FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH IN ASIA

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Abstract

This study investigates the relationship between financial development and economic growth using panel data on Asian economies with and without well-developed stock markets, considering several indicators of the banking sector and stock market development. The empirical results indicate that stock market capitalization has several causal effects on economic growth. Furthermore, Asian economies with developed stock markets tended to grow faster than those without well-developed stock markets, and economies with large stock market capitalization were inclined to experience strong economic growth. However, there was no significant evidence to support the idea that banking sector development indicators can boost economic growth in Asia.

Keywords: Financial development, Stock market, Economic growth, Panel data, Asia

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1. INTRODUCTION

Economic growth is recognized as an important factor in economic development. According to macroeconomic theory, human capital development, physical capital accumulation, and increased productivity from technological innovation, are crucial factors for long-term economic growth. Furthermore, the role of the financial sector has also been mentioned as being important for promoting economic growth. Gurley and Shaw (1955) mentioned that financial development could promote growth by increasing the savings rate, and in turn, enhancing physical capital accumulation. In addition, McKinnon (1973) argued that a well-developed financial system is key to economic growth due to its positive impact on productivity improvement. King and Levine (1993) demonstrated that stock market development could promote economic growth by encouraging saving, and lowering investment risk.

Many recent studies provide empirical evidence in support of the relationship between financial development and economic growth in both developed and emerging economies. When considering the components of financial markets, the stock market is one critical factor. Previous studies (e.g., Ngare et al., 2014; Cournède and Denk, 2015; Estrada et al., 2010) have showed that stock market capitalization is an important proxy of financial development for emerging markets. The study of Ngare et al. (2014) showed that stock market development had a positive impact on economic growth in Africa. In the case of Asian countries, the importance of financial development in promoting economic growth remains in question. Figure 1 indicates that during the period from 1995–2015, the average market capitalization to GDP, experienced an increasing trend, reaching its highest level of 114% in 2015. However, average GDP growth fluctuated continuously, showing an increasing overall trend until 2004. During the global financial crisis (2008–2009), average GDP growth in Asia declined sharply.

In considering the level of stock market development in Asia, Figure 2 shows the average market capitalization in Asia during the period from 1995 to 2015. The highest average stock market capitalization was found in Hong Kong, followed by Singapore, and then Malaysia, indicating that within a 40-year period many economies developed stock markets, resulting in a 100% increase in GDP for some countries.

Even though stock market development is well - established in

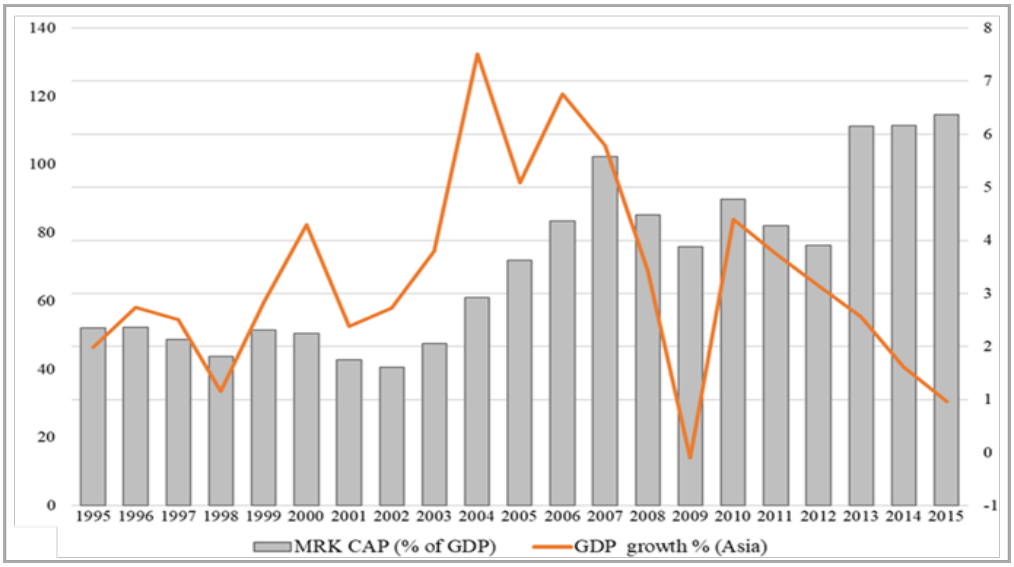

Figure 1: Stock market capitalization and economic growth in Asia
Source: World Bank database

most Asian economies, there are some countries which either do not have a stock market, or have a stock market which is still in the early stages of development. A well-developed stock market is defined as belonging to an economy where market capitalization is able to cover more than 5% of GDP and the market has been established for more than 10 years. When the stock market is very small and undeveloped (i.e., been in operation for just a short period of time), the impact on economic growth is negligible. Hence, the countries for which this is true, are categorized as economies without well-developed stock markets. Based on the World Bank database data for 2015, stock markets in several Asian countries e.g., Cambodia and Laos PDR, had been established for less than 10 years. Additionally, in some countries such as Uzbekistan, the market capitalization is too small to provide a significant macroeconomic effect[1]. As a result, the existing empirical studies on stock market development in Asia do not include the economies without well-developed stock markets in their study samples. Furthermore, many studies focus on banking sector indicators, using historical data on Asia as a proxy for financial development.

