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# Submission Cover

## 21<sup>st</sup> Australasian Finance and Banking Conference

### 1. Title

Loan Loss Reserves and Bank Stock Returns: Evidence from Asian Banks
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### 2. Primary Author

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## **Loan Loss Reserves and Bank Stock Returns:**

### **Evidence from Asian Banks**

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26 June 2009

#### **Abstract**

This study examines the effects of the loan-loss-reserves-to-gross-loans ratio, a proxy for credit risk, on bank stock returns for a sample of 42 listed Asian banks during the period 1999-2007. By applying a panel data analysis that includes a control for market returns, book-to-market ratio, size, and country-specific factors, the results show that the ratio has a negative and significant influence on bank stock returns. Overall, the results suggest that credit risk remains a major threat to Asian banks. In addition, while loan loss reserves are needed for mitigating credit risk, investors do not consider them as good news or a credible signal concerning bank intentions to resolve problem loans.

*JEL classification:* C33, G10, G14, G21, M41.

*Keywords:* bank stock returns, loan loss reserves, credit risk, Asian banks

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The views expressed in this paper are the author's only and do not necessarily reflect those of Bank Indonesia.

## **Loan Loss Reserves and Bank Stock Returns:**

### **Evidence from Asian Banks**

#### **Abstract**

This study examines the effects of the loan-loss-reserves-to-gross-loans ratio, a proxy for credit risk, on bank stock returns for a sample of 42 listed Asian banks during the period 1999-2007. By applying a panel data analysis that includes a control for market returns, book-to-market ratio, size, and country-specific factors, the results show that the ratio has a negative and significant influence on bank stock returns. Overall, the results suggest that credit risk remains a major threat to Asian banks. In addition, while loan loss reserves are needed for mitigating credit risk, investors do not consider them as good news or a credible signal concerning bank intentions to resolve problem loans.

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## 1. Introduction

Providing loans is one of the major activities of banks.<sup>1</sup> By extending loans to individuals and businesses, banks act as an important financial intermediary institution. Bank lending is also a major focus of attention of monetary and banking authorities as it can influence the effectiveness of monetary policy and put pressures on the financial stability, particularly when there is an increase in credit risk.

The most popular measure of credit risk is the non-performing-loans (NPL) ratio. However, in the absence of this ratio, one can use alternative measures such as the loan-loss-reserves-to-gross-loans (LLRGL) ratio.<sup>2</sup> Agusman et al. (2008) show that the LLRGL ratio is a good measure of credit risk, and can be used as a surrogate for market-based risk measures.

The objective of this study is to examine the effects of the LLRGL ratio on stock returns for a sample of 42 Asian banks during the period 1999-2007. This study is important for following reasons. First, while credit risk has long been recognized as a major threat to banking, to the best of our knowledge, there is no research available on the impact of credit risk on bank stock returns. Previous studies such as Choi et al. (1991) and Atindéhou and Gueyie (2001) have examined the sensitivity of bank stock returns to market, interest and exchange rate risk. However, the sensitivity to credit risk remains unexplored.

Second, loan loss reserves have been widely used in addressing problem loans. But, its impacts on bank stock returns are not well understood and previous studies on this subject generally show conflicting results. For example, Beaver et al. (1989), Elliot et al. (1991), Griffin and Wallach (1991) find a positive relation, whereas Ahmed et al. (1999) and Docking et al. (1997 and 2000) document a

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<sup>1</sup> Several researchers have explored why bank loans are special. See, for example, James (1987), Becketti and Morris (1992), Billett et al. (1995 and 2006), and Fields et al. (2006). In general, they argue that the specialness of bank loans lies in their comparative cost advantage in information gathering and monitoring processes relative to other financial institutions.

<sup>2</sup> As described by Hatfield and Lancaster (2000), loan loss reserve is a contra-asset account to cover possible loan default. In particular, when a bank's loan portfolio review reveals the possibility of increasing credit risk, then additional reserves are added to the loan loss reserve account to further cushion against the possibility of future loan default.

negative relation. By examining Asian banks, the present study will improve our understanding on this important issue.

