Bank Development, Stock Market Development and Economic Growth in Selected Asian Economies

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ABSTRACT

This study examines bank development, stock market development and economic growth nexus in selected Asian economies, namely Indonesia, Malaysia, the Philippines, Singapore, Thailand, Hong Kong, Korea and Japan over the period from 1995 to 2018. This study uses a more homogeneous economies to produce a more economically stylised. The results of the panel vector error-correction approach demonstrate that there is bi-directional causality between real GDP per capita and the ratio of stock market capitalization to GDP. Real GDP per capita is found to Granger cause the ratio of stock market traded to GDP and not vice versa. The use of the ratio of stock market capitalization to GDP for stock market development is found to have significant impact on real GDP per capita than the use of the ratio of stock market traded to GDP on real GDP per capita. The ratio of trade openness and real effective exchange rate respectively is found to Granger cause bank development. Moreover, there is bi-directional causality between the ratio of trade openness and real effective exchange rate. In a restricted version of the estimation model, there is bi-directional Granger causality between real GDP per capita and stock market development and bank development, respectively, which bank development is proxied by the ratio of domestic credit to private sector to GDP or the ratio of domestic credit to private sector by banks to GDP and not the ratio of broad money to GDP. A different proxy for stock market development or bank development could have different impact on each other and on economic growth. The ratio of stock

market capitalization to GDP is found to Granger cause the ratio of broad money to GDP and not vice versa. Thus, there is some evidence that stock market development stimulates bank development and not vice versa. Stock market development and bank development are not substitute to each other. Stock market development and bank development are appropriate to boost economic growth.

INTRODUCTION

Financial development is identified as a significant source of economic growth (Adu, Marbuah and Mensah, 2013). The financial development-led economic growth hypothesis postulates that expansion of financial development induces economic growth whereas the economic growth-led financial development hypothesis presumes that economic growth requires more financial service and development (Durusu-Ciftci, Ispir and Yetkiner, 2017). Patrick (1966) assets that the development of a robust financial sector can spur economic growth (Adu, Marbuah and Mensah, 2013). The link between financial development and economic growth was initiated by the work of Schumpeter (1934) and then further explored by Goldsmith (1969), McKinnon (1973), Shaw (1973), Robinson (1952), Lucas (1988), King and Levine (1993), Levine (1997), Bekaert, Harvey and Lundblad (2005) and Bertocco (2008), amongst others. The financial development and economic growth nexus is an actively researched topic in financial economics (Ibrahim and Alagidede, 2018a, 2018b; Pan and Mishra, 2018).

Bank development improves the allocation of resources from less productive sector to more productive sector and hence promotes economic growth by mitigating the effects of information asymmetry and transaction cost (King and Levine, 1993; Levine, 1997; Bekaert, Harvey and Lundblad (2005); and Bertocco, 2008). Moreover, bank development spurs technological innovation. Therefore, efficiency and development of bank foster economic growth (Ono, 2017). Stock market development allows firm to diversify portfolio, which increases liquidity. This reduces risk and hence stimulates economic growth. Stock market development fosters specialisation in entrepreneurship and encourages adoption of new technology. Stock market development promotes better corporate control. Stock market development enhances efficiency of resource allocation. This reduces information cost and accelerates economic growth. Stock market development encourages economic growth (Fufa and Kim, 2018).

A number of studies such as Boot and Thakor (1997) and Coval and Thakor (2005), amongst others, argues that bank development is better at reducing market frictions associated with the mobilisation and allocation of resources towards more productive activities. Conversely, Holmstrom and Tirole (1993), Boyd and Smith (1998) and Allen and Gale (1999), amongst others, argue that well-functioning stock market is better at reducing information and transaction cost, which foster economic growth. Levine (1997), Allen and Gale (2000) and Song and Thakor (2010), amongst others, emphasize both bank development and stock market development rather than one of them as they are not only competing but also complementary source of financing. Narayan and Narayan (2013) find no evidence that neither the financial sector nor the banking sector boosts economic growth in the Middle Eastern countries. The evidence on heterogeneity in financial development and economic growth nexus led to the grouping of countries by the same income level in the analysis (Andini and Andini, 2014; Henderson, Papageorgiou and Parmeter, 2013; Odedokun, 1996; Rioja and Valev, 2014). Rioja and Valev (2014) find that stock market development does not contribute to economic growth in low income countries whereas bank development is found to have positive and significant impact on capital accumulation. Rioja and Valev (2004) show that bank development is found to have positive and significant impact on capital accumulation in low income countries but stock market development is found to have insignificant impact on capital accumulation or productivity growth in those countries. On the other hand, stock market development is found to have positive and significant impact on both productivity and capital growth in high income countries whilst bank development only affects capital accumulation.