Therefore, the main objective of

[1] List of the economies with stock markets, without stock markets, and without well-developed stock markets are shown in section 3, Table 1.

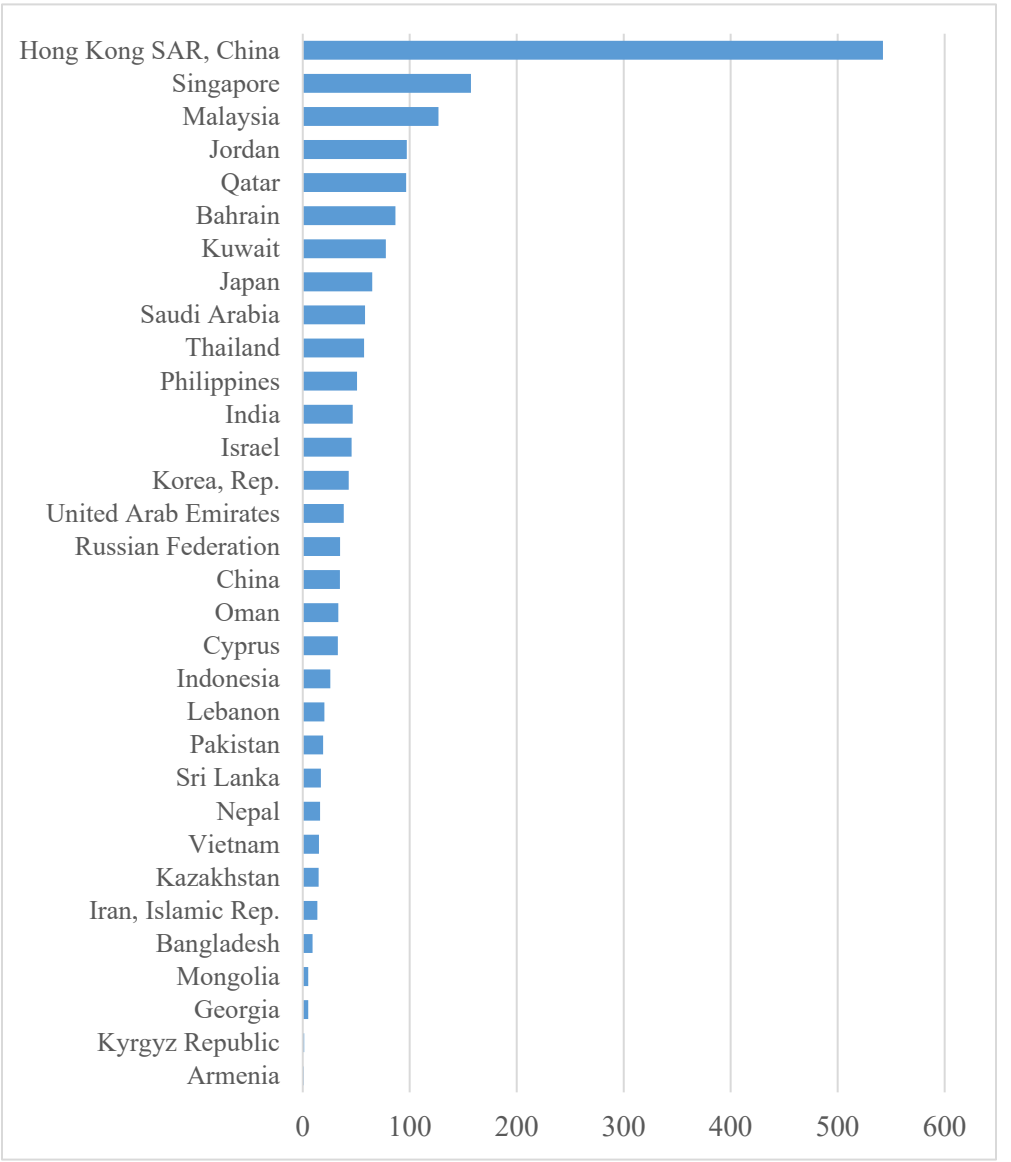

Figure 2: Market capitalization (percent of GDP) in Asia
Source: World Bank database

this paper is to examine the relationship between stock market development and economic growth using datasets for economies with well-developed stock markets and those without. In addition, banking sector development indicators are used to investigate their impact on economic growth. Some econometric methods from previous studies are also applied in this paper. Firstly, causality tests were conducted to check the direction of the relationship between financial market

development and economic growth. Secondly, a dynamic panel data model was estimated using the generalized method of moments (GMM) to control against the possibility of endogeneity bias. Thus, the empirical results in this study will provide useful information for governments in Asian countries to focus on stock market promotion as a central aspect of their financial development plans. For example, a tax incentive policy may be required to accelerate the growth of stock market capitalization. In outline, the remainder of this paper will discuss the literature on financial market development and economic growth in section 2, explain the data and econometric methodology in section 3, and present the empirical results in section 4, while section 5 will provide a conclusion to the paper.

