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The Impact of Credit and Stock Market Development on Economic Growth in Asian Countries*

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Abstract

The paper has used the Solow-Swan growth model to analyze the long-term impact of credit market development and stock market development on economic growth in Asia from 2000 to 2019. The empirical model is performed with panel cointegration analysis by Common Correlated Effects (CCE) method with cross-sectional dependencies. The results find that there exists a cointegration relationship among stock market, credit market development, and economic growth. These results also show that financial structure improves the exact impact of financial development on economic growth, namely the opposite effect of stock market development and credit market development. Moreover, the Granger causality test reveals a bi-directional relationship between credit market development and economic growth, while only unidirectional causality from stock market development to economic growth for the whole group panel. And it is different for a specific country, according to Kónya's test. The view of the new structuralism does not apply in the Asian financial system when we estimate the Nonlinear Autoregressive Distributed Lag model (NARDL) to analyze the asymmetric relationship between financial structure and economic growth. On the whole, policymakers can draw on the findings to provide policy implications to improve their country's financial system as well as pursue the goal of sustainable economic growth.

Keywords: Credit Market, Stock Market, Economic Growth, Asian Countries

JEL Classification Code: G10, O16, O40

1. Introduction

The relationship between financial development and economic growth is always been one of the interesting topics in academic discussions throughout the centuries. One of the leading views on economics is that financial development is conducive to economic growth. This view is deeply proposed by Schumpeter (1911), who claims that increasing the availability of financial institutions and financial instruments reduces transaction costs and information costs. He argued that banks are the most important driver behind economic growth as they finance and support technological innovations for the efficient production of goods. In general, there are four perspectives on the relationship between financial development and economic growth. First, financial development is a driver of economic growth (Hick, 1969; Shaw, 1973; King & Levine, 1993; Beck & Levine, 2004). Second, economic growth is a driver of financial development (Goldsmith, 1969; Robinson, 1979; Ang & McKibbin, 2007). Third, it is the bidirectional causal relationship between finance and growth (Ang, 2008). The final view holds that there is no causal relationship between financial development and economic growth, neither of which has any significant influence on the other (Ductor & Grechyna, 2015; Akbas, 2015).

The structure of the financial sector determines the impact of financial development on economic growth, as economists debate the advantages of one structure over another (Lin et al., 2009). In this sense, financial development is often associated with a transition from a bank-based financial system to a market-based financial

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system (Panizza, 2014). Theoretically, characterized by the type of institutions, the financial system is categorized into two main groups: bank-based financial and market-based financial system (Goldsmith, 1969). In the former, financial intermediaries are crucial in mobilizing savings, allocating capital, and facilitating hedging, and providing diversification risk (Levine, 2002). By contrast, the latter is characterized by an advanced stock market and banking system, in which banks still play a dominant role in capital allocation. However, banks are still less important than the stock market because companies mainly rely on external funding raised from the stock market.

Many previous studies, when analyzing economic growth with financial structure appearance, mainly consider whether the bank-based system and market-based system are complementary or alternative, and either of them or bank-based system or market-based system will promote economic growth. In general, there are three main views regarding this issue. First, some economists emphasize the advantages of a bank-based financial system (Demirguc-Kunt & Levine, 2001; Levine, 2002;) while others argue in favor of the stock market (Beck & Levine, 2004; Levine, 2005; Trehan, 2013; Castro et al., 2015; Luintel et al., 2016; Liu & Zhang, 2020). Second, both bank-based and market-based are necessary for economic growth. They complement each other instead of replacing (Blackburn et al., 2005; Oima & Ojwang, 2013). Third, differences in financial structure are thought to be unrelated to economic growth (Beck et al., 2000; Demirguç-Kunt & Maksimovic, 2002; Beck & Levine, 2002; Ndikumana, 2005). At that time, a question was raised to find whether the financial structure of the countries still affected economic growth. Do the different financial structures improve the exact impact of financial development on economic growth?

Besides that, Lin and Monga (2010) proposed a new structuralism view that shows at each stage of economic development, the structure of preferential factors determines the structure of the economy. The respective sectoral structure of the economic system is based on the comparative advantage approach, thereby determining the corresponding financial structure. In other words, the real sector is considered to be the main determinant of the structure of the financial system. Therefore, financial structure is viewed as an endogenous and dynamic process, determined by the demand for different types of specific financial services, and associated with each stage of economic development. The financial system originally operates as a bank-based system to provide financial services. As the economy grows, with greater capital accumulation, it has switched towards a market-based model. Thus, a question arises whether countries, in their process of economic development, have a bank-based or a market-based financial system throughout the process, or depending on each stage of economic development. Will there be a change in the transformation of the financial structure of a country's financial system?

For the Asian region, although there are many emerging economies with high growth rates and tremendous investment attraction, the recent practical analysis shows that the growth rate in Asia is on a downward trend as in Figure 1.

