0.295*	0.254*
	(-0.700) (0.395)	(-0.460) (0.598)	(1.900) (0.394)	(0.970) (0.770)	(1.760) (0.167)	(1.960) (0.129)
Non-Bank-Specific Variables						
CONCEN	-0.020***	-0.020**	-0.005**	-0.005	-0.007	0.004
	(-5.780) (0.004)	(-2.260) (0.009)	(-2.200) (0.002)	(-1.490) (0.003)	(-1.050) (0.007)	(0.800) (0.005)
GDPG	0.002	0.002	-0.022	-0.022	0.058	-0.072*
	(0.200) (0.010)	(0.070) (0.028)	(-0.700) (0.031)	(-0.330) (0.066)	(1.080) (0.054)	(-1.710) (0.042)
INF	-0.062***	-0.062	-0.051***	-0.051	0.081***	0.019
	(-3.250) (0.019)	(-1.330) (0.047)	(-4.570) (0.011)	(-1.280) (0.40)	(2.620) (0.031)	(0.770) (0.024)
Dum-	0.894***	0.894**	0.490*	0.490	0.245	0.009
time	(5.330) (0.168)	(2.270) (0.393)	(1.880) (0.261)	(1.100) (0.447)	(0.750) (0.325)	(0.040) (0.253)
R-squared					0.480	0.820
F-statistic					10.850***	52.670***
Wald test	2993.500***	303.850***	31381.890***	1218.480***		
Sargan test	12.106		9.219			
(P-Value)	(0.743)		(0.904)			
AR(1) test	-1.841	-1.109	-1.925	-1.772		
(P-Value)	(0.066)	(0.267)	(0.054)	(0.076)		
AR(2) test	-1.530	-1.401	1.190	0.986		
(P-Value)	(0.126)	(0.161)	(0.234)	(0.324)		

Note: ***, ** and * indicate significance at 1, 5 and 10% levels, respectively. Values in the parentheses are Z-statistics and standard error, respectively. The Hansen test is a test of over-identification restrictions. Arellano–Bond orders 1 and 2 are tests for first- and second-order correlation, respectively, which asymptotically N (0, 1), test first-difference residuals in the system's GMM estimation. Two-step errors are computed according to Windmeijer's (2005) finite-sample correction

PSM as the market-based measure (as will be the case using NIM for mainstream banks) revealed that the persistence of participation banks was as high as 0.6 (with t-values all in excess of 2.000) on the previous year's PSM values. That would appear to suggest that the participation banking system is largely not fully competitive. If it were fully competitive, we would have the lagged coefficient closer to zero than closer to one as in this case. Even if measured by ROA, the values are closer to 0.25. Obviously for the purpose of measuring persistence in performance, the market-based measure of PSM (or NIM) revealed the fuller extent of previous year's performance largely influencing the current year's performance.

The numbers for the high- and low-income countries also revealed the same trend, as seen in Tables 5 and 6. The PSM coefficients of high-income countries have lag coefficient values as high as 0.72 while the corresponding numbers for ROA is as low as 0.20. It is possible that the use of market-based PSM reveals the full extent of performance persistence to be three times higher compared to the number revealed by the ROA, which is a smoothed number[4].

In the case of low-income country samples, the results revealed the effect of a different regulatory control prevalent in such countries. Banks in low-income countries are guided by the central banks that receive orders from the government to promote socially-directed investments, often with controls on what the banks could charge for such directed lending practices. Given that this phenomenon is widely known in the literature, it is unlikely that the performance measures would have persistence as high as in open economies, for example, as reported for the high-income countries. Thus, the coefficients on the lagged PSM are not significant: the values are around 0.09 with low t-values to be significant. The ROA coefficients are statistically significant in one case and not significant in another case. These too are unlikely to be of economic significance since the values are very low, at 0.17.

CONCLUSION

This paper, in reporting interesting findings on a new type of bank (participation banks), started with the aim of finding whether a significant relationship could exist between bank performance factors and a set of factors reported to be correlated with bank performance. Profit-share contracting by participation banks is new and has a short history. These banks collectively have some US$4,700 billion in assets in some 50 countries. Participation banks work alongside the much more established mainstream banks, which price deposits and lending costs on interest rates. The test models we applied were an advanced model based on the widely used older model by Ho and Saunders (1981). More specifically, we used the current panel data regression method with refinements to overcome some deficiencies as found in the relevant econometric literature.

[4] See Footnote 1.