Furthermore, previous studies mostly use an event-study approach. This methodology may not be applicable when announcements about loan loss reserves are not well documented such as in the case of Asian financial systems where only limited banks are listed in the capital markets. The present study resolves this limitation by implementing a panel data analysis.<sup>3</sup>

The panel data analysis includes controls for market returns, the book-to-market ratio, size, and country-specific factors, and we find that the LLRGL ratio has a negative and significant influence on bank stock returns. These results indicate that credit risk remains a major threat to Asian banks. Moreover, while loan loss reserves are required for mitigating credit risk, investors do not consider them as good news or a credible signal concerning bank intentions to resolve problem loans. The implication of these findings is that the loan loss provisions ratio provides an ambiguous signal. Thus, bank management should consider additional measures to convey the magnitude of problematic loans to the capital markets.

## **2. Literature Review**

Agusman et al. (2008) examine the relation between accounting and capital market risk measures using a sample of 46 Asian banks during 1998-2003. They find that the LLRGL ratio, a proxy for credit risk, is significantly related to total return risk and non-systematic risk. As a result, the ratio can be considered as a surrogate for market-based risk measures.

Earlier research by Beaver et al. (1989) investigates the relation between financial reporting, supplemental disclosures, and share prices for a sample of 149 US banks. They find that the supplemental disclosures of nonperforming loans and the maturity of loans have incremental explanatory power beyond that provided by

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<sup>3</sup> Beaver et al. (1989) and Ahmed et al. (1999) have adopted a panel data framework (the fixed-effects model), but only for limited analysis.

allowance for loan losses.<sup>4</sup> They also document that higher allowance for loan losses is associated with higher market values of bank stock.

The majority of the research on the link between loan loss reserves and bank stock returns uses an event study approach. Elliott et al. (1991) explore the information content of announcements of increased reserves for loan loss by Citicorp and other banks, and the write-off announcement made by the Bank of Boston during 1987. They argue that since the announcement of an increase in loan loss reserves is to resolve problem loans in lesser developed countries (LDC), it could be interpreted favorably as a signal of willingness to deal with the LDC debt problem. Consistent with this argument, they find that the strongest stock-price increases are associated with the Citicorp announcement. In contrast, those banks with the greatest exposure to LDC debt and with the largest reserves sustained the largest stock-price decreases at the Bank of Boston write-off announcement.

Wahlen (1994) investigates three related but separate disclosures of loan portfolio default risk: changes in nonperforming loans, loan loss provisions and loan chargeoffs. Using two samples of US banks, he finds that unexpected loan loss provisions are positively related to future changes in cash flows as far as three years ahead, given current cash flows, unexpected changes in non-performing loans and unexpected loan chargeoffs. Moreover, stock price reactions to annual returns and earnings announcement dates confirm that investors interpret discretionary components of unexpected provisions as good news about future changes in cash flows, although provisions are measures of expected losses that reduce current earnings.

Griffin and Wallach (1991) examine how the stockholders' returns of 13 large US banks were affected by their decisions to place Brazilian loans on a nonaccrual basis and to increase loan loss reserves to recognize the higher probability of default. They find that the stock market responded adversely to the banks' reclassification of loans to the nonaccrual basis, and positively to subsequent

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<sup>4</sup> Beaver et al. (1989, p.162) state that "allowance for (possible) for loan losses" is another name for "loan loss reserve".

announcements of additions to loan loss provisions. The latter reaction is consistent with banks' use of those adjustments as credible signals about their intentions and abilities to resolve the Latin American debt situation.

Musumeci and Sinkey (1990) also use an event-study method to examine security returns for the 25 largest US bank holding companies surrounding Citicorp's \$3 billion loan-loss-reserve decision. They document positive and significant abnormal returns for Citicorp and other money-center banks when Citicorp announces its reserve allocations. They also find positive abnormal returns for the other money-center banks when they announced their reserve decisions. They argue that these reserve decisions affect market prices because they signal economic value-enhancing corporate and strategic restructurings.