2. LITERATURE REVIEW

This literature review emphasizes the importance of the relationship between financial development and economic growth. Levine, Loayza, and Beck (2000) demonstrated that cross-country differences in legal and accounting systems have an impact on financial development. Furthermore, the reform of legal and accounting methods has been found to improve contract enforcement, accounting standards and creditor rights, and can enhance financial development and boost economic growth. Several subsequent studies empirically investigated the relationship between financial development and economic growth. Beck, et al. (2000) used panel data from 77 countries between 1960 and 1995 to check for causality between financial development and growth. They showed that higher levels of financial sector development positively affected the total factor productivity associated with economic growth.

Rioja and Valev (2004) found a strong and positive relationship between financial development and growth in countries with highly developed financial systems. The authors also noted that this relationship was unclear in countries with early-stage financial development. Nevertheless, Cournède and Denk (2015) examined the relationship between financial development and economic growth in OECD and G20 countries, indicating that higher credit resulted in a slower growth rate, in contrast to stock market development where the expansion of funds can boost growth in general.

Later, several studies investigated the separate effects of the stock market and banking sector development on economic growth. Levine and Zervos (1998) demonstrated that banking sector development (bank credit) had a

positive relationship with improved productivity and capital formation, leading to economic growth. Beck and Levine (2004) applied GMM discovering positive impacts of the stock market and banking sector development on economic growth, while Caporale, et al. (2014) reported the existence of a unidirectional causal relationship between financial sector development and economic growth. Ngare, et al. (2014) presented that stock market development had a positive impact on growth in Africa, and this perception was supported by the evidence that the increase in economic growth was higher in countries with stock markets than those without.

In the case of the Asian countries, Estrada et al. (2010) showed that the efficiency of financial systems is associated with economic growth in developing Asian economies. Bayar (2014) applied various indicators of financial development to bond and equity markets and provided supporting evidence for a positive relationship between financial development and economic growth in emerging Asian countries. Subsequently, the study of Rana and Barua (2015), also indicated that domestic savings and total debt services have a significant effect on economic growth in emerging South Asian countries. However, some indicators, namely domestic credit, trade balance, and broad money, had no significant impact on fostering economic growth.

Conversely, Lucas (1988) mentioned that economists often overstate the importance of the financial system in boosting economic growth. Moreover, Singh (1997) argued that developing countries with stock markets often had inefficient allocation of resources due to the high volatility in the market pricing process. Furthermore, Shan, et al. (2003) supported Lucas's view by indicating that in some Asian economies (like China), the financial system had a weak influence on economic growth. Deidda and Fattouh (2002) reported the existence of a nonlinear relationship between financial development and economic growth using a threshold regression model. Al-Malkawi et al. (2012) also found a relationship between financial development and growth in the United Arab Emirates, although it was negative. Moreover, Yildirim et al. (2013) examined the relationship between financial development and economic growth using asymmetric causality to test for stationarity in emerging European economies. They found no causality between financial development and economic growth.

In summary, empirical results in the existing literature have revealed a strong positive correlation between financial development and economic

growth. However, there are still conflicting results, depending on the econometric methodology and samples used in each study. In addition, most of the existing studies do not cover economies without well-developed stock markets in Asia.

3. METHODOLOGY

Two main econometric methods are used in this study to analyze the relationship between financial development and economic growth. Firstly, causality tests are used to indicate the relationship direction between these variables. Secondly, panel data models are used to confirm the significance of financial development indicators on growth. Data sources and econometric methodology are discussed in the following section.

3.1 Data sources and descriptions

Macroeconomic panel data and the banking sector development variables of Asian economies were collected from the World Development Indicators (WDI) database, while stock market development indicators were collected from QlikTech International AB (QID), in the annual data range from 1975 to 2015. The WDI data included 48 economies in Asia. These economies were separated into three sub-groups: economies without a stock market, economies with low level stock market development,[2] and economies with well-developed stock markets. A list of the Asian economies included in the WDI database is shown in Table 1[3].

Table 1 contains a total of 48 economies, consisting of 32 economies with well-established stock markets, eight without stock markets, and eight with low level stock market development. The lists of macroeconomic variables and banking sector development indicators for all 48 economies are shown in the Table 2. Stock market development indicators are available for only the 32 economies with well-established stock markets. Hence, a dummy variable was applied to represent the indicators for economies without well-developed stock markets.

In this study, the growth rate of GDP per capita in US dollars (GROWTH) was used as the dependent variable. To estimate the

[2] Economies with low level of stock market development are defined as those in which the markets had been set up for less than 10 years or where market capitalization was too small compared to GDP to have a significant macroeconomic effect.

[3] Hong Kong and Macao are included, which are special administrative regions of China. Both economies have their own currencies and macroeconomic management. The WDI database does not include Taiwan.