The number of official published empirical studies on this topic is quite small for Asian countries; however, it has successfully attracted the attention of researchers such as Ang (2009), Kumar and Paramanik (2020), and Camba and Camba (2020). These studies only mainly focus on individual countries; therefore, it is not possible to draw comprehensive conclusions. Besides that, according to Asian Development Bank (ADB), if the financial development is too much, Asian countries are recommended to increase

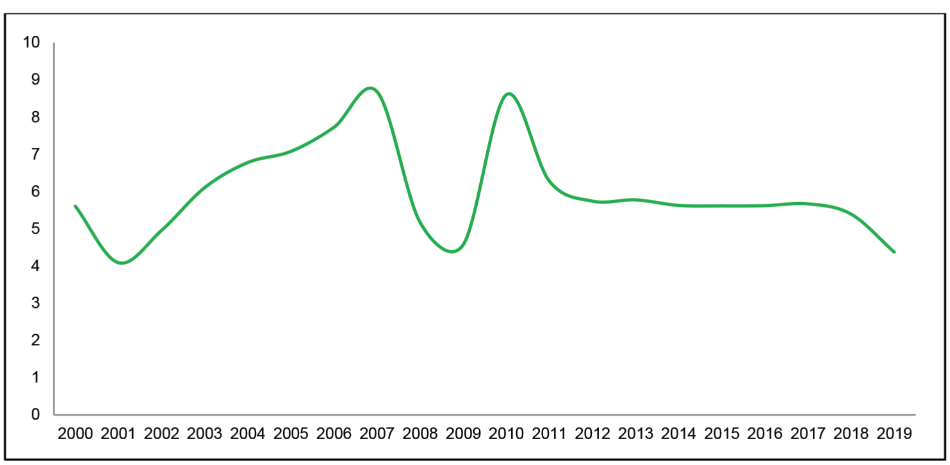

Figure 1: GDP Annual Growth Rate in Asia (%)

Note: The raw data was obtained from the IMF database.

their financial development because the empirical results, cited by these experts show that the financial development of Asian countries is still significantly lower than Europe and the US, that financial development has a significant positive correlation with economic growth. So where is the right direction for Asian economies?

The study is organized as follows. Section 2 describes the literature review; in Section 3 we detail the sample, proxy variable measurement, and the econometric models; We report the results in Section 4 and discuss concluding remarks in Section 5.

2. Literature Review

In general, studies that analyze bank-based or market-based financial systems are both important issues for economic growth. Many researchers still prefer the bank-based to the market-based system (Hoshi et al., 1990; Morck & Nakamur, 1999; Demirguc-Kunt & Levine, 2001; Levine, 2002). Hoshi et al. (1990) supposed banks are likely to make long-term investments in the real sector, while investments in market-based system setups may be overly sensitive to stock market prices. From the perspective of Morck and Nakamura (1999), debt issuers who work in financial institutions are more cautious. Even in times of economic crisis, close links between banks and businesses can allow firms to continue investing without causing them to go bankrupt (Demirguc-Kunt & Levine, 2001). In addition, banks provide mobilized capital to benefit from the economic size (Levine, 2002). Besides that, Levine (2005) supposed that financial intermediaries had a negative influence on companies that could exist in bank-based systems.

On the contrary, the preponderance of financial strength held by the stock market and economic performance depends on how good or bad the stock market is (Trehan, 2013). Castro et al. (2015) also emphasized the role of the market-based system when it comes to reducing the dependence on internal capital. This system extended the effects of sizable economic in high-income countries (Luintel et al., 2016). According to Liu and Zhang (2020), a market-based system promoted more the development of the Chinese economy than bank-based.

Meanwhile, several studies emphasize the complementary effects of bank-based and market-based in the overall financial system on economic growth (Blackburn et al., 2005; Oima & Ojwang, 2013, Gambacorta et al., 2014). Accordingly, Blackburn et al. (2005) found the banking system to complement the stock market rather than as substitutes for each other. Oima and Ojwang (2013) argued that capital provided is mainly by the banking system or the capital market, which is not so important, but the quality of financial services is really meaningful. This leads to an emphasis on the importance of creating efficient banking systems and capital markets instead of choosing a financial structure. Gambacorta et al. (2014) demonstrated that both bank and stock market promote economic growth up to a certain aggregate funding limit. Beyond this limit, neither bank nor market expansion leads to real growth. By contrast, Bose and Neumann (2015) argued that there is no optimal financial structure for all countries.