Theory provides conflicting predictions about both the impact of overall financial development on economic growth and about the separate effect of bank development or stock market development on economic growth. Theory also provides conflicting predictions about whether stock market development and bank development are substitute, compliment or whether one is more contributory to economic growth than the other. Moreover, some theories stress that it is not bank development or stock market development but it is both bank development and stock market development contribute to economic growth (Durusu-Ciftci, Ispir and Yetkiner, 2017). The empirical results show various conclusions about the link between financial development and economic growth. Some studies demonstrate that financial development Granger causes economic growth, economic growth Granger causes financial development. Moreover, some studies show bi-directional Granger causality between financial development and no Granger causality between financial development and economic growth. The results may due to the different level of financial development and economic growth, different country, different period and so forth. This study examines bank development, stock market development and economic growth nexus in selected Asian economies, namely Indonesia, Malaysia, the Philippines, Singapore, Thailand, Hong Kong, Korea and Japan using panel vector error-correction approach over the period from 1995 to 2018. Financial development indexes are high for Singapore, Hong Kong, Korea and Japan. Financial development indexes are relatively low for Malaysia, Thailand, Indonesia and the Philippines. In 2017, financial development indexes for Singapore, Hong Kong, Korea and Japan were 0.75, 0.75, 0.87 and 0.88, respectively. Financial development indexes for Malaysia, Thailand, Indonesia and the Philippines 0.68, 0.70, 0.37 and 0.39, respectively (Table 1). Therefore, this study tries to use a group of more homogeneous economies in financial development to result a more economically stylised (Fufa and Kim, 2018). This study stipulates whether stock market development and bank development are substitute, compliment or whether which one is more contributory to economic growth. Also, this study uses different proxy for bank development and stock market development to examine their relationship with economic growth. The result of bank development and stock market development and economic growth can be different with the use of different proxy for bank development and stock market development (Guru and Yadav, 2019). This study provides some evidence of the significant impact of bank development and stock market development on economic growth in this Asian region.

LITERATURE REVIEW

Financial development is an important factor for economic growth (Pradhan, Arvin and Bahmani, 2018; Pradhan et al., 2018). Kar and Mandal (2014) show that the financial deepening positively and significantly affects economic growth. Conversely, Ono (2017) concludes that bank development does not contribute significantly to economic growth in Russia. Adu, Marbuah and Mensah (2013) show that economic growth is sensitive to proxy used for financial development. The ratio of domestic credit to private sector to Gross Domestic Product (GDP) and the ratio of private sector credit to total domestic credit are conducive for economic growth while the ratio of broad money supply to GDP is not inducing for economic growth. The matter is the proxy for the financial development used. Asteriou and Spanos (2019) report that before the global financial crisis, 2008-2009, financial development promotes economic growth but after the crisis, financial development hinders economic growth. In the years 2008-2009, the capital adequacy of bank protects depositors and promotes the stability of the financial system.

Ibrahim and Alagidede (2018a) test the link between financial development and economic growth in a panel data of 29 sub-Saharan African countries for the period from 1980 to 2014. The results of the dynamic system generalized methods of moments (GMM) panel estimator show that financial development positively and significantly affects economic growth. Moreover, financial development damages economic growth if improved in financial sector is not parallel with the growth of real sector in the economy. In another paper, Ibrahim and Alagidede (2018b) use the same set of panel data report the same conclusion, that is, financial development positively and significantly affects economic growth. However, financial development is insignificant to economic growth below a certain threshold of per capita income, human capital and financial development. Higher level of per capita income, human capital and the level of finance is a condition for economic growth in long run.

Banerjee, Ahmed and Hossain (2017) review bank development, stock market development and economic growth in Bangladesh for the period from 1974 to 2012. Bank development is found to contribute positively and significantly to economic growth in the short run and long run. Conversely, there is no evidence of stock market development stimulates economic growth in the short run and long run. Boako and Alagidede (2017) test the nexus between stock market development and economic growth in Africa. Stock

market development is proxied by turnover ratio of domestic share and percentage of market capitalization to domestic listed firms whereas economic growth is proxied by GDP growth, net foreign direct investment flows, gross savings and capital formation. This study finds no link between stock market development and economic growth. Bank development shall increase its role in the economy and stock market development shall be promoted as an important source of finance in the economy.

Singh and Weisse (1998) show that stock market development is unlikely to spur long-term economic growth in developing countries as they encourage short-term profit and also require sophisticated monitoring system to function effectively. Conversely, bank development nurtures long-term relationship with investor and hence provides a stable source of finance for achieving economic growth and industrialisation in the long run. Cavenaile, Gengenbach and Palm (2014) also report that financial development is found to Granger cause economic growth. Financial development supports economic growth in the long run.

There are many studies show that stock market development positively and significantly affects economic growth (Ali, 2013; Raj and Roy, 2014; Akel and Torun, 2017). Pan and Mishra (2018) report that the Toda Yamamoto causality test shows that economic growth causes the Shenzhen B share market. The state-owned firms play an important role in economic growth in China in the short run. Pradhan (2018) shows both uni-directional and bi-directional causality between stock market development and economic growth. Nonetheless, there is no unique relationship between stock market development and economic growth in G-20 countries.