Our findings pointed to a number of valid conclusions relating to this new form of banking. To start with, the net interest margin is not possible for this type of bank, so we used the equivalent 'profit-shared margin' as a market-based measure of bank performance. To that variable, we added the much older return on assets as a profitability measure. On the other side of the equation were seven bank-specific variables and three non-bank-specific variables widely used in banking studies over the last eight years. We also used a time dummy to eliminate the effect of the global financial crisis during some years.

Next, we found that the OLS-method-based tests showed that both bank-specific and non-bank-specific factors were all statistically correlated with the profit-share and return-on-assets measures. One bank-specific factor, namely, liquidity risk, was not significant to the relationship. However, when more accurate test statistics were obtained using the GMM panel regressions, only the bank-specific factors (excepting bank size) were all significantly correlated with the two bank performance measures.

The third result was that the banking system is not fully competitive as is evident from the significant persistence of current performance on past performance. The degree of persistence was as high as 0.72 for high-income-country participation banks. Finally, for the low-income-country banks, there was a strong impact of inflation affecting bank performance: 1% inflation affects performance by 0.5%. We found a high degree of explanatory power of the model with more than 50% explained variation in the test statistics.

The data set we used was from an established source, so it is possible to extend this study over different test periods other than the one we used as the post-global-crisis period. Further extension of this study is possible to compare results in this paper with new results from a matched pair of mainstream banks in the same 25 countries.

To sum up, the motivation of this study was to identify different performance measures in order to investigate if their performance measure(s) are correlated with known bank-specific and non-bank-specific factors.

ACKNOWLEDGEMENT

Sincere thanks are due to several people who helped to shape this final draft by incorporating useful comments of discussants on earlier drafts. We owe them all a collective debt. Next, we acknowledge with gratitude permission to use databases from the library system of University Putra Malaysia. Finally, we are grateful to a colleague who helped to edit this paper. For remaining errors, we take collective responsibility.

REFERENCES

Ahmad, N. H., & Ariff, M. (2007). Multi-country study of bank credit risk determinants. *International Journal of Banking and Finance, 5*(1), 6.

Akhtar, M. F., Ali, K., & Sadaqat, S. (2011). Factors influencing the profitability of Islamic banks of Pakistan. *International Research Journal of Finance and Economics, 66*, 125–132.

Allen, L. (1988). The determinants of bank interest margins: A note. *Journal of Financial and Quantitative Analysis, 23*(2), 231–235.

Angbazo, L. (1997). Commercial bank net interest margins, default risk, interest-rate risk, and off-balance sheet banking. *Journal of Banking and Finance, 21*(1), 55–87.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies, 58*(2), 277–297.

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics, 68*(1), 29–51.

Ariff, M., Iqbal, M., & Mohamad, S. (Ed.). (2012). *Prospects and challenges of developing sukuk Islamic debt markets around the world. The Islamic Debt Market for Sukuk Securities: The Theory and Practice of Profit Sharing Investment*, Edward Elgar Publishing; Cheltenham, UK.

Athanasoglou, P. P., Brissimis, S. N., & Delis, M. D. (2008). Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of International Financial Markets, Institutions and Money, 18*(2), 121–136.

Badarudin, E., Ariff, M., & Khalid, A., (2013). Post Keynesian money endogeneity in G-7 economies: Is it accommodationist or structuralist or liquidity preference? *Journal of International Money and Finance, 33*(2013), 146–162.

Bashir, A. H. M. (2003). Determinants of profitability in Islamic banks: Some evidence from the Middle East. *Islamic Economic Studies, 11*(1), 31–57.

Beltratti, A., & Stulz, R. M. (2009). Why did some banks perform better during the credit crisis? A cross-country study of the impact of governance and regulation. National Bureau of Economic Research. *Journal of Financial Economics, 105*(1), 1-17.

Berger, A. N., & Bouwman, C. H. (2009). Bank liquidity creation. *Review of Financial Studies, 22*(9), 3779–3837.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics, 87*(1), 115–143.

Bourke, P. (1989). Concentration and other determinants of bank profitability in Europe, North America and Australia. *Journal of Banking and Finance, 13*(1), 65–79.

Busch, R., & Kick, T. (2009). Income diversification in the German banking industry (No. 2009, 09). *Discussion Paper Series 2*, Deutsche Bundesbank, Banking and Financial Studies.

Chortareas, G. E., Garza-García, J. G., & Girardone, C. (2012). Competition, efficiency and interest rate margins in Latin American banking. *International Review of Financial Analysis, 24*, 93–103.