In addition to individual studies highlighting the impact of a bank-based or a market-based financial system on economic growth, several studies emphasize the importance of the stage of economic development in determining the financial structure (Demirguc-Kunt et al., 2011; Lee, 2012). To clarify how financial structure and economic growth are interrelated, new structuralism has been proposed. Specifically, Allen and Gale (2000) investigated the relationship between financial structure and the real economy in 93 countries from 1976 to 2004. They hypothesized that the demand for financial services that is originated in the real sector should be a structure of a financial system. Their findings suggested the relationship between financial structure and the real economy. In other words, the structure of the real economy is an important factor affecting the financial structure. Demirguç-Kunt et al. (2011) used new data collected from approximately 150 countries to illustrate how different financial systems in the world are. They found banks, other financial intermediaries, and stock markets all grew and operated more efficiently as countries became richer. As income increases, the financial industry develops. In higher-income countries, the stock market becomes more active and efficient than banks. Therefore, financial systems tend to be more market-based. In contrast, Lee (2012) uses time series to analyze the impact of financial structure on economic development. He demonstrates that the banking sector plays an important role in promoting growth during the early stages of economic expansion, while the market plays an important role in promoting growth in the early stages of economic expansion for all countries. Markets and banks complement each other during periods of economic growth. This finding is partly consistent with the new structural perspective.

Seven and Yetkiner (2017) analyzed the impact of financial structure on economic growth in a group of countries based on income level. They reported that banking development is conducive to growth in low- and middle-income countries, but harmful in high-income countries. On the contrary, they showed that the development of the stock market favors growth in the middle- and high-income countries. Sahay et al. (2015), also found a nonlinear relationship between the financial system and economic growth. According to Bist (2018), a common problem with studies on thresholds in the finance-growth nexus is that they are performed on heterogeneous groups of countries (high or middle- or low-income countries). Thus, the threshold is no longer an important issue in current finance–growth studies.

3. Research Methodology

3.1. Data

The paper uses data from Asian countries from 2000 to 2019 (Table 1). To analyze the impact of the credit market and stock market development on economic growth, we excluded countries with no stock market and no completed information provided. Finally, our sample includes 18 countries (China, India, Indonesia, Iran, Israel, Japan, Jordan, Kazakhstan, Korea, Malaysia, Pakistan, Philippines, Saudi Arabia, Singapore, Sri Lanka, Thailand, UAE, Vietnam). Data is compiled from World Development Indicators and Global Financial Development Database. In particular, the economic growth variable (LnY) is calculated based on the natural logarithm of real gross domestic product (GDP) per capita. The credit market development (LnCM) is measured as the natural logarithm of the ratio of domestic credit to the private sector to GDP. The stock market development is computed as the stock market capitalization to GDP ratio (LnSM). LnP is defined as the growth rate of the employed population.

3.2. Model and Methodology

To examine the impact of financial development on economic growth when it is affected by financial structure, we use the Solow-Swan growth model developed by Durusu-Ciftci et al. (2016) to analyze the long-term impact of credit and stock market development on economic growth (see Appendix A for more information):

$$\begin{aligned}\mathrm{Ln}Y_{it} &= \beta_0 + \beta_1 \mathrm{LnCM}_{i,t} + \beta_2 \mathrm{LnSM}_{i,t} \\ &\quad + \beta_3 \mathrm{Ln}(\eta_{i,t}\,(1+x) + \delta + x) + \varepsilon_i\end{aligned} \tag{1}$$

Where: $\beta_0 = \mathrm{Ln}A_0 + (1+x)_t$

$$\beta_1 = \frac{\delta\alpha}{1-\alpha}$$

$$\beta_2 = \frac{(1-\delta)\alpha}{1-\alpha}$$

β_1, β_2, β_3 measures the contribution of credit market development, stock market development, and the growth rate of the employed population; η: population growth rate; δ: the rate of depreciation; x: growth rate of technology; $x + \delta = 0.05$ (Mankiw et al., 1992).

3.3. Econometric Method

Pesaran (2004) introduced the cross-sectional dependence (CD) test which applied to both large and small cross-sectional dimensions and provides results for balanced and unbalanced panel data. This test provides an error term based on the cointegration test for panel data and gives strong results in small samples. This test is based on the sum of squares of the correlation coefficients between the residuals and can be formulated as follows:

$$CD = \sqrt{\frac{2T}{N(N-1)}}\left[\sum_{i=1}^{N-1}\sum_{j=i+1}^{N} T\,\hat{\rho}_{ij}\right] \quad N(0,1) \tag{2}$$

Where: $\hat{\rho}_{ij}$ is the estimated correlation coefficient between the residuals of the individual OLS estimates.

If there is cross-sectional dependency in panel data, first-generation unit root tests cannot be used. In this case, the second-generation unit root tests are like the cross-sectional augmented Dickey-Fuller (CADF) test and the cross-sectional augmented IPS (CIPS) test of Pesaran (2007). The CIPS test is a simple average of individual CADF regression as follows:

$$\mathrm{CIPS} = \frac{1}{N}\left[\sum_{i=1}^{N}\tilde{t}_i\right] \tag{3}$$

Where: $\tilde{t}_i$ is the ordinary least squares t-ratio of b_i in the CADF regression:

$$\begin{aligned}\Delta y_{it} &= \alpha_i + b_i y_{i,t-1} + c_i \bar{y}_{t-1} \\ &\quad + \sum_{j=0}^{qi} d_{ij}\Delta\bar{y}_{t-j} + \sum_{j=0}^{qi}\delta_{ij}\Delta y_{i,t-j} + \varepsilon_{it}\end{aligned} \tag{4}$$