While the above studies generally show a positive relation between loan loss reserves and bank stock returns, several researchers find a negative relation. Ahmed et al. (1999) use a sample of 113 bank holding companies that file Y-9 reports with the Federal Reserve to construct more powerful tests of capital and earnings management effects on bank loan loss provisions. They find strong support for the hypothesis that loan loss provisions are used for capital management. More importantly, they document that loan loss provisions are negatively related to both future earnings changes and contemporaneous stock returns.

Docking et al. (1997) examine a sample of loan loss reserve announcements by US banks found in *The Wall Street Journal Index (WSJI)*. They report negative and statistically significant announcement effects associated with the loan loss reserve announcements. Subsequently, Docking et al. (2000) extend the work of Docking et al. (1997) by investigating intragroup and intergroup differences that may exist between the stock-price reaction to loan loss reserve announcements by money-center and regional banks. Docking et al. (2000) find that significant stock-price effects of bank loan loss reserves announcements exist despite the fact that these accounting adjustment have no concurrent cash-flow implications. They also document that consistent with expected information effects, negative abnormal

returns surrounding the announcements tend to be much more important in the case of regional as opposed to money-center banks.

Hatfield and Lancaster (2000) investigate announcements of additions to loan loss reserves for 33 US bank holding companies. Interestingly, they find that the reaction to an increase in the loan loss reserves is negative and statistically significant before the announcement; but, subsequently becomes positive and remains statistically significant for several days afterwards.

### **3. Data and methodology**

#### *3.1. Data and sample*

Listed banks from nine countries in Asia, including Hong Kong, Indonesia, Pakistan, Philippines, Singapore, South Korea, Sri Lanka, Taiwan, and Thailand for the 1999-2007 period are used in the study.<sup>5</sup> Capital market data including stock prices and market indices for each country were obtained from Datastream, while accounting data were collected from BankScope.

#### *3.2. Panel data methodology*

A panel data methodology is used to accommodate the heterogeneity among the 42 Asian banks. In addition, this methodology can reduce problems associated with multicollinearity and estimation bias, and specifies the time-varying relation between dependent and independent variables (Baltagi, 2001, and Hsiao, 1986).

Beaver et al. (1989) and Ahmed et al. (1999) have used panel data methodology in examining loan loss reserves and provisions. In particular, Beaver et al. (1989) adopt the fixed-effects model to explain the impacts of loan loss reserves on the market-to-book ratio, whereas Ahmed et al. (1999) implement the fixed-effects model to explain the effects of loan loss provisions on net returns. However,

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<sup>5</sup> The list of the sample banks is provided in Appendix 1. To be included in this research, the banks' data (based on the December year-end reports) should be obtainable from Datastream and Bankscope for all years during the study period. Moreover, at least two banks' data should be available for each sample country.

the two studies did not report the statistical tests necessary to determine the most appropriate model.

In the panel data analysis, an F-test is used to determine whether the fixed-effects model outperforms the pooled OLS, and the Breusch and Pagan Lagrange Multiplier (LM) test is used to determine whether the random-effects model outperforms the pooled OLS. Moreover, as described in Wooldridge (2002) and Greene (2003), the Hausman test is implemented to compare the fixed-effects model with the random-effects model.

### 3.3. *Variables*

In this study, the dependent variable is annual bank stock return (BSR).<sup>6</sup> The main independent variable is the loan-loss-reserves-to-gross-loans (LLRGL) ratio. We expect that the relation between LLRGL and BSR will be negative because, intuitively, credit risk should have a negative effect on banks. Agusman et al. (2008) shows that LLRGL is a good proxy for credit risk, while Ahmed et al. (1999) and Docking et al. (1997 and 2000) document a negative relation between loan loss provisions and bank stock returns.

