ARE BANKS AND STOCK MARKET COMPETE OR COMPLEMENT RELATIONSHIP?: EMPIRICAL EVIDENCE FROM THE PHILIPPINES, MALAYSIA AND SINGAPORE

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ABSTRACT Based on the previous studies, a few researchers mentioned the two strings of problems that are preventing the ability of firms in a country from securing the financing to develop those firms. Among the common problems faced by firms are 'certification-friction' and 'financing-friction'. 'Certification-friction' occurs when firms' quality of credit information is incomplete, while 'financing-friction' arose when a firm had to bear hefty refinancing loans from other parties. A complementary relationship between banks and stock markets is essential to solving the problem of 'certification-friction' and 'financing-friction'. Thus, the main purpose of this paper is to study the relationship between banks and stock markets, whether they are competing or complementing each other. This study will focus on low, middle and high level income countries. The indicators used are credit domestic for the private sector as a percentage of GDP, market capitalisation as a percentage of GDP, treasury bills, and broad money as a percentage of GDP and inflation. Annual time series data over the period from 1989 until 2018, and Autoregressive Distributed Lag (ARDL) testing approaches, as an analytical technique, are used. Banks and stock markets complemented each other when the result shows a positive relationship and vice versa. Thus, the empirical findings of this study expect banks and stock markets in selected countries to show a positive relationship.

Keywords: Financial institutions, financial markets, domestic credit to the private sector, stock market capitalization, augmented-dickey fuller (ADF) unit root test, autoregressive distributed lag (ARDL) model.

INTRODUCTION

The financial system is one of the most critical systems in a country. Every country has a financial system regulated by the government of that country. The management of a good financial system helps to boost revenue and strengthen the country's economy. A financial system comprises central banks, financial institutions, financial markets, and financial instruments. Financial institutions and financial markets has a critical role in the financial system by enhancing the country's economy.

Financial institutions, such as commercial banks are one of the few institutions that carry out activities of raising funds or financial resources and lending them to individuals, firms, or governments. While financial markets such as the stock market are companies' stock-buying platforms. The stock market will also help to raise funds or the companies' financial resources. There is a possibility that banks and stock markets need each other to ensure that the country's financial system is more efficient. For example, a company may need banks and stock markets to help with the funding or financial resources by increasing its business activities.

Commercial banks and the stock market may assist in raising funds or financial resources of a company, despite some issues that may prevent banks and the stock market from helping the company. According to the study by Osoro and Osano (2014), there are two types of problems commonly encountered by companies, namely 'certification-friction' and 'financing-friction'. 'Certification-friction' is a problem where a company cannot borrow funds from commercial banks due to inaccurate or incomplete credit quality information of the company. A company that failed to borrow from a commercial bank will become desperate for funds, and result in the company borrowing from other parties.

When a company makes a loan from an outside party, the company will have to bear a higher cost of repayment due to the relatively high-interest rate compared to the rates offered by commercial banks. Such a problem is known as 'financing-friction'. Borrowing companies not only have to deal with the high repayment costs, but they will miss the opportunity to invest in the stock

market as well due to the repayment issue. These 'certification-friction' and 'financing-friction' problems can weaken the country's financial system, and at the same time affecting the country's economy as well.

Banks are one of the expert institutions in credit analysis. The 'certification-friction' problem of a company can be mitigated if the bank can assist in solving the company's credit analysis if it is incomplete or inaccurate. Once the 'certification-friction' issue is resolved, the company will have the opportunity to borrow from commercial banks without facing the high burden of repayment while solving the 'financing-friction' problem. In addition, the company will have the opportunity to engage in investment activities, such as getting listed on the stock market.

This study selects three countries with different levels of income, namely the Philippines, Malaysia and Singapore. The Philippines, Malaysia and Singapore represents the lower, middle and higher level income country, respectively. The income levels of these countries were selected by referring to the gross domestic product (GDP) per capita of each country. In the year 2018, the GDP per capita value for the Philippines is USD3,102.7, while the GDP per capita value for Malaysia is USD11,373.2, and the GDP per capita value for Singapore is USD64,581.9. The statistics of the GDP per capita values were obtained from the World Development Indicators (WDI) Website, 2020.

Song and Thakor (2010) mentioned in their studies that strong institutions such as commercial banks are essential for the stock markets. Banks allow borrowers such as firms to make loans that do not involve any risk to the banks in the future. Borrowers such as firms which take loans from commercial banks, generally have a lower risk of loan repayment. Thus, firms could focus on gaining and increasing profit, for instance and getting listed on the stock markets. If firms become listed companies in the stock markets, they will be able to make massive profits. In turn, the firms could settle their bank loan repayment without problems. Consequently, the 'certification-friction' and 'financing-friction' issues will cease as well.