Table 1: List of Asian economies with and without well-developed stock markets

Economies with well-developed stock markets	Economies without well-developed stock markets	
	Low level of stock market development	No stock market
Armenia, Bahrain, Bangladesh, China, Cyprus, Georgia, Hong Kong, India, Indonesia, Iran, Israel, Japan, Jordan, Kazakhstan, Korea Rep, Kuwait, Kyrgyz, Lebanon, Malaysia, Mongolia, Nepal, Oman, Pakistan, Philippines, Qatar, Russia, Saudi Arabia, Singapore, Sri Lanka, Thailand, UAE, Vietnam	Azerbaijan, Bhutan, Cambodia, Iraq, Lao PDR, Maldives, Myanmar, Uzbekistan	Afghanistan, Brunei, Macao, Syrian Arab Republic, Tajikistan, Timor-Leste, Turkmenistan, Yemen

Source: The WDI database

Table 2: List of variables and data sources

Variables	Definitions	Sources
Dependent variable		
GROWTH	Growth rate of GDP per capita	WDI
Main explanatory variables		
MRKCAP	Stock market capitalization (% of GDP)	QID
ST	Stock total value traded (% of GDP)	QID
TO	Stock market turnover ratio (% of GDP)	QID
CD	Domestic credit to private sector (% of GDP)	WDI
LQD	Liquid liabilities (% of GDP)	QID
Control Variables		
YPCR	GDP per capita ($)	WDI
GL	Gross fixed capital formation (% of GDP)	WDI
GOV	General government spending (% of GDP)	WDI
INF	Inflation rate (% of GDP deflator)	WDI
PL	Primary school enrollment (% gross)	WDI
TR	Trade openness (% of GDP)	WDI

panel regressions, proxies for the financial development indicators were used as the main explanatory variables in the study. There are two sub-components of the financial development indicators; these include the stock market development indicators of stock market capitalization (MRKCAP), value of the total stock traded (ST), and the stock market turnover ratio (TO), and also the banking sector development indicators of credit to the private sector (CD), and liquid liabilities

(LQD). Control variables from the literature on cross-country growth was also included, i.e., gross fixed capital formation (GL), primary school enrollment rate (PL), trade openness (TR), inflation rate (INF), and general government spending (GOV). A summary of the variables and data sources for each variable is presented in Table 2.

3.2 Econometric methodology

In this paper, two main economic methodologies were employed to examine the relationship between financial market development and economic growth; these were the causality test and panel data model. Each methodology is discussed in the following section.

Firstly, Granger causality tests were used to check for significance and the direction of the relationship between different pairs of variables. The stationarity of variables was first checked. Then, panel VAR models were estimated, and the Granger causality tests computed. The bivariate panel VAR model is specified as follows.

$$y_{i.t} = \alpha_0 + \alpha_1 y_{i,t-1} + \cdots + \alpha_n y_{i,t-n} + \beta_1 x_{i,t-1} + \cdots + \beta_n x_{i,t-n} + \varepsilon_{i,t} \quad (1)$$

$$x_{i.t} = \gamma_0 + \gamma_1 x_{i,t-1} + \cdots + \gamma_n x_{i,t-n} + \mu_1 y_{i,t-1} + \cdots + \mu_n y_{i,t-n} + \varepsilon_{i,t} \quad (2)$$

where $y_{i.t}$ is GDP per capita growth (GROWTH) and $x_{i.t}$ represent several proxies for financial development and the stock market development indicators.

Secondly, the long-term effects of financial development on economic growth were further investigated using the panel data model. This model applies the standard cross-country growth regression from Barro (1990), augmented by several financial development indicators and stock market dummy variables.

Panel data were considered using the full sample dataset (48 economies, including those without well-developed stock markets). The dependent variable was the growth rate of GDP per capita (GROWTH) and the main explanatory variables were the banking sector development indicators (BSD), which consist of Domestic credit to the private sector, and Liquid liabilities. Dummy variables were used to indicate the economies with stock markets (DUM), with the interaction between these dummy variables and stock market capitalization expressed as an interactive term ($DUM{*}MRKCAP$) to control for the level of stock market development. Several control variables were included; these were lagged GDP per capita (YPCRt-1), gross fixed capital formation (GL), primary school enrollment rate (PL), trade openness (TR), inflation rate (INF) and government spending (GOV).

Panel data were estimated using a fixed effects model, as in the shown regression.

$$Growth_{i.t} = \alpha + \lambda[BSD]_{i,t} + \beta_1 YPCR(-1)_{i,t} + \beta_2 GL_{i,t} + \beta_3 PL_{i,t} + \beta_4 TR_{i,t} + \beta_5 INF_{i,t} + \beta_6 GOV_{i,t} + \beta_7 DUM_{i,t} + \beta_8 DUM * MRKCAP_{i,t} + \varepsilon_{i,t} \quad (3)$$

Next, the sub-sample was considered only for those economies with well-developed stock markets (32 out of 48) to investigate the impact of financial development on growth rate. The financial development indicators [FD] consisted of proxies for banking sector development indicators; these were domestic credit to the private sector (CD), and liquid liabilities (LQD), as well as proxies for the stock market development indicators, namely stock market capitalization (MRKCAP), value of total stock traded (ST), and stock market turnover ratio (TO). A similar set of control variables was also applied as for the previous regression (YPCRt-1, GL, PL, TR, INF, and GOV).