Claeys, S., & Vander Vennet, R. (2008). Determinants of bank interest margins in Central and Eastern Europe: A comparison with the West. *Economic Systems, 32*(2), 197–216.

Cornett, M. M., McNutt, J. J., & Tehranian, H. (2010). The financial crisis, internal corporate governance, and the performance of publicly-traded US bank holding companies. *Social Science Research Network (SSRN)*, 1476969.

Deep, A., & Schaefer, G. (2004). Are banks liquidity transformers? *Social Science Research Network (SSRN)*, 556289.

Demirgüç-Kunt, A., & Huizinga, H. (1999). Determinants of commercial bank interest margins and profitability: Some international evidence. *The World Bank Economic Review, 13*(2), 379–408.

Demirgüç-Kunt, A., & Huizinga, H. (2011). Do we need big banks? Evidence on performance, strategy and market. Evidence on Performance, Strategy and Market. *Social Science Research Network (SSRN)*, 1774423.

Demirguc-Kunt, A., Laeven, L., & Levine, R. (2003). Regulations, market structure, institutions, and the cost of financial intermediation (Vol. w 9890). National Bureau of Economic Research.

Distinguin, I., Roulet, C., & Tarazi, A. (2013). Bank regulatory capital and liquidity: Evidence from US and European publicly traded banks. *Journal of Banking and Finance, 37*(9), 3295–3317.

Flamini, V., McDonald, C. A., & Schumacher, L. (2009). The determinants of commercial bank profitability in Sub-Saharan Africa. International Monetary Fund.

García-Herrero, A., Gavilá, S., & Santabárbara, D. (2009). What explains the low profitability of Chinese banks? *Journal of Banking and Finance, 33*(11), 2080–2092.

Goddard, J., Liu, H., Molyneux, P., & Wilson, J. O. (2011). The persistence of bank profit. *Journal of Banking and Finance, 35*(11), 2881–2890.

Goddard, J., Liu, H., Molyneux, P., & Wilson, J. O. (2013). Do bank profits converge? *European Financial Management, 19*(2), 345–365.

Goddard, J., Molyneux, P., & Wilson, J. O. (2004). The profitability of European banks: a cross-sectional and dynamic panel analysis. *The Manchester School, 72*(3), 363–381.

Hassan Al-Tamimi, H. A. (2006). The determinants of the UAE commercial banks' performance: A comparison of the national and foreign banks. *Journal of Transnational Management, 10*(4), 35–47.

Ho, T. S., & Saunders, A. (1981). The determinants of bank interest margins: Theory and empirical evidence. *Journal of Financial and Quantitative Analysis, 16*(4), 581–600.

Kasman, A., Tunc, G., Vardar, G., & Okan, B. (2010). Consolidation and commercial bank net interest margins: Evidence from the old and new European Union members and candidate countries. *Economic Modelling, 27*(3), 648–655.

Kosmidou, K. (2008). The determinants of banks' profits in Greece during the period of EU financial integration. *Managerial Finance, 34*(3), 146–159.

Lewis, M. K., Ariff, M., & Mohamad, S. (Eds.). (2014). *Risk and regulation of Islamic banking*. UK and USA: Edward Elgar Publishing.

Liu, H., & Wilson, J. O. (2010). The profitability of banks in Japan. *Applied Financial Economics*, 20(24), 1851–1866.

Mamatzakis, E., & Remoundos, P. (2003). Determinants of Greek commercial banks profitability, 1989-2000. *Spoudai, 53*(1), 84–94.

Masood, O., Aktan, B., & Chaudhary, S. (2009). An empirical study on banks' profitability in the KSA: A co-integration approach. A*frican Journal of Business Management, 3*(8), 374.

Maudos, J. N., & Fernandez de Guevara, J. (2004). Factors explaining the interest margin in the banking sectors of the European Union. *Journal of Banking and Finance, 28*(9), 2259–2281.

McShane, R., & Sharpe, I. G. (1985). A time series/cross section analysis of the determinants of Australian trading bank loan/deposit interest margins: 1962–1981. J*ournal of Banking and Finance, 9*(1), 115–136.

Micco, A., Panizza, U., & Yanez, M. (2007). Bank ownership and performance. Does politics matter? *Journal of Banking and Finance, 31*(1), 219–241.

Mirzaei, A., Liu, G., & Moore, T. (2013). Does market structure matter on banks' profitability and stability? Emerging versus advanced economies. *Brunel University, Economics and Finance, Working Paper*, 11–12.