This study uses several control variables. The first control variable is the returns on the nine relevant capital market indices (CMR). This variable is used by Atindéhou and Gueyie (2001) and Saporoschenko (2002).<sup>7</sup> Moreover, as suggested by Fama and French (1992), Barber and Lyon (1997), and Lewellen (2004), we also use the book-to-market ratio (BTMR) of equity, and firm size (SIZE), measured by the market capitalization of equity. As in the previous studies, the relations between

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<sup>6</sup> The return is simply calculated as the stock price at year  $t$  minus the stock price at year  $t-1$  divided by the stock price at year  $t$ .

<sup>7</sup> In examining the impact of exchange rate risk on Canadian chartered banks' stock returns, Atindéhou and Gueyie (2001) use the capital market returns as one of the control variables. Moreover, Saporoschenko (2002) uses the Japanese stock market return as one of independent variable in a study on the sensitivity of Japanese bank stock returns to economic factors. Therefore, we believe that the use of the relevant capital market indices (CMR) as one of the control variables is appropriate for our study.

CMR and BSR, and between BTMR and BSR are expected to be positive, whereas the relation between SIZE and BSR is expected to be negative.

Furthermore, following Agusman et al. (2008), we use eight country dummy variables (DCOUNTRY) to control for the differences in the banking structure and regulatory environments, and the different economic and political characteristics. Indonesia is used as the numeraire country.

### 3.4. Empirical model

Based on the above discussions, the following general model is used:

$$\begin{aligned} \text{BSR} = & \alpha_0 + \alpha_1(\text{LLRGL}) + \alpha_2(\text{CMR}) + \alpha_3(\text{BTMR}) + \alpha_4(\text{SIZE}) \\ & + \sum_{\alpha=5}^{\alpha=13} \text{DCOUNTRY} + \text{error} \end{aligned} \quad (1)$$

where BSR = the bank stock returns, LLRGL = the loan-loss-reserves-to-gross-loans ratio, CMR = the relevant capital market returns, BTMR = the book-to-market ratio, SIZE = the market capitalization of equity, and DCOUNTRY= the eight countries dummy variables.

## 4. Empirical results

### 4.1. Descriptive statistics

Table 1 presents descriptive statistics for the raw variables. BSR has a mean (median) of 17.5% (8.7%), while the mean and the median of LLRGL is 5.5% and 3.8%, respectively. The mean (median) of CMR is 19.1% (17.0%). The remaining two variables are highly skewed with skewness measures of -6.4 (BTMR) and 3.9 (SIZE). To mitigate skewness and the existence of outliers, the Kane and Meade (1998) rank transformation is used.<sup>8</sup> Multicollinearity values, as suggested by Gujarati (2003), indicate that multicollinearity is not a serious problem in the sample.

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<sup>8</sup> Basically, the rank transformation involves replacing each observation of variable  $X$  for year  $t$ , with its corresponding rank from 1 to  $n$  in ascending sequence divided by  $n + 1$ .

**(Insert Table 1 here)**

#### *4.2. Regression results*

Table 2 presents the regression results.<sup>9</sup> The F-test indicates that the fixed-effects model outperforms the pooled OLS. However, the Breusch and Pagan Lagrange Multiplier (LM) test suggests that the pooled OLS is superior to the random-effects model. The Hausman test shows that the fixed-effects model outperforms the random-effects model. While these tests indicate that the fixed-effects model is the best specification, for comparison purposes, all three models are presented.

**(Insert Table 2 here)**

Because the data are pooled, heteroskedasticity and autocorrelation may affect the OLS results. A likelihood ratio test and the Wooldridge test identified the existence of heteroskedasticity and autocorrelation in the data.<sup>10</sup> Therefore, following Wooldridge (2002 and 2003), Arellano (1987 and 2003) and Bertrand et al. (2004), cluster-robust variance and covariance estimators are used to resolve these issues.