The regressions are displayed as follows.

$$Growth_{i.t} = \alpha + \lambda[FD]_{i,t} + \beta_1 YPCR(-1)_{i,t} + \beta_2 GL_{i,t} + \beta_3 PL_{i,t} + \beta_4 TR_{i,t} + \beta_5 INF_{i,t} + \beta_6 GOV_{i,t} + \varepsilon_{i,t} \quad (4)$$

Finally, the dynamic panel data models were applied, and estimated using the GMM. The growth rate of GDP per capita (GROWTH) was still used as the dependent variable. Instrumental variables (second and third lag of growth rate of GDP per capita) were used to control for endogeneity bias. The dynamic panel data model can be written as follows.

$$Growth_{i.t} = \sum_{j=1}^{p} \alpha_j Growth_{i,t-j} + \lambda[FD]_{i,t} + \beta_1 YPCR_{i,t-1} + \beta_2 GL_{i,t} + \beta_3 PL_{i,t} + \beta_4 TR_{i,t} + \beta_5 INF_{i,t} + \beta_6 GOV_{i,t} + \varepsilon_{i,t} \quad (5)$$

4. Empirical Results

The correlation coefficients between the financial development indicators and economic growth were considered first, generating the computed results displayed in Table 3. Overall, the banking sector development indicators, namely domestic credit (CD), and liquid liabilities (LQD), had a negative correlation with growth, while the remaining financial development indicators had positive correlations with economic growth. Moreover, correlations among the banking sector development indicators (CD, LQD) were high. In addition, correlations between the stock market development indicators, i.e., stock market capitalization (MRKCAP), and stock total value traded (ST) were also high (0.78). These results lead to the awareness of a multicollinearity

Table 3: Coefficients of correlations between all variables in the study

Correlation	*GROWTH*	*YPCR(-1)*	*GL*	*PL*	*GOV*	*INF*	*TR*	*CD*	*LQD*	*MRKCAP*	*ST*	*TO*
GROWTH	1.00											
YPCR(-1)	-0.31***	1.00										
GL	0.33***	-0.15***	1.00									
PL	0.04	-0.03	0.10*	1.00								
GOV	-0.23***	0.37***	-0.25***	-0.08	1.00							
INF	0.00	-0.34***	-0.01	0.03	-0.33***	1.00						
TR	-0.10**	0.13**	-0.11**	-0.05	-0.08*	-0.11**	1.00					
CD	-0.05	0.52***	0.29***	-0.11**	0.07	-0.40***	0.25***	1.00				
LQD	-0.08*	0.46***	0.14***	0.04	0.09**	-0.38***	0.28***	0.85***	1.00			
MRKCAP	-0.03	0.33***	0.00	-0.01	-0.03	-0.15***	0.60***	0.44***	0.51***	1.00		
ST	0.06	0.36***	0.08*	-0.04	0.00	-0.15***	0.41***	0.47***	0.51***	0.78***	1.00	
TO	0.16***	0.06	0.17***	-0.24***	-0.05	-0.08*	-0.21***	0.20***	0.13**	-0.02	0.44***	1.00

Note: *** indicates significance at the 1%, ** at the 5% and * at the 10% levels.

Table 4: Empirical results from the panel unit root test

	Level	**First difference**
Variables	ADF – Fisher chi-square	ADF– Fisher chi-square
GROWTH	450.24***	1053.05***
CD	48.38	363.25***
LQD	69.82	704.17***
MRKCAP	81.72**	299.28***
ST	81.93***	245.79***
TO	115.59***	344.23***

Note: *** indicates significance at the 1%, ** at the 5% and * at the 10% levels.

problem if the included variables are concurrently used in the regressions. Panel unit root tests were performed on all financial development indicators. The Fisher tests were computed from the results of the individual ADF tests. The results of the panel unit root tests on the level and first difference in the data are reported in Table 4.

Overall, the panel unit root tests show that GDP per capita growth (GROWTH) and stock market development indicators (MRKCAP, ST, TO) are stationary at the 1% significance level. However, the banking sector development indicators (CD, and LQD) are non-stationary for level, but stationary for first difference.

Hence, Granger causality was applied using the level data for GDP per capita growth (GROWTH), stock market capitalization (MRKCAP), total value of stock traded (ST), and stock turnover ratio (TO), and using the first difference data for private credit (CD), and liquid liabilities (LQD). The results are summarized in Table 5 and show a unidirectional relationship between stock market capitalization and GDP per capita growth. Specifically, stock market capitalization Granger causes GDP per capita growth at the 1% significance level, but GDP per capita growth does not Granger cause market capitalization. In addition, there is no significant Granger causality between the total value of stock traded and GDP per capita growth. However, for the stock turnover ratio, and credit to the private sector, a unidirectional relationship was observed in which GDP per capita growth Granger causes economic growth, stimulated by the demand for financial services. Finally,

Table 5: Empirical results from VAR Granger causality test

Outcome			Lag	Chi-sq
MRKCAP	→	GROWTH	5	41.17061***
	←		5	2.880202
ST	→	GROWTH	1	0.409922
	←		1	0.272281
TO	→	GROWTH	1	1.160567
	←		1	5.231399**
D(CD)	→	GROWTH	1	0.421877
	←		1	9.184304***
D(CDB)	→	GROWTH	1	0.507543
	←		1	7.017781***
D(LQD)	→	GROWTH	3	18.20233***
	←		3	7.966265**

Table 6: Fixed effects model test.

