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Finance-led growth hypothesis for Asia: an insight from new data

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ABSTRACT

The quest for the development of financial system has been the major concern of the Asian economies over the years. Using a System Generalized Methods of Moments technique for 44 Asian countries over the period 1980–2017, we evaluate the effect of financial development on economic growth for the entire Asia, sub-regions and groups of the countries by their levels of income. Additionally, we considered the subcomponents of the financial system. The contribution of this study hinges on the use of a comprehensive measure of financial development, and consideration of the heterogeneity of the Asian countries concerning the finance-growth nexus. The findings revealed that financial development spurs economic growth in Asia. Specifically, the development of financial institutions have a greater impact than development of financial markets on growth of upper-middle and high-income countries while the reverse is the case for low and low-middle income countries in the continent.

KEYWORDS

Financial development; economic growth; financial institutions; financial markets; Asia

JEL CLASSIFICATION CODES

D53; F43; G23; N15

1. Introduction

The quest for determinants of economic growth has been the main issue of discussion in the literature. In light of that, researchers and policymakers have recognized that the financial sector is crucial for economic progress in developed, emerging, and developing economies. For instance, studies have argued that a sound financial sector is essential for capital accumulation and investment and thus stimulates economic activities (Schumpeter 1934; Levine 1997; Greenwood and Smith 1997). The financial system plays the vital role of harnessing savings, channeling the savings to the investments with high returns in the economy, diversifying risks of investments, and facilitating business transactions (Levine 2005; Demirguc-Kunt and Levin 2009; Dabla-Norris and Srivisal 2013).

Therefore, a well-developed financial system enhances economic progress and a repressed financial system hampers the growth of an economy (Shaw 1973; McKinnon

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1973). Meanwhile, the efforts to strengthen the financial system to build a vibrant economy have been globally intensified due to incessant currency and financial crises experienced over the years. For instance, the Asian financial crisis in 1997 made many countries in Asia and around the world to implement desirable financial reforms. Also, the global financial crisis amplified the importance of the financial sector in any economy. Meanwhile, most Asian countries were less affected by the 2008 global financial crisis compare with their counterparts elsewhere in the world. At the same time, the countries on the continent have experienced sustained growth over the years.

However, despite the consensus in the literature that financial development (FD) significantly affects growth, there are divergence and contradictions in the findings on the effect of FD on sustained growth. Some studies (Qamruzzaman and Jianguo 2018; Afonso and Blanco Arana 2018) find a positive impact of FD on economic development while others (Arcand, Berkes, and Panizza 2012; Philippon and Reshef 2013; Eugster 2014) argue that FD negatively affects growth. Furthermore, the findings vary across countries, regions, and continents. Equally, issues about the channel through which FD affects growth are unresolved. Some studies argue that the effect is channeled through the financial institutions while others conclude that the effect is transmitted through the financial market. Against this backdrop, the studies on the FD-growth nexus remains inconclusive. Therefore, this study aims to evaluate the impact of FD on growth in Asia. The role of the financial system in enhancing economic progress has attracted the attention of researchers and policymakers over time across all regions of the world. The issue has been well researched on and several conclusions were drawn. The curiosity of the researchers was rekindled due to the devastating effects of the financial crisis on growth and development. Consequently, the recent literature established that the financial system is a fundamental determinant of growth. (see Habibullah 1999; Zhang, Wang, and Wang 2012; Arcand, Berkes, and Panizza 2012; Philippon and Reshef 2013; Majid 2007; Bayar 2014; Eugster 2014; Chaibi 2015; Aizenman, Jinjarak, and Park 2015; Durusu-Ciftci, Ispir, and Yetkiner 2017; Qamruzzaman and Jianguo 2018; Afonso and Blanco Arana 2018; Shahani, Sharma, and Akriti 2018; Yang 2019; Swamy and Dharani 2019; Demetriades and Rewilak 2020; Kumar and Paramanik 2020).

Despite the plethora of studies, there is no general agreement on whether the effect is positive or negative and the same or different across different levels of income and economic development. Hence, numerous essential questions about the finance-growth relationship are still begging for answers, particularly regarding the Asian continent. There are different regions and countries at different levels of income and development in Asia. So, do FD affect growth in Asia? Is the effect positive or negative? Which component (financial institutions or financial market) of the financial system affects growth? Is the effect the same for all the regions and at different levels of income and development in Asia? These are the questions the current study seeks to answer.

Moreover, numerous indicators (Bank credit, market capitalization, broad money supply etcetera) were used as proxies for FD. The common defect of all the indicators is a lack of inclusiveness. Since, all parts of the financial system function concurrently, using disintegrated components of the financial system could lead to

misleading conclusions about the effect of FD on growth particularly in Asia where the countries are heterogeneous in terms of macroeconomic fundamentals.

In addition, the coronavirus (COVID-19) pandemic has affected all facets of the world economy including the financial sector, and the global economy is confronted with new challenges in all aspects (Jean 2020; Blanco-Arana 2020; Chen and Lee 2020; Blackman et al. 2020). Consequently, the nexus between financial development and economic growth could greatly experience paradigm shift. For instance, Jorda, Singh, and Taylor (2020) submitted that pandemic may not destroy capital accumulation, rather it induces precautionary savings and reshape the operation of the global financial market. This may greatly affect the financial development and its relationship with economic growth. Hence, the COVID-19 pandemic makes it even more imperative to revisit the finance-growth nexus, especially in Asia, which is epicenter of the pandemic.