Where: $\Delta\bar{y}_{t-j}$ is delays of differences

$\Delta\bar{y}_{i,t-j}$ is the value of one term delay of $\Delta\bar{y}$

Table 1: Descriptive Statistics

Variables	Obs	Mean	Std.Dev	Minimum	Maximum
LnY	360	12.737	2.864	7.066	19.501
LnCM	360	4.141	0.644	2.323	5.358
LnSM	360	3.811	1.029	−0.895	5.715
LnP	360	0.267	0.824	−3.292	2.748

If all series are integrated at order one, then cointegration analysis should be performed in the next step (Pesaran, 2007), which considers cross-sectional dependency is needed to use. A cross-sectional dependency could be explained that in a situation in which units forming panel are affected by a shock, then the other units of the panel are affected as well.

3.3.1. Cointegration Analysis

Westerlund (2005) assumed panel-specific cointegrating vectors where all panels have individual slope coefficients. Westerlund derives variance ratio test statistics based on a model in which the AR parameter either is panel-specific or is the same over the panels. Pesaran (2006) proposed Common Correlated Effects (CCE) estimation procedure to test the long-run relationship with cross-sectional dependence. This test can be computed by least squares applied auxiliary regressions. The observed regressors are augmented with the cross-section averages of the dependent variable and the observed regressors as proxies for the unobserved factors.

3.3.2. Causality Analysis

Both Kónya (2006), Dumitrescu and Hurlin (2012) introduced an approach to the Granger causality test with cross-sectional dependence. Whereas Dumitrescu and Hurlin (2012) offer a Granger causality test for heterogeneous panels which is based on the stationary fixed-effects panel model. This test has a strong result under the conditions of cross-sectional dependency with the Monte Carlo simulations as follows:

$$y_{i,t} = \sum_{k=1}^{K} \gamma_{i,k} y_{i,t-k} + \sum_{k=1}^{K} \beta_{i,k} x_{i,t-k} + \varepsilon_{i,t} \tag{5}$$

Where: K stands for the lag length.

$\gamma_{i,k}$ is an autoregressive parameter.

$\beta_{i,k}$ is the regression coefficient pitch changing among the groups.

The average statistic $Z_{N,T}^{\text{HNC}}$ with asymptotic distribution is used when $T > N$ as defined as:

$$Z_{N.T}^{\text{HNC}} = \sqrt{\frac{N}{2K}}\left(W_{N.T}^{\text{HNC}} - K\right) \qquad T, N \to \infty \quad N(0,1) \tag{6}$$

If $T > 5 + 2K$, the average statistic with semi-asymptotic distribution is used when $N > T$ as defined as:

$$Z_{N,T}^{\text{HNC}} = \frac{\sqrt{N} W_{N,T}^{\text{HNC}} - \frac{1}{N}\sum_{i=1}^{N} E(W_{i,T})}{\sqrt{\frac{1}{N}\sum_{i=1}^{N} \text{Var}(W_{i,T})}} \qquad N \to \infty \quad N(0,1) \tag{7}$$

Where: The average statistic: $W_{N,T}^{\text{HNC}} = \frac{1}{N}\sum_{i=1}^{N} W_{i,T}$; $E(W_{i,T})$ and $\text{Var}(W_{i,T})$ denote the mean and the variance of the statistic $W_{i,T}$.

If there is a cross-sectional dependence, then 5% of the approximated value and 5% of the simulated critical values are used.

By contrast, Kónya's approach allows the identification of a specific country with Granger causality. This bootstrap panel causality procedure has three advantages. First, Zellner (1962) proposed the approach by the seemingly unrelated regression (SUR), which is more effective than OLS if cross-sections are dependent. Second, the causality test is based on the Wald test with bootstrap critical values to a specific country. That is why it does not impose a general hypothesis for specific countries in which Granger causality can be determined. Last, this process does not require any pretense for panel unit root test or cointegration. By contrast, ignoring potential trends leads to situations in which the results of the proposed method can only be used to evaluate short-term causality. This bootstrap panel causality approach is calculated as a system of two sets of the following equations:

$$\begin{aligned}
y_{1,t} &= \alpha_{1,1} + \sum_{i=1}^{ly_1} \beta_{1,1,i} y_{1,t-i} + \sum_{i=1}^{lx_1} \gamma_{1,1,i} x_{1,t-i} + \varepsilon_{1,1,t} \\
y_{2,t} &= \alpha_{1,2} + \sum_{i=1}^{ly_1} \beta_{1,2,i} y_{2,t-i} + \sum_{i=1}^{lx_1} \gamma_{1,2,i} x_{2,t-i} + \varepsilon_{1,2,t} \\
&\vdots \qquad \vdots \qquad \vdots \qquad \vdots \\
y_{N,t} &= \alpha_{1,N} + \sum_{i=1}^{ly_1} \beta_{1,N,i} y_{2,t-i} + \sum_{i=1}^{lx_1} \gamma_{1,N,i} x_{N,t-i} + \varepsilon_{1,N,t}
\end{aligned}$$