Stock market development and bank development positively and significantly influence economic growth (Beck and Levine, 2004; Ayadi et al., 2014). Kim et al. (2013) investigate the impact of financial development and stock market development on economic growth in a panel data of 94 countries for the period from 1976 to 2005. The results of the dynamic system GMM panel estimator show that for high-income countries, the effect of financial development and stock market development on economic growth is negative. However, if such countries develop their financial markets with their manufacturing industries, the effect becomes positive. This study presents policy recommendations emphasizing the significance of combining financial development with real economic development. Ahmad et al. (2016) inspect bank development, stock market development and economic growth in selected nine African economies using the pooled mean group estimation, which allows the intercepts, short-run coefficients and error variances to be different across countries but constraints the long-run coefficients to be identical of an annual panel data for the period from 1987 to 2012. The results support that bank development and stock market development promote economic growth in the long run. The global financial crisis, 2007-2008 reduces positive impact of bank development and stock market development on economic growth.

Guru and Yadav (2019) investigate financial development and economic growth in a panel of five emerging economies, namely Brazil, Russia, India, China and South Africa (BRICS) for the period from 1993 to 2014. The measurements of bank development are the percentage of bank's liquid liabilities to GDP as a measure for financial depth, the ratio of commercial bank assets to deposit money bank assets plus central bank assets as a measure of bank size, credit to deposit ratio as a measure of financial stability, the bank credit to bank deposits as a measure for banking penetration and the domestic credit to private sector to GDP. The measurements of stock market development are stock market size, value of shares traded and turnover ratio. The control variables are inflation, exports to GDP and the enrolment in secondary education. Economic growth is measured by per capita income. The results of the dynamic system GMM estimator confirm that bank development is positively and significantly determining economic growth. Moreover, bank development and stock market development are complementary to each other in promoting economic growth. The both bank development and stock market development shall be developed for economic growth.

Fufa and Kim (2018) investigate that the relationship between stock market development, bank development and economic growth in a panel data of 64 the period from 1989 to 2012. The panel data is a homogeneous group of European and non-European high-income countries and upper and lower middle-income countries averaged over five and three years. The results of the dynamic system GMM panel estimator with Windmeijer correction indicate that the relationship between financial development and economic growth depends on the stages of economic growth of the countries. A more homogeneous economies result a more economically stylised.

Ngare, Nyamongo and Misati (2014) investigate the impact of stock market development on economic growth using annual panel data of 36 countries in Africa, which 18 countries have stock markets for the period from 1996 to 2010. The results show that country with stock market tends to grow faster compared to country without stock market, country which is relatively developed and has stock market tends to grow less faster compared to small country with stock market, stock market has positive and significant effect on

economic growth. Moreover, investment, human capital formation and openness positively and significantly influence economic growth in the Africa region whereas macroeconomic instability (inflation) and government consumption negatively and significantly influence economic growth. Country that is politically stable and less corrupt tends to grow faster.

Rioja and Valev (2014) study the impact of stock market development and bank development on economic growth, which is proxied by productivity growth and capital accumulation in a large cross country panel of 62 high- and low-income countries for the period from 1980 to 2009. The data are averaged over five-year intervals. The measurements for stock market are turnover ratio, value traded and market capitalization. The results of the dynamic system GMM panel estimator show that bank credit affects capital accumulation across all countries. For low income countries, bank development is found to have positive impact on capital accumulation. For high income countries, stock market development is found to have positive impact on productivity growth and capital accumulation.

Cole, Moshirian and Wu (2008) examine the influence of bank development and stock market development on economic growth in a panel data of 18 developed and 18 emerging markets for the period 1973 to 2001. The results of the dynamic system GMM panel estimator show that bank's stock return positively and significantly influence on future GDP growth. Also, the informational content of bank's stock return is captured by country specific and institutional characteristics such as bank accounting disclosure standards, banking crises, enforcement of insider trading law and government ownership of bank.

Durusu-Ciftci, Ispir and Yetkiner (2017) show that debt from credit market and equity from stock market are two long run determinants of GDP per capita. The empirical results based on a panel of 40 countries over the period from 1989 to 2011 demonstrate both credit market and stock market are found to have positive long-run effects on GDP per capita and the impact of credit markets is greater. The deepening of financial market such as improving institutional and legal measures to strengthen creditor and investor rights and contract enforcement would expedite economic growth.