Therefore, this study examines the effect of FD on growth in Asia. The main objective of the study is to examine the effect of FD on growth in Asia. Specifically, first, it evaluates the effect of the financial institutions on growth. Second, it investigates the effect of financial market development on economic development. Third, it investigates the effect of financial institutions' development on economic development. Fourth, the study finds out the relative effect of FD on growth across regions and income levels of countries in Asia. The marginal contributions of this study hinge on the use of an all-inclusive measure of financial development, the separation of the effects of the development of the financial markets from the development of the institutions as well as the consideration of the sub-regions and different income groups of the Asian countries. The incorporation of the heterogeneity in the finance-economic growth literature provides a clear understanding of the effect of financial development on economic growth in Asia. This is tremendously important for the design and implementation of desirable economic policies for the Asian economy. Since the study separated the effect of the financial institutions from that of the financial markets for each group of countries in the Asian continent, it makes it easy for policymakers, stakeholders, governments and development agencies to know the component of the financial sector that needs particular attention to promote growth and achieve certain developmental goals and targets. Moreover, the study contributes significantly to the debate on the issue of FD-growth nexus by using the most comprehensive measure of financial development. Also, the study provides an insight into the effect of FD on growth for other countries and regions outside Asia.

2. Literature review

Theoretical and empirical literature continues to grow in the field of financial economics regarding the relationship between FD and growth. In theory, Schumpeter (1911) posits that a vibrant financial system enhances technological innovation and promotes growth by providing financial services to pragmatic innovators and entrepreneurs. He contends that by spurring technological innovation via efficient resource allocation, a well-functioning financial system propels growth. In the same vein, the supply-leading hypothesis propounded by Patrick (1966) submits that a sound

financial system enhances growth. It expresses that financial markets enable the transfer of funds from the surplus spending units to the deficit spending units. This facilitates investment and consequently promotes economic growth. Following the work of Schumpeter (1911), many studies have empirically examined the effect of FD on growth.

The pioneering study of Goldsmith (1969) first finds evidence that FD positively affects income per capita (GDP per capita). Similarly, King and Levine (1993) examine the FD on growth in OECD for the period 1960–1989. The study finds a positive impact of FD on growth. McKinnon (1973) and Shaw (1973) also submit similar findings. De Gregorio and Guidotti (1995) studied a panel of 100 countries for 1960–1985. The study affirms that FD is positively related to growth. Choe and Moosa (1999) examine the FD-growth nexus in South Korea for the 1970–1992 period. The study observes that the development of the financial sector correlates directly with growth. Using a sample of 10 developing countries, Christopoulos and Tsionas (2004) show that FD contributes positively to growth.

Recently, the positive relationship between FD and growth has been revalidated for several countries within and outside Asia. For instance, Omri et al. (2015) argue that there is a unidirectional causality running from FD to growth for a sample of twelve MENA countries for the period 1990–2011. Habibullah (1999), Majid (2007) and Bayar (2014) considered the effect of FD on the growth of the emerging Asian economies. The studies submit that the development of the financial sector has a positive effect on growth. However, the study is restricted to only the emerging Asian economies with the use of narrow indicators of FD. Similarly, Zhang, Wang, and Wang (2012) in a micro-level study; the effect of FD on growth in china reported a positive effect of FD in the countries. The study used city-level data for the period ranging from 2001 to 2006.

Furthermore, few recent studies have submitted a positive relationship between financial development and economic growth in Asia. For instance, Murari (2017) explores the nexus between financial development and economic growth in South Asian Middle-income countries over a period from 1980 to 2013. Using a panel data technique, the study uses domestic credit to the private sector and domestic credit by the banking sector as the proxy for financial institutions development, and market capitalization as a proxy for financial markets development. The findings reveal a positive impact of financial development on economic growth. Similarly, Shahani, Sharma, and Akriti (2018) examine the cointegration relationship between financial development (credit to the private sector) and economic growth (per capita GDP) using ARDL for three south Asian countries (India, Pakistan and Sri Lanka). The study reports a positive cointegrating relationship between the financial development and economic growth in India and Sri Lanka but it does not exist in the case of Pakistan.

Nawaz, Lahiani, and Roubaud (2019) used a bootstrap ARDL approach with structural breaks to examine the relationship between financial development and economic growth in Pakistan over the period 1972–2017. The findings revealed that financial development propels economic growth through the enhancement of production. The result remains robust even when natural resources and structural breaks are

accounted for in the analysis. Moreover, Sharma and Kautish (2020) extended the literature vis-a-vis the link between financial development and economic growth using the pooled mean group (PMG) estimation technique for four South Asian middle-income countries. The findings show a positive but weak influence of the financial institutions (banking sector) development on economic growth. Additionally, the study reveals that the combined effect of financial institutions and markets on economic growth is positive and substantially strong. Chaudhry, Sabir, and Gulzar (2019) using GMM estimation methods, equally report positive nexus between financial development, technological development, and economic growth in South Asia. Using non-linear ARDL with quarterly data ranging from 1996Q1 to 2018Q3, Kumar and Paramanik (2020) examine the association between financial development and Indian economic growth. The study finds that financial development does positively affects economic growth in the long run but it does not in the short run. Also, the study submits that both positive and negative financial development have an equal magnitude of impact on economic growth. In a general study for a sample of 40 middle-income countries over the period 1989–2011, Durusu-Ciftci, Ispir, and Yetkiner (2017) augmented the Solow-Swan growth model with financial market indicators and conclude that debt from credit market and equity from stock markets are two important determinants of economic growth. More so, the study used augmented mean group (AMG) and commonly correlated estimator (CEE) techniques. It submits that the positive impact of the credit market is substantially greater than the contribution of the stock markets for economic growth. Thus, the study recommends the prioritization of policies aimed at deepening financial markets. In a similar vein, Yang (2019) evaluates the impact of financial development on the economic growth of middle-income economies. The study concludes that domestic credit propels economic growth and there is feedback causality between the two variables.