and

$$\begin{aligned}
x_{1,t} &= \alpha_{2,1} + \sum_{i=1}^{ly_2} \beta_{2,1,i} y_{1,t-i} + \sum_{i=1}^{lx_2} \gamma_{2,1,i} x_{1,t-i} + \varepsilon_{2,1,t} \\
x_{2,t} &= \alpha_{2,2} + \sum_{i=1}^{ly_2} \beta_{2,2,i} y_{1,t-i} + \sum_{i=1}^{lx_2} \gamma_{2,2,i} x_{1,t-i} + \varepsilon_{2,2,t} \\
&\vdots \qquad \vdots \qquad \vdots \qquad \vdots \\
x_{N,t} &= \alpha_{2,N} + \sum_{i=1}^{ly_2} \beta_{2,N,i} y_{N,t-i} + \sum_{i=1}^{lx_2} \gamma_{2,N,i} x_{N,t-i} + \varepsilon_{2,N,t}
\end{aligned} \tag{8}$$

Where: lx and ly to the optimal lag lengths.

Because the results of the causality test may be sensitive to the lag structure, it is crucial to select the number of the optimal lag length (lx, ly). Then, the Akaike information criterion (AIC) is used to select optimal lags.

4. Results

The result of Table 2 shows that all the variables have rejected the null hypothesis of non-cross-sectional dependence at a 1% level of significance. The Pesaran

CD test reveals strong evidence of cross-sectional dependence among the panel. This means that any shock in one country is being transmitted to another one in Asian countries. This finding shows we should conduct the second-generation unit root tests and Westerlund panel cointegration test which add robustness between the cross-sectional dependency in the panel.

Table 3 lists the outcomes of the CIPS and CADF unit root test. The results show that all the variables are stationary at first difference with 1% significance level (with CIPS unit root test) and 5% significance level (with CADF unit root test). Therefore, these results of the second-generation unit root test support contention that variables under investigation are all I (1) variables.

As can be seen from the results in Table 4 by the Westerlund panel cointegration test, the findings indicated evidence of the absence of cointegration for both some panels and all panels at the 1% level. Thus, there is the existence of cointegration between credit market development and stock market development, and economic growth.

Table 5 reports panel estimation result for the model given by the CCE method. The empirical evidence from model estimation indicates that there is a positive and significant long-run impact of stock market development on steady-state level of GDP per capita. In particular, a 1% increase in stock market development of Asian countries will promote their average GDP per capita growth by 0.029%. These results indicate that the stock market is of vital importance in facilitating finance-growth nexus, as well as playing a crucial role in supporting our theoretical expectation that stock market development has a positive impact on economic growth and is consistent with Luintel et al. (2016) and Durusu-Ciftci et al. (2016). In addition, there is a negative and significant relationship between credit market development and GDP per capita. While this finding is assessed for the entire group of Asian countries, it will differ significantly for each individual country. Therefore, we continue to analyze the Granger Causality test proposed

Table 2: Cross-Sectional Dependence Test Results of the Model

Panel A		
Variables	**CD_Test**	***p*_value**
LnY	47.797***	0.000
LnCM	7.799***	0.000
LnSM	28.38***	0.000
LnP	7.442***	0.000
Panel B		
	CD_Test	**p_value**
Model	26.347***	0.000

Note: Panel A reports the CD test developed by Pesaran (2004) for individual variables and Panel B reports the CD test for the Fixed Effect model. Hausman test is used to choose between Fixed Effect and Random Effect. ***, **, and * denote statistical significance of the coefficients at 1%, 5%, and 10% levels respectively.

Table 3: Panel Unit Root Test

Panel A	**CIPS (Constant)**		**CIPS (Constant & Trend)**	
	Level	**Different**	**Level**	**Different**
LnY	−2.395**	−3.478***	−2.675*	−3.590***
LnCM	−2.094	−3.556***	−2.624	−3.626***
LnSM	−1.979	−3.831***	−2.374	−3.774***
LnP	−1.636	−2.526***	−1.789	−2.353
Panel B	**CADF (Constant)**		**CADF (Constant & Trend)**	
LnY	0.069*	0.038**	0.224	0.715
LnCM	0.332	0.000***	0.884	0.014**
LnSM	0.173	0.000***	0.213	0.004***
LnP	0.191	0.000***	0.000***	0.000***

Note: Panel A reports the results of CIPS unit root tests of Pesaran (2007), the CIPS statistics are also reported in the table. Panel B reports the results of CADF unit root tests, *p*_value is also reported. The number of lags included lags is specified by the Akaike information criterion (AIC). ***, **, and * Denote statistical significance of the coefficients at 1%, 5%, and 10% levels respectively.