Generally, financial development is important for economic growth (Cavenaile, Gengenbach and Palm, 2014; Kar and Mandal, 2014; Pradhan, Arvin and Bahmani, 2018; Ibrahim and Alagidede, 2018a, 2018b; Pradhan et al., 2018). Banerjee, Ahmed and Hossain (2017) show that bank development is found to have positive impact on economic growth in the short run and long run. There is no evidence of stock market development stimulates economic growth in the short run and long run. Boako and Alagidede (2017) also find no link between stock market development and economic growth. Singh and Weisse (1998) show that bank development and not stock market development spurs long-term economic growth in developing countries. However, there are some studies show that stock market development positively and significantly affects economic growth (Ali, 2013; Raj and Roy, 2014; Akel and Torun, 2017). Pradhan (2018) shows both uni-directional and bi-directional causality between stock market development and economic growth in G-20 countries. There are some studies demonstrate that both stock market development and bank development positively and significantly influence economic growth (Beck and Levine, 2004; Ahmad et al., 2016; Ayadi et al., 2014; Kim et al., 2013; Durusu-Ciftci, Ispir and Yetkiner, 2017). Guru and Yadav (2019) report that bank development and stock market development are complementary to each other in stimulating economic growth. The both bank development and stock market development shall be developed for economic growth. Fufa and Kim (2018) highlight that a more homogeneous economies result a more economically stylised. Ngare, Nyamongo and Misati (2014) report that countries with stock markets tend to grow faster compared to countries without stock markets, countries which are relatively developed and have stock markets tend to grow less faster compared to small countries with stock markets. Rioja and Valev (2014) report that for low income countries, bank development is found to have positive effect on capital accumulation. For high income countries, stock market development is found to have positive effect on productivity growth and capital accumulation. On the whole, the empirical results are inconclusive.

DATA AND METHODOLOGY

Real GDP per capita (Y_{it}, 2010 = 100), the ratio of stock market capitalization to GDP (SMC_{it}), the ratio of stock market traded to GDP (ST_{it}), the ratio of domestic credit to private sector to GDP (DC_{it}), the ratio of domestic credit to private sector by banks to GDP (DCB_{it}), the ratio of broad money to GDP (BM_{it}), the ratio of trade openness (TO_{it}) and real effective exchange rate ($REER_{it}$, 2010 = 100) were obtained from *World Development Indicators*. Real GDP per capita is the proxy for economic growth. The ratio of stock market capitalization to GDP measures stock market development. Another measurement for stock market development is the ratio of stock market traded to GDP. The ratio of domestic credit to private sector to GDP represents bank development, which is a better proxy as it counts only bank credit to the private sector and

excludes credits by development bank and loans to the government and public companies (Adu, Marbuah and Mensah, 2013; Ahmad et al, 2016). There are two other proxies used for bank development, namely the ratio of domestic credit to private sector by banks to GDP and the ratio of broad money to GDP. All data were transformed into the natural logarithms before estimation. The data is yearly from 1995 to 2018.

The two economic models, which are estimated respectively an augmented model of Ono (2017). Model 1 is expressed with different proxy for stock market development as follows:

$$\ln Y_{it} = f(\ln SMC_{it}, \ln DC_{it}, \ln FDI_{it}, \ln REER, \ln TO_{it}) \quad (1a)$$

$$\ln Y_{it} = f(\ln ST_{it}, \ln DC_{it}, \ln FDI_{it}, \ln REER, \ln TO_{it}) \quad (1b)$$

where SMC_{it} is the ratio of stock market capitalization to GDP and ST_{it} is the ratio of stock market traded to GDP. If the result of the estimation with the proxy for stock market development, namely stock market capitalization is better than stock market traded tin terms of more coefficients are statistically significant then Model 2, which is a restricted version of Model 1 is estimated with different proxy for bank development as follows:

$$\ln Y_{it} = f(\ln SMC_{it}, \ln DC_{it}) \quad (2a)$$

$$\ln Y_{it} = f(\ln SMC_{it}, \ln DCB_{it}) \quad (2b)$$

$$\ln Y_{it} = f(\ln SMC_{it}, \ln BM_{it}) \quad (2c)$$

where DC_{it} is the ratio of domestic credit to private sector to GDP, DCB_{it} is the ratio of domestic credit to private sector by banks to GDP and BM_{it} is the ratio of broad money to GDP. The use of Model 2 is to test robustness result of Model 1. The panel vector error-correction model (VECM) is estimated to examine causal relationship between the variables. The first step is to estimate the long-run model for Model 1 or Model 2 in order to obtain the error correction term. The second step is to estimate the Granger causality model with the error correction term (Lee et al., 2008; Holtz-Eakin et al.). The Ganger causality test in the panel VECM for Model 1(a) and Model 2(a) are respectively as follows:

$$\begin{bmatrix} \Delta\ln Y_{it} \\ \Delta\ln SMC_{it} \\ \Delta\ln DC_{it} \\ \Delta\ln REER_{it} \\ \Delta\ln TO_{it} \end{bmatrix} = \begin{bmatrix} \mu_1 \\ \mu_2 \\ \mu_3 \\ \mu_4 \\ \mu_5 \end{bmatrix} + \sum_{\rho=1}^{k} \begin{bmatrix} \theta_{11\rho}\theta_{12\rho}\theta_{13\rho}\theta_{14\rho}\theta_{15\rho} \\ \theta_{21\rho}\theta_{22\rho}\theta_{23\rho}\theta_{24\rho}\theta_{25\rho} \\ \theta_{31\rho}\theta_{32\rho}\theta_{33\rho}\theta_{34\rho}\theta_{35\rho} \\ \theta_{41\rho}\theta_{42\rho}\theta_{43\rho}\theta_{44\rho}\theta_{45\rho} \\ \theta_{51\rho}\theta_{52\rho}\theta_{53\rho}\theta_{54\rho}\theta_{55\rho} \end{bmatrix} \times \begin{bmatrix} \Delta\ln Y_{it-\rho} \\ \Delta\ln SMC_{it-\rho} \\ \Delta\ln DC_{it-\rho} \\ \Delta\ln REER_{it-\rho} \\ \Delta\ln TO_{it-\rho} \end{bmatrix} + \begin{bmatrix} \phi_{1i} \\ \phi_{2i} \\ \phi_{3i} \\ \phi_{4i} \\ \phi_{5i} \end{bmatrix} \times ec_{it-1} + \begin{bmatrix} \varepsilon_{1it} \\ \varepsilon_{2it} \\ \varepsilon_{3it} \\ \varepsilon_{4it} \\ \varepsilon_{5it} \end{bmatrix} \quad (3)$$

$$\begin{bmatrix} \Delta\ln Y_{it} \\ \Delta\ln SMC_{it} \\ \Delta\ln DC_{it} \end{bmatrix} = \begin{bmatrix} \mu_1 \\ \mu_2 \\ \mu_3 \end{bmatrix} + \sum_{\rho=1}^{k} \begin{bmatrix} \theta_{11\rho}\theta_{12\rho}\theta_{13\rho} \\ \theta_{21\rho}\theta_{22\rho}\theta_{23\rho} \\ \theta_{31\rho}\theta_{32\rho}\theta_{33\rho} \end{bmatrix} \times \begin{bmatrix} \Delta\ln Y_{it-\rho} \\ \Delta\ln \mathrm{SMC}_{it-\rho} \\ \Delta\ln DC_{it-\rho} \end{bmatrix} + \begin{bmatrix} \phi_{1i} \\ \phi_{2i} \\ \phi_{3i} \end{bmatrix} \times ec_{it-1} + \begin{bmatrix} \varepsilon_{1it} \\ \varepsilon_{2it} \\ \varepsilon_{3it} \end{bmatrix} \quad (4)$$

where Δ is the first difference operator and ε_{jit} (j = 1, 2, 3, 4, 5, 6, 7) is a disturbance term. The significance of the coefficient of the error correction term (ec_{it-1}) exposes the long-run causality between the variables. The error correction term measures the rate of dependent variable restores to the equilibrium in the short run from the long-run disequilibrium. The significance of the F-statistic on the coefficients of the lagged differences of independent variables indicates the short-run causality of independent variables. For example,

if $\theta_{12p} \neq 0\forall_i$ asserts that $\Delta \ln SMC_{it-\rho}$ Granger causes $\Delta \ln Y_{it}$. Conversely, if $\theta_{21p} \neq 0\forall_i$ denotes that $\Delta \ln Y_{it}$ Granger causes $\Delta \ln SMC_{it-\rho}$. If $\theta_{13p} \neq 0\forall_i$ asserts that $\Delta \ln DC_{it-\rho}$ Granger causes $\Delta \ln Y_{it}$ and if $\theta_{31p} \neq 0\forall_i$ denotes that $\Delta \ln Y_{it}$ Granger causes $\Delta \ln DC_{it-\rho}$. If $\theta_{23p} \neq 0\forall_i$ implies that $\Delta \ln DC_{it-\rho}$ Granger causes $\Delta \ln SMC_{it}$ and if $\theta_{32p} \neq 0\forall_i$ implies that $\Delta \ln SMC_{it}$ Granger causes $\Delta \ln DC_{it-\rho}$.

EMPIRICAL RESULTS AND DISCUSSIONS

Table 2 shows the results of the panel unit root tests, namely the Levin, Lin and Chu panel unit root test, the ADF-Fisher Chi-square unit root test and the PP – Fisher Chi-square unit root test. All the panel unit tests are conducted with the estimation without including a constant. On the whole, the panel unit root tests demonstrate that all the variables are I(1).

[Insert Table 2 about here]

Table 3 display the results of the Johansen Fisher panel cointegration tests. Generally, the null hypothesis of no cointegration among the variables in model 1(a), model 1(b) and Model 2(a), Model 2(b) and Model 2(c) is rejected. More specifically, there are three cointegrating vectors in Model 1(a), two cointegrating vectors in Model 1(b) and one cointegrating vector in Model 2(a), Model 2(b) and Model 2(c), respectively. Thus, there is evidence of cointegration for the panel as a whole and or at least for one of the countries in these panels.

