Financial Development and Economic Growth: Evidence from Six Asian Economies

by

Yue He

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Abstract

The study analyzes the effects of financial development on the growth of real GDP in six Asian economies: China, Hong Kong, India, South Korea, Singapore and Taiwan covering the most recent periods from 1994 to 2011. Based on two orthodox complementary models, I estimate regression equations for panel data and all six economies. The main findings are as follows: (a) turnover value of stock market and credit to private sector promote growth for six economies as a whole, whereas the liquid liabilities of financial system and total domestic credits have no impact. (b) Granger causality tests support the view that more credits to the private sector is a consequence of economic growth, while bi-directional causality is spotted between the turnover value of stock market and the economic growth. (c) For individual economies, the development of stock market has a beneficial effect on growth in China, Hong Kong, Korea and Singapore, but does not play a critical role in India and Taiwan. Instead, India's GDP growth gains from the growth rate of credits allocated to the private sectors. Taiwan is the only economy whose GDP growth is unrelated to financial development.

I. Introduction

The relationship between financial development and economic growth has received great deal of attention in both theoretical and empirical literature. Theoretical literatures intended to identify the function of financial systems: Levine (1997) attributed the emergence of financial intermediations to ameliorating transaction and information costs; Pagano (1993) summarized functions of financial system as better funneling saving to firms, improving the allocation of capital and affecting the saving rate. In the empirical part, Goldsmith (1969) firstly proposed to use the value of financial intermediary assets divided by GNP as proxy of financial development. King and Levine (1993) extended their work by including three more variables (BANK, PRIVATE, PRIVY) to capture the domestic credits in banking industry. Later on, the effect of stock market was considered in the terms of market capitalization and turnover value by Levine and Zervos (1998). However, all these precursory literatures analyzed cross-sectional data covering economies all over the world such that the various effect of financial development would be messed around due to a wide diversity among different economies. This speculation was supported by Odedokun (1996) who showed different results of finance-growth nexus in various groups of economies including Sub-Saharan African economies, Asian economies, Western hemisphere economies and etc.. Therefore, this paper will choose six Asia economies and regions including China, Hong Kong, India, Korea, Singapore and Taiwan (two BRIC economies and Four Asian Tigers), which share geographical and culture similarity and rapid economic growth in the last 20 years, to analyze the impetus of their growth.

For the literature focusing on Asia economies, Hsu and Liu (2006) examined the finance-growth nexus for three Asian economies, Taiwan, Korea and Japan. They found that this

relationship differs in three economies, for example, the finance aggregate has positive effects on Taiwan's economy but has negative effects on other economies. However, their result might be distorted for the following reasons: (1) the sample size was not sufficiently large (20 data for each economy in their paper). (2) Integration tests were not conducted to prevent spurious regressions. Zhang (2003) was another literature who implemented the production function in Odedokun (1996) to study eight East and Southeast Asian economies covering the period of 1960 to 1999. As a result, he did not find the evidence to support positive relationship between financial depth and economic growth. Zhang collected sufficient length of data, but he failed to include critical financial development measurements in his model (omitted variables).

Extending the classical production function and four widely-used measurement of financial development (including banking industry and stock market), this paper attempts to provide careful and precise analysis of the finance-growth nexus among six Asian economies in the latest 20 years. Three main contributions are made as follows: (1) address the effects of financial development on the economic growth of the six Asian economies as a whole and compare the importance of different measurements; (2) test the causality directions between economic growth and financial development; (3) illustrate the effect of financial development of individual economies.

The next section of this paper reviews the relevant literatures in this area. Section 3 develops the methods and section 4 conveys the estimated results. The concluding section is in the end of this paper.

II. Literature review

2.1 Function of financial system

A large and expanding literature has investigated the linkage between financial market development and economic growth; these studies have shown that financial development and economic growth are closely related. However, there is no consensus among economists about the definition of financial market development and the extent to which financial market development has contributed to economic growth. Pagano (1993) made an extensive survey of this literature. He used the growth model[1] to illustrate three channels which had been employed in past studies of finance-growth nexus: funneling saving to firms, improving the allocation of capital, and affecting the saving rate.

2.1.1 Funneling saving to firms

Mobilizing savings and transforming savings to investment on firms is costly. It involves '(a) overcoming the transaction costs associated with collecting savings from different individuals and (b) overcoming the informational asymmetries associated with making savers feel comfortable in relinquishing control of their savings' (Levine 1997). Specifically, the costs involve the spread between lending and borrowing rates, or securities brokers and dealers' commissions and fees. Pagano (1993) argued that financial development increased the growth rate if it reduced this 'leakage of resources'.

In addition, corporate governance provided by financial arrangements or intermediaries is

[1]In Pagano's paper, the author use the simplest endogenous growth model in which $Y_t = AK_t$, and also assume investment $I_t = K_{t+1} - (1-\delta)K_t$ and saving $S_t = I_t/\varphi$. Thus, the output growth rate $g = A\varphi s - \delta$, where A is social marginal productivity of capital, φ is the portion of saving funneled to investment, and $s = S/Y$ is private saving rate.

also central to the economic growth. To the extent that shareholders and creditors effectively monitor firms and induce managers to maximize firm value, this will improve the firm's profitability and make savers more willing to finance production and innovation.

2.1.2 Improving the allocation of capital

The work of Greenwood and Jovanovic (1990) was in the line of 'improving the allocation of capital'. In their model, financial intermediaries could be regarded as 'networks' of private investors extracting information about aggregate risk, diversifying the idiosyncratic (individual-specific) risk and arranging for debit and credit. Thus, economic growth was accelerated by financial intermediaries because they facilitated agents to have more information about the shocks, improved the allocation of capital, and then generated higher rate of return to be earned on capital.

Obstfeld (1994) provided an analysis of the same effect, in connection with the integration of international capital markets. In his N-economies model, investors of each economy allocated their investment between safe capital which shared a common rate of return to all economies and a risk capital, assuming that more risky technologies yielded higher expected returns. Similar with the 'networks' in Greenwood and Jovanovic (1990), the integration of capital markets made it possible for the investors in every economy to diversify their risks at the international level. So the international portfolio diversification encouraged 'a global shift from (relatively) low-return, low-risk investments into high-return, riskier investments'. This meant that more resources will be allocated to these types of investment which stimulate global growth.

Besides identifying the best production technologies, financial intermediaries might also boost the rate of technological innovation by identifying those entrepreneurs with the best

chances of successfully initiating new goods and production processes.

2.1.3 Affecting the saving rate

'Affecting the saving rate' is another channel that financial development can affect growth. However, the sign of this relationship is ambiguous. Higher returns of investment ambiguously affect individual's saving decisions due to well-known income and substitution effects.

Jappelli and Pagano (1994) considered a three-period overlapping-generation model to analyze the influence of liquidity constraints on saving rate and growth rate. They found out that liquidity constraints on household (they could borrow at most a proportion of the present value of their lifetime income when they are young) raised the saving rate and increased the growth rate. Consequently, the development of financial intermediaries could contribute to loosen the liquidity constraints, and thus reduced economic growth. De Gregorio (1992) proposed a model where liquidity constraints raise saving but lower human capital accumulation, so that their overall effect on growth was ambiguous.

2.1.4 The channel between stock market and economic growth

Levine (1991) indicated that the stock market allowed agents to diversify portfolios[2], as well as to facilitate the ability to trade ownership of firms without disrupting the productive processes occurring within firms. The stock markets allowed private investors to invest in numerous firms and stay away from 'idiosyncratic productivity shocks'. The possibility of risk diversification encouraged agents to hold a greater share of their personal wealth in the form of productive capital. This in turn contributed directly to the acceleration of growth.

[2] The effects are presented in Greenwood and Jovanovic (1990) and Obstfeld (1994).

Besides, the stock markets provided a trading mechanism for agents who value future consumption and intend to increase their wealth with other agents that receive liquidity shocks and want to consume their wealth. This eliminated the premature withdrawal of capital from firms and thus accelerated the growth rate of per capita output.

Stock market might also stimulate the production of information about firms. As markets became larger and more liquid, agents might have greater incentives to expend resources in researching firms. Thus, larger and increasing liquid markets would boost incentives to produce this valuable information with positive implication for capital allocation (Merton 1987).

Also, Levine (1991) suggested an externality of capital maintained in the firm implying that premature liquidation of productive investment may therefore, through this external effect, reduced the rate of human capital accumulation. Consequently, financial institution, by providing better management of liquidity risks, also had a positive effect on growth through this channel.

2.2 Evidence

2.2.1 Cross-country studies

In empirical applications, Goldsmith (1969) was the seminal work in this area (Levine 1997). Assuming that the size of the financial system was positively correlated with the provision and quality of financial services, he used value of financial intermediary assets divided by GNP to estimate the level of financial development and observed the ‘rough parallelism’ between economic and financial development among 35 economies from 1860 to 1963.

King and Levine (1993) extended Goldsmith’s work by enlarging sample size and adding

control variables[3] that influence economic growth. Besides, they defined financial development by 4 proxies: DEPTH (ratio of liquid liabilities to GDP), BANK (degree to which the central bank versus commercial banks are allocating credit), PRIVATE (credit issued to nonfinancial private firms divided by total credit), and PRIVY (credit issued to nonfinancial private firms divided by GDP). Using data on 80 economies from 1860 to 1989, King and Levine (1993) concluded that all four proxies of the level of financial development are strongly associated with real per capita GDP growth.

In addition to the role of banking service, the nexus of stock market and growth was also examined. Levine and Zervos (1998) used CAPITALIZATION to measure the size of stock market, TURNOVER (which equals the value of the trades of domestic shares on domestic exchanges divided by the value of listed domestic shares) and VALUE TRADED (which equals the value of the trades of domestic shares on domestic ex-changes divided by GDP) to measure the liquidity of stock market, and BANK CREDIT (which equaled the value of loans made by commercial banks and other deposit-taking banks to the private sector divided by GDP) to measure the development of banking. Analyzing the cross-sectional data over 47 economies from 1976 to 1993, they showed that 'stock market liquidity and banking development both positively predict growth'.

All empirical works reviewed above (i.e., Goldsmith, 1969; King and Levine, 1993; Levine and Zervos, 1998) conducted simple OLS regressions with cross-economy data, of the type popularized by Barro (1991). This approach was to calculate the average value of each economy's financial variable and economic growth over a long time horizon in the first place and then run the regression across diverse economies. Although it was able to estimate the average

[3] Initial income, education level, government expenditures, inflation rate, export and import ratio and etc.

influence of financial development on the long-term economic growth, it failed to consider the economy-specified factors, the time-series dimension of the data and the endogeneity of all regressors (Beck et al. 2000). Also there was no clear findings on the direction of causality (Arestis and Demetriades, 1997).

2.2.2 Panel data studies

Equipped with a dynamic Generalized-Method-of-Moments (GMM) panel estimator developed by Arellano and Bond (1991), Rousseau and Wachtel (2000)[4] eliminated economy-specific effects by differencing the growth regression equations, and showed 'leading roles for stock market liquidity and the intensity of activity in traditional financial intermediaries on per capita output.'

Beck and Levine (2004) employed the 'system' panel estimator developed by Arellano and Bover (1995) and affirmed the positive effects of financial development on output growth even after accounting for other determinants of growth as well as for potential biases induced by simultaneity, omitted variables and unobserved economy-specific effect on the finance-growth nexus.

2.2.3 Studies for specific countries

It is true that a huge amount of studies confirm the existence of a positive nexus, but counter-evidence also exists. Zhang (2003) studied eight East and Southeast Asian economies including China, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore and Thailand, covering the period of 1960 to 1999. In the estimation model, labor input, stock of capital, exports and

[4] Beck et al. (2000) and Levine et al. (2000) also implemented this method.

financial development were used as explanatory variables. The author defined financial development to be the ratio of liquidity liabilities to GDP, and the estimating results of this study did not support the view that financial development promotes economic growth.

Hsu and Liu (2006) examined the relationship between financial development and the source of growth for three Asian economies, namely, Taiwan, Korea, and Japan. After controlling for international capital mobility and financial policies, they showed that the finance-growth nexus was diverse in three economies. FINANCE AGGREGATE (the ratio of liquidity liabilities to GDP), for example, had positive effects on Taiwan's economy, but showed negative effect on other economies. Hsu and Liu (2006) argued that this differentiation was due to the relative stability of financial system and appropriate sequence to financial liberalization in Taiwan from 1980.

Some scholars attributed this inconsistency to some economy-specialized conditions. Arestis, Demetriades and Luintel (2001) analyzed quarterly data from five developed economies; Germany 1973-1997, the United States 1972-1998, Japan 1974-1998, the United Kingdom 1968-1997, and France 1974-1998. Stock market capitalization ratio, ratio of domestic bank credit to nominal GDP, and eight-quarter moving standard deviation of the stock market prices were used to estimate the development of stock market and banking development. They found that both stock markets and banks led economic growth in France, Germany and Japan, but the link between financial development and economic growth in the United Kingdom and the United States was found to be 'statistically weak and, if anything, to run from growth to financial development'.

2.3 Causality

2.3.1 Granger causality test

The direction of the causality between financial development and GDP growth (i.e., whether finance promotes growth or finance follows growth or both happens) is another essential topic. Using time-series data of 16 economies, Demetriades and Hussein (1996) found causality was bi-directionality in some of the economies they examined, and in some economies, financial development followed economic growth[5].

2.3.2 Co-integration analysis

Claiming that the integration and cointegration properties of the data were ignored in the previous literatures, Christopoulos and Tsionas (2004) analyzed the data of 10 developing economies via panel unit root tests and panel cointegration analysis. Using 'fully modifies OLS' to estimate the co-integrating relation - a method that deals with the problem of 'endogeneity of regressors', they concluded that the long run causality from financial development to economic growth was fairly strong and significant, while there was no short run causality between them.

2.3.3 Test by industry-level analysis

Research of Rajan and Zingales (1998, henceforth RZ) was the first influential study which investigated causality by industry-level analysis. Their main hypothesis was that better-developed financial intermediaries and markets helped overcome market frictions that drove a wedge between the price of external and internal finance. Lower costs of external finance facilitated firm growth and new firm formation. Therefore, industries that were more dependent

[5] For example, tests using 'LM' (M2/GDP-growth nexus) show that finance follows growth in 9 economies and bi-directionality appears in 6 economies, while finance promote growth only in Spain.

on external financing would have relatively higher growth rates in countries with more developed financial markets.

To test their hypothesis, the researchers measured the dependence of industries on external finance and estimate the coefficient for the interaction between dependence and development after correcting for country and industry effects. RZ found out that the coefficient estimate for the interaction between external dependence and total capitalization measure, was positive and statistically significant at the one-percent level. This implied that an increase in financial development disproportionately boosted the growth of industries that were naturally heavy users of external finance. Meanwhile, this supported the view that financial development spured growth by facilitating the flow of external finance.

III. Methodology

3.1 The theoretical framework

This research intends to examine whether financial market development has an impact on the economic growth. Following Odedokun (1996) (also see Hsu and Liu 2006), this paper utilizes the production function framework to achieve the objectives, as in Eq. (1) below:

$$Y_t = f(L_t, K_t, F_t, Z_t) \tag{1}$$

where Y denotes the aggregate output (real GDP), L denotes the amount of labor (measured by labor force of the economy), K denotes the amount of physical capital, F is vector of factors that

represent the level of financial development and Z is vector of other factors that can be influent the total output. The subscript t denotes the time period.

Taking differential of Eq. (1) and appropriately rearranging the resulting expression, we shall arrive at the growth Eq. (2):

$$\dot{Y} = a \cdot \dot{L} + b \cdot \frac{I}{Y} + c \cdot \dot{F} + d \cdot \dot{Z} \tag{2}$$

where the time subscript is omitted for simplification and the dot on the top of a variable denotes that the variable is now in a growth rate form so that $\dot{Y}, \dot{L}, \dot{F}, \dot{Z}$ are growth rates of real GDP, labour force, financial development level vector and the vector of other inputs respectively. Since the growth rate of K is usually not known, the share of real gross investment in real GDP (I/Y) is used to replace $\dot{K}$ following the fact that $I/Y = \dot{K} \cdot K/Y$. Also $a = \partial Y/\partial L \cdot L/Y$; $b = \partial Y/\partial K$; $c = \partial Y/\partial F \cdot F/Y$; $d = \partial Y/\partial Z \cdot Z/Y$ are assumed to be constant parameters (or vectors of parameters for c and d) having traditional interpretations within the framework of neo-classical growth equation (Odedokun 1996).

For the other growth-determining factors, Feder (1982) has empirically showed the positive and significant relationship between growth in export-GDP ratio and economic growth. Also, in the work of Odedokun (1996)[6], the only element of vector Z was the real exports. Thus, after denoting the value of real exports by X, Eq. (2) becomes:

$$\dot{Y} = a \cdot \dot{L} + b \cdot \frac{I}{Y} + c \cdot \dot{F} + d \cdot \dot{X} \tag{3}$$

However, as mentioned in Odedokun (1996), Eq. (3) had its own shortcomings: (a)

[6] and also see Ram(1999), Zhang(2003), Hsu and Liu(2007).

theoretical underpinning of this model was weak; (b) it was possible for there to be reverse causation from $\dot{Y}$ to $\dot{F}$, i.e., financial development follows economic growth. Owing to above reasons, this paper adopts the framework of Odedokun (1996) who dichotomized economy-wide productive activities into the financial and non-financial sectors and derived the following equation with the assumption that there existed an externality of financial sector on the productive activities taking place in the real sector[7]:

$$\dot{Y} = a \cdot \dot{L} + b \cdot \frac{I}{Y} + c \cdot \frac{F}{Y} \cdot \dot{F} + d \cdot \dot{X} \tag{4}$$

Besides the 'superior theoretical underpinning', the advantage of Eq. (4) is that the chance for reverse causation was remote (Odedokun, 1996). However, as pointed out by Ram (1999), this model was not valid to include other possible growth-determining factors: $\dot{X}$. Therefore, this paper implements both Eq. (3) and (4) to investigate the relationship between financial development and economic growth since it is hard to say which one is better.

3.2 Measurement of financial development

One of the key part of investigate the finance-growth nexus is the measurement of financial development. Various financial variables have been used in the previous empirical literature, some of which are listed in the Table 3.1.

[7] Model of Odedokun 1996: $F = F(L_F, K_F)$; $R = R(L_R, K_R); Y = R + F; L = L_F + L_R; K = K_F + K_R$, here F, R is output of financial and non-financial sector.

Table 3.1 Summary of financial variables in some existing literature

Proxies for financial development			Studies
Banking Services	Size	Value of liquid liabilities (M2 or M3) divided by GDP (or GNP)	Goldsmith (1969), King and Levine (1993), Demetriades and Hussein (1996), Odedokun (1996), Rousseau and Wachtel (2000), Zhang (2003), Christopoulos and Tsionas (2004), Shen and Lee (2006), Hsu and Liu (2006), Kıran, et al. (2009)
	Credits	Ratio of bank credit divided by bank credit plus central bank domestic assets	King and Levine (1993)
		Ratio of domestic bank credit to GDP	Atje and Jovanovic (1993), Levine and Zervos (1998), Arestis et al. (2001)
	Credits to private sector	Ratio of credit allocated to private enterprises to total domestic credit	King and Levine (1993)
		Ratio of credit by deposit money banks to private sector divided by GDP	Demetriades and Hussein (1996), Shen and Lee (2006), Kıran, Yavuz and Güriş (2009)
		Ratio of total credit to private enterprises divided by GDP	King and Levine (1993), Levine and Zervos (1998), Beck and Levine (2004), Kıran, Yavuz and Güriş (2009)
Stock Market	Size	Value of listed domestic shares on domestic exchanges divided by GDP	Levine and Zervos (1998), Rousseau and Wachtel (2000), Arestis, Demetriades and Luintel (2001), Beck and Levine (2004), Shen and Lee (2006), Wong and Zhou (2011)
	Liquidity	Value of the trades of domestic shares on domestic exchanges divided by the value of listed domestic shares	Levine and Zervos (1998), Beck and Levine (2004), Shen and Lee (2004)
	Liquidity Volatility	Value of the trades of domestic shares on domestic exchanges divided by GDP	Levine and Zervos (1998), Rousseau and Wachtel (2000), Shen and Lee (2004)
		Standard deviation of market returns	Levine and Zervos (1998), Arestis et al. (2001)

As noted in the literature review, the key function of financial intermediation is to allow agents to have better information ex ante about possible investments and allocate capital, monitor investments and exert corporate governance after providing finance, facilitate the trading, diversify and manage risks, mobilize and pool savings, and ease the exchange of goods and services (Levin 2005).

Also, the development of stock market with higher liquidity can allow agents to diversify portfolios and hold a greater share of personal wealth in the form of productive capital (Levine 1991). So this paper uses the following indicators to measure the development of banking industry and stock market:

M2: equals the real value of wide money stock. It measures the size of financial intermediaries and is widely used in empirical works (King and Levine, 1993; Levine and Zervos, 1998; Beck and Levine, 2002; Christopoulos and Tsionas, 2003; Zhang, 2003).

CREDIT: equals the real value of total domestic credit issued by financial intermediaries.

PRIVATE: equals the real value of total domestic credit allocated to private sector. This indicator measures the allocation of credit with the assumption that financial systems that allocate more credit to private firms are more engaged in researching firms, providing risk management services, mobilizing savings and improving the allocation of capital than financial systems that simply funnel credit to the government or state owned enterprises (Levine 1997).

VT (Value Traded): equals the real value of the trades of domestic shares on domestic exchanges. It follows the definition in Levine and Zervos (1998) and measures the liquidity of domestic stock markets.

The first three indicators gauge the development of banking industry while the last one measures the liquidity of stock market. This paper does not adopt the capitalization of stock market as an indicator because the author believes that it is the liquidity, other than the size of stock market, diversifies the private investors' portfolio and lowers the risks. Also Levine and Zervos (1998) found that stock market size, volatility, and international integration were not robustly linked with growth.

After substituting F by four indicators of financial development, adding the error and intercept terms, and rearranging the expressions, Eq. (3) and (4) become:

$$\dot{Y}_t = \beta_0 + \beta_1 \cdot \dot{L}_t + \beta_2 \cdot (I/Y)_t + \beta_3 \cdot \dot{X}_t + \beta_4 \cdot \dot{M}2_t + \beta_5 \cdot \dot{CREDIT}_t + \beta_6 \cdot \dot{PRIVATE}_t + \beta_7 \cdot \dot{VT}_t + u_t \quad (5)$$

$$Y_t = \beta_0 + \beta_1 \cdot \dot{L}_t + \beta_2 \cdot (I/Y)_t + \beta_3 \cdot \dot{X}_t + \beta_4 \cdot (M2/Y)_t \cdot \dot{M}2_t + \beta_5 \cdot (CREDIT/Y)_t \cdot \dot{CREDIT}_t + \beta_6 \cdot (PRIVATE/Y)_t \cdot \dot{PRIVATE}_t + \beta_7 \cdot (VT/Y)_t \cdot \dot{VT}_t + u_t \quad (6)$$

where β_0 is the intercept and u_t is the error term.

Consequently, the estimates of Eq. (5) and (6) are presented in the following sections to describe the effects of financial development on economic growth for six Asian economies.

IV. Empirical Results

4.1 Data source

The balanced panel is chosen to maximize the sample size, include annual data of six Asian economies (China, India, Singapore, South Korea, Hong Kong and Taiwan) from 1993 to 2011. All the data are sourced from 'CEIC Data Company Ltd', of which series code can be found in the appendix. The variables used in the regressions are computed as follows:

(a) Economic growth ($\dot{Y}$) is measured as the annual growth rate of the real GDP (2005 price).

(b) Labor force growth ($\dot{L}$) is measured as the annual growth rate of the number of employed people in each economy ('employment' in the database).

(c) The ratio of investment to GDP ($^{I}/_{Y}$) is 'Gross Fixed Capital Formation' plus 'Changes in Inventories', and divided by 'Gross Domestic Product'.

(d) Real export growth ($\dot{X}$) is calculated as the annual growth rate of real export value.

(e) Wide money stock growth ($\dot{M}2$) is measured as the annual growth rate of 'Money plus Quasi-Money' deflated by the 'GDP deflator (2005 price)'.

(f) Domestic credit growth ($C\dot{R}EDIT$) is measured as the annual growth rate of 'Domestic Credit' deflated by the 'GDP deflator (2005 price)'.

(g) Credit to private sector growth ($PRI\dot{V}ATE$) is measured as the annual growth rate of 'Claims on Private Sector' deflated by the 'GDP deflator (2005 price)'.

(h) Value Traded growth ($\dot{VT}$) is measured as the annual growth rate of 'Turnover Value' deflated by the 'GDP deflator (2005 price)'. In the case of those economies for which only monthly data is available, 'VT' is calculated as the sum of 12 months' value in one certain year.

4.2 Description of data

4.2.1 Average level of annual data

Table A.1 presents the average of all dependent and explanatory variables for the six economies. China, as a rapidly ascendant economy during the last 18 years, enjoys the highest average real GDP growth rate (10.1%), as well as the growth rate of export (15.1%), M2 (14.1%), domestic credit (13%), credit to private sector (12.3%), and stock market turnover (51.8%): almost all the 'growth variables' except for employment growth rate (0.8%).

As another rising economy in 'BRICS', India enjoys a rapid growth rate of real GDP (7%) on average from 1994 to 2011. In addition, its growth rate of export (12.7%), M2 (10.2%), domestic credit (9.5%), and credit to private sector (11.5%) are also higher than four 'Asia Tigers'. However, India's financial market is apparently not big enough relative to its GDP value, since it ranks the bottom in M2 to GDP ratio (0.061), credit to GDP ratio (0.57), private to GDP ratio (0.35), and value traded to GDP ratio (0.18).

Although its average GDP growth rate (3.8%) is the lowest among six Asia economies, Hong Kong, which is widely regarded as an international financial center, owns the highest wide money stock to GDP ratio (2.468), private to GDP ratio (1.565), and value traded to GDP ratio (4.434). This is due to the liquidity of its capital market and perfect capital mobility enjoyed by

the territory.

As the other three ‘Asia Tigers’: Korea, Singapore and Taiwan, could still enjoy very highly developed financial industry, however, the pace of evolution has slowed down during the last 18 years: Singapore ranks the last position of value traded growth rate (9.2%); while the growth rate of M2 (6.7%), domestic credit (5.4%), and credit to private sector (5.1%) in Taiwan are lowest among six economies.

In sum, ‘Four Asia Tigers’ (Hong Kong, Korea, Singapore and Taiwan) have more developed financial industries and stock markets (in the sense that they possess higher average ratio of financial variables to GDP among six Asian economies), while their development pace is much slower than two emerging ‘BRICS’ economies (China and India). For the growth rate of real GDP, China ranks the top, followed by India and Singapore (6.3%).

4.2.2 Correlations of variables

Table A.2 presents the correlation matrix of the dependent and explanatory variables of China, Hong Kong, India, Korea, Singapore, Taiwan and panel, respectively. As shown in the table of China, the growth rate of real GDP of China is positive correlated with investment to GDP ratio (0.33) and export growth rate (0.41), which is pretty coincident with the reality that the major driving forces of China’s economic development are investment and export during last 18 years.

For the financial variables, the proxy that measures the development of stock market (VT growth rate) of China is positively correlated with economic growth while all ‘banking industry’ variables (M2 growth rate, CREDIT growth rate, and PRIVATE growth rate) are negatively correlated with GDP growth. This pattern can also be found in Singapore. However, India, as

another ‘BRICS’ economy, shows an opposite picture: all its ‘banking industry’ variables are positive correlated with economic growth whereas the correlation coefficient of ‘VT growth rate’ is negative. I will discuss this interesting pattern later.

For the correlation matrix of panel, as we can see, only one high correlation coefficient is spotted: correlation coefficient between ‘PRIVATE growth rate’ and ‘CREDIT growth rate’ (0.83). The remaining correlation coefficients are in the range of -0.12 to 0.48, all of which are acceptable when it comes to avoiding the problem of multi-collinearity.

Figure A.1 roughly characterizes the relationship between the GDP growth rate (DY in the graph) and four financial development measurements (DF, DB, DP, DVT in the graph) based on the aggregate (panel) data. Positive linear relationships are shown in all four diagrams. Therefore, it is reasonable to estimate the financial-growth nexus by classic linear regressions.

4.3 Estimated results

4.3.1 Tests for integration

Before estimation, Time series ADF tests and panel unit roots tests are launched in Table A.3 to prevent spurious regressions[8]. Here ‘Level’ and ‘Diff’ denote the augmented Dickey-Fuller t-tests for a unit root in levels and first differences respectively for economy-based data. For panel data, we use the fisher chi-square statistics to test for a unit root for all variables in the models. As it can be shown, most variables of time series data and panel data are stationary at the level. All the variables used in the models (including time series and panel data) reject the hypothesis of a unit root in first differences.

[8] Whenever a variable with a unit root is used as a regressor in a linear regression model, the standard assumptions that we have made for asymptotic analysis are violated (Davidson & Mackinnon 2004).

4.3.2 Estimated results of panel data

Table A.4 presents the estimated results of two models (Eq. (5), and Eq. (6) respectively) by using Panel EGLS[9]. There are 4 specifications in this table because two different proxies for banking development (CREDIT growth rate and PRIVATE growth rate), which are highly correlated to each other, are attempted.

For the model 1, the coefficients of 'M2 growth rate', which measure size of financial intermediaries, are found insignificantly. This is quite consistent with the conclusion of Zhang (2003) who analyzed panel data of eight East and Southeast Asian economies. One possible explanation is that the effect of monetary policy is largely influenced by stability of financial system because Asian economies suffered from the financial crisis in 1997-1998. The second proxy for banking development, the coefficient of 'CREDIT growth rate' is also insignificant. The implication here is that the size of banks and financial intermediaries cannot stimulate economic growth. On the other hand, the coefficient of 'PRIVATE growth rate', which is another measurement of banking development, shows significantly positive connection with economic growth: 1% growth on the total credits to private sectors contributes to 0.069% the GDP growth rate. The possible explanation is that the efficiency and structure of the financial intermediations instead of the relative size of banking industry promote the GDP growth rate.

As stock market development measurements, the coefficient of 'VT growth rate' is found to be significantly positive, implying that boom and buoyant stock markets have a beneficial effect on the GDP growth rate. With a combination of high expectation of economic growth and relatively less developed financial system, Asian economies attract more foreign investors

[9] Estimated GLS for Cross-section Seemingly-Unrelated-Regression (SUR).

putting their money in the stock markets instead of business credits. Thus the high liquidity of the capital markets amounts to the high economic growth in Asian economies.

For the model 2, the results are quite similar with what we learn in the model 1. The coefficients of 'M2 growth rate × M2 GDP ratio', as well as the coefficient of 'CREDIT growth rate × CREDIT GDP ratio' are insignificant. However, the coefficients of 'PRIVATE growth rate × PRIVATE GDP ratio' and 'VT growth rate × VT GDP ratio' are significantly positive.

For the three macro-economic control variables (Investment share, Export growth rate and Employment growth rate), the results of both models provide a strong support to the growth theory (Barro, 1991) and the production function framework this paper utilizes. All the coefficients are significantly positive, showing that the growth rate of physical capital, export value and labor forces have impacts on GDP growth.

In sum, wide money stock (M2) and value of total domestic credits by financial intermediaries (CREDIT) show weak connection with economic growth, while the total credits to the private sector (PRIVATE) and value of stocks traded (VT) are found to have significantly positive effect on the growth. One possible explanation is that the efficiency and structure of the financial intermediations instead of the relative size of banking industry promote the GDP growth rate.

Comparing the effects of all the growth determinants, investment share has the most significant impact on economic growth, namely, 1% growth on the investment share contributes to 0.239% the GDP growth rate.

4.3.3 Estimated results of economy-based data

OLS estimated results of both models are listed in Table A.5. To prevent multi-colinearity, various specifications are implemented through different economies due to the correlation matrix of explanatory variables of specific economies.[10]

For China, the coefficients of the variables which measure the development of banking industry cannot support the hypothesis that finance promotes growth, and even show significantly negative connections in specification (3). One possible explanation is that highly intervened by the government, the China's banking sector is not entirely developed for the purpose of profit maximization. Also, the 'credits' allocated to the firms may take time, especially in an economy with less liberated financial system, to become a real project, whereas the effect of "stock value trade" is more timely because once a trade is made, the trading agent can receive commission which turns out to be services created.

On the other hand, the measurement of the stock market shows significantly positive relationship with economic growth. Not only because the effect of stocks trading is more timely, but also due to the fact that the GDP per capita of China is relatively small, so the return of investing in bull stock market for individual investors is very big comparing to their wages and stimulates their consumptions.

Besides, export growth rate is the most significant determinant of China's GDP growth: 1% growth on the real export value contributes to about 0.037% the GDP growth rate, implying that expansion of domestic firms' overseas sales play an important role in the economic growth, which is in line with what we learn in practice.

[10] For example, there are 6 specifications in the table of China because the correlation coefficient among 'M2 growth rate', 'CREDIT growth rate' and 'PRIVATE growth rate', as well as the correlation coefficient among 'M2 GDP ratio', 'CREDIT GDP ratio' and 'PRIVATE GDP ratio' are sufficiently close to 1. To avoid the emergence of multicollinearity, these three financial explanatory variables are used sequentially in each model.

The results of financial-growth nexus in Hong Kong, Korea and Singapore are in parallel with China: A Prosperous stock market is the major impetus of economy's GDP growth while the development of banking industry is either irrelevant with or obstacles the economic growth. Besides the lagging effect mentioned above, the reasons behind similar finance-growth nexus might be different. For Hong Kong, which has no independent monetary policy, its money supply is determined by the FX inflow, thus has little impact on economic growth. For Korea, as interest rates at all banks is controlled by government, along with high proportion of nonperforming bank loans and heavy dependence on the Bank of Korea for low-cost funds to support their outstanding loans, had left the privately owned commercial banks very vulnerable. A substantial part of their outstanding loans had been still policy-related (Hsu and Liu, 2006). For Singapore, it could be the case that its financial system just plays a role to develop the offshore business, instead of its domestic business.

Among all the growth determinants, employment growth rate contribute most to economic growth in Hong Kong and Korea, while export is the most significant impetus of economic growth in Singapore.

In light of Taiwan, the development of financial market has little effect on the economic growth: all the estimated coefficients of financial variables fail to reject the Wald test at 10% level. Instead, 'Export growth rate' and 'Employment growth rate' have positive impact on the economic growth in Taiwan. One possible reason is that the political situation is not as stable as the other five Asian economies. As China enjoys rapid economic growth rate in the last 18 years, the ambiguous relationship with China largely diminish the interest of foreign investors and thus the economic growth of Taiwan.

For India, the result is quite different from China, although both economies are members of 'BRICS'. The only significant growth determinant is PRIVATE, one measurement of banking industry equals to the domestic credits to the private sector. This result is plausible because the economic growth in India in the recent years is largely due to its prosperous private companies, including high-tech industry and out-sources service companies.

4.4 Causality test

In this section, pair-wise Granger causality tests are implemented, as shown in Table A.6 and A.7, to catch the long run causality between financial development variables and economic growth.

As a whole, endogeneity is an issue but is not serious in this study. The test results show that M2 and VT cause economic growth, and economic growth also Granger causes M2 and VT: they are only two financial variables with bidirectional causality to economic growth. It implies that the fast growing of broad money (M2) may fulfill the need of domestic investment, which has developed into profitable projects contributing to the economic growth. For VT, as more and more hot money comes to the stock markets in Asian economies, private firms are easier to accumulate enough investment for further development.

However, CREDIT and PRIVATE do not cause economic growth, but these variables have one-way causalities driven by economic growth. Most of credits banks issued, including credits to state-owned enterprises, private sectors, or research department, may take time to become profitable and contribute to the economic growth. But the rapid economic growth can bring banks much confidence to issue more credits and thus boost the credits variables.

In summary, the results of Granger causality test suggest that broad money and turnover value of stock market contribute to economic growth while economic growth contributes to broad money, total credit, private sector credit, and turnover value of stock market in the aggregation of six Asian economies.

Table 4.1: Summary of causality test

Economy	Causality Test Direction	
	F⇒Y	Y⇒F
Panel	M2, VT	M2, CREDIT, PRIVATE, VT
China	VT	M2, CREDIT, PRIVATE
Hong Kong		PRIVATE
India		M2, PRIVATE
Korea		VT
Singapore		PRIVATE
Taiwan		CREDIT, PRIVATE

4.5 Discussion

The estimation results are summarized in the Table 4.2.

Table 4.2: Summary of estimated result

Economy	Economic Growth Determinants
Panel	PRIVATE, VT, IS*[11], Export, Employment
China	VT, Export*
Hong Kong	VT, Export, Employment*
India	PRIVATE*

[11] IS denote 'Investment Share'; the variable with '*' is the most significant variable for the corresponding economy.

Korea	VT, IS, Employment*
Singapore	VT, Export*
Taiwan	Export*

Contrary to the result of many empirical literatures, like Goldsmith (1969), King and Levine (1993), Christopoulos and Tsionas (2004), or Kuran et al. (2009), this paper cannot detect any significantly positive relationship between economic growth and the liquid liabilities of financial system in all economies. One possible explanation is that the effect of monetary policy is largely influenced by regional factors as all four literatures mentioned above include data from a world-wide set of economies. Odedokun (1996) partly support this claim. Estimating financial–growth nexus by time series data of 71 economies all over the world, he showed that financial intermediation coefficient was positive and significant for 57.1% of Western hemisphere economies while the proportion for Asian economies was only 36.4%. In addition, for the literatures focusing on Asian economies, especially in East Asia, Hsu and Liu (2006) and Zhang (2003) have drawn the similar conclusion. Another explanation is that the effect of M2 on the economic growth is overestimated on the absence of stock market measurement.

The relationship between economic growth and total domestic credit is attested to be insignificant, whereas the coefficients of 'PRIVATE growth rate' in the estimated results of panel data and India are found positive. One possible explanation is that the efficiency and structure of the financial intermediations instead of the relative size of banking industry promote the GDP growth rate.

For the measurement of stock market, the nominal value of stocks traded during the year (i.e., Value Traded) has significant positive linkage with economic growth for almost all economies

except Taiwan. It implies that a rapidly growing stock market with high turnover value would promote economic growth. This result is quite consistent with Hsu and Liu (2007) who analyzed time series data for Taiwan, Korea and Singapore and showed positive relationship between economic growth and 'Turnover ratio' in Korea and Singapore[12].

Comparing the impacts of banking industry development (which is represented by M2, CREDIT and Private) and stock market development (which is represented by Value Traded), on economic growth, the latter perform much better that all three measurement of banking development (in the sense that the effects of the stock market development are more significantly positive than the positive effects of the latter). However, the estimated coefficient of 'PRIVATE growth rate' is much larger than 'Value Traded growth rate', implying that the increase of credit to private sector promote economic growth more than the development of stock market.

From the above analysis, credits allocated to the private sector (Private) and turnover value of the stock market (Value Traded) are positively related to economic growth. However, through the Granger causality tests, the high growth rate and value of 'Private' turns out to be the consequence of rapid economic growth. This result is consistent with Demetriades and Hussein (1996)[13] who showed one-way causality which growth causes finance was spotted in 7 out of 11 economies while only 2 economies has evidence of reverse one-way causation. For the measurement of stock market, the evidence that finance promote growth is found for 'Value Traded GDP ratio'.

Our result is quite consistent with the influential work using industrial level data by Rajan and Zingales (1998). They use data on 36 industries across 42 counties to test whether financial

[12] The variable 'VT/GDP' of this paper is equivalent to the variable 'Turnover Ratio' in Hsu and Liu (2007).
[13] The variable 'Private/GDP' of this paper is equivalent to the variable 'LD' in Demetriades and Hussein (1996).

development promote economic growth by facilitating the flow of external finance. Their result shows that 'Total capitalization' (stock market capitalization to GDP) and 'Bank debt' (Domestic credit to private sectors to GDP) significantly boost the growth of industries that are heavily dependent on external finance. The difference between our work and RZ is that we test the effect by financial development to economy as a whole, while RZ focus on whether more credit provided by financial intermediaries would foster the growth of industry with heavy external dependence.

V. Conclusion and Policy Suggestion

In the past two decades, China, Hong Kong, Korea, Singapore, India and Taiwan have attracted worldwide attention to the rapid economic growth that they enjoyed and severe financial crisis they suffered during 1997-1998. The role of financial system in the economic growth seems critical to these six Asian economies, hence, is worthwhile for further investigation.

This paper studies how financial development affects the growth of real GDP in six Asia economies using both panel and time series data from 1994 to 2011. Three measurements of banking industry (M2, Domestic Credits, and Credits to Private Sectors), plus one proxy of stock market development (Turnover Value of Stock Market) are composed to estimate the effect of financial size, efficiency and structure on economic growth. The model also consists of three variables to control for macro-economic diversity (Investment Ratio, Real Export Value, and Employment Rate). In addition, two models are implemented to complement weakness of each specification. After estimating the finance-growth nexus, examining the validness of the regression and testing causal directions, three main conclusions are made as follows.

First of all, using panel data of six economies, the turnover value of stock market and credits to private sector have positive and significant effects on growth rate of real GDP, whereas the liquid liabilities of financial system and total domestic credits have negative or no effect on the economic growth.

Secondly, for the two variables positively related to economic growth, Granger causality tests support the view that credits to the private sector simply follows the growth rate of real GDP, while bi-directional causality is spotted for the turnover value of stock market.

Thirdly, from the result of economy-specific analysis, the development of stock market has a beneficial effect on growth in China, Hong Kong, Korea and Singapore, but does not play a critical role in the economy of India and Taiwan. Instead, India's GDP growth gains from the growth rate of credits allocated to the private sectors. Taiwan is the only economy whose GDP growth is unrelated to any of these four measurements in the paper.

5.1 Policy Suggestion

For six Asian economies as a whole, value of broad money supply and total domestic credit show little connection with economic growth. This is possibly due to the fact that the lending business / loan issue of banks in Asian economies are highly intervened by the government. As a result, banks have little flexibility on providing loans to non-publicly supported projects, leading to slower economic growth pace. Therefore, to boost economic growth and development, the authority in Asian economies should work towards establishing a more open and diversified banking industry by continuing to liberalize the financial sector, aiming at providing credit to most profitable firms and projects. It is clear that the positive relationship between private sector credit and economic growth support this suggestion as well.

On the other hand, turnover value of stock market proves as one impetus of economic growth in Asian economies. This situation may be attributed to the growing numbers of investors being optimistic to the Asian stock market. As the turnover value rises, private enterprises and innovative business are easier to find financial support, which leads to the economic growth. To serve this end, reducing transaction costs, encouraging foreign investors, securing the interest of smaller investors seem to be plausible.

For specific economy, this paper focuses on China and Hong Kong because they are much different from other four Asian economies in the sense that Hong Kong has returned to China since 1997 so that monetary policies in these two economies are coordinated. In addition, Hong Kong is an international financial center with almost the most liberalized capital market in the world, while the financial industry of China is well known for high level of government intervention. Upon this reason, this paper makes some policy suggestions of financial system in China and Hong Kong based on the comparison of economy-level estimations as follows.

China enjoys the most enviable economic growth in the past 18 years, however, to which the development of banking industry contributes is relatively small, it may due to the fact that China's banking sector is highly intervened by the government so that it does not develop for the purpose of profit maximization. In addition, high proportion of credit is allocated to national projects like high-speed rail which leave private entrepreneurs a harder borrowing environment to live with. Therefore, it seems that less direct intervention to the industry and more policies of credit allocation leaning to the private sector, in particular to those profitable projects, are favorable to the further economic growth of China.

The turnover value of stock market in China shows positive and significant effect on the

GDP growth, which may due to the fact that the GDP per capita of China is relatively small, so the return of investing in bull stock market for individual investors is very big comparing to their wages and stimulates their consumptions. Therefore, the public confidence towards the Chinese stock market and private investors' incentives of trading are much critical. Hence, imposing tougher restriction on listed companies, preventing information failure and cheating seems workable. It may contribute to strengthen the public's confidence toward to stock market, leading to higher turnover in the future.

Furthermore, our conclusion might shed light on the recent Chinese stock market crash. From June 15 to July 3, the Shanghai stock market has fallen about 36 percent within 3 weeks. The value of stock market has evaporate for $2.36 Trillion from the peak, that's about 10 times Greece's GDP. As the correlation we found out in the paper, the stock market crash might cause decrease of domestic consumption and output. Because the higher money supply or credits are just the effect of economic growth in China, the solution of the recession caused by stock market crash has to be stock market itself. The responses of Chinese government these days seem confirm our implications: limitation of short selling under the threat of arrest, suspension of IPOs, encouraging but-back by listed companies, restrictions of security company's reducing holding-shares behavior, and etc. These policies gradually take into effect by far, as the Shanghai stock market has stably gone up since July.

Apart from China, the turnover value of stock market in Hong Kong also shows positive and significant effect on the GDP growth, because the financial system in Hong Kong is more liberated with a huge amounts of foreign and mainland investors trade in its stock market, which may stimulate the economic growth of Hong Kong through the way of commissions. Therefore, expanding the turnover value of stock market in Hong Kong, issuing more mainland stocks or

establishing a RMB-based market seems to be applicable. On the top of it, developing a market for corporate and public bonds may help to strengthen the role of Hong Kong, an international financial center.

5.2 Further extensions

Of course, the analysis presented here leaves many interesting unanswered questions in financial-growth nexus. One important aspect of the problem, which this paper has not considered, is the time lag between financial development and economic growth. When the monetary policy is in place, it takes time for financial sector and private companies to react to expand their business activities in the real economy before economic growth could be achieved. This issue has not been fully tackled in this research and has been the scope of discussion in future studies. Another extension is that more macro-economic or financial factors (such as human capital or frequencies of financial crisis) which may affect the economic growth could be inserted into the estimation model to address their roles in the growth process of an economy.

Appendix A: Tables and Figures

Table A.1: average value of variables

Variables	China	Hong Kong	India	Korea	Singapore	Taiwan
Real GDP growth rate (dY)	0.101	0.038	0.070	0.049	0.063	0.046
Investment GDP ratio (I/Y)	0.410	0.253	0.285	0.310	0.271	0.230
Export growth rate (dX)	0.151	0.072	0.127	0.097	0.080	0.084
Employment growth rate (dL)	0.008	0.014	0.004	0.013	0.051	0.011
M2 growth rate (dM2)	0.141	0.081	0.102	0.092	0.091	0.067
M2 GDP ratio (M2/Y)	1.416	2.468	0.612	0.615	1.109	1.972
CREDIT growth rate (dB)	0.130	0.072	0.095	0.091	0.094	0.054
CREDIT GDP ratio (B/Y)	1.232	1.498	0.570	0.817	0.759	1.648
Private growth rate (dP)	0.123	0.064	0.115	0.088	0.082	0.051
Private GDP ratio (P/Y)	1.094	1.565	0.348	0.825	0.997	1.338
Value Traded growth rate (dVT)	0.518	0.282	0.175	0.240	0.092	0.149
VT GDP ratio (VT/Y)	0.341	4.434	0.180	0.906	1.079	2.329

Figure A.1: Scatter graph of GDP growth rate with financial development measurements

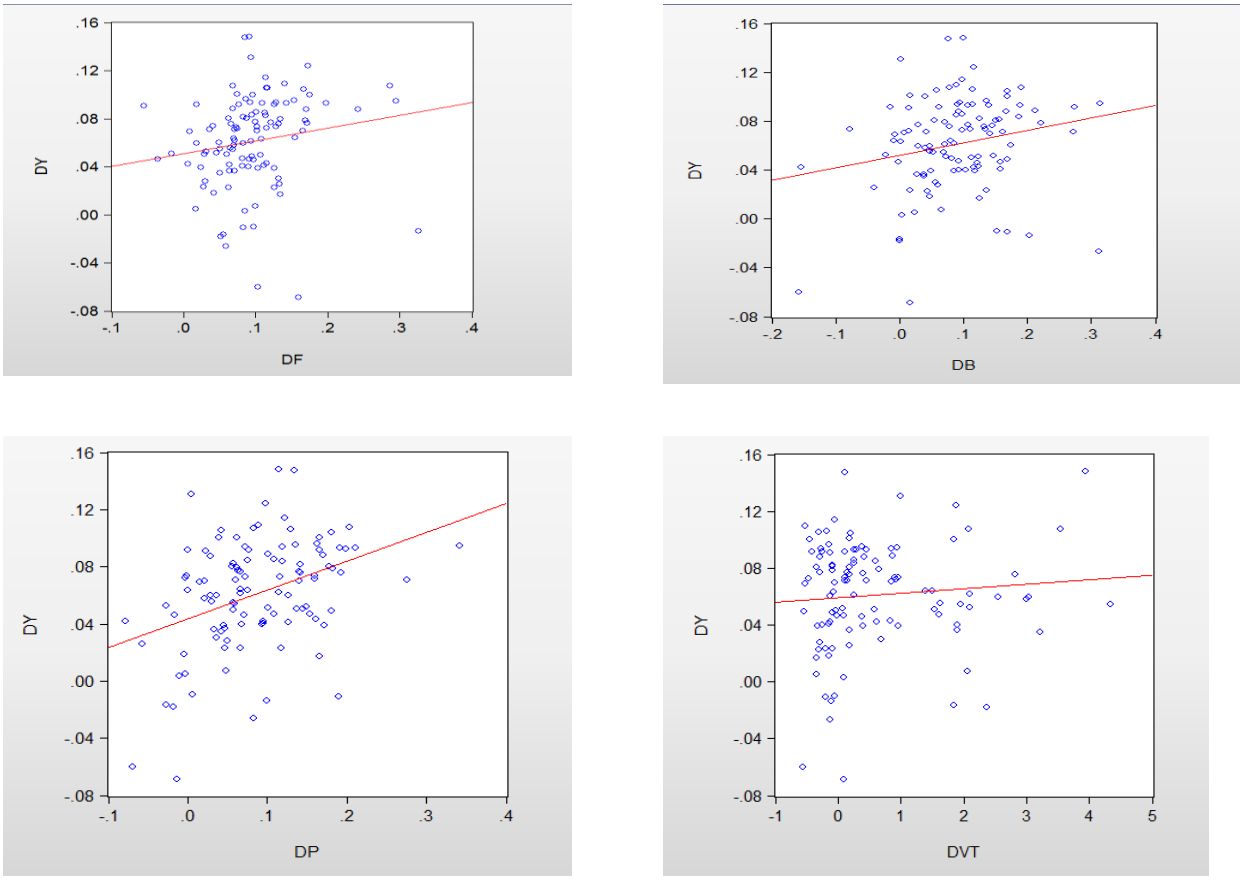

Table A.2: Correlation matrix

China	dY	I/Y	dX	dL	dM2	dB	dP	dVT
Real GDP growth rate (dY)	1.00							
Investment GDP ratio (I/Y)	0.33	1.00						
Export growth rate (dX)	0.41	-0.15	1.00					
Employment growth rate (dL)	-0.38	-0.82	0.07	1.00				
M2 growth rate (dM2)	-0.30	-0.02	-0.49	0.15	1.00			
CREDIT growth rate (dB)	-0.40	-0.12	-0.49	0.11	0.79	1.00		
Private growth rate (dP)	-0.29	0.04	-0.53	0.04	0.88	0.92	1.00	
Value Traded growth rate (dVT)	0.67	-0.02	0.02	-0.02	0.09	0.03	0.14	1.00
Hong Kong	dY	I/Y	dX	dL	dM2	dB	dP	dVT
Real GDP growth rate (dY)	1.00							
Investment GDP ratio (I/Y)	-0.12	1.00						
Export growth rate (dX)	0.75	-0.29	1.00					
Employment growth rate (dL)	0.62	0.35	0.12	1.00				
M2 growth rate (dM2)	0.23	-0.24	0.38	-0.06	1.00			
CREDIT growth rate (dB)	0.25	-0.01	0.10	0.13	-0.32	1.00		
Private growth rate (dP)	0.52	0.09	0.34	0.37	-0.26	0.79	1.00	
Value Traded growth rate (dVT)	0.57	0.00	0.25	0.45	0.46	0.04	0.22	1.00
India	dY	I/Y	dX	dL	dM2	dB	dP	dVT
Real GDP growth rate (dY)	1.00							
Investment GDP ratio (I/Y)	0.56	1.00						
Export growth rate (dX)	0.04	0.24	1.00					
Employment growth rate (dL)	0.41	0.44	-0.31	1.00				
M2 growth rate (dM2)	0.03	0.20	-0.23	0.10	1.00			
CREDIT growth rate (dB)	0.04	0.43	0.16	0.19	0.64	1.00		
Private growth rate (dP)	0.24	0.38	0.59	-0.21	0.48	0.67	1.00	
Value Traded growth rate (dVT)	-0.01	-0.28	-0.11	0.04	0.41	0.16	0.27	1.00
Korea	dY	I/Y	dX	dL	dM2	dB	dP	dVT
Real GDP growth rate (dY)	1.00							
Investment GDP ratio (I/Y)	0.56	1.00						
Export growth rate (dX)	-0.36	0.15	1.00					
Employment growth rate (dL)	0.90	0.54	-0.31	1.00				

M2 growth rate (dM2)	0.20	-0.05	-0.11	0.01	1.00			
CREDIT growth rate (dB)	0.52	0.33	-0.22	0.45	0.48	1.00		
Private growth rate (dP)	0.63	0.38	-0.26	0.54	0.45	0.98	1.00	
Value Traded growth rate (dVT)	0.32	-0.20	-0.43	0.03	0.49	0.38	0.42	1.00
Singapore	dY	I/Y	dX	dL	dM2	dB	dP	dVT
Real GDP growth rate (dY)	1.00							
Investment GDP ratio (I/Y)	0.03	1.00						
Export growth rate (dX)	0.73	-0.10	1.00					
Employment growth rate (dL)	0.17	-0.24	0.42	1.00				
M2 growth rate (dM2)	-0.40	0.09	-0.27	-0.21	1.00			
CREDIT growth rate (dB)	-0.24	0.29	-0.41	-0.14	0.53	1.00		
Private growth rate (dP)	-0.03	0.31	-0.06	-0.07	0.29	0.76	1.00	
Value Traded growth rate (dVT)	0.31	-0.26	0.03	-0.01	0.05	-0.01	-0.33	1.00
Taiwan	dY	I/Y	dX	dL	dM2	dB	dP	dVT
Real GDP growth rate (dY)	1.00							
Investment GDP ratio (I/Y)	0.58	1.00						
Export growth rate (dX)	0.88	0.43	1.00					
Employment growth rate (dL)	0.78	0.49	0.76	1.00				
M2 growth rate (dM2)	0.15	0.40	0.03	0.32	1.00			
CREDIT growth rate (dB)	0.52	0.61	0.39	0.71	0.75	1.00		
Private growth rate (dP)	0.57	0.52	0.47	0.81	0.64	0.96	1.00	
Value Traded growth rate (dVT)	0.28	0.23	0.03	0.22	0.03	0.24	0.21	1.00
Panel (six economies)	dY	I/Y	dX	dL	dM2	dB	dP	dVT
Real GDP growth rate (dY)	1.00							
Investment GDP ratio (I/Y)	0.48	1.00						
Export growth rate (dX)	0.43	0.16	1.00					
Employment growth rate (dL)	0.19	-0.09	0.09	1.00				
M2 growth rate (dM2)	0.16	0.31	-0.07	-0.12	1.00			
CREDIT growth rate (dB)	0.21	0.32	-0.12	-0.01	0.44	1.00		
Private growth rate (dP)	0.38	0.37	0.04	0.02	0.44	0.83	1.00	
Value Traded growth rate (dVT)	0.14	0.40	0.03	-0.03	0.28	0.23	0.26	1.00

Table A.3: ADF unit root tests

Variables	China		Hong Kong		India		Korea		Singapore		Taiwan		Panel	
	level	diff	level	diff	level	diff	level	diff	level	diff	level	diff	level	diff
dY	-2.62*		-3.84***		-3.09**		-4.37***		-3.91*		-3.77**		48.54**	
I/Y	0.17	-2.76*	-1.80	-4.83**	-1.99	-4.55**	-2.44	-4.31**	1.98	-4.48**	-3.16	-5.49***	10.98	31.58***
dX	-5.30***		-3.69**		-5.51***		-5.16***		-4.52***		-5.71***		81.01***	
dL	-1.16	-4.21***	-2.96***		-1.59*		-3.18***		-3.65***		-2.07**		42.07**	
dM2	-1.41	-4.09***	-4.37***		-3.43**		-1.94	-4.89***	-3.86***		-4.24***		40.83***	
dB	-4.03***		-2.79*		-3.22**		-3.35**		-3.69**		-3.26**		43.75***	
dP	-4.03***		-2.61*		-3.53**		-3.4**		-3.66**		-2.93*		43.16***	
dVT	-3.98***		-4.05***		-2.16	-2.38*	-4.52***		-4.26***		-3.06**		50.79***	
dM2 × M2/Y	-0.57	-8.12***	-3.65**		-2.04	-5.27***	-2.06	-3.94**	-3.89***		-4.88***		38.13***	
dB × B/Y	-4.06***		-2.43	-4.31***	-2.42	-7.61***	-3.57**		-4.06***		-3.19**		28.61***	
dP × P/Y	-4.03***		-2.34	-4.62***	-2.76*		-3.41**		-4.00***		-2.98*		26.26***	
dVT × VT/Y	-4.15***		-3.83**		-3.16**		-4.48***		-4.30***		-2.69*		31.19***	
M2/Y	-1.12	-4.09***	-0.07	-4.42***	-0.09	-2.59*	-2.05	-3.25*	-1.34	-4.52***	1.62	-4.59***	4.75	51.26***
B/Y	-1.48	-3.41**	-2.81*		-3.35*		-2.17	-3.18**	-3.08	-4.47**	-1.59	-3.86**	15.41	53.83***
P/Y	-1.50	-3.37**	-2.34	-1.46	0.49	-4.90***	-1.33	-3.48**	-2.45	-4.70***	-1.42	-3.05**	11.03	46.68***
VT/Y	-2.04	-6.20***	-0.95	-4.05***	-2.17	-3.69**	-1.95	-5.26***	-2.28	-4.79***	-2.49	-6.29***	15.97	81.01***

Notes: The augmented Dickey-Fuller t-tests are launched for time series data, and fisher chi-square statistics are used to test a unit root for panel data. Number of lags is selected using SIC criterion. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A.4: Estimated results of Panel

Explanatory Variables	Model 1		Model 2	
	(1)	(2)	(3)	(4)
Constant	-0.029 (-2.068)	-0.024* (-1.670)	-0.005 (-0.335)	0.001 (0.058)
Investment Share	0.239*** (5.279)	0.212*** (4.534)	0.174*** (3.501)	0.145*** (2.925)
Export growth rate	0.084*** (5.896)	0.089*** (6.565)	0.076*** (4.590)	0.080*** (4.974)
Employment growth rate	0.106** (2.390)	0.122*** (2.828)	0.106** (2.051)	0.121** (2.297)
M2 growth rate	-0.002 (-0.066)	-0.019 (-0.567)		
CREDIT growth rate	0.016 (0.517)			
Private growth rate		0.069** (2.492)		
Value Traded growth rate	0.014*** (7.409)	0.013*** (7.197)		
M2 growth rate× M2 GDP ratio			0.010 (0.419)	0.002 (0.069)
CREDIT growth rate× CREDIT GDP ratio			0.015 (0.788)	
Private growth rate× Private GDP ratio				0.059*** (2.651)
Value Traded growth rate× Value Traded GDP ratio			0.002*** (3.466)	0.002*** (3.333)
Adjusted R-squared	0.742	0.788	0.630	0.681
D.W. stat	2.026	1.997	2.029	2.022
Redundant Fixed Effects Tests	8.43***	6.46***	4.165***	4.262***
p-value	0.00	0.00	0.00	0.00

Notes: Since the null hypotheses of Hausman test are rejected, we use the fixed effect model. Redundant fixed effect tests are launched. Figures in parentheses are t-values; *. ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A.5-1: Estimated results of time series data (China)

China	Model 1			Model 2		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.058* (1.745)	0.070** (2.171)	0.058* (1.809)	-0.024 (0.456)	0.037 (0.728)	0.022 (0.441)
Investment Share	0.112 (1.472)	0.084 (1.208)	0.111 (1.525)	0.174 (1.653)	0.145 (1.432)	0.177* (1.773)
Export growth rate	0.039*** (3.355)	0.036** (2.784)	0.035** (2.726)	0.048** (2.974)	0.046*** (3.085)	0.045*** (2.958)
Employment growth rate	-0.875 (-1.109)	-1.129 (-1.661)	-0.928 (-1.286)	0.096 (0.072)	-0.102 (-0.080)	0.237 (0.188)
M2 growth rate	-0.052 (-1.548)					
CREDIT growth rate		-0.045 (-1.654)				
Private growth rate			-0.051* (-1.877)			
Value Traded growth rate	0.011*** (6.518)	0.011*** (6.295)	0.011*** (7.123)			
M2 growth rate× M2 GDP ratio				-0.027 (-0.870)		
CREDIT growth rate× CREDIT GDP ratio					-0.032 (-1.431)	
Private growth rate× Private GDP ratio						-0.041 (-1.445)
Value Traded growth rate× Value Traded GDP ratio				0.011*** (4.707)	0.011*** (4.953)	0.012*** (5.109)
R-squared	0.802	0.817	0.818	0.779	0.800	0.800
D.W. stat	1.299	1.450	1.495	1.118	1.247	1.268
F-statistic	9.749***	10.703***	10.813***	8.499***	9.601***	9.637***
Prob.(F-statistic)	0.00	0.00	0.00	0.00	0.00	0.00

Notes: Figures in parentheses are t-values; *. ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A.5-2: Estimated results of time series data (Hong Kong)

Hong Kong	Model 1		Model 2	
	(1)	(2)	(3)	(4)
Constant	0.031 (1.330)	0.034 (1.476)	0.026 (0.972)	0.031 (1.125)
Investment Share	-0.094 (-1.148)	-0.103 (-1.238)	-0.086 (-0.925)	-0.101 (-1.048)
Export growth rate	0.249*** (6.146)	0.242*** (5.273)	0.262*** (5.984)	0.252*** (5.105)
Employment growth rate	0.899*** (3.966)	0.875*** (3.766)	1.018*** (4.571)	1.007*** (4.263)
M2 growth rate	-0.080 (-0.816)	-0.083 (-0.795)		
CREDIT growth rate	0.033 (0.944)			
Private growth rate		0.041 (0.729)		
Value Traded growth rate	0.016** (2.168)	0.016* (2.072)		
M2 growth rate× M2 GDP ratio			-0.028 (-0.700)	-0.026 (-0.595)
CREDIT growth rate× CREDIT GDP ratio			0.027 (1.375)	
Private growth rate× Private GDP ratio				0.026 (0.899)
Value Traded growth rate× Value Traded GDP ratio			0.002* (1.734)	0.002 (1.439)
R-squared	0.915	0.913	0.904	0.895
D.W. stat	1.809	1.896	2.439	2.570
F-statistic	19.833***	19.176***	17.236***	15.634***
Prob.(F-statistic)	0.00	0.00	0.00	0.00

Notes: Figures in parentheses are t-values; *. ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A.5-3: Estimated results of time series data (India)

India	Model 1 (1)	Model 2 (2)
Constant	0.043 (1.349)	0.046 (1.389)
Investment Share	0.155 (1.247)	0.169 (1.187)
Export growth rate	-0.112 (-1.393)	-0.130 (-1.382)
Employment growth rate	0.708 (1.528)	0.435 (1.025)
M2 growth rate	-0.149 (-0.694)	
CREDIT growth rate	-0.325* (-2.037)	
Private growth rate	0.346** (2.188)	
Value Traded growth rate	-0.002 (-0.174)	
M2 growth rate× M2 GDP ratio		-0.325 (-0.904)
CREDIT growth rate× CREDIT GDP ratio		-0.419 (-1.723)
Private growth rate× Private GDP ratio		0.810* (2.104)
Value Traded growth rate× Value Traded GDP ratio		-0.419 (0.060)
R-squared	0.624	0.616
D.W. stat	2.517	2.297
F-statistic	2.379*	2.294
Prob.(F-statistic)	0.10	0.11

Notes: Figures in parentheses are t-values; *. ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A.5-4: Estimated results of time series data (Korea)

Korea	Model 1		Model 2	
	(1)	(2)	(3)	(4)
Constant	-0.040 (-1.332)	-0.039 (-1.269)	-0.036 (-1.194)	-0.037 (-1.225)
Investment Share	0.212* (1.997)	0.205* (1.886)	0.196* (1.952)	0.197* (1.951)
Export growth rate	0.001 (0.027)	0.001 (0.042)	0.004 (0.135)	0.004 (0.119)
Employment growth rate	1.511*** (7.565)	1.500*** (7.119)	1.482*** (7.691)	1.471*** (7.359)
M2 growth rate	0.035 (0.721)	0.028 (0.579)		
CREDIT growth rate	-0.043 (-0.651)			
Private growth rate		-0.022 (-0.329)		
Value Traded growth rate	0.015*** (3.306)	0.015*** (3.127)		
M2 growth rate× M2 GDP ratio			0.026 (0.374)	0.021 (0.301)
CREDIT growth rate× CREDIT GDP ratio			-0.027 (-0.426)	
Private growth rate× Private GDP ratio				-0.011 (-0.175)
Value Traded growth rate× Value Traded GDP ratio			0.010*** (3.834)	0.010*** (3.702)
R-squared	0.937	0.935	0.943	0.942
D.W. stat	2.447	2.482	2.504	2.516
F-statistic	27.161***	26.360***	30.477***	30.04***
Prob.(F-statistic)	0.00	0.00	0.00	0.00

Notes: Figures in parentheses are t-values; *. ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A.5-5: Estimated results of time series data (Singapore)

Singapore	Model 1 (1)	Model 2 (2)
Constant	0.022 (0.602)	0.021 (0.599)
Investment Share	0.091 (0.740)	0.094 (0.817)
Export growth rate	0.317*** (3.508)	0.329*** (3.851)
Employment growth rate	-0.078 (-0.939)	-0.085 (-1.098)
M2 growth rate	-0.203* (-1.852)	
CREDIT growth rate	0.072 (0.424)	
Private growth rate	0.032 (0.170)	
Value Traded growth rate	0.045* (1.823)	
M2 growth rate× M2 GDP ratio		-0.155 (-1.653)
CREDIT growth rate× CREDIT GDP ratio		0.065 (0.762)
Private growth rate× Private GDP ratio		0.006 (0.039)
Value Traded growth rate× Value Traded GDP ratio		0.031** (2.236)
R-squared	0.760	0.781
D.W. stat	1.379	1.141
F-statistic	4.523**	5.081***
Prob.(F-statistic)	0.02	0.01

Notes: Figures in parentheses are t-values; *. ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A.5-6: Estimated results of time series data (Taiwan)

Taiwan	Model 1		Model 2	
	(1)	(2)	(3)	(4)
Constant	-0.021 (-0.493)	-0.023 (-0.601)	-0.003 (-0.057)	-0.001 (-0.181)
Investment Share	0.151 (0.674)	0.159 (0.749)	0.148 (0.583)	0.173 (0.719)
Export growth rate	0.215*** (3.077)	0.219*** (3.049)	0.197** (2.938)	0.203** (2.876)
Employment growth rate	0.261 (0.295)	0.109 (0.104)	0.312 (0.367)	0.148 (0.143)
M2 growth rate	-0.059 (-0.231)	-0.039 (-0.175)		
CREDIT growth rate	0.106 (0.426)			
Private growth rate		0.096 (0.484)		
Value Traded growth rate	0.004 (0.639)	0.005 (0.693)		
M2 growth rate× M2 GDP ratio			-0.118 (-0.938)	-0.089 (-0.855)
CREDIT growth rate× CREDIT GDP ratio			0.119 (0.763)	
Private growth rate× Private GDP ratio				0.110 (0.484)
Value Traded growth rate× Value Traded GDP ratio			0.000 (0.071)	0.000 (0.176)
R-squared	0.838	0.839	0.843	0.842
D.W. stat	2.563	2.564	2.578	2.581
F-statistic	9.471***	9.524***	9.849***	9.791***
Prob.(F-statistic)	0.00	0.00	0.00	0.01

Notes: Figures in parentheses are t-values; *. ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A.6: Granger Causality Test (Panel)

Null Hypothesis	F-Statistic	Prob.
$\dot{M}2$ does not Granger Cause $\dot{Y}$	5.42	0.01***
$\dot{Y}$ does not Granger Cause $\dot{M}2$	2.65	0.07*
$\dot{B}$ does not Granger Cause $\dot{Y}$	0.17	0.84
$\dot{Y}$ does not Granger Cause $\dot{B}$	2.36	0.09*
$\dot{P}$ does not Granger Cause $\dot{Y}$	0.75	0.47
$\dot{Y}$ does not Granger Cause $\dot{P}$	3.22	0.04**
$\dot{VT}$ does not Granger Cause $\dot{Y}$	2.23	0.11
$\dot{Y}$ does not Granger Cause $\dot{VT}$	3.66	0.03**
$M2/Y$ does not Granger Cause $\dot{Y}$	5.63	0.01***
$\dot{Y}$ does not Granger Cause $M2/Y$	1.77	0.17
B/Y does not Granger Cause $\dot{Y}$	0.36	0.70
$\dot{Y}$ does not Granger Cause B/Y	0.56	0.57
P/Y does not Granger Cause $\dot{Y}$	0.84	0.43
$\dot{Y}$ does not Granger Cause P/Y	3.14	0.04**
VT/Y does not Granger Cause $\dot{Y}$	3.01	0.05*
$\dot{Y}$ does not Granger Cause VT/Y	0.18	0.83

Notes: *. ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A.7-1: Granger Causality Test (China)

Null Hypothesis	F-Statistic	Prob.
$\dot{M}2$ does not Granger Cause $\dot{Y}$	2.79	0.11
$\dot{Y}$ does not Granger Cause $\dot{M}2$	7.95	0.01***
$\dot{B}$ does not Granger Cause $\dot{Y}$	1.75	0.21
$\dot{Y}$ does not Granger Cause $\dot{B}$	8.70	0.01**
$\dot{P}$ does not Granger Cause $\dot{Y}$	1.94	0.18
$\dot{Y}$ does not Granger Cause $\dot{P}$	9.35	0.00***
$\dot{VT}$ does not Granger Cause $\dot{Y}$	3.43	0.06*
$\dot{Y}$ does not Granger Cause $\dot{VT}$	2.00	0.18
$M2/Y$ does not Granger Cause $\dot{Y}$	0.95	0.41
$\dot{Y}$ does not Granger Cause $M2/Y$	8.35	0.01***
B/Y does not Granger Cause $\dot{Y}$	0.92	0.42
$\dot{Y}$ does not Granger Cause B/Y	5.86	0.02**
P/Y does not Granger Cause $\dot{Y}$	0.64	0.54
$\dot{Y}$ does not Granger Cause P/Y	6.09	0.01***
VT/Y does not Granger Cause $\dot{Y}$	0.67	0.53
$\dot{Y}$ does not Granger Cause VT/Y	0.91	0.43

Notes: *. ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A.7-2: Granger Causality Test (HK)

Null Hypothesis	F-Statistic	Prob.
$\dot{M}2$ does not Granger Cause $\dot{Y}$	1.38	0.29
$\dot{Y}$ does not Granger Cause $\dot{M}2$	0.09	0.91
$\dot{B}$ does not Granger Cause $\dot{Y}$	0.01	0.98
$\dot{Y}$ does not Granger Cause $\dot{B}$	1.06	0.37
$\dot{P}$ does not Granger Cause $\dot{Y}$	0.35	0.71
$\dot{Y}$ does not Granger Cause $\dot{P}$	1.46	0.27
$\dot{VT}$ does not Granger Cause $\dot{Y}$	1.95	0.18
$\dot{Y}$ does not Granger Cause $\dot{VT}$	0.93	0.42
$M2/Y$ does not Granger Cause $\dot{Y}$	1.22	0.33
$\dot{Y}$ does not Granger Cause $M2/Y$	0.67	0.53
B/Y does not Granger Cause $\dot{Y}$	0.01	0.99
$\dot{Y}$ does not Granger Cause B/Y	0.65	0.54
P/Y does not Granger Cause $\dot{Y}$	0.81	0.46
$\dot{Y}$ does not Granger Cause P/Y	8.85	0.01***
VT/Y does not Granger Cause $\dot{Y}$	0.10	0.89
$\dot{Y}$ does not Granger Cause VT/Y	0.37	0.69

Notes: *. ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A7-3: Granger Causality Test (India)

Null Hypothesis	F-Statistic	Prob.
$\dot{M}2$ does not Granger Cause $\dot{Y}$	0.51	0.61
$\dot{Y}$ does not Granger Cause $\dot{M}2$	0.58	0.57
$\dot{B}$ does not Granger Cause $\dot{Y}$	0.03	0.96
$\dot{Y}$ does not Granger Cause $\dot{B}$	0.94	0.41
$\dot{P}$ does not Granger Cause $\dot{Y}$	0.21	0.81
$\dot{Y}$ does not Granger Cause $\dot{P}$	4.41	0.04**
$\dot{VT}$ does not Granger Cause $\dot{Y}$	1.14	0.35
$\dot{Y}$ does not Granger Cause $\dot{VT}$	0.15	0.86
$M2/Y$ does not Granger Cause $\dot{Y}$	2.67	0.11
$\dot{Y}$ does not Granger Cause $M2/Y$	3.91	0.05**
B/Y does not Granger Cause $\dot{Y}$	1.61	0.24
$\dot{Y}$ does not Granger Cause B/Y	0.23	0.79
P/Y does not Granger Cause $\dot{Y}$	1.58	0.24
$\dot{Y}$ does not Granger Cause P/Y	3.76	0.05**
VT/Y does not Granger Cause $\dot{Y}$	0.27	0.76
$\dot{Y}$ does not Granger Cause VT/Y	0.36	0.70

Notes: *. ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A.7-4: Granger Causality Test (Korea)

Null Hypothesis	F-Statistic	Prob.
$\dot{M}2$ does not Granger Cause $\dot{Y}$	0.73	0.50
$\dot{Y}$ does not Granger Cause $\dot{M}2$	1.87	0.19
$\dot{B}$ does not Granger Cause $\dot{Y}$	0.29	0.75
$\dot{Y}$ does not Granger Cause $\dot{B}$	0.03	0.96
$\dot{P}$ does not Granger Cause $\dot{Y}$	0.25	0.77
$\dot{Y}$ does not Granger Cause $\dot{P}$	0.15	0.86
$\dot{VT}$ does not Granger Cause $\dot{Y}$	0.23	0.79
$\dot{Y}$ does not Granger Cause $\dot{VT}$	9.71	0.00***
$M2/Y$ does not Granger Cause $\dot{Y}$	0.33	0.72
$\dot{Y}$ does not Granger Cause $M2/Y$	1.11	0.36
B/Y does not Granger Cause $\dot{Y}$	0.52	0.61
$\dot{Y}$ does not Granger Cause B/Y	0.14	0.86
P/Y does not Granger Cause $\dot{Y}$	0.54	0.59
$\dot{Y}$ does not Granger Cause P/Y	0.10	0.90
VT/Y does not Granger Cause $\dot{Y}$	0.00	0.99
$\dot{Y}$ does not Granger Cause VT/Y	11.02	0.00***

Notes: *. ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A.7-5: Granger Causality Test (SG)

Null Hypothesis	F-Statistic	Prob.
$\dot{M}2$ does not Granger Cause $\dot{Y}$	0.23	0.79
$\dot{Y}$ does not Granger Cause $\dot{M}2$	1.03	0.38
$\dot{B}$ does not Granger Cause $\dot{Y}$	0.71	0.50
$\dot{Y}$ does not Granger Cause $\dot{B}$	2.53	0.12
$\dot{P}$ does not Granger Cause $\dot{Y}$	0.20	0.82
$\dot{Y}$ does not Granger Cause $\dot{P}$	3.99	0.04**
$\dot{VT}$ does not Granger Cause $\dot{Y}$	2.70	0.11
$\dot{Y}$ does not Granger Cause $\dot{VT}$	0.28	0.75
$M2/Y$ does not Granger Cause $\dot{Y}$	0.43	0.65
$\dot{Y}$ does not Granger Cause $M2/Y$	0.64	0.54
B/Y does not Granger Cause $\dot{Y}$	2.06	0.17
$\dot{Y}$ does not Granger Cause B/Y	0.81	0.47
P/Y does not Granger Cause $\dot{Y}$	0.82	0.46
$\dot{Y}$ does not Granger Cause P/Y	1.31	0.30
VT/Y does not Granger Cause $\dot{Y}$	0.46	0.64
$\dot{Y}$ does not Granger Cause VT/Y	0.11	0.88

Notes: *. ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A7-6: Granger Causality Test (Taiwan)

Null Hypothesis	F-Statistic	Prob.
$\dot{M}2$ does not Granger Cause $\dot{Y}$	1.31	0.31
$\dot{Y}$ does not Granger Cause $\dot{M}2$	0.85	0.45
$\dot{B}$ does not Granger Cause $\dot{Y}$	1.55	0.25
$\dot{Y}$ does not Granger Cause $\dot{B}$	1.69	0.22
$\dot{P}$ does not Granger Cause $\dot{Y}$	1.56	0.25
$\dot{Y}$ does not Granger Cause $\dot{P}$	1.71	0.22
$\dot{VT}$ does not Granger Cause $\dot{Y}$	0.19	0.82
$\dot{Y}$ does not Granger Cause $\dot{VT}$	0.56	0.58
$M2/Y$ does not Granger Cause $\dot{Y}$	0.11	0.89
$\dot{Y}$ does not Granger Cause $M2/Y$	0.58	0.57
B/Y does not Granger Cause $\dot{Y}$	0.13	0.87
$\dot{Y}$ does not Granger Cause B/Y	4.12	0.04**
P/Y does not Granger Cause $\dot{Y}$	0.46	0.64
$\dot{Y}$ does not Granger Cause P/Y	6.58	0.01***
VT/Y does not Granger Cause $\dot{Y}$	2.82	0.11
$\dot{Y}$ does not Granger Cause VT/Y	0.58	0.57

Notes: *. ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Appendix B: Data Source and Series Code

Economy	Series Name	Data Source	Series Code
China	CN: Gross Domestic Product (GDP)	IMF	229470701
	CN: GDP Deflator		229471001
	CN: GDP: Gross Fixed Capital Formation		229470101
	CN: GDP: Changes in Inventories		229470201
	Employment	Ministry of HR and Social Security	4945301 (CGHA)
	Exports: Annual: Yuan	General Administration of Customs	6328601 (CJKA)
	CN: Banking Survey: Money Plus Quasi Money	IMF	229460101
	CN: Banking Survey: Domestic Credit		229457401
	CN: Banking Survey: Claims on Private Sector		229458001
	Turnover: Value: Shanghai Stock Exchange: Stocks	Shanghai Stock Exchange	13094301 (CZJB)
Hong Kong	HK: Gross Domestic Product (GDP)	IMF	224687201
	HK: GDP Deflator		224688001
	HK: GDP: Gross Fixed Capital Formation		224685801
	HK: GDP: Changes in Inventories		224686001
	HK: GDP: Exports of Goods and Services		224685401
	Employment: Yearly	Census & Statistic Department	319840301 (HGBWDN)
	HK: Banking Survey: Money Plus Quasi Money	IMF	224665601
	HK: Banking Survey: Claims on Private Sector		224666201
	Turnover: Value	Hong Kong Exchange	18831801 (HZSA)
India	IN: Gross Domestic Product (GDP)	IMF	224731801
	IN: GDP Deflator		224732801
	IN: GDP: Gross Fixed Capital Formation		224730801
	IN: GDP: Changes in Inventories		224731001
	IN: GDP: Exports of Goods and Services		224730401
	Employment	Central Statistical Organization	19489801 (IGBA)
	IN: Monetary Survey: Money Plus Quasi Money	IMF	224713501
	IN: Monetary Survey: Domestic Credit		224711101
	IN: Monetary Survey: Claims on Private Sector		224711701
	BSE: Turnover: Value	Bombay Stock Exchange Limited	21911101 (IZFB)
Korea	KR: Gross Domestic Product (GDP)	IMF	224934901
	KR: GDP Deflator		224935901
	KR: GDP: Gross Fixed Capital Formation		224933701
	KR: GDP: Changes in Inventories		224933901
	KR: GDP: Exports of Goods and Services		224933301
	Employment	National Statistical Office	28622201 (KGSA)
	KR: Monetary Survey: Money Plus Quasi Money	IMF	224905701
	KR: Monetary Survey: Domestic Credit		224903301
	KR: Monetary Survey: Claims on Private Sector		224904201
	KOSPI: Turnover: Value: All Shares	Korea Exchange	30738101 (KZTB)
Singapore	SG: Gross Domestic Product (GDP)	IMF	225396101
	SG: GDP Deflator		225397001
	SG: GDP: Gross Fixed Capital Formation		225395601
	SG: GDP: Changes in Inventories		225395701
	SG: Employment		225383201
	SG: Exports: fob: Local Currency		225383401
	SG: Monetary Survey: Money Plus Quasi Money		225373901
	SG: Monetary Survey: Domestic Credit		225371801
	SG: Monetary Survey: Claims on Private Sector		225372401
	(DC)SGX Turnover: Value: Mainboard & Clob	Singapore Exchange	36707001 (SZGR)
Taiwan	Gross Domestic Product (GDP)	Directorate-General of Budget, Accounting and Statistics	261811501 (WARCBA)
	Gross Domestic Product (GDP): Deflator		261861101 (WARLBA)
	Fixed Capital Formation (GFCF)		261841501 (WARCBAAC)
	GDP: Domestic Demand: Increase in Stocks		261810201 (WARCBAAD)
	GDP: DR: Exports of Goods & Services		261810401 (WARCBABA)
	Employment		45316301 (WGRC)
	Money Supply M2	Central Bank of the Republic of China	321861301 (WKBAJAAAA)
	Loans and Investments: Monetary Financial Institutions		321860701 (WKFBAAA)
	Loans and Investments: MF: Private Sector		321861201 (WKFBEAAA)
	TWSE: Turnover: Annual: Stock	Taiwan Stock Exchange Corporation	46104901 (WZGZ)

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