Table 4: Cointegration Analysis Results

	Some Panels	All Panels
Variance ratio	2.783*** (0.003)	3.336*** (0.000)

Note: Panel reports the result panel cointegration analysis of Westerlund with the cross-sectional dependence. ***, **, and * denote statistical significance of the coefficients at 1%, 5%, and 10% levels respectively.

Table 5: Panel Estimation Results for the Model Given by CCE

	LnSM	LnCM	LnP
	0.029* (0.067)	−0.111* (0.052)	0.007 (0.952)
p_value (CD statistic)	0.4876		

Note: Figures in parenthesis are *p*-value. ***, **, and *denote statistical significance of the coefficients at 1%, 5%, and 10% levels respectively.

Table 6: The Bootstrap Panel Granger Causality Results with Cross-Sectional Dependence for all Panels

	Wald Statistics	Bootstrap Critical Values	*p*-value
H0: Stock market development does not Granger cause Economic growth	10.005	9.008*	0.084
H0: Economic growth does not Granger cause Stock market development	2.998	5.994	0.142
H0: Credit market development does not Granger cause Economic growth	12.364	12.546**	0.028
H0: Economic growth does not Granger cause Credit market development	19.447	23.17***	0.002

Note: The bootstrap *p*-value was generated with 500 replications. ***, **, and *denote statistical significance of the coefficients at 1%, 5%, and 10% levels respectively.

by Kónya (2006) and Dumitrescu and Hurlin (2012) with cross-sectional dependence for all groups and specific countries (Tables 6 and 7).

The obtained results in Table 6 showed strong evidence of bidirectional causality between credit market development and economic growth. However, there is only a unidirectional Granger causality from stock market development to economic growth. For each specific country, the results in Table 7 confirm a bidirectional causality between financial development and economic growth in Indonesia (for the stock market and credit market development), Jordan, and Thailand (for stock market development). Besides, the empirical evidence also showed a unidirectional causality relationship from stock market development to economic growth in India, Japan, Israel, Kazakhstan, Malaysia, and UAE.; between credit market development and economic growth in India, Iran, Jordan, Pakistan, and Vietnam. Hence, we may deduce that the stock market capitalization to GDP ratio, which measures stock market development, and the credit to the private sector to GDP, which measures credit market development, can both influence economic growth. The results support the argument of Trehan (2013), that is the superiority of the financial power which is held by the stock market and economic performance depends on how good or poor the stock market is. In addition, the result shows that economic growth could play an important role in stock market development (Iran, Korea, Philippines) and credit market development (Isreal, Japan, Korea, Malaysia, Saudi Arabia, and UAE). By contrast, any development of the stock market and bank market (economic growth) is expected to have a negligible effect on economic growth (stock market and bank market) for other countries in the sampling data.

In addition, the view of new structuralism argues that the structure of the bank-based financial system is in the early stages of economic development, followed by the market-based in advanced stages (Lin, 2010; Demirguc-Kunt et al., 2011; Lee, 2012). Therefore, the structure of the financial system changes over time and involves a change in real economic development. Shin et al. (2014) who approached and developed the Nonlinear

Table 7: The Bootstrap Panel Granger Causality Results for a Specific Country

	H0: Stock Market Development does not Granger Cause Economic Growth		H0: Economic Growth does not Granger Cause Stock market Development		H0: Credit Market Development does not Granger Cause Economic Growth		H0: Economic Growth does not Granger Cause Credit Market Development	
	Wald Statistic	*p*-value	Wald Statistic	*p*-value	Wald Statistic	*p*-value	Wald Statistic	*p*-value
China	0.752	0.410	3.024	0.134	0.813	0.422	3.659	0.358
India	6.913**	0.018	0.704	0.428	21.235***	0.002	0.823	0.386
Indonesia	17.043***	0.000	6.056**	0.050	12.880***	0.004	7.403**	0.026
Iran	0.871	0.346	11.865***	0.008	3.628*	0.062	3.959	0.106
Israel	13.962***	0.002	0.052	0.848	0.177	0.674	9.156***	0.006
Japan	5.262**	0.036	0.084	0.770	0.046	0.834	5.039**	0.042
Jordan	18.936***	0.000	11.956**	0.028	22.193***	0.002	1.545	0.218
Kazakhstan	6.481**	0.024	0.018	0.932	0.946	0.366	15.370***	0.006
Korea	0.788	0.424	5.020*	0.064	0.507	0.526	7.419***	0.010
Malaysia	26.669***	0.002	0.602	0.440	0.083	0.822	5.157**	0.036
Pakistan	1.439	0.26	0.228	0.692	16.438***	0.000	2.998	0.212
Philippines	1.753	0.216	5.945*	0.078	0.267	0.628	18.830***	0.002
Saudi Arabia	2.879	0.100	0.017	0.882	0.760	0.366	3.393*	0.090
Singapore	0.542	0.434	0.676	0.444	0.001	0.988	2.757	0.130
Sri Lanka	9.628***	0.006	0.093	0.816	2.110	0.152	2.135	0.418
Thailand	8.669**	0.020	4.193*	0.066	0.607	0.470	18.436***	0.004
UAE	5.193**	0.030	0.284	0.638	1.056	0.348	19.639***	0.000
Vietnam	1.205	0.284	3.149	0.338	60.076***	0.000	0.6422	0.500

Note: ***, ** and * denote statistical significance of the coefficients at 1%, 5% and 10% levels respectively. The bootstrap *p*-value was generated with 500 replications.