As expected, the fixed-effects specification (the best model) indicates that the LLRGL has a significant negative effect on BSR. With the R-squared of 36%, the model explains considerably well the relation between the two variables.<sup>11</sup> The same results are also shown by the random-effects model and the pooled OLS, although with a lower R-squared. The results indicate that an increase in loan loss reserves has a negative and significant effect on bank stock returns. Hence, our findings are consistent with Ahmed et al. (1999) and Docking et al. (1997 and 2000).

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<sup>9</sup> In this study, we use Stata 9.0 for all estimations.

<sup>10</sup> In addition to the likelihood ratio test, we also use the White test to examine the presence of heteroskedasticity problems. The results are generally consistent.

<sup>11</sup> As reported by Lev (1989) and Chen and Zhang (2007), accounting fundamentals typically explain stock returns with very low R-squared (less than 10%).

Consistent with expectations, the relation between CMR and BSR is positive and significant for all three models. However, the relation between BTMR and BSR is negative and significant. This is inconsistent with Fama and French (1992), and Barber and Lyon (1997). Surprisingly, the relation between SIZE and BSR is not significant in any one of the models. Perhaps this suggests that for Asian banks, size is not a matter in gaining stock returns.

Since under the fixed-effects model the country dummy variables are dropped, we use the results of the random-effects model and the pooled OLS to analyze the impact of the dummy variables. In general, the results indicate that during the 1999-2007 period, bank stock returns in Hong Kong, Pakistan, Philippines, South Korea, Sri Lanka, Taiwan, and Thailand are significantly higher than Indonesia. Moreover, bank stock returns of Singapore are also higher than Indonesia, but not significant.

#### *4.3. Further analysis*

Since country dummy variables add explanatory power to bank stock return models, nine dummy interaction variables are created by multiplying each country dummy variable with the LLRGL variable. Our purpose is to compare the impact of the LLRGL ratio across each country in the study and the dummy interaction for Indonesia is used as the numeraire. The results are shown in Table 3.

Again, the specification tests indicate that the fixed-effects model is the best. The results suggest that the estimated coefficient on the dummy interaction for Taiwan is positive and significant, whereas for South Korea it is negative and significant. Hence, the impacts of the LLRGL on bank stock returns in Taiwan are higher than Indonesia while in South Korea are lower.<sup>12</sup> Overall, the findings suggest that the effect of the LLRGL on bank stock returns can vary from country to country.

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<sup>12</sup> The random-effects and pooled OLS models provide inconsistent results. In particular, under the two models, the coefficients on the dummy interactions for Hong Kong, Pakistan, Philippines, Sri Lanka, and Thailand are positive and significant.

## **5. Conclusions**

The objective of this study is to examine the effects of the LLRGL ratio on stock returns for a sample of 42 listed Asian banks during the period 1999-2007. Using a panel data analysis, the results show a negative and significant relation between the ratio and bank stock returns, suggesting that an increase in credit risk reduces bank stock returns. Moreover, investors do not consider loan loss reserve additions as good news or a credible signal concerning bank intentions to resolve problem loans. The results provide support for the studies by Ahmed et al. (1999) and Docking et al. (1997 and 2000).

Our findings have some important implications for bank management and banking authorities. First, bank management, particularly listed banks, needs to be judicious in using loan loss reserves to alleviate credit risk. Thus, listed banks should find other more sophisticated tools for improving loan quality. For the same reason, bank management also needs to limit the use of loan loss reserves for earnings management purposes. Moreover, banking authorities may need to limit their reliance on loan provisioning as a major prescription for reducing credit risk in the industry. Also, they have to be very selective in requiring banks to increase loan loss reserves. Not all problems of bad loans should be resolved by increasing the loan loss reserves. Perhaps, by requiring banks to sell or restructure their bad loans, banks' equity values can be increased.

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**Table 1: Descriptive Statistics**

The table presents descriptive statistics of the raw variables. The study uses annual observations of 42 capital market listed commercial banks in nine countries in Asia over the period 1999-2007. BSR is the bank stock returns. LLRGL is the ratio of loan-loss-reserves-to-gross-loans. CMR is the returns of the relevant capital markets. BTMR is the book-to-market-equity ratio. SIZE is the market capitalization of equity. There are 378 observations.