Redundant fixed effect tests	Cross-section F-test: 3.739115	Prob. 0.0000

there was a bidirectional relationship between liquid liabilities and GDP per capita growth, indicating a potential feedback relationship with GDP per capita growth.

Next, the panel data models were estimated by conducting fixed effect redundancy tests. The results in Table 6 reject the null hypotheses in favor of the alternative model with fixed effects to control for heterogeneity in each economy

According to the results in Table 6, the alternative hypothesis can be accepted since it shows that the use of the fixed effects model for estimating the panel data models is appropriate. Starting with the full sample dataset (48 economies, including those without well-developed stock markets) following equation 3, as presented in Table 7, and then estimating the sub-sample only for those economies with well-developed stock markets (32) to investigate the impact of financial development on the growth rate, based on equation 4, as indicated in Table 8.

In Table 7, columns 3 and 5, the coefficient estimates for the stock market dummy variables (DUM) show a positive relationship with growth at the 1% significance level. This suggests that Asian economies with well-developed stock markets tend to grow at a higher rate than those

without. The interactive term (DUM*MRKCAP) also confirms a positive significant relationship between stock market capitalization and economic growth (see columns 4 and 6 of Table 7), where economies with high level, well-developed stock markets tend to grow faster compared to those with a low level.

Table 7: Empirical results from the fixed effects model (FEM) of Asian economies (All economies)

	GDP growth per capita					
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Financial Development indicators						
CD	-0.0326***	-	-0.0416***	-0.0347***	-	-
	(-2.351)		(-3.679)	(-3.131)		
LQD	-	-0.0244***	-	-	-0.0329***	-0.0325***
		(-2.579)			(-3.382)	(-3.273)
DUM	-	-	1.7567***	-	1.7612***	-
			(3.468)		(3.431)	
DUM*MRKCAP	-	-		0.0085*	-	0.0125***
				(1.922)		(2.603)
Control Variables						
Lag of per capita GDP	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	0.0001***
	(-3.539)	(-3.770)	(-3.615)	(-3.887)	(-3.883)	(-4.177)
GL	0.1067***	0.0908***	0.1045***	0.1103***	0.0853***	0.0949***
	(3.361)	(2.835)	(3.309)	(3.476)	(2.675)	(2.970)
PL	-0.0208	-0.0244	-0.0302	-0.0199	-0.0343*	-0.0223
	(-1.121)	(-1.130)	(-1.616)	(-1.070)	(-1.832)	(-1.198)
GOV	-0.2307***	-0.2267***	-0.2215***	-0.2223***	-0.2150***	0.2132***
	(-5.910)	(-5.759)	(-5.691)	(-5.665)	(-5.469)	(-5.386)
INF	-0.0068***	-0.0067***	-0.0064***	-0.0067***	-0.0063***	-0.0066***
	(-5.822)	(-5.715)	(-5.443)	(-5.748)	(-5.323)	(-5.624)
TR	0.0266***	0.0274***	0.0234**	0.0166	0.0256**	0.0167
	(2.748)	(2.648)	(2.422)	(1.513)	(2.480)	(1.502)
Intercept	6.1528***	6.8127***	6.7699***	6.6203***	7.5574***	7.4474***
	(3.061)	(3.389)	(3.374)	(3.275)	(3.758)	(3.689)
Observations	1024	1009	1024	1024	1009	1009
R-squared	0.216	0.210	0.225	0.219	0.220	0.216
F-test	5.641	5.318	5.653	5.441	5.508	5.379
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]

Note: t-values are in parentheses. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% levels respectively.

Table 8: Empirical Results from the fixed effects model (FEM) (Selected Asian economies with stock markets)