Autoregressive Distributed Lag model (NARDL) allows us to analyze the relationship among variables that are linear or nonlinear, symmetric, or asymmetric in both short-term and long-term while preserving all values of the standard ARDL method. To test this point, we select countries where economic growth has an impact on the development of the credit market and stock market to find whether new structuralism exists in these countries (Indonesia, Korea, Phillippines, Thailand). Based on the model of Lee (2012):

$$F_i = f\,(\mathrm{LnY}^-, \mathrm{LnY}^+)$$

Where: F_i is the ratio of the combined financial structure of both the bank and market indices is measured by the stock market capitalization ratio on private credit.

NARDL model (p, q) based on extending linear ARDL model by the following formula (see Table 8):

$$\Delta Fi_t = \rho Fi_{t-1} + \sum_{j=1}^{p-1} \gamma_t \Delta Fi_{t-j} + \theta^+ LnY_{t-1}^+ + \theta^- LnY_{t-1}^- + \sum_{j=0}^{q-1} \left(\varphi_j^+ \Delta LnY_{t-j}^+ + \varphi_j^- \Delta LnY_{t-j}^- \right) + \varepsilon_t$$

Where:

The asymmetric distributed lag parameters: θ^+, θ^-

The long-run negative and positive coefficients:

$$\hat{\beta}^+ = -\theta^+ / \rho \text{ and } \hat{\beta}^- = -\theta^- / \hat{\rho}$$

To determine which country has a financial system as the view of new structuralism, we consider the long-run and

Table 8: Results of Testing NARDL Model

DFi	Indonesia	Korea	Philippines	Thailand
Fi_{t-1}	−3.421** (0.017)	−1.403* (0.033)	−2.212** (0.004)	−2.02 (0.029)
LnY^{+}_{t-1}	−7.714 (0.202)	10.734 (0.232)	14.67* (0.449)	−2.978 (0.580)
LnY^{-}_{t-1}	−4.805 (0.269)	9.634 (0.197)	18.07 (0.334)	−2.319 (0.618)
dFi_{t-1}	1.506* (0.057)	−0.075 (0.836)	0.549 (0.137)	0.175 (0.683)
$dLnY^{+}$	1.78 (0.865)	5.049 (0.265)	−6.77 (0.642)	1.351 (0.77)
$dLnY^{-}$	−5.001 (0.425)	3.225 (0.52)	0.707 (0.517)	3.008 (0.414)
F_{PSS}	6.891	3.855	5.452	2.5977
$L_{LnY}{}^{+}$	−2.255 (0.252)	7.652 (0.320)	6.631 (0.419)	−1.474 (0.595)
$L_{LnY}{}^{-}$	1.405 (0.317)	−6.868 (0.292)	−8.167 (0.292)	1.148 (0.632)
W_{LR}	1.43 (0.298)	0.3693 (0.560)	2.128 (0.183)	0.547 (0.481)
W_{SR}	2.476 (0.191)	0.567 (0.473)	1.641 (0.236)	0.052 (0.825)
χ^2(PT)	0.573	0.4635	0.11	0.786
χ^2(HT)	0.68	0.1127	0.036	0.705
F_test	0.888	0.5611	0.855	0.718
JB	0.569	0.8170	0.1261	0.657

Note: The dependent variable DF_i, F_i is the financial structure ratio variable, LnY is the economic growth variable. LnY^{+}, LnY^{-} long-run positive and negative components. WLR, WSR is the Wald test of long-run and short-run symmetry. FPSS is the *F*-statistic value according to Shin et al. (2014). The 5% critical values of upper and lower bounds for $k = 1$ tabulated by Peseran et al. (2001) are 4.94 and 5.73, respectively. χ^2 (PT) is a series correlation test, χ^2 (HT) is a Breusch-Pagan test of variance change, *F*-test is a Ramsey RESET test, JB tests normal distribution. ***, **, and * denote statistical significance of the coefficients at 1%, 5%, and 10% levels respectively.

short-run coefficients in both high and low regimes ($L_{LnY}{}^{+}$, $L_{LnY}{}^{-}$, $dLnY^{+}$, $dLnY^{-}$). If the coefficient is negative and significant, it indicates that there is a bank-based financial system for that country. And the lower magnitude in the higher regime or the value changes from negative to positive implies a tendency towards the market-based financial system in the advanced stages of economic development. Therefore, we conclude that the view of new structuralism is valid for the financial system of that country. The regression results from Table 8 show that none of the selected countries in Asia has the financial system as the view of the new structuralism. The countries have either a bank-based or a market-based financial system.