On the contrary, numerous channels via which excessive FD could negatively affect growth have been discussed in the literature. It is argued that the excessive development of the financial sector increases the rates of booms and busts which ultimately worsens the economic situation of the country at lower growth. Also, too much finance lure human capital to the financial sector at the expense of other productive sectors in the county. This results in the misallocation of resources and its consequent negative effect on growth (See, Eugster 2014; Arcand, Berkes, and Panizza 2012; Philippon and Reshef 2012, 2013). Similarly, a couple of recent studies in Asia submit that FD has a significant impact on growth but the nature of the impact differs across the countries (see Pradhan et al. 2013; Aizenman, Jinjarak, and Park 2015; Qamruzzaman and Jianguo 2018; Afonso and Blanco Arana 2018; Carré and L'oeillet 2018). Other studies found a nonlinear relationship between financial development and economic growth. For instance, Ibrahim and Alagidede (2018) found that finance propels economic growth at an above certain threshold of financial development below which economic growth is insensitive to financial development. Most recently, Swamy and Dharani (2019) showed evidence of an inverted U-shaped relationship between finance and growth for 24 advanced economies. This shows that there exists a threshold effect of financial development on economic growth beyond which further improvement in the financial sector would result in a decline of economic growth.

Better still, Williams (2018) contends that finance-led growth has been broken. That is, FD does not have a significant impact on growth. The study was carried out with a sample of 32 Latin American and Caribbean countries comprising emerging and developing countries throughout 1970–2014. He explains that the broken relationship results from the inability of the vibrant financial system to channel funds to a profitable investment. He argues that this happens because of the existence of weak institutions which enables political elites to influence the flow of credit to their firms. Similarly, Beck et al. (2008) find that household credit is not significantly related to growth in a panel of 45 developing countries.

The plethora of studies notwithstanding, the research on the effect of FD is still inconclusive about the nature of the effect of FD on growth as several research gaps are yet to be addressed. The debate is contentious even after the global financial crisis, the use of assorted statistical techniques. First, some of the aforementioned studies revealed positive nexus between finance and economic growth while others showed evidence of a negative or inverted U-shaped relationship.

Second, none of the studies dissect the contribution of financial institutions and financial markets based on the level of income of the Asian countries and sub-regions. Meanwhile, studies have shown that the effect of financial development on economic growth varies by the level of income in other regions across the world. For instance, Demetriades and Hook Law (2006) submit that the impact of finance on growth is weaker in low/middle-income countries vis-à-vis the high-income countries. Also, Henderson, Papageorgiou, and Parmeter (2013) reported a significant positive impact of financial development on the economic growth of developed countries but the finance-growth nexus is statistically insignificant for the developing countries. Again, Ehigianmusoe and Lean (2018) provided empirical evidence that the impact of financial development on economic growth varies significantly based on the level of income of the West African countries. The study shows that financial improvement propels growth in some of the economies but it does not in others. Accordingly, the finance-growth nexus is found to be weaker for low-income countries. The findings were robust despite the consideration of structural breaks and cross-sectional dependency. Thus, since Asia is a conglomeration of countries belonging to all categories of levels of income (low, low-middle, middle and high), it is imperative to evaluate the finance-growth hypothesis regarding the continent considering the heterogeneity of the countries based on the different income levels.

Third, all the studies used single measures of FD. Hence, their indicators suffer the problem of lack of comprehensiveness, which enormously affects the estimates of the finance-growth nexus. For example, Demetriades and Rewilak (2020) attributed the break in the finance-growth nexus to the use of defective measures of financial development. They argue that the positive effect of financial development on growth can only be recovered by using a better measure of financial development. Accordingly, the study submits that with quality-adjusted measures of financial development, the finance-growth nexus remains intact regardless of the global financial crisis and other events that were accused to be responsible for the break in the finance-growth hypothesis. Thus, the use of the comprehensive measure of financial development in this study is a huge contribution to the debate on the finance-growth hypothesis.

Therefore, this study bridges the research gaps by examining the effect of FD on the growth of a sample of high-income, upper-middle-income, and low-middle income Asian countries using a recently developed FD index. The study is distinct from previous studies mainly in the use of an all-inclusive measure of FD (FD index). We used a comprehensive FD index (FDI) constructed by Sahay et al. (2015) of the International Monetary Fund (IMF). Both the subcomponents of the FD index (development of financial institutions and market institutions) are also used. Further, the analysis is carried out for the entire continent and in groups of countries by their level of income and development (High, upper-middle and low-middle income countries). This provides robust findings of the effect of FD on growth in the Asian continent and gives pragmatic insights on the issue.

3. Data and methods

3.1. Data

The study considers the impact of FD on growth with a panel of 44 Asian countries over the period 1980–2017. The sample and time frame is deliberately and strategically chosen. Over this period, Asia has been the most economically vibrant continent in the world. Many Asian countries recorded unprecedented growth over the period. Also, several financial reforms aimed at developing and integrating the financial sector of the Asian countries are implemented during this period particularly post 1997 Asian financial crisis.

The growth of GDP is used as a measure of growth. The GDP data for all the countries is obtained from World Development Indicators (World Bank 2018). A comprehensive FD index (FDI) constructed by Sahay et al. (2015) of the International Monetary Fund (IMF) is used in this study. The index was constructed to overcome the defects of the narrow indicators (domestic credit, market capitalization) used as proxies for FD. The FD index is normalized and thus ranges between 0 (lowest) to 1 (highest). The broad index captures banks and nonbank financial institutions as well as the financial markets (stock and bond markets). An individual index measuring the depth, access, and efficiency of both the financial institutions (FI) and financial markets (FM) was captured in the index.

The study, therefore, uses the overall FD index (FD), financial institutions development index (FI), and the development of the financial market index (FM) as a measure of financial sector development. This is to examine the relative importance of each component of the financial system as a determinant of growth among the countries with different levels of income in the Asian continent. Also, control variables (population growth, inflation, literacy rate and government consumption (involvement) were included in the analysis of this study. All the control variables are sourced from World Development Indicators (World Bank 2018).

3.2. Model specification

Following the framework of the augmented Solow growth model as modified by Durusu-Ciftci, Ispir, and Yetkiner (2017) to capture FD, the empirical model of this study is specified as;

$$GRGDP_{it} = \beta_0 + \beta_1 GRGDP_{it-1} + \beta_2 PGR_{it} + \beta_3 INF_{it} + \beta_4 LITR_{it} + \beta_5 GCON_{it} + \beta_6 FD_{it} + \varepsilon_{it} \quad (1)$$

$$GRGDP_{it} = \emptyset_0 + \emptyset_1 GRGDP_{it-1} + \emptyset_2 PGR_{it} + \emptyset_3 INF_{it} + \emptyset_4 LITR_{it} + \emptyset_5 GCON_{it} + \emptyset_6 FI_{it} + \varepsilon_{it} \quad (2)$$

$$GRGDP_{it} = \gamma_0 + \gamma_1 GRGDP_{it-1} + \gamma_2 PGR_{it} + \gamma_3 INF_{it} + \gamma_4 LITR_{it} + \gamma_5 GCON_{it} + \gamma_6 FM_{it} + \varepsilon_{it} \quad (3)$$

Equations (1)–(3) capture the effects of overall FD, financial institutions development, and financial market development, respectively. $GRGDP_{it-1}$ is the initial growth rate of GDP per capita of country i at period t. PGR_{it} is the population growth of country i at period t, INF_{it} is the inflation rate of country i at period t, $LITR_{it}$ is the literacy rate of country i at period t, $GCON_{it}$ denotes government consumption of country i at period t,FD_{it}, FI_{it} and FM_{it} represents the overall FD index, financial institutions development index, and financial market development index of country i at period t, respectively. The disturbance error term and the slope coefficients are denoted by ε and β, $\emptyset$, γ, respectively.

3.3. Methods of data analysis

Method of estimation of panel data models has undergone an age-long modification and improvement. Parameter estimates of Ordinary Least Square (OLS) techniques will be bias and inconsistent in the case of dynamic panel models. This is because the dependent variable depends on its lagged values and the lagged dependent variable is correlated with the error component. In this case autocorrelation due to the presence of a lagged dependent variable among the explanatory variables and heterogeneity among the individuals becomes evident. Hence the estimates of the coefficients using OLS will be bias and inconsistent even if the error terms are not serially correlated (Batagi 2008).

This led to the development and use of alternative estimation techniques by various scholars over time. Some of the technics are the Within Groups estimator, Arellano-Bond first difference Generalized Method of Moments (GMM) estimator and Blundell – Bond System GMM estimator among others. However, Judson and Owen (1999) performed some Monte Carlo experiments and found that a sizeable bias in the within estimator. Nickell (1981) shows that the Within Groups Estimator for a dynamic panel model results in bias and inconsistent estimates.

In a similar vein, Arellano (1989) finds that for simple dynamic error components models, the first differenced GMM estimator has very large variances over a significant range of parameter values. Furthermore, Arellano and Bover (1995) and Blundell and Bond (1998) show that the first difference GMM estimator may be subject to a large downward finite sample bias. Therefore, they recommended the use of system GMM that was revealed an improvement over the first differenced GMM. Empirical

Table 1. Descriptive statistics.

Variables	Observations	Mean	Standard deviation	Minimum	Maximum
GRGDP	1,672	4.149	1.884	0.318	9.590
FD	1,672	0.272	0.173	0.0382	0.697
FI	1,672	0.339	0.177	0.0756	0.852
FM	1,672	0.201	0.188	0.000215	0.620
GDPPC	1,672	7,893	10,775	331.1	38,761
INF	1,672	11.58	20.38	0.6104	96.25
PGR	1,672	2.125	0.425	1.408	2.973
LITR	1,672	9.758	7.164	0.976	26.69
Number of countries	44	44	44	44	44

Source: Author's computation. GRGDP = Growth rate of GDP, FD = Overall FD index, FI = Financial institutions development index, FM = Financial markets development index, GDPPC = GDP per capita, GRGDPPC = Growth rate of GDP per capita, PGR = Population growth rate, LITR = Literacy rate and INF = Inflation rate.

literature shows that the current level of growth can be determined by the previous growth rate. Thus, the dynamic nature of the growth renders OLS within-group estimator (fixed effect and random effect) techniques inappropriate. Therefore, the System GMM estimator is employed for the estimation of the models specified in this study. The System GMM estimator solves the problem of heteroscedasticity and endogeneity by providing an internal instrument (Roodman 2009).

4. Results discussion

To examine the characteristics of the variables as well as the relationship between FD and growth, preliminary analysis were conducted and the results are presented as follows:

The descriptive statistics of all the variables used in this study are presented in Table 1. This is to enable a cursory examination of the statistical properties of the variables. The result shows that for a sample of 1672 observations (44 countries over 38 years), the average growth of GDP of the Asian countries is about 4.15 percent, average GDP per capita 7893 Dollars with an average growth rate of about 4 percent over the period. The GDP growth is a minimum of 0.318 and a maximum of 9.59. This shows that on average, the Asian countries recorded positive GDP growth over the period. However, the minimum and maximum growth rate of GDP per capita are 331.1 and 38761 respective. The average population growth is about 2%, the inflation rate is on the average of about 11.58%, and a literacy rate of about 9.758%. The averages of the Overall FD index, Overall FD index, and financial markets development index are 0.272, 0.339 and 0.201, respectively. The standard deviation, minimum and maximum values of the variables show that there are significant variations in the variables over the period.

These statistical properties of the variables, therefore, show the significant economic dynamics that play out in the Asia continent over the period. The economic dynamics ranging from unprecedented growth, the Asian financial crisis and the financial reforms that followed the crisis as well as the recent global financial crisis in 2008. Also, this is the period when Asia recorded tremendous economic successes and became economically vibrant in the global economy. Hence, the choice of the period for this study is apt and timely for the evaluation of the impact of FD on growth in Asia.

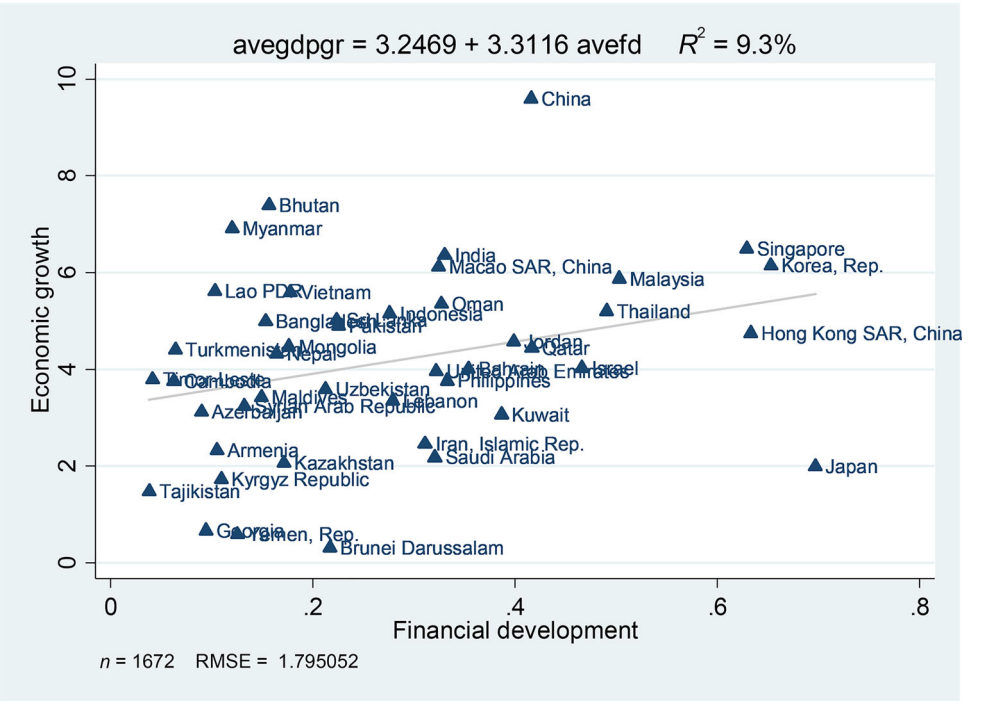


Figure 1. Relationship between growth and FD.

The relationship between growth and overall FD is presented by the scatter plot in Figure 1. The FD index is represented in the horizontal axis while the average growth rate of GDP by country is represented in the vertical axis. It shows a positive association between GDP growth and the average FD index. This connotes that, countries that have developed the financial sector also record high rates of growth. For instance, Singapore, Korea Republic, Hong Kong, Malaysia, and Thailand have an average FD index of above 0.5 with an associated GDP growth of about 5% over the period considered. On the other hand, most of the countries (such as Brunei, Yemen, Georgia, Tajikistan, Kazakhstan, Armenia, Maldives, Kyrgyzstan etcetera) that recorded an average FD index of about 0.4 or less are associated with average GDP growth of about 4% or less. The R-square indicates that about 9.3% of changes in GDP growth are because of changes in FD over the period. Therefore, the development of the financial sector is associated positively with high growth in Asia.

Figure 2 is a scatter plot showing the relationship between the Development of financial institutions and growth in Asia. It shows that majority of the countries such as Singapore, Korea Republic, Hong Kong, Malaysia and Thailand, Macao, Israel, Jordan etcetera that has a relatively higher index of financial institutions development also recoded relatively high rates of growth over the period considered. Contrariwise, the countries with a low index of development of financial institutions have a relatively low average GDP growth rate. Countries in this category include Brunei, Yemen, Saudi Arabia, Azerbaijan, Georgia, Tajikistan, Kazakhstan, Armenia, Maldives and Kyrgyzstan et cetera. About a 6.8% improvement in GDP growth is associated with the development of financial institutions over the period as indicated by the R-

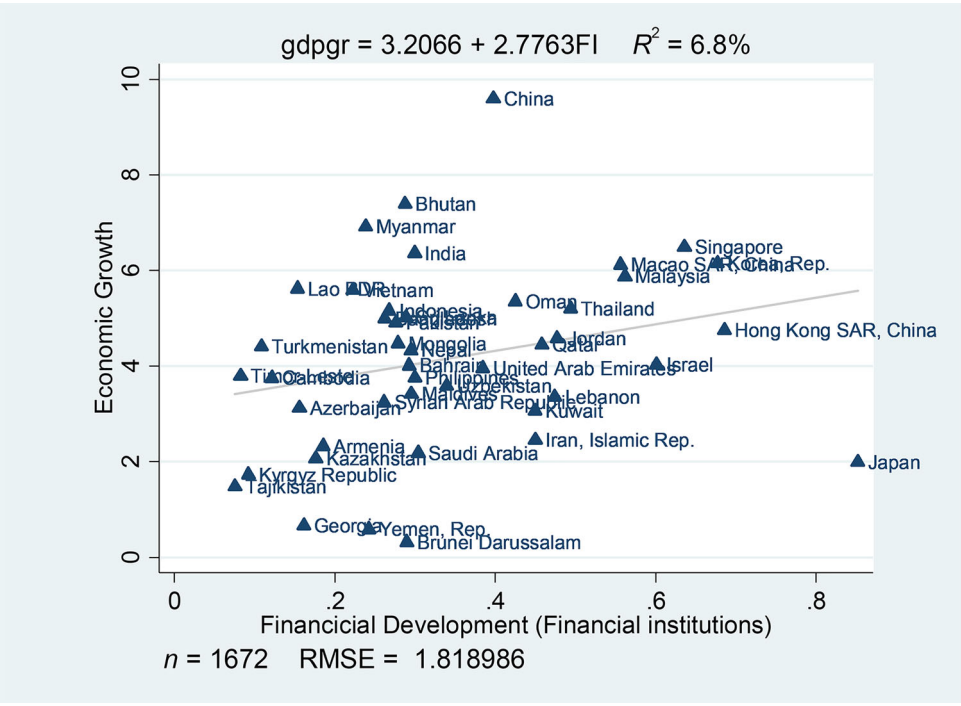


Figure 2. Relationship between growth and financial institutions development.

square. Therefore, there is a positive relationship between the development of financial institutions and growth in the Asian continent. In other words, the rapid growth recorded by most of the Asian countries is not unconnected with institutional reforms implemented in most of the countries to strengthen the financial institutions over the period.

Similarly, the nexus between financial market development and growth in Asia over the period considered is displayed in Figure 3. Although there are few exceptional cases, the majority of the countries (China, Singapore, Korea Republic, Hong Kong, Malaysia and Thailand) associated with high GDP growth have high financial market development index as well. Equally, the countries (Brunei, Yemen, Georgia, Tajikistan, Kazakhstan, Armenia, Maldives, Kyrgyzstan etcetera) with low financial market development index are associated with low GDP growth over the period. So, on average, high financial market development index is associated with high financial market development index and vice versa. This confirms the direct relationship between growth and the development of financial markets.

Succinctly, Figures 1–3 show the development of the financial sector is positively correlated with the growth of Asian countries over the period considered. By this token, the growth dynamics of countries in Asia are not unconnected with the financial reforms, which took place in the continent over the period. Meanwhile, the effect of the FD is further evaluated with the use of panel regression techniques presented in this study.

To examine the effect of the FD on growth for all the Asian countries considered, dynamic system GMM panel regression was estimated and the result is

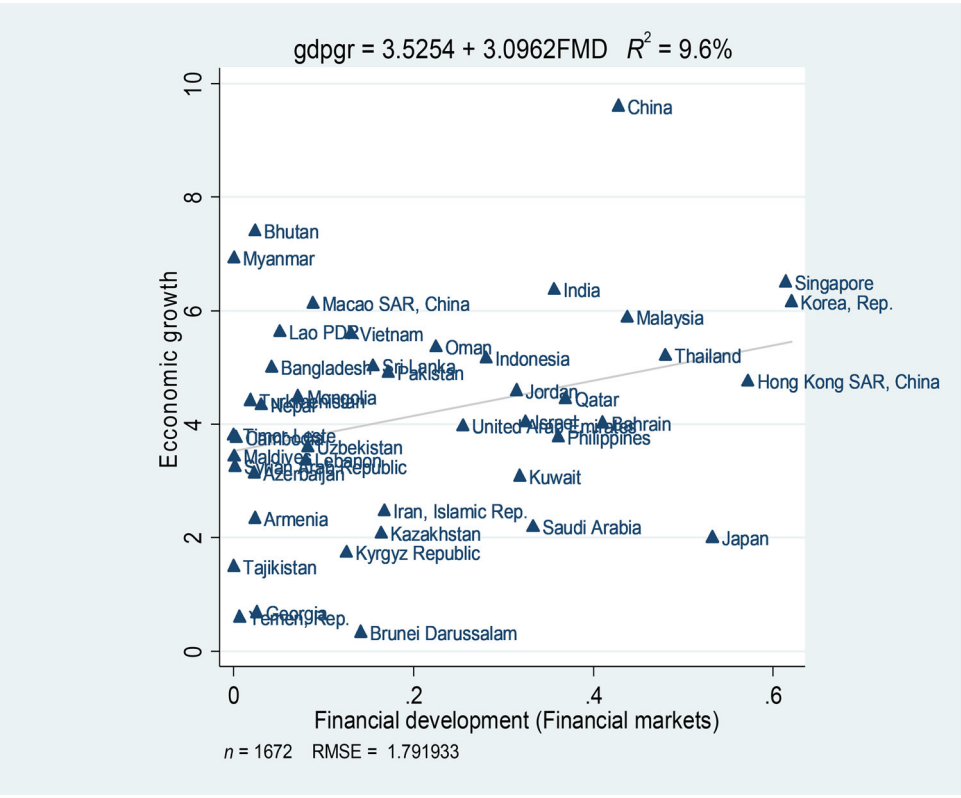


Figure 3. Relationship between growth and financial market development.

presented in Table 2. Growth is the dependent variable while, the Inflation rate, Literacy rate, Government consumption, Population growth rate serve as the control variables. The measures of FD included are financial institutions development index, financial markets development index and Overall FD index as independent variables.

The result shows that the inflation rate, population growth rate and government consumption/involvement are inversely related to the rate of growth. This implies that a low rate of growth is associated with a high rate of the inflation rate, population growth rate and government consumption/involvement in Asia. On the contrary, the lagged growth rate of GDP, Literacy rate, and all the FD indices are positively related to growth. This indicates that the higher the previous level of growth, literacy rate and FD, the higher the rate of growth in the Asian continent. However, the result indicates that the literacy rate is statistically insignificant while all other variables are statistically significant. Overall FD index and financial institutions' development index are significant at a 1% level while the financial market development index is significant at a 5% level of significance. By magnitude, financial institutions' development index, financial markets development index and Overall FD index results in 6.64, 4.05 and 6.74% increase in growth, respectively. This implies that FD is an important determinant of growth in Asia. Access to Efficient financial services and a vibrant financial market enhances growth in Asia.

Table 2. Effect of FD on growth for all countries.

Dependent variable: The growth rate of GDP per capita			
Independent variables	(1) Institutions	(2) Markets	(3) Overall
Lagged Growth rate of GDP per capita	0.36***	0.37***	0.36***
	(0.020)	(0.020)	(0.020)
Inflation rate	−0.0029**	−0.0030**	−0.0029**
	(0.0014)	(0.0014)	(0.0014)
Literacy rate	0.0046	0.0046	0.0038
	(0.0061)	(0.0061)	(0.0061)
Government consumption/involvement	−0.064**	−0.066**	−0.062**
	(0.028)	(0.028)	(0.028)
Population growth rate	−0.18**	−0.17*	−0.17*
	(0.089)	(0.089)	(0.089)
Financial institutions development index	6.64***		
	(1.86)		
Financial markets development index		4.05**	
		(1.70)	
Overall FD index			6.74***
			(2.01)
Constant	1.58**	3.02***	1.96***
	(0.79)	(0.58)	(0.73)
Observations	1,628	1,628	1,628
Number of countries	44	44	44
Diagnostic tests			
Wald test	375.27 [0.000]	368.10 [0.000]	373.48 [0.000]
Sargan test	4.402 [0.3542]	3.854 [0.4262]	3.833 [0.4291]

( ), [ ], ***, ** and * denote *p*-value, Standard error, 1%, 5% and 10% level of significance, respectively.

Table 3 contains the regression result of the effect of FD on growth for high-income Asian countries. The dependent variable is still the Growth rate of GDP while the FD index and the control variables are the independent variables. The result displays a positive relationship between growth and literacy rate as well as all the measures of FD. On the other hand, government involvement, inflation, and population growth have negatively related to the growth of the GDP of the high-income countries in Asia. Meanwhile, population growth, Literacy rate, and financial institutions' development index are statistically significant while other variables are insignificant. High population growth impedes growth while a high literacy rate propels the growth of the countries. The development of financial institutions has a significant positive effect on the growth of the high-income countries in Asia. In other words, the high growth rate of the high-income countries is associated with the development of their financial institutions. The development of financial markets is insignificant for the growth of high-income countries. This shows that well-developed financial institutions promote growth among high-income Asian countries.

The effect of FD on the growth of low-middle income countries in Asia is also evaluated using the Dynamic System GMM. The result is presented in Table 4 with the growth of GDP as the dependent variable and the same independent variables. All the measures of FD have a positive relationship with the growth of GDP. Similarly, lagged growth and population growth are directly related to the growth of GDP. Conversely, the inflation rate, literacy rate and government consumption/involvement are inversely related to the growth of GDP. However, the financial markets' development index and Overall FD index are statistically significant while the

Table 3. Effect of FD on growth for high-income countries.

Dependent variable: Growth rate of GDP per capita			
Independent variables	(1) Institutions	(2) Markets	(3) Overall
Lagged Growth rate of GDP per capita	0.10***	0.12***	0.11***
	(0.029)	(0.029)	(0.029)
Inflation rate	−0.000073	−0.00045	−0.00018
	(0.0012)	(0.0012)	(0.0012)
Literacy rate	0.020**	0.020**	0.020**
	(0.0080)	(0.0080)	(0.0080)
Government consumption/involvement	−0.087	−0.11*	−0.098*
	(0.058)	(0.058)	(0.058)
Population growth rate	−0.31***	−0.29***	−0.30***
	(0.095)	(0.096)	(0.095)
Financial institutions development index	8.87***		
	(3.43)		
Financial markets development index		−0.75	
		(3.05)	
Overall FD index			4.25
			(3.52)
Constant	2.49	5.88***	4.46***
	(1.52)	(1.10)	(1.36)
Observations	518	518	518
Number of countries	44	44	44
Diagnostic tests			
Wald test	44.98 [0.0000]	38.80 [0.0000]	39.90 [0.000]
Sargan test	4.402 [0.3542]	3.854 [0.4262]	3.833 [0.4291]

( ), [ ], ***, ** and * denote *p*-value, Standard error, 1%, 5% and 10% level of significance, respectively.

Table 4. Effect of FD on growth for low-middle income countries.

Dependent variable: Growth rate of GDP per capita			
Independent variables	(1) Institutions	(2) Markets	(3) Overall
Lagged Growth rate of GDP per capita	0.085***	0.076***	0.082***
	(0.029)	(0.029)	(0.029)
Inflation rate	−0.0075	−0.0069	−0.0074
	(0.012)	(0.012)	(0.012)
Literacy rate	−0.013	−0.014*	−0.013*
	(0.0079)	(0.0079)	(0.0079)
Government consumption/involvement	−0.11**	−0.090*	−0.10**
	(0.047)	(0.047)	(0.047)
Population growth rate	0.098	0.11	0.11
	(0.11)	(0.11)	(0.11)
Financial institutions development index	1.83		
	(2.92)		
Financial markets development index		13.3***	
		(2.83)	
Overall FD index			10.1***
			(3.27)
Constant	4.38***	2.18**	2.22**
	(1.16)	(0.87)	(1.10)
Observations	664	664	664
Number of countries.	44	44	44
Diagnostic tests			
Wald test	19.02 [0.0041]	40.77 [0.0000]	28.34 [0.0001]
Sargan test	4.402 [0.3542]	3.854 [0.4262]	3.833 [0.4291]

(), [], ***, ** and * denote *p*-value, Standard error, 1%, 5% and 10% level of significance, respectively.

Table 5. Effect of FD on growth for upper-middle income countries.

Dependent variable: Growth rate of GDP per capita			
Independent variables	(1) Institutions	(2) Markets	(3) Overall
Lagged Growth rate of GDP per capita	0.018	0.015	0.0097
	(0.047)	(0.047)	(0.047)
Inflation rate	−0.00067	−0.00053	−0.00063
	(0.0018)	(0.0018)	(0.0018)
Literacy rate	0.0097	0.0077	0.0080
	(0.010)	(0.010)	(0.010)
Government consumption/involvement	−0.28***	−0.28***	−0.28***
	(0.040)	(0.039)	(0.039)
Population growth rate	−0.48**	−0.54***	−0.51**
	(0.20)	(0.20)	(0.20)
Financial institutions development index	11.2***		
	(3.93)		
Financial markets development index		10.6***	
		(3.13)	
Overall FD index			13.3***
			(3.83)
Constant	4.57***	6.35***	4.78***
	(1.56)	(0.96)	(1.29)
Observations	408	408	408
Number of countries	44	44	44
Diagnostic tests			
Wald test	74.56	78.36	78.87 [0.000]
	[0.000]	[0.000]	
Sargan test	2.412	3.754	3.632 [0.3294]
	[0.3543]	[0.4232]	

(), [], ***, ** and * denote *p*-value, Standard error, 1%, 5% and 10% level of significance, respectively.

financial institutions' development index is statistically insignificant. This suggests that financial market development is more crucial than financial institutions' development for the growth of the lower-middle-income countries in Asia.

When the effect of the FD on the growth of the upper-middle countries is considered, the estimates obtained are presented in Table 5. With the same dependent and independent variables as used for the high income, low-middle income, and all countries in the Asian continent considered, the result demonstrates that inflation rate, population growth rate and government consumption/involvement have a negative relationship with the growth of GDP. Contrarily. Financial institutions' development index, financial markets development index and Overall FD index are positively related to the growth of GDP. The result, however, indicates that the lagged growth rate of GDP, inflation rate and literacy rate is statistically insignificant. Government consumption/involvement in population growth and all the FD measures are statistically significant. This means the variables are significant determinants of the growth of the low-middle income countries. Hence, FD has a significant positive impact on the growth of the countries. Specifically, one percent increase in financial institutions development index, financial markets development index and Overall FD index result in 11.2, 10.6 and a 13.3% increase in growth of the low-middle income countries, respectively.

The Wald test statistics are highly significant at one percent level for all the models. This indicates that the model is a good fit. Also, the Sargan test of over-identifying restrictions is insignificant for all the models and thus the instruments are

valid. The diagnostic tests (Wald and Sargan test) show that the model is robust and the estimates are valid for policy inferences regarding the impact of FD on growth in Asia.

5. Conclusion

The study evaluates the effect of FD on growth in Asia. A panel of forty-four Asian countries over the period 1980–2017 was considered. This sample comprises 44 countries from all the regions in Asia (East, West, Southeast, South and Central Asia) and at all levels of income (High, upper-middle, low-middle, and low-income countries). The contribution of this study hinges on the use of a comprehensive FD measure constructed by Sahay et al. (2015) of the International Monetary Fund (IMF), and consideration of the heterogeneity of the Asian countries concerning the finance-growth nexus. We considered both the subcomponents of the FD index (development of financial institutions and market institutions) are also used. Further, the analysis is carried out for the entire continent and in groups of countries by their level of income and development (High, upper-middle and low-middle income countries). The growth rate of GDP per capita was used for growth while the FD index represented FD. Inflation, literacy rate, government involvement (consumption), and population growth are also included as control variables in the analysis. Preliminary analysis was carried out using descriptive statistics and panel scatter plots for growth and FD and its components (Financial institutions development and financial markets development). The impact of FD on growth was evaluated with the use of the Dynamic System GMM estimator. The findings therefrom, validate the postulate that population growth, inflation, and excessive government involvement hurt growth. On the other hand, literacy rate and previous growth positively affect growth.

From the focus of the study, the findings reveal that the growth is a positive development of financial institutions and markets and the entire financial system in Asia. The result reveals that the Asian countries that witness tremendous growth during the period equally recorded a high level of FD. The development of the financial market is shown to be the strongest correlate of growth in the continents.

Meanwhile, when all the countries are considered, the findings show that FD is an important determinant of growth in Asia. Well-developed financial institutions, vibrant financial markets, and a sound financial system enhance growth in Asia. It is also revealed that the development of financial institutions has greater predictive power on growth than the development of the financial market in the continent. That is, the development of financial institutions has a more positive effect than the development of financial markets on growth in Asia over the period considered.

To examine whether or not the effect of FD on growth is the same for all levels of income of the countries, the estimations are calibrated for high income, upper-middle, and low and low-middle income countries in the continent. The outcome reveals that the impact of FD is positive for all the categories of countries. However, the outcome shows that financial market development is more crucial than financial institutions' development for the growth of the lower-middle-income countries in Asia. The development of financial institutions does not have a significant impact on

the growth of the low and low-middle income countries. This is in tandem with the submission of several previous studies (see, Choe and Moosa 1999; Arcand, Berkes, and Panizza 2012; Philippon and Reshef 2012, 2013; Eugster 2014).

On the other side, the development of financial institutions has a significant positive effect on the growth of the high-income countries in Asia. In other words, the high growth rate of the high-income countries is associated with the development of their financial institutions. The development of financial markets is insignificant for the growth of high-income countries. This shows that well-developed financial institutions promote growth among high-income Asian countries. This corroborates the conclusion of Zhang, Wang, and Wang (2012) which shows that reforms of the financial system propel growth in China (Also see King and Levine 1993; McKinnon 1973; Shaw 1973).

In the case of upper-middle-income countries, both the development of financial institutions and markets have a significant impact on growth but the development of financial institutions has a greater impact on growth. This is similar to the conclusion of Chaibi (2015) that FD positively correlates with growth in MENA countries.

In sum, this study concludes that financial system spur growth in Asia and the development of financial institutions have a greater impact than the development of financial markets on the growth of upper-middle and high-income countries while the reverse is the case for low and low-middle income countries in the country.

6. Policy implications

The quest for the development of the financial system has been the major concern of the Asian economies over the years. This is to enhance the economic progress of the continent. This study, therefore, provides empirical insights on the effect of FD on growth in the continent. From the conclusion, it reaffirms the finance-led growth hypothesis. Therefore, the use of financial reforms for the achievement of sustainable growth in Asia is a step in the right direction. An efficient and sound financial system propels growth. Further, the relative importance of the subsectors of the financial system (institutions and markets) needs to be considered for different levels of incomes of the countries. In general, financial institutions' development is fundamental for growth in the continent. Low/Lower-middle income countries should focus on financial markets reforms while the high-income countries focus on the development of the financial institutions. A vibrant stock and bond market aids the channeling of funds to most profitable investments and thus propels the growth of the low-middle income countries. Meanwhile, to sustain growth in high-income countries strong financial institutions become vital in harmonizing savings for investment. The upper-middle-income countries need reforms that will simultaneously develop both the financial institutions and markets with more emphasis on the financial institutions. Pithily, financial institutional development becomes more effective than the financial market development as the country moves from lower-income level to higher