<b>Variables</b>	<b>Mean</b>	<b>Median</b>	<b>Standard Deviation</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Skewness</b>
BSR	0.175	0.087	0.504	-0.800	2.495	1.273
LLRGL	0.055	0.038	0.062	0.002	0.517	3.332
CMR	0.191	0.170	0.333	-0.509	1.166	0.365
BTMR	0.909	0.741	0.952	-12.281	4.255	-6.411
SIZE (\$000,000)	2,326.313	629.979	4,751.392	11.347	38,629.026	3.932

## Table 2: Regression Results

Results from the one-factor panel data regressions. The estimation uses annual observations of 42 capital market listed commercial banks in nine countries in Asia over the period 1999-2007 (balanced panel). The dependent variable is BSR (the bank stock returns). The independent variables include LLRGL, CMR, BTMR and SIZE. LLRGL is the ratio of loan-loss-reserves-to-gross-loans. CMR is the returns of the relevant capital markets. BTMR is the book-to-market-equity ratio. SIZE is market capitalization of equity. Indonesia is the numeraire country. All raw variables are transformed using the rank transformation. Cluster-robust standard errors (to account for both heteroskedasticity and autocorrelation) are in parentheses. \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% level, respectively.

Dependent variable:		BSR		
Independent variables	Expected signs	Pooled OLS	Fixed Effects	Random Effects
Constant		0.281*** (0.103)	0.484*** (0.142)	0.284*** (0.103)
LLRGL	-	-0.172** (0.081)	-0.321*** (0.102)	-0.174** (0.081)
CMR	+	0.527*** (0.049)	0.510*** (0.051)	0.527*** (0.049)
BTMR	+	-0.159* (0.096)	-0.351*** (0.098)	-0.163* (0.095)
SIZE	-	0.046 (0.110)	0.244 (0.172)	0.046 (0.110)
Hong Kong		0.150** (0.069)	dropped	0.149** (0.069)
Pakistan		0.161** (0.064)	dropped	0.161*** (0.064)
Philippines		0.191*** (0.068)	dropped	0.192*** (0.069)
Singapore		0.060 (0.075)	dropped	0.060 (0.075)
South Korea		0.125* (0.069)	dropped	0.125* (0.069)
Sri Lanka		0.104* (0.057)	dropped	0.104* (0.057)
Taiwan		0.133* (0.076)	dropped	0.133* (0.076)
Thailand		0.180** (0.084)	dropped	0.180** (0.084)
R <sup>2</sup>		0.31	0.36	0.33
F statistics		21.78***	57.29***	-
N		378	378	378
<i>Specification tests:</i>				
• F test (Pooled OLS vs FEM)			1.79***	
• LM test (Pooled OLS vs REM)			0.76	
• Hausman test (FEM vs REM)			48.36***	
<i>Heteroskedasticity test</i> : Likelihood Ratio test			60.82**	
White test			92.17***	
<i>Autocorrelation test</i> : Wooldridge test			13.59***	

**Table 3: Regression Results – Further Analysis**

Results from the one-factor panel data regressions. The estimation uses annual observations of 42 capital market listed commercial banks in nine countries in Asia over the period 1999-2007 (balanced panel). The dependent variable is BSR (the bank stock returns). The independent variables include LLRGL, CMR, BTMR and SIZE. LLRGL is the ratio of loan-loss-reserves-to-gross-loans. CMR is the returns of the relevant capital markets. BTMR is the book-to-market-equity ratio. SIZE is market capitalization of equity. LLRGLxthe country dummy variable is a dummy interaction variable. LLRGLxIndonesia is the numeraire. All raw variables are transformed using the rank transformation. Cluster-robust standard errors (to account for both heteroskedasticity and autocorrelation) are in parentheses. \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% level, respectively.

Dependent variable:		BSR		
Independent variables	Expected signs	Pooled OLS	Fixed Effects	Random Effects
Constant		0.348*** (0.074)	0.497*** (0.165)	0.348*** (0.074)
LLRGL	-	-0.283*** (0.087)	-0.343** (0.150)	-0.283*** (0.087)
CMR	+	0.504*** (0.044)	0.512*** (0.051)	0.504*** (0.044)
BTMR	+	-0.107 (0.074)	-0.380*** (0.115)	-0.107 (0.074)
SIZE	-	0.139** (0.067)	0.174 (0.219)	0.139** (0.067)
LLRGLxHong Kong		0.019*** (0.006)	0.014 (0.012)	0.019*** (0.006)
LLRGLxPakistan		0.031*** (0.010)	0.022 (0.035)	0.031*** (0.010)
LLRGLxPhilippines		0.014*** (0.005)	-0.001 (0.010)	0.014*** (0.005)
LLRGLxSingapore		-0.006 (0.008)	-0.004 (0.015)	-0.006 (0.008)
LLRGLxSouth Korea		-0.012 (0.008)	-0.042*** (0.016)	-0.012 (0.008)
LLRGLxSri Lanka		0.018* (0.011)	0.040 (0.067)	0.018* (0.011)
LLRGLxTaiwan		0.027 (0.045)	0.296** (0.132)	0.027 (0.045)
LLRGLxThailand		0.011* (0.006)	-0.004 (0.005)	0.011* (0.006)
R <sup>2</sup>		0.31	0.38	0.32
F statistics		59.23***	31.45***	-
N		378	378	378
<i>Specification tests:</i>			2.13***	
• F test (Pooled OLS vs FEM)			0.41	
• LM test (Pooled OLS vs REM)			66.72***	
• Hausman test (FEM vs REM)			50.03	
<i>Heteroskedasticity test</i> : Likelihood Ratio test			86.05**	
White test			13.57***	
<i>Autocorrelation test</i> : Wooldridge test				

## Appendix 1: Banks and their Country of Operations

Countries and Bank Names	Countries and Bank Names	Countries and Bank Names
Hong Kong	Pakistan	Sri Lanka
1. Wing Lung Bank Ltd	1. MCB Bank Ltd	1. Sampath Bank
2. Wing Hang Bank Ltd	2. Habib Metropolitan Bank Ltd	2. Hatton National Bank Ltd
3. International Bank of Asia	3. Bank of Punjab	3. Commercial Bank of Ceylon Ltd
4. ICBC (Asia) Ltd	4. Askari Commercial Bank Ltd	
5. Hang Seng Bank Ltd		Taiwan
6. Bank of East Asia Ltd	Philippines	1. Chang Hwa Commercial Bank
	1. Union Bank of the Philippines	2. Bank of Kaohsiung
Indonesia	2. Rizal Commercial Banking Corp.	3. Far Eastern International Bank
1. Panin	3. Philippine National Bank	4. Taichung Commercial Bank
2. NISP	4. Metropolitan Trust & Bank Company	5. Union Bank of Taiwan
3. Lippo	5. China Banking Corporation – Chinabank	
4. BII	6. Bank of the Philippine Islands	Thailand
5. Permata		1. Thai Military Bank Pcl
6. Danamon	Singapore	2. Siam Commercial Bank Pcl
7. Niaga	1. United Overseas Bank Ltd - UOB	3. Krung Thai Bank Pcl
	2. Oversea-Chinese Banking Co Ltd – OCBC	4. Kasikornbank Pcl
		5. Bank of Ayudhya Pcl
	South Korea	6. Bangkok Bank Pcl
	1. Pusan Bank	
	2. Korea Exchange Bank	
	3. Daegu Bank	

*Notes:* Market Indices: Hang Seng (Hong Kong); Jakarta Composite (Indonesia); Karachi 100 (Pakistan); PSE Composite (Philippines); Strait Times– New (Singapore); Seoul Composite (South Korea); All Share (Sri Lanka); Taiwan Weighted (Taiwan); SET (Thailand).