[Insert Table 3 about here]

Table 4 report the results of the Granger-causality tests. The error correction terms are many found to be negative and statistically significant. The results of Model 1(a) show that the ratio of stock market capitalization to GDP is found to Granger cause real GDP per capita and real GDP per capita is found to Granger cause the ratio of stock market capitalization to GDP. Real GDP per capita is found to Granger cause is the ratio of domestic credit to private sector to GDP. Trade openness is found to Granger cause real GDP per capita. Real effective exchange rate and trade openness, respectively is found to Granger cause the ratio of domestic credit to private sector to GDP. The results of Model 1(b) show that real GDP per capita is found to Granger cause the ratio of stock market traded to GDP. Real GDP per capita, the ratio of stock market traded to GDP, real effective exchange rate and trade openness, respectively is found to Granger cause the ratio of domestic credit to private sector to GDP. There is bi-directional Granger causality between trade openness and real effective exchange rate.

Hence, there is bi-directional causality between real GDP per capita and the ratio of stock market capitalization to GDP. Real GDP per capita is found to Granger cause the ratio of stock market traded to GDP and not vice versa. Real effective exchange rate and trade openness, respectively is found to Granger cause the ratio of domestic credit to private sector to GDP and not vice versa. When the ratio of stock market capitalization to GDP is used for the proxy for stock market development, trade openness is found to Granger cause stock market development. Moreover, when the ratio of stock market traded to GDP is used for the proxy for stock market development, there is bi-directional Granger causality between trade openness and real effective exchange rate.

The results of Model 2(a) (Model 2(b)) demonstrate that the ratio of stock market capitalization to GDP (the ratio of domestic credit to private sector to GDP) and real GDP per capita are bi-directional Granger causality. The result of Model 2(a) and the result of Model 2(b) is about the same. The results of Model 2(c) also demonstrate that the ratio of stock market capitalization to GDP and real GDP per capita are bi-directional Granger causality. Moreover, the ratio of stock market capitalization to GDP is found to Granger cause the ratio of broad money to GDP.

Hence, there is bi-directional causality between real GDP per capita and the ratio of stock market capitalization to GDP and the ratio of domestic credit to private sector to GDP or the ratio of domestic credit by banks to GDP. However, there is no evidence of Granger causality between real GDP per capita and the ratio of broad money to GDP. The ratio of stock market capitalization to GDP is found to Granger cause the ratio of broad money to GDP.

[Insert Table 4 about here]

This study uses a homogeneous income group panel. The findings are that both stock market development and bank development important are found to be important to spur economic growth. The finding of this study supports the notion of Schumpeter (1934), Goldsmith (1969), McKinnon (1973), Shaw (1973), Robinson (1952), Lucas (1988), King and Levine (1993), Levine (1997), Bekaert et al. (2005), Bertocco (2008) and Guru and Yadav (2019), amongst others. Knowing that bank development and stock market development promote economic growth and therefore developing countries should encourage the development of bank development and stock market development at the international level. The financial system provides important services for economic growth and that stock market development and bank development both are important for economic growth (Karim, 2016). Besides, real effective exchange rate is found to affect economic growth. Economic growth, bank development, real effective exchange rate and trade openness is also important to influence stock market development. The supply-leading hypothesis is found to be relevant as financial development is a result of economic growth. There is some evidence that stock market development stimulates bank development and not vice versa (Islam, 2013). Therefore, there stock market development and bank development are not substitute to each other. Each has important role in the economy.

CONCLUDING REMARKS

This study has examined bank, stock market development and economic growth nexus in selected Asian economies, namely Indonesia, Malaysia, the Philippines, Singapore, Thailand, Hong Kong, Korea and Japan over the period from 1995 to 2018. A more homogeneous economies in financial development may result a more economically stylised (Fufa and Kim, 2018). Financial development is relatively high for Singapore, Hong Kong, Korea and Japan. Financial development is relatively low for Malaysia, Thailand, Indonesia and the Philippines. The results of the panel vector error-correction approach show that there is bi-directional causality between real GDP per capita and the ratio of stock market capitalization to GDP. Real GDP per capita is found to Granger cause the ratio of stock market traded to GDP and not vice versa. The use of the ratio of stock market capitalization to GDP for stock market development is found to have significant impact on real GDP per capita than the use of the ratio of stock market traded to GDP on real GDP per capita. The choice of different measure for stock market development could have different impact on economic growth. The ratio of trade openness and real effective exchange rate respectively is found to Granger cause bank development. There is bi-directional causality between the ratio of trade openness and real effective exchange rate. In a restricted version of the estimation model, there is bi-directional Granger causality between real GDP per capita and stock market development and bank development, respectively, which bank development is proxied by the ratio of domestic credit to private sector to GDP or the ratio of domestic credit to private sector by banks to GDP and not the ratio of broad money to GDP. The use of a different proxy for stock market development or bank development could have different impact on each other and on economic growth. The ratio of stock market capitalization to GDP is found to Granger cause the ratio of broad money to GDP and not vice versa. Hence, stock market development stimulates bank development and not vice versa. Stock market development and bank development are not substitute to each other. Bank development and stock market development are both foster economic growth.