Mokhtar, H. S. A., Abdullah, N., & Alhabshi, S. M. (2008). Efficiency and competition of Islamic banking in Malaysia. *Humanomics, 24*(1), 28–48.

Naceur, S. B., & Goaied, M. (2008). The determinants of commercial bank interest margin and profitability: Evidence from Tunisia. *Frontiers in Finance and Economics, 5*(1), 106–130.

Naceur, S. B., & Omran, M. (2011). The effects of bank regulations, competition, and financial reforms on banks' performance. *Emerging Markets Review, 12*(1), 1–20.

Nazir, T. (2010). Analyzing financial performance of commercial banks in India: Application of CAMEL Model. *Pakistan Journal of Commerce and Social Sciences, 4*(1).

Pasiouras, F., & Kosmidou, K. (2007). Factors influencing the profitability of domestic and foreign commercial banks in the European Union. *Research in International Business and Finance, 21*(2), 222–237.

Perry, P. (1992). Do banks gain or lose from inflation. *Journal of Retail Banking, 14*(2), 25–40.

Rossi, S. P., Schwaiger, M., & Winkler, G. (2005). Managerial behavior and cost/profit efficiency in the banking sectors of Central and Eastern European countries. Unpublished paper, Oesterr. National Bank.

Saunders, A., & Schumacher, L. (2000). The determinants of bank interest rate margins: An international study. *Journal of International Money and Finance, 19*(6), 813–832.

Shen, C. H., Chen, Y. K., Kao, L. F., & Yeh, C. Y. (2009, June). Bank liquidity risk and performance. In *17th Conference on the Theories and Practices of Securities and Financial Markets*, Hsi-Tze Bay, Kaohsiung, Taiwan.

Srairi, S. A. (2009). Factors influencing the profitability of conventional and Islamic commercial banks in GCC countries. *Review of Islamic Economics,13*(1), 5–30.

Staikouras, C. K., & Wood, G. E. (2004). The determinants of European bank profitability. *International Business and Economics Research Journal, 3*, 57–68.

Sufian, F. (2009). Determinants of bank efficiency during unstable macroeconomic environment: Empirical evidence from Malaysia. *Research in International Business and Finance, 23*(1), 54–77.

Sufian, F., & Parman, S. (2009). Specialization and other determinants of non-commercial bank financial institutions' profitability: Empirical evidence from Malaysia. *Studies in Economics and Finance, 26*(2), 113–128.

Tan, Y., & Floros, C. (2012). Bank profitability and inflation: The case of China. *Journal of Economic Studies, 39*(6), 675–696.

Williams, B., & Rajaguru, G. (2007). The chicken or the egg? The trade-off between bank non interest income and net interest margins. In *20th Australasian Finance and Banking Conference*, Sydney, Australia.

Williams, J. (2004). Determining management behaviour in European banking. *Journal of Banking and Finance, 28*(10), 2427–2460.

Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics, 126*(1), 25–51.

APPENDIX

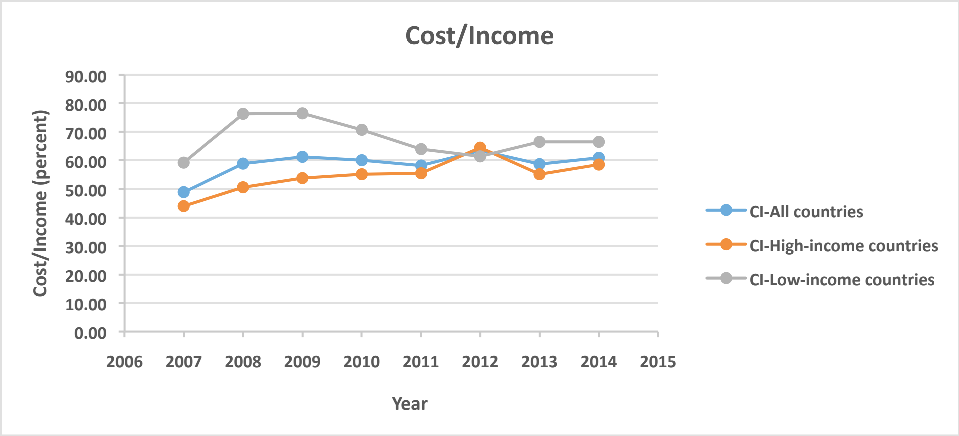

Figure 1. Average cost/income ratio for 100 Islamic banks over the years 2007 to 2014