Variable	GDP growth per capita (1)	(2)	(3)	(4)
Financial Development indicators				
CD	-0.0258***	-0.0443***	-	-
	(-2.585)	(-4.671)		
LQD	-	-	-0.0160	-0.0330**
			(-1.402)	(-2.564)
MRKCAP	0.0071**	-	0.0089**	-
	(2.047)		(2.353)	
ST	-	0.0134***	-	0.0182***
		(2.871)		(3.305)
TO	0.0001	-0.0052	0.0002	-0.0064*
	(0.068)	(-1.534)	(0.101)	(-1.754)
Control variables				
Lag of per capita GDP	-0.0001***	-0.0001***	-0.0001***	-0.0001***
	(-4.966)	(-2.751)	(-4.969)	(2.666)
GL	0.0939***	0.0737**	0.0794**	0.0052
	(2.689)	(2.093)	(2.195)	(0.137)
PL	-0.0094	-0.0382	-0.0162	-0.0491
	(0.336)	(-1.110)	(-0.571)	(-1.306)
GOV	-0.2127***	-0.2972***	-0.1963**	-0.3615***
	(-2.826)	(-3.689)	(-2.497)	(-4.295)
INF	-0.0493**	-0.0835***	-0.0523**	-0.0864***
	(-2.162)	(-3.479)	(-2.232)	(-3.352)
TR	0.0102	0.0053	0.0081	0.0051
	(0.935)	(0.582)	(0.706)	(0.488)
Intercept	7.2376**	13.607***	7.7745**	16.987***
	(2.238)	(3.358)	(2.350)	(3.778)
Observations	556	438	539	423
R-squared	0.371	0.404	0.355	0.369
F-test	8.035	8.290	7.450	7.116
	[0.000]	[0.000]	[0.000]	[0.000]

Note: t-values are in parentheses. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% levels respectively.

Next, the effects of the several banking sector development indicators and stock market development indicators were considered. Tables 7 and 8 show that banking development indicators, namely domestic credit to the private sector (CD), and liquid liabilities

(LQD), mostly have significantly negative impacts on GDP per capita growth overall. These results contrast with the conventional view that all aspects of financial development have potential to promote economic growth.

Regarding stock market development indicators, the results from columns 1 and 3 in Table 8 show that stock market capitalization to GDP has a positive impact on growth at the 5% significance level. In columns 2 and 4 of Table 8, the results show that the total value of stock traded (ST) has a positive and significant relationship with growth at the 1% significance level. Table 8, column 4 indicates that the turnover ratio has a negative impact on growth at the 10% significance level, suggesting a weak relationship between the turnover ratio and economic growth. The results for the turnover ratio in other regression specifications are not statistically significant at the 5% level.

This section considers the results of the dynamic panel data models, which were estimated with GMM to control for the problem of endogeneity. The lagged dependent variables were included as explanatory variables. Baum (2006) mentioned that the regressor exogeneity assumption no longer holds in the dynamic panel data model and suggested constructing instrumental variables using the second and third lags of dependent variables. Therefore, this study follows the estimation methodology of Baum (2006) for the dynamic panel data model, with the following results.

Firstly, considering the J-statistic, where the null hypothesis is that the instrumental variable is valid, and the alternative hypothesis is that the instrumental variable is invalid. The null hypothesis cannot be rejected. The results support the adoption of second and third lagged dependent variables ($GROWTH_{-2, -3}$) as the instrumental variables in these regressions.

The results for the panel data models with GMM estimation are shown in Table 9. The role of stock market development is considered initially. In columns 1 and 3, the stock market dummy is included. The results show that the estimated coefficients of the dummy variable are positively significant at the 1% level. This result suggests that Asian economies with stock markets tend to grow faster than those without by 2.2482% GDP per capita (see Table 9, column 1). Furthermore, the interaction dummy, induced to control for the level of stock market development, indicates a positive and significant relationship with economic growth (see Table 9, columns 2 and 4). This indicates that economies with a high level of

Table 9: Empirical Results of the Panel data models with GMM estimation (all Asian economies)

	GDP growth per capita			
Variable	(1)	(2)	(3)	(4)
Financial development variables				
CD	-0.0264*** (-2.735)	-0.0252*** (-8.759)	-	-
LQD	-	-	-0.0400 (-1.446)	-0.0275*** (-2.896)
DUMMY	2.2482*** (10.713)	-	1.8237*** (4.007)	-
DUM*MRKCAP	-	0.006657*** (3.325)	-	0.0074** (1.864)
Control variables				
Lag of GDP growth	0.1644*** (24.154)	0.2002*** (115.240)	0.1538*** (22.658)	0.2064*** (27.597)
Lag of per capita GDP	-0.0004*** (-5.272)	-0.0002*** (-18.979)	-0.0003*** (-2.181)	-0.0002*** (-7.019)
GL	0.0235** (2.496)	0.0502*** (6.349)	0.0902*** (3.810)	0.0542*** (6.491)
PL	-0.1713*** (-14.826)	-0.0595*** (-17.596)	-0.1958*** (-10.188)	-0.0649*** (-5.074)
GOV	-0.4509*** (-9.941)	-0.3783*** (-42.554)	-0.4706*** (-4.774)	-0.3839*** (-16.237)
INF	-0.0007** (-2.148)	-0.0024*** (-7.653)	0.0002 (0.371)	-0.0025*** (-7.696)
TR	0.0586*** (6.157)	0.0340*** (9324)	0.0701*** (6.690)	0.0313*** (7.888)
Observations	976	976	962	962
J-statistic	31.1366	32.9006	33.6808	39.3361
Prob(J-statistic)	0.655199	0.569825	0.386049	0.207282

Note: t-values are in parentheses. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% levels respectively.

development in their stock markets tend to grow faster than those with low levels of development, by 0.0074% (see Table 9, column 4).

The banking sector development indicators are considered in Table 10; these are domestic credit to the private sector, and liquid liabilities. Even though these indicators are shown to be significantly related to economic growth at the 1% level (see Table 10, columns 1, and 2), the results indicate a negative relationship with growth. This can be explained by an increase in domestic credit to the private sector equating to 1% of GDP, which tends

to reduce GDP per capita growth by 0.0236%. A rise in liquid liabilities equating to 1% of GDP will decrease GDP per capita growth by 0.0171%. In other words, domestic credit to the private sector and liquid liabilities are shown to have a negative contribution towards economic growth, meaning that an increase in funding caused by a rise in credit does not support growth, and instead tends to impede it.

Table 10: Empirical Results of the Dynamic Panel Data Models with GMM estimation
(Selected Asian economies with stock markets)

	GDP growth per capita				
Variable	(1)	(2)	(3)	(4)	(5)
Financial development variables					
CD	-0.0236*** (-4.443)	-	-	-	-
LQD	-	-0.0171** (-1.850)	-	-	-
MRKCAP	-	-	0.0173*** (2.814)	-	-
ST	-	-	-	0.0394*** (2.667)	-
TO	-	-	-	-	0.0007 (0.517)
Control variables					
Lag of GDP growth	0.2003*** (62.058)	0.2069*** (13.594)	0.1191*** (5.679)	0.1166*** (3.873)	0.1798*** (21.514)
Lag of per capita GDP	-0.0002*** (-7.985)	-0.0002*** (-6.280)	-0.0005*** (-4.749)	-0.0004* (-1.937)	-0.0002 (-1.483)
GL	0.0545*** (5.658)	0.0585*** (6.657)	0.0477 (1.345)	0.0258 (0.266)	-0.0187 (-0.528)
PL	-0.0648*** (-10.064)	-0.0755*** (-4.770)	-0.0556 (-1.577)	-0.0325 (-0.595)	-0.0409 (-0.792)
GOV	-0.3898*** (-10.006)	-0.4059*** (-4.437)	-0.7204*** (-9.951)	-1.1872*** (-7.263)	-0.5284*** (-5.860)
INF	-0.0020*** (-3.459)	-0.0025*** (-4.454)	-0.0061 (-0.871)	-0.1520*** (-3.830)	-0.0373** (-2.072)
TR	0.0412*** (7.201)	0.0364*** (5.515)	0.0388** (2.458)	0.0187 (0.497)	0.0375*** (4.184)
Observations	976	962	539	460	548
J-statistic	35.0970	32.3912	23.7023	19.0117	23.1702
Prob(J-statistic)	[0.463]	[0.594]	[0.363]	[0.327]	[0.392]

Note: t-values are in parentheses. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% levels respectively.

Furthermore, the dynamic panel data model was estimated using alternative measures for stock market development, namely stock market capitalization, total value of stock traded, and the turnover ratio. The results shown in Table 10 (columns 3, 4, and 5) indicate that stock market capitalization and the total value of stock traded have a positive relationship at the 1% significance level, meaning that when stock market capitalization expands by 1% of GDP, growth per capita rises by 0.0173%. This finding supports the finding that a 1% increase in GDP to the total value of stock traded results in a 0.0394% increase in GDP per capita growth rate. Finally, the positive coefficients of the stock market development indicators according to the GMM, indicate that when stock market development increases to a higher level, it leads to greater economic growth. In other words, stock market development can boost growth by enhancing investment.

5. CONCLUSION

This study investigated the relationship between financial development and economic growth, employing several econometric methodologies. These consisted of dummy variables for economies without well-developed stock markets, causality tests, fixed effect panel data models, and a dynamic panel data model with GMM estimation.

The main findings revealed that when considering the models with the dummy variables, Asian economies with well-developed stock markets were found to grow faster than those without. Moreover, the interaction dummies were shown to have a positive and significant relationship with economic growth, implying that economies with highly developed stock markets tend to experience faster economic growth than those with low level stock market development.

Secondly, the results of several financial development indicators were compared, and contrasting evidence found concerning the hypothesis that banking sector development can promote economic growth in Asia. Indeed, banking sector development indicators were found to have a negative effect on economic growth, meaning that an increase in credit slows economic growth. These results support the findings of Cournède (2015) who argued that bank credit does not promote economic growth as it consists of low-quality credit allocated to households rather than productive business credit. Conversely, for the stock market development indicators, a positive relationship was found between stock market capitalization and the total

value of stock traded. Moreover, the results also showed the casual effect of stock market capitalization on economic growth. These results support the argument that the development of stock markets is key to growth enhancement in Asian economies.

Consequently, this study provides important policy implications. Stock market development is found to be a crucial aspect of financial development in Asia. Economic growth in Asia is affected by the existence of stock markets and the level of stock market capitalization. Hence, governments of Asian economies should emphasize stock market promotion as a central aspect of their financial development plans. For example, the establishment of stock markets should be accelerated in economies currently without them, and progress facilitated in those with low level stock market development. For Asian economies with stock markets, government policies, such as tax incentives, may be required to accelerate the growth of stock market capitalization. Such policies can have a positive effect on long-term economic growth.

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