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Table 1
Financial Development Indexes

Year	Indonesia	Malaysia	Philippines	Singapore	Thailand	Hong Kong	Korea	Japan
1995	0.27	0.51	0.32	0.57	0.44	0.60	0.59	0.58
1996	0.33	0.46	0.37	0.59	0.35	0.63	0.60	0.62
1997	0.39	0.55	0.42	0.65	0.47	0.78	0.60	0.64
1998	0.36	0.52	0.37	0.65	0.46	0.70	0.63	0.65
1999	0.32	0.55	0.40	0.69	0.46	0.70	0.68	0.69
2000	0.32	0.59	0.37	0.72	0.45	0.71	0.75	0.73
2001	0.31	0.55	0.33	0.77	0.49	0.74	0.79	0.69
2002	0.31	0.54	0.33	0.76	0.50	0.71	0.80	0.72
2003	0.28	0.56	0.34	0.75	0.56	0.73	0.79	0.73
2004	0.29	0.59	0.34	0.73	0.56	0.76	0.80	0.77
2005	0.30	0.58	0.33	0.71	0.53	0.73	0.80	0.81
2006	0.30	0.61	0.33	0.71	0.52	0.73	0.81	0.84
2007	0.33	0.67	0.35	0.74	0.52	0.75	0.82	0.85
2008	0.37	0.60	0.33	0.80	0.58	0.80	0.79	0.82
2009	0.32	0.63	0.33	0.72	0.58	0.74	0.83	0.82
2010	0.29	0.64	0.34	0.71	0.63	0.74	0.81	0.82
2011	0.32	0.66	0.35	0.71	0.63	0.76	0.84	0.81
2012	0.33	0.66	0.37	0.70	0.64	0.72	0.86	0.81
2013	0.35	0.67	0.37	0.71	0.70	0.73	0.85	0.84
2014	0.36	0.67	0.38	0.70	0.70	0.73	0.85	0.84
2015	0.36	0.66	0.38	0.71	0.70	0.77	0.85	0.86
2016	0.37	0.65	0.38	0.72	0.73	0.73	0.85	0.86
2017	0.37	0.68	0.39	0.75	0.70	0.75	0.87	0.88

Source: *Financial Development Index Database*, International Monetary Fund.

Table 2
The Results of the Panel Unit Root Test Statistics

	LLC	ADF	PP
$\ln Y_{it}$	18.6527	0.0244	0.0046
$\ln SMC_{it}$	1.7990	4.2947	7.1218
$\ln ST_{it}$	0.5870	6.8938	7.1717
$\ln \mathrm{TR}_{it}$	-0.2222	8.9274	6.5198
$\ln DC_{it}$	0.7027	6.7795	5.9646
$\ln DCB_{it}$	0.8117	8.2305	7.0982
$\ln \mathrm{BM}_{it}$	3.3412	3.7989	2.9554
$\ln FDI_{it}$	-1.4808	17.6902	19.3716
$\ln TO_{it}$	0.1521	8.7488	8.1839
$\ln REER_{it}$	-0.5030	11.4950	12.3656
$\Delta \ln Y_{it}$	-1.8436**	48.2494***	89.3793***
$\Delta \ln SMC_{it}$	-17.0693***	211.7020***	237.5020***
$\Delta \ln ST_{it}$	-16.3868***	194.8140***	188.2990***
$\Delta \ln \mathrm{TR}_{it}$	-16.8851***	185.6610***	237.8410***
$\Delta \ln DC_{it}$	-9.8856***	112.5670***	112.2620***
$\Delta \ln DCB_{it}$	-5.5820***	110.9170***	110.4530***
$\Delta \ln \mathrm{BM}_{it}$	-11.0868***	133.8920***	139.1500***
$\Delta \ln FDI_{it}$	-15.4792***	193.3740***	203.3420***
$\Delta \ln TO_{it}$	-12.5651***	153.2460***	155.4450***
$\Delta \ln REER_{it}$	-8.4293***	118.1690***	114.2740***

Notes: LLC denotes the Levin, Lin and Chu panel unit root test. ADF denotes the ADF-Fisher Chi-square unit root test. PP denotes the PP – Fisher Chi-square unit root test. Values in the parentheses are the lags used in the estimations. *** (**, *) denotes significance at the 1% (5%, 10%) level.