5. Conclusion

This paper examines the relationship between the credit market and stock market development and economic growth in Asian countries from 2000 to 2019. The results fill the gaps that previous studies overlooked when analyzing finance - growth nexus in Asia. Firstly, we used the Solow-Swan growth model to analyze the long-term impact of the credit market and stock market development on economic growth. The empirical model is performed with panel cointegration analysis by the CCE method with cross-sectional dependencies. The results find that there exists a cointegration relationship among stock market, credit market development, and economic growth. The empirical evidence from the CCE model estimation indicates that there is a positive and significant long-run impact of stock market development on steady-state level of GDP per capita, in line with Luintel et al. (2016) and Durusu-Ciftci et al. (2016). Hence, the results find a negative impact of credit market development on economic growth Thus, these findings reveal that, for the entire group panel, financial structure increases the exact impact of financial development on economic growth, meaning the opposing effect of stock market development with credit market development, although this is different for each country.

Second, the findings also confirm a bidirectional causality between stock market development and economic growth in Kazakhstan, the Philippines, and Thailand. The empirical evidence also shows a unidirectional causality relationship from stock market development (credit market development) to economic growth and vice versa in some Asian countries. Therefore, financial development is a cause as well because of economic growth in these countries.

Finally, we examined the view of new structuralism as advanced by Lin (2010) performing the NARDL model. This method gives the ability to capture the effect through differing stages of economic development on the financial structure in some Asian countries where have an impact of economic growth on financial structure with bank-based or market–based. The findings find that there does not exist the view of new structuralism in the analyzed countries.

The current situation of developing Asian countries, providing capital for the economy mainly depends on the banking system but empirical evidence finds a negative effect of the bank-based financial system on economic growth for the whole group, and it could be negative or positive for a specific country. This may be explained by the fact that these markets are not developed equally, and do not create a real competitive environment for capital. Thus, each country needs to have its own financial system development strategy. Specifically, some countries should only focus on financial development in depth, increasing efficiency and value, the others can do both depth development and expansion in scale. On the other hand, the research results imply that to pursue the goal of sustainable economic growth, it should reduce the gap with the developed countries in the world. However, Asian countries should avoid excessive financial development and rapid development at all costs, as the financial system's positive role in stimulating economic development will be lost.

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Appendix A

Solow-Swan growth model developed by Durusu-Ciftci et al. (2016) assumed that investment is financed by Cobb-Douglas function, a combination of debt and equity, as follow:

$$Y_0 = K_t^{\alpha} + \left(A_t L_t\right)^{1-\alpha} \quad 0 < \alpha < 1$$

Where: Y_t is output, K_t is physical capital, L_t is labor force, A_t is the overall technological progress and α is the production elasticity of capital.

And if: $\frac{A_{t+1}}{A_t} = 1 + x; \ \frac{L_{t+1}}{L_t} = 1 + \eta;$

Then, the fundamental equation of growth in a Solow framework is defined as:

$$K_{t+1} - K_t = S_t - \delta K_t$$

Where: $K_{t+1} - K_t$: net investment, S_t is gross saving, and δ is depreciation rate assumed to be constant.

After that, the fundamental equation becomes as:

$$K_{t+1} - K_t = \text{CM}^{\theta}\,\text{SM}^{1-\theta}\,Y_t - \delta K_t$$

Where:

$$\text{CM} = \left(\frac{\text{CM}_t^{\theta}}{Y_t}\right), \text{SM} = \left(\frac{\text{CM}_t^{\theta}}{Y_t}\right) \text{ are constant}$$

We defined:

$\tilde{k}_t = \frac{K_t}{A_t L_t}$: capital per efficient capita; $\tilde{y}_t = \frac{Y_t}{A_t L_t}$: output per efficient capita.

Then:

$$(1+\eta)(1+x)\tilde{k}_{t+1} - \tilde{k}_t = \text{CM}^{\theta}\text{SM}^{1-\theta}\tilde{k}_t^{\alpha} - \delta\tilde{k}_t$$

We defined:

$$\tilde{k} = \left(\frac{\text{CM}^{\theta}\text{SM}^{1-\theta}}{\eta + \delta + (1+\eta)x}\right)^{\frac{1}{1-\alpha}};$$

$$\tilde{y} = \left(\frac{\text{CM}^{\theta}\text{SM}^{1-\theta}}{\eta + \delta + (1+\eta)x}\right)^{\frac{\alpha}{1-\alpha}}$$

Taking the natural log of both sides:

$$\text{Ln}Y = \beta_0 + \beta_1\text{LnCM} + \beta_2\text{LnSM} - \beta_3\text{Ln}\left[\eta + \delta + (1+\eta)x\right]$$

or

$$\text{Ln}Y = \beta_0 + \beta_1\text{LnCM} + \beta_2\text{LnSM} + \beta_3\text{Ln}\left[\eta + \delta + (1+\eta)x\right]$$