Therefore, this article aims to examine the complementary relationship between banks and stock markets in the context of the Philippines, Malaysia and Singapore. The information gained from this study could help the banks and markets institutions to function more efficiently. Several researchers pointed out that banks and the stock markets complemented each other. The study by Arize, Kalu and Nkwor (2018) mentioned that banks and stock markets in Nigeria are complementary to each other. This paper is organised as follows: section two discusses the previous literature related to this study, section three explains the method and variable used in this study and finally, section four explains the results and expectation of this study.

LITERATURE REVIEW

Theoretical literature review

Based on the literature review, there are several studies conducted on financial development while focusing on financial institutions such as banks and the stock market. The study by Osoro and Osano (2014) stated that several problems could disrupt the financial system. Among the issues that the researchers identified are 'certification-friction' and 'financing-friction'. These problems are related to each other. According to the researchers, the problems would affect the financial system and the economic growth of a country. Big companies are one of the major contributors to economic development and such problems happened to most companies. The issues are related to commercial banks and the stock market.

Furthermore, the two types of problems can adversely affect a company's ability to take out commercial loans from commercial banks. Song and Thakor (2010) analysed and stated that only commercial banks could help solve the 'certification-friction' problems. The banks' advantage in the quality analysis would help companies that often encountered such problems. This also will affect the 'financing-friction' problem. Once the quality of the credit company problem is resolved, the company will be able to get loans from commercial banks with low and reasonable repayment rates and in turn will help reduce 'financing-friction' problems.

Additionally, when the company is no longer facing these issues, it will likely focus on becoming one of the participating companies in the stock market. The presence of large companies listed on the stock market will further strengthen the country's stock market while simultaneously boost its economy. Banks and the stock markets are complementary and interdependent. When banks and stock markets complement each other, it reduces both the 'certification-friction' and 'financing-friction' problems.

Empirical literature review

Arize, Kalu and Nkwor (2018) studied the relationship between banks and stock markets in Nigeria. Using annual time series data from 1981 to 2014, the empirical findings of the study show a complementary relationship between banks and the stock markets in the country. The researchers also found that banks and stock markets have a long-term relationship. The methods used to perform the analysis were Augmented-Dickey Fuller (ADF) unit root test and Autoregressive Distributed Lag Model (ARDL). The variables used in this study were credits to the private sector, market capitalisation, market turnover, treasury bills, inflation and broad money.

Meanwhile, Issahaku, Abor and Harvey (2017) also analysed the relationship between banks and stock markets in 61 developing countries. The empirical results of the study support the notion that banks and stock markets are complementary, as the results show a positive relationship between banks and the stock market in those countries. The researchers used the Ordinary Least Square (OLS) method to perform the study analysis. Among the variables used in this study are stock market capitalisation to GDP, stock market total value traded, turnover ratio, volatility of stock price, banking sector credit to GDP, number or bank branches, net interest margin, disposable income, bank deposits, credit volume, GDP per capita, inflation, investment and trade openness. A total of 14 data set from 1999 to 2013 were used in this study.

Osoro and Osano (2014) conducted a study in Kenya. Their findings were similar to the findings of Issahaku *et al.* (2017) and Arize *et al.* (2018) that banks and stock markets have complementary relationships. Besides,

studies on the relationship between banks and stock markets in Kenya also indicate long-term relationships. The methods used to analyse the relationship between banks and stock markets are the Johansen cointegration test and Vector Error Correction Model (VECM). Data used were from January 2000 to December 2012. The study used variables such as credits to the private sector, market capitalisation, equity turnover, stock price index, treasury bills, inflation and broad money.

Lee (2012) conducted studies in the United States, the United Kingdom, Japan, South Korea, France and Germany. The researcher used 41 data set from 1961 until 2002. The researchers analysed the relationship between banks and the stock markets and found that banks and the stock markets have a long-term relationship in promoting the country's economy. In addition, empirical results supported the relationship between banks and the stock markets, which complemented each other in the United Kingdom, Japan, South Korea, France and Germany, but not in the United States. The variables used in this study were real GDP, nominal GDP, deflator GDP, stock market capitalisation, stock value traded, stock market trading value, deposit money banks, assets and population. The researchers applied the Granger causality test in their study.

Bank indicator

Banks are the independent variable in this study. Yang (2019) examined the contribution of financial development towards economic growth in 49 countries, including high-income and upper-middle-income countries. The researchers used domestic credit to the private sector as an indicator for banks. Other variables used in this study were GDP growth per capita, broad money, total value stock traded, market capitalisation of listed companies and inflation. The vector autoregression (VAR) model and Granger causality test were applied in this study and the findings show a Granger-causality between market development and economic growth. The findings also indicated strong evidence of Granger causality between banks and inflation. Furthermore, the study found that financial development has a positive contribution to economic growth. Thus, domestic credit to the private sector as a percentage of GDP will be the bank indicators.

Stock market indicator

The stock market is the dependent variable of this study. Fufa and Kim (2018) studied the financial system of 64 countries including high and middle-income countries. The researchers used the stock market size and stock market liquidity as an indicator for measuring the stock market. The stock market size used market capitalisation while stock market liquidity used the total value traded and turnover ratio. Dynamic panel generalised method of moment (GMM) was employed to analyse data collected and the empirical results reveal that banks and stock markets have a positive impact on economic growth. Thus, for the proxy of stock market size, this study will use stock market capitalisation as the percentage of GDP.

Control variables

This study will use treasury bills and broad money as control variables to avoid bias during the analysis of the relationship between banks and the stock markets. Arize, Kalu and Nkwor (2018) employed similar variables in their study.

Methodology

Augmented Dickey-Fuller (ADF) unit root test and Autoregressive Distributed Lag (ARDL) model were used in this study as a method to analyse data collected. Arize, Kalu and Nkwor (2018) examined the relationship between banks and the stock markets using ADF and ARDL in their study. Credit to the private sector and stock market capitalisation were used in the study, which was conducted in Nigeria. The empirical result indicated a positive relationship between banks and the stock markets; thus, suggesting the relationship was complementary rather than competing with each other. According to a study by Pesaran *et al.* (2001), the ARDL model is more suitable for testing the relationship of a small sample size of data. Other than that, there are many researchers such as Jusoh and Tsen (2016) have been used augmented dickey-fuller (ADF) unit root test in their studies also.

DATA AND METHODOLOGY

Scope of the study

This study will analyse the relationship between banks and the stock market in low, middle and high level income countries using 29 annual time series data set starting from the year 1989 until 2018, extracted from the World Development Indicators, World Bank (WDI, 2020). Several other online databases were also used to support the data obtained from WDI, including International Financial Statistics (IMF), Stock Exchange of Singapore (SGX), Kuala Lumpur Stock Exchange (KLSE) and the Philippine Stock Exchange (PSEi). The Philippines, Malaysia and Singapore represents low-, middle- and high-income countries, respectively.

Data and variables

Five sets of data are used in this study. The dependent variable is stock market capitalisation, while the independent variable is the banks. The dependent variable used the stock market size as an indicator by using the stock market capitalisation as percentage of GDP as a proxy. The independent variable is the domestic credit to the private sector as percentage of GDP. Domestic credit to the private sector is one of the fund sources provided by financial companies such as commercial banks. Commercial banks lend funds to domestic companies. This study also employed control variables to avoid bias when conducting the analysis. Control variables used are treasury bills rate and broad money as percentage of GDP. Table 1 shows the definitions each of variables to be used in this study.

Table 1 The definition of variables

Variable	Definitions
Domestic credit to the private sector (percentage of GDP)	Domestic credit to the private sector refers to the financial resources which is provided by banks to the private sector such as loans.
Stock market capitalisations (percentage of GDP)	Stock market capitalization known as the market value of the company traded on the stock market which is calculated by the number of shares outstanding multiply with share price.
Treasury bills rate	Treasury bills are government debt instruments issued by the Federal Treasury for working capital, calculated by lending rate minus the risk premium.
Broad money, M2 (percentage of GDP)	Broad money also known as M2 is a measure of money supply, which includes M1, saving deposits, money market funds, certificates of deposit, and other time deposits.

Sources: World Development Indicators (WDI), World Bank Website, 2020

Methodology

Among the variables used in this study are domestic credit to the private sector as GDP percentage, market capitalisation as GDP percentage, treasury bills rate and broad money as GDP percentage. Methods employed in this study for analysing the result are Augmented Dickey-Fuller (ADF) and Autoregressive Distributed Lag (ARDL) model. ADF is used to determine whether the variables are stationary or non-stationary. Stationary variables mean they do not have unit root; thus, the null hypothesis will be rejected. While ARDL is used for analysing the relationship between banks and the stock market, whether they are competing or complementing each other. The ARDL method is proposed by Pesaran *et al*. (2001), which has the advantage of analysing a relationship using a small size of data compared to other cointegration tests.

Hypothesis

The purpose of the hypothesis is to examine the relationship between banks and the stock market, particularly in the Philippines, Malaysia and Singapore. The summary of the relationship needs to support the proposed hypothesis:

H0: There is a competing relationship exists between banks and stock market.
H1: There is a complementing relationship exists between banks and stock market.

The complementary relationship between banks and the stock market will help to reduce 'certification-friction' as well as 'financing-friction' issues that were mentioned in the study by Song and Thakor (2010). Other researchers such as Arize *et al.* (2017), also argued that the relationship between banks and stock markets is complementary. Therefore, this hypothesis is developed to support the statement that "there is a competing relationship exists between banks and stock market in the Philippines, Malaysia, and Singapore."

Model specification

In reference to the main objective of this article, namely to study the relationship between banks and stock markets, the study's analysis is focusing on the relationship among the indicators of banks and stock markets. Banks will be measured by the domestic credit to the private sector as percentage of GDP, while the stock market will be measured by the stock market capitalisation as percentage of GDP. This study also used several control variables such as treasury bills rate and broad money as percentage of GDP, to avoid bias during the analysis of the relationship among the variables. There are two types of models used in this study, namely Model 1 (*DCPS | SMC, TB, M2*) and Model 2 (*SMC | DCPS, TB, M2*).

$$DCPSt = SMC1 + TB2 + M23 \text{ ---------- Model 1}$$
$$SMCt = DCPS1 + TB2 + M23 \text{ ---------- Model 2}$$

DCPS represents the credit to the private sector as percentage of GDP, *SMC* represents stock market capitalisation as percentage of GDP, *TB* represents treasury bills rate, and *M2* represents broad money as percentage of GDP.

$$LDCPSt = LSMC1 + LTB2 + LM23 \text{ ---------- Model 1}$$
$$LSMCt = LDCPS1 + LTB2 + LM23 \text{ ---------- Model 2}$$

This article attempts to investigate the relationship among the logarithm of credit to the private sector as percentage of GDP (*LDCPS*), the logarithm of stock market capitalisation as percentage of GDP (*LSMC*), logarithm treasury bills rate (*LTB*) and the logarithm of broad money as percentage of GDP (*LM2*).

ANALYSIS OF RESULTS

Unit root test results

Table 2 shows the result of the Augmented Dickey-Fuller (ADF) unit root test for the Philippines, Malaysia and Singapore. The variables used in this study are logarithm domestic credit to the private sector (*LDCPS*) as percentage of GDP, the logarithm stock market capitalisation (*LSMC*) as percentage of GDP, logarithm treasury bills rates (*LTB*) and logarithm broad money (*LM2*) as percentage of GDP. If the result of the unit root test accepts the null hypothesis that means the variables are non-stationary or have unit root. However, if the analysis result rejects the null hypothesis, that means the variables are stationary or do not have unit root.

Table 2 Augmented Dickey-Fuller (ADF) Unit Root Test

Variable	PHILIPPINE		MALAYSIA		SINGAPORE	
	Level	First Difference	Level	First Difference	Level	First Difference
DCPS	0.4216	0.0066*	0.5177	0.0000*	0.6762	0.0000*
SMC	0.0461**	0.0000*	0.0785***	0.0000*	0.0802***	0.0000*
TB	0.5683	0.0000*	0.2699	0.0001*	0.2570	0.0004*
M2	0.5554	0.0000*	0.1330	0.0000*	0.4705	0.0000*

Notes: *,**,*** shows result will reject null hypothesis at 1%, 5% and 10% significant of level.
Source: Data results is generated by using Eviews software

Based on the analysis test using Eviews, the result show *LDCPS* for the Philippines is stationary or does not has unit root in the first order difference (0.0066). *LDCPS* will reject the null hypothesis at a 1% significance of level. *LSMC* for the Philippines accepts H1 in ordinary series (0.0461) and

the first order difference (0.0000) because the variables are stationary or do not have unit root. In ordinary series, *LSMC* rejects the null hypothesis at a 5% significance of level and a 1% significance of level for the first order difference. Next, *LTB* for the Philippines accepts the null hypothesis at the ordinary level (0.5683), but accept H1 in the first order difference (0.0000) because the variables are stationary or do not have unit root. Thus, *LTB* will reject the null hypothesis at a 1% significance of level. *LM2* for the Philippines shows that the ordinary level (0.5554) rejects the null hypothesis because the variables are non-stationary or have unit root. However, it accepts H1 in the first order difference (0.0000) because *LM2* is stationary or does not have unit root. *LM2* will reject the null hypothesis at a 1% significance of level.

Meanwhile, the analysis result shows the *LDCPS* for Malaysia is non-stationary at the ordinary level (0.5177) but stationary in the first order difference (0.0000). *LDCPS* for Malaysia will reject the null hypothesis at a 1% significance of level because the variables are stationary or do not have unit root. ADF analysis test also shows the *LSMC* in Malaysia is stationary at the ordinary level (0.0785) and the first order difference (0.0000). That means *LSMC* for Malaysia will reject the null hypothesis at a 10% significance of level in ordinary and a 1% significance of level in the first order difference. *LTB* for Malaysia accepts the null hypothesis at the ordinary level (0.2699) and rejects the null hypothesis in the first order difference (0.0001) at a 1% significance of level. *LTB* in Malaysia is non-stationary or has a unit root. *LM2* for Malaysia are stationary (0.1330) at ordinary level and accepts the null hypothesis. In the first order difference (0.0000), *LM2* rejects the null hypothesis at a 1% significance of level because it is non-stationary or unit root.

On the other hand, for Singapore, the *LDCPS* variables accept the null hypothesis at the ordinary level (0.6762) but reject the null hypothesis in the first order difference (0.0000) at a 1% significance of level. That means *LDCPS* for Singapore are stationary or do not have unit root. *LSMC* rejects the null hypothesis at the ordinary level (0.0802) at a 10% significance of level and also rejects the null hypothesis in the first order difference (0.0000) at a 1% significance of level. The result shows that *LSMC* is stationary or does not have unit root. *LTB* for Singapore accepts the null hypothesis at the ordinary level (0.2570) but rejects the null hypothesis in the first order

difference (0.0004) at a 1% significance of level. *LTB* variable is stationary or does not have unit root. Last but not least, the ADF test for *LM2* accepts the null hypothesis at the ordinary level (0.4705) but rejects the null hypothesis at a 1% significance of level at the first order difference (0.0000).

Overall, the ADF unit root test result shows that the variables reject the null hypothesis at 1%, 5%, and 10% significance level. That means the variables for the Philippines, Malaysia and Singapore are stationary or do not have unit root. Thus, the variables test can proceed to the ARDL test. ARDL will test for a competing or complementing relationship between banks and stock market variables.

Bound test results

The cointegration relationship test among the variables is formulated based on two models, namely Model 1 (*DCPS|SMC, TB, M2*) and Model 2 (*SMC|DCPS, TB, M2*). These models will do the bounds test to check whether or not the statistic exceeds the upper critical I(1) value. If the bounds test show that the statistic result exceeds the upper bound critical I(1) value, then the analysis test will proceed to investigate the short-run and long-run relationship between banks and stock market by using ARDL model.

Table 3 Autoregressive Distributed Lag (ARDL) Bound Test

Significance	I(0) Bound		I(1) Bound
10%	2.72		3.77
5%	3.23		4.35
2.5%	3.69		4.89
1%	4.29		5.61
AIC (1,4)	**F-Statistic**		
	MODEL 1, (DCPS|SMC,TB,M2)	**MODEL 2, (SMC|DCPS,TB,M2)**	
Philippine	5.558189**		3.935858***
Malaysia	10.38703*		4.038839***
Singapore	3.780857***		8.550811*

Notes: *,**,*** shows result will reject null hypothesis at 1%, 5% and 10% significant of level.
Source: Data results is generated by using Eviews software

Table 3 shows the autoregressive distributed lag (ARDL) test results using the Eviews software to analyse the variables for the Philippines, Malaysia and Singapore. The test used the Akaike information criterion (AIC). Based on the model specification, logarithm domestic credit to the private sector (*LDCPS*) as percentage of GDP will be the independent variable, and logarithm stock market capitalisation (*LSMC*) as percentage of GDP will be the dependent variable. Other variables, such as logarithm treasury bills rates (*LTB*) and logarithm broad money (*LM2*) as percentage of GDP, will be the control variable in this study. For the bound test, if the F-statistic value is larger than the upper bound I(1) critical value at 1%, 5%, or 10% significance level, it means a long-run relationship exists among the variables. Thus, the null hypothesis will be rejected. However, if the F-statistic value is smaller than the upper bound I(0) critical value, it means the null hypothesis is accepted because a long-run relationship among the variables does not exist.

For the Philippines, the calculated F-statistic of model 1 was equal to 5.558189, which is larger than the upper bound I(1) critical value at a 5% significance of level, while the F-statistic value of model 2 is 3.935858, which is larger than the upper bound I(1) critical value at a 10% significance of level. That means the result rejects the null hypothesis because a long-run relationship between banks and the stock market exists.

Meanwhile, for Malaysia, the calculated F-statistic of model 1 was equal to 10.38703, which is larger than the upper bound I(1) critical value at a 1% significance of level, while the F-statistic of model 2 was 4.038839, which is larger than the upper bound I(1) critical value at a 10% significance of level. Thus, the result rejects the null hypothesis because a long-run relationship between banks and the stock market exists.

Finally, the ARDL bound test result for Singapore also shows the calculated F-statistic of model 1 was equal to 3.780857, which is larger than the upper bound I(1) critical value at a 10% significance of level, while the F-statistic value of model 2 is 8.550811, which is larger than the upper bound I(1) critical value at a 1% significance of level. Thus, the null hypothesis is rejected because a long-run relationship between banks and the stock market exists.

In conclusion, the result of the ARDL bound test rejects the null hypothesis proposed for companies in the Philippines, Malaysia and Singapore. That means there is a long-run relationship between banks and the stock market in each of the countries in this study.

Cointegration results

This section explains the cointegration result of Model 1 (*DCPS|SMC, TB, M2*) and Model 2 (*SMC|DCPS, TB, M2*) for the relationship tests between banks and the stock market in the Philippines, Malaysia and Singapore using the annual time series data for the period between 1989 and 2018. This analysis will show whether the relationship between banks and the stock market is competing or complementary with each other in each of the countries.

Table 4 Short-run relationship between banks and stock market for Philippine

Variable	LDCPS	LSMC	LTB	LM2
LDCPS[1]	-	0.019408	0.016530	0.555371
	-	0.6281	0.0637***	0.0127**
LSM[2]	0.315854	-	-0.154327	-0.459251
	0.2754	-	0.1117	0.2316
LTB[3]	0.714017	-0.261026	-	0.280580
	0.2433	0.1808	-	0.0229**
LM2[4]	0.377685	0.030447	-0.034321	-
	0.0000*	0.0718***	0.0395**	-

Notes: *,**,*** shows results will reject null hypothesis at 1%, 5% and 10% significant of level.
[1]ARDL (1,0,2,3)
[2]ARDL (1,0,0,0)
[3]ARDL (1,0,0,3)
[4]ARDL (1,1,3,0)
Source: Data results is generated by using Eviews software

Table 4 illustrates the short-run relationship between the variables for companies in the Philippines. The coefficient value of the relationship between *LDCPS* and *LSMC* is 0.019408 in model 1 (*LDCPS | LSMC, LTB, LM2*). The result is positive but insignificant. The coefficient value of the relationship between *LDCPS* and *LTB* is 0.016530. The result is positive, with a 10% significance of level. The coefficient value of the relationship

between *LDCPS* and *LM2* is 0.555371. The relationship is also positive and at a statistically significant level of 5%. Next, for model 2 (*LSMC | LDCPS, LTB, LM2*), the coefficient value of the relationship between *LSMC* and *LDCPS* is 0.315854. The relationship is positive but insignificant. The coefficient value of the relationship between *LSMC* and *LTB* is −0.154327. The relationship is negative and insignificant. The coefficient value of the relationship between *LSMC* and *LM2* is −0.459251, and this relationship is also negative and insignificant.

Table 5 Long-run relationship between banks and stock market for Philippine

Variable	LDCPS	LSMC	LTB	LM2
LDCPS	-	0.055854	0.116334	1.399237
	-	0.6086	0.1443	0.0000*
LSMC	0.713126	-	-0.348436	-1.036885
	0.3135	-	0.0939***	0.2613
LTB	1.868267	-0.682990	-	-3.806701
	0.1775	0.1048	-	0.0124**
LM2	0.533173	-0.076072	-0.153335	-
	0.0003*	0.5137	0.0026*	-

Notes: *,**,*** shows the results will reject null hypothesis at 1%, 5% and 10% significant of level.
Source: Data results is generated by using Eviews software

Table 5 shows the long-run relationship among the variables for companies in the Philippines. Model 1 (*LDCPS | LSMC, LTB, LM2*) shows that the coefficient value of the relationship between *LDCPS* and *LSMC* is 0.055854. The relationship is positive but insignificant. The coefficient value between *LDCPS* and *LTB* is 0.116334. The relationship is positive and insignificant. The coefficient value of the relationship between *LDCPS* and *LM2* is 1.399237. The relationship is positive and significant at a 1 per cent level. Model 2 (*LSMC | LDCPS, LTB, LM2)* shows that the coefficient value of the relationship between *LSMC* and *LDCPS* is 0.713126. The relationship is positive but insignificant. The coefficient value of the relationship between *LSMC* and *LTB* is −0.348436. The relationship is negative but statistically significant at a 10 per cent level. The coefficient value of the relationship between *LSMC* and *LM2* is −1.036885. The relationship is negative and insignificant.

Table 6 Short-run relationship between banks and stock market for Malaysia

Variable	LDCPS	LSMC	LTB	LM2
LDCPS[5]	-	0.006162	0.066977	0.594820
	-	0.7964	0.0568***	0.0000*
LSMC[6]	2.679706	-	0.942220	2.484777
	0.0907***	-	0.0112**	0.0262**
LTB[7]	1.714535	-0.079705	-	-1.588538
	0.0009*	0.3883	-	0.0002*
LM2[8]	1.194954	-0.008404	-0.203510	-
	0.0000*	0.8143	0.0002*	-

Notes: *,**,*** shows the result will reject null hypothesis at 1%, 5% and 10% significant of level.
[5]ARDL (1,2,2,3)
[6]ARDL (1,0,3,0)
[7]ARDL (1,2,1,1)
[8]ARDL(1,2,1,0)
Sources: Data results is generated by using Eviews software

Table 6 shows the short-run relationship between the variables for Malaysian companies. Model 1 (*LDCPS | LSMC, LTB, LM2*) shows that the coefficient value is 0.006162. The relationship is positive but insignificant. The coefficient value of the relationship between *LDCPS* and *LTB* is 0.066977. The relationship is positive and statistically significant at a 10% level. The coefficient value of the relationship between *LDCPS* and *LM2* is 0.594820. The relationship is positive and statistically significant at a 1% level. Model 2 (*LSMC | LDCPS, LTB, LM2*) shows that the coefficient value is 2.679706. The relationship is positive and statistically significant at a 10% level. The coefficient value of the relationship between *LSMC* and *LTB* is 0.942220. The relationship is positive and statistically significant at a 5% level. The coefficient value of the relationship between *LSMC* and *LM2* is 2.484777. The relationship is positive and statistically significant at a 5% level.

Table 7 Long-run relationship between banks and stock market for Malaysia

Variable	LDCPS	LSMC	LTB	LM2
LDCPS	-	0.298126	0.421372	1.018701
	-	0.0001	0.0012	0.0056
LSMC	2.436374	-	-1.134779	-4.768428
	0.0006*	-	0.0351**	0.0015*
LTB	-0.702618	-0.105122	-	-2.095111
	0.0310**	0.3780	-	0.0000*
LM2	0.686289	-0.149713	-0.406576	-
	0.0003*	0.0411**	0.0000*	-

Notes: *,**,*** shows the result will reject null hypothesis at 1%, 5% and 10% significant of level.
Source: Data results is generated by using Eviews software

Table 7 shows the long-run relationship among the variables for companies in Malaysia. Model 1 (*LDCPS | LSMC, LTB, LM2*) shows that the coefficient value of the relationship between *LDCPS* and *LSMC* is 0.298126. The relationship is positive and statistically significant at a 1% level. The coefficient value of the relationship between *LDCPS* and *LTB* is 0.421372. The relationship is positive and also statistically significant at a 1% level. The coefficient value of the relationship between *LDCPS* and *LM2* is 1.018701. The relationship is positive and statistically significant at a 1% level. Model 2 (*LSMC | LDCPS, LTB, LM2*) shows that the coefficient value of the relationship between *LSMC* and *LDCPS* is 2.436374. The relationship is positive and statistically significant at a 1% level. The coefficient value of the relationship between *LSMC* and *LTB* is −1.134779. The relationship is negative but significant at a 5% level. The coefficient value of the relationship between *LSMC* and *LM2* is −4.768428. The relationship is negative and statistically significant at a 1% level.

Table 8 Short-run relationship between banks and stock market for Singapore

Variable	LDCPS	LSMC	LTB	LM2
LDCPS[9]	-	-0.059347	0.029772	0.308239
	-	0.0950***	0.0072*	0.0109**
LSMC[10]	-1.949677	-	0.186928	1.268994
	0.0010*	-	0.0511***	0.0024*
LTB[11]	-3.228245	-0.026312	-	-0.309595
	0.0108**	0.9205	-	0.7669
LM2[12]	0.671355	0.034385	0.024051	-
	0.0067*	0.4741	0.2027	-

Notes: *,**,*** show the result will reject null hypothesis at 1%, 5% and 10% significant of level.
[9]ARDL (1,2,2,3)
[10]ARDL (1,0,3,0)
[11]ARDL (1,2,1,1)
[12]ARDL (1,1,3,0)
Source: Data results is generated by using Eviews software

   Table 8 shows the short-run relationship between the variables for companies in Singapore. Model 1 (*LDCPS | LSMC, LTB, LM2*) shows that the coefficient value of the relationship between *LDCPS* and *LSMC* is −0.059347. The relationship is negative but statistically significant at a 10% level. The coefficient value of the relationship between *LDCPS* and *LTB* is 0.029772. The relationship is positive and statistically significant at a 1% level. The coefficient value of the relationship between *LDCPS* and *LM2* is 0.308239. The relationship is positive and statistically significant at a 5% level. Model 2 (*LSMC | LDCPS, LTB, LM2*) shows that the coefficient value of the relationship between *LSMC* and *LDCPS* is −1.949677. The relationship is negative but statistically significant at a 1% level. The coefficient value of the relationship between *LSMC* and *LTB* is 0.186928. The relationship is positive and statistically significant at a 10% level. The coefficient value of the relationship between *LSMC* and *LM2* is 1.268994. The relationship is positive and statistically significant at a 1% level.

Table 9 Long-run relationship between banks and stock market for Singapore

Variable	LDCPS	LSMC	LTB	LM2
LDCPS	-	1.167191	-0.386328	-2.146637
	-	0.5560	0.3974	0.5912
LSMC	-2.650117	-	-0.467773	1.724892
	0.0017*	-	0.0028*	0.0008*
LTB	10.158513	3.339630	-	-13.576094
	0.2371	0.2353	-	0.1252
LM2	3.456271	-0.780411	0.902492	-
	0.8297	0.8944	0.8557	-

Notes: *,**,*** shows result will reject null hypothesis at 1%, 5% and 10% significant of level.
Source: Data results is generated by using Eviews software

Table 9 shows that the long-run relationship between the variables for Singapore. Model 1 (*LDCPS | LSMC, LTB, LM2*) shows that the coefficient value of the relationship between *LDCPS* and *LSMC* is 1.167191. The relationship is positive but insignificant. The coefficient value of the relationship between *LDCPS* and *LTB* is −0.386328. The relationship is negative and insignificant. The coefficient value of the relationship between *LDCPS* and *LM2* is −2.146637. The relationship is negative and insignificant. Model 2 (*LSMC | LDCPS, LTB, LM2*) shows that the coefficient value of the relationship between *LSMC* and *LDCPS* is −2.650117. The relationship is negative and statistically significant at a 1% level. The coefficient value of the relationship between *LSMC* and *LTB* is −0.467773. The relationship is negative and statistically significant at a 1% level. The coefficient value of the relationship between *LSMC* and *LM2* is 1.724892. The relationship is positive and statistically significant at a 1% level.

Overall, the short-run relationship of Model 1 (*LDCPS | LSMC, LTB, LM2*) and Model 2 (*LSMC | LDCPS, LTB, LM2*) shows that banks and the stock markets in the Philippines and Malaysia have a positive relationship, while Singapore has a negative relationship. Meanwhile, the long-run relationship

between banks and stock markets in the Philippines and Malaysia is positive. However, for Singapore, it was positive in Model 1 but negative in Model 2. Based on the study by Arize *et al.* (2018), if the banks and stock markets relationship is positive, it suggests that complementary relationships exist and vice versa. Thus, the Philippines and Malaysia reject the null hypothesis because the findings show that there is a complementary relationship between banks and the stock markets. Singapore accepts the null hypothesis, which indicates that is there is a competing relationship between banks and stock markets in the country. However, for the long-run relationship in Model 1, Singapore rejects the null hypothesis because a complementary relationship exists between banks and the stock markets.

CONCLUSION

The issues regarding the relationship between banks and the stock market are one of the most frequently debated issues among economists. Issues such as 'certification-friction' and 'financing-friction' that may arise in big companies will adversely affect the operation of the companies. Moreover, if the issues persist and no actions are taken to resolve them, most likely, they will affect the countries' economy. Besides, this study also provides additional information to relevant parties such as policymakers, private companies and government. The aim is to balance banks' involvement such as commercial banks in the industry through long-term financing, as well as to develop the stock market for long-term productivity financing. Furthermore, the information obtained by this study will help the countries to improve their financial system, especially in undeveloped countries. The positive relationship between banks and the stock market will enhance the quality and efficiency of the country's financial services and not only on the basis of bank-based or market-based economy. This statement was also mentioned by Osoro and Osano (2014) in their study on the Kenyan financial system.

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