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Table 3
The Results of the Johansen Fisher Panel Cointegration Tests

No. of CE(s)	Fisher Trace Test	Fisher Max-Eigen Test
Model 1(a) – $\ln Y_{it}$, $\ln SMC_{it}$, $\ln DC_{it}$, $\ln REER_{it}$, $\ln TO_{it}$		
None	152.1***	107.4***
At most 1	64.68***	51.61***
At most 2	26.23*	26.04*
At most 3	12.36	13.69
At most 4	9.313	9.313
Model 1(b) – $\ln Y_{it}$, $\ln ST_{it}$, $\ln DC_{it}$, $\ln REER_{it}$, $\ln TO_{it}$		
None	163.9***	139.9***
At most 1	50.75***	39.51***
At most 2	22.97	15.79
At most 3	17.91	19.05
At most 4	11.63	11.63
Model 2(a) - $\ln Y_{it}$, $\ln SMC_{it}$, $\ln DC_{it}$		
None	68.93***	61.43***
At most 1	23.32	21.26
At most 2	18.60	18.60
Model 2(b) - $\ln Y_{it}$, $\ln SMC_{it}$, $\ln DCB_{it}$		
None	72.96***	65.76***
At most 1	23.57	20.45
At most 2	20.72	20.72
Model 2(c) - $\ln Y_{it}$, $\ln SMC_{it}$, $\ln BM_{it}$		
None	63.40***	67.40***
At most 1	14.35	10.86
At most 2	20.51	20.51

Notes: *** (*) denotes significance of the t-statistic at the 1% (10%) level.

Table 4
The Results of the Granger Causality Test in the Panel VECM

Model 1(a) – lnY_{it}, lnSMC_{it}, ln DC_{it} , ln $REER_{it}$, ln TO_{it}

	$\Delta \ln Y_{it}$	$\Delta \ln SMC_{it}$	$\Delta \ln DC_{it}$	$\Delta \ln REER_{it}$	$\Delta \ln TO_{it}$
$\Delta \ln Y_{it}$	-	7.0898**	32.3200***	0.4546	3.5637
$\Delta \ln SMC_{it}$	121.1672***	-	1.6843	3.8537	0.5823
$\Delta \ln DC_{it}$	3.6825	4.2419	-	0.9447	0.6040
$\Delta \ln REER_{it}$	0.8842	0.1258	38.0900***	-	4.1491
$\Delta \ln TO_{it}$	0.9743	5.7553*	32.3110***	5.8964	-
$ec_{\mathrm{it}-1}$	-0.0023	-0.0293**	-0.0315***	0.0035	-0.0043

Model 1(b) – lnY_{it}, lnST_{it}, ln DC_{it} , ln $REER_{it}$, ln TO_{it}

	$\Delta \ln Y_{it}$	$\Delta \ln ST_{it}$	$\Delta \ln DC_{it}$	$\Delta \ln REER_{it}$	$\Delta \ln TO_{it}$
$\Delta \ln Y_{it}$	-	7.8815**	38.0950***	0.7484	4.4384
$\Delta \ln ST_{it}$	0.5813	-	5.5112*	1.2687	2.0137
$\Delta \ln DC_{it}$	0.1383	0.3950	-	2.1225	0.4596
$\Delta \ln REER_{it}$	1.5232	2.1452	34.946***	-	5.7712*
$\Delta \ln TO_{it}$	4.5578	1.7719	30.881***	6.1362**	-
$ec_{\mathrm{it}-1}$	0.0010	-0.0447	-0.0625***	0.0033	0.0022

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Table 4 (Continued)

Model 2(a) - $\ln Y_{it}, \ln SMC_{it}, \ln DC_{it}$

	$\Delta \ln Y_{it}$	$\Delta \ln SMC_{it}$	$\Delta \ln DC_{it}$
$\Delta \ln Y_{it}$	-	8.4979**	31.9310***
$\Delta \ln SMC_{it}$	112.5044***	-	1.3383
$\Delta \ln DC_{it}$	4.6445*	3.2583	-
$ec_{\mathrm{it}-1}$	-0.0014**	-0.0516*	-0.0061

Model 2(b) - $\ln Y_{it}, \ln SMC_{it}, \ln DCB_{it}$

	$\Delta \ln Y_{it}$	$\Delta \ln SMC_{it}$	$\Delta \ln DCB_{it}$
$\Delta \ln Y_{it}$	-	7.0542**	29.4521***
$\Delta \ln SMC_{it}$	113.7038***	-	1.7297
$\Delta \ln DCB_{it}$	4.7307*	3.3414	-
$ec_{\mathrm{it}-1}$	0.0003	-0.0593**	-0.0316**

Model 2(c) - $\ln Y_{it}, \ln SMC_{it}, \ln BM_{it}$

	$\Delta \ln Y_{it}$	$\Delta \ln SMC_{it}$	$\Delta \ln BM_{it}$
$\Delta \ln Y_{it}$	-	10.0082***	4.4348
$\Delta \ln SMC_{it}$	97.2249***	-	13.5320***
$\Delta \ln BM_{it}$	4.1684	1.1138	-
$ec_{\mathrm{it}-1}$	-0.0005**	-0.0738**	-0.0044

Notes: See also Table 2 for explanation. The values are χ^2 statistics. *** (**, *) denotes significance at the 1% (5%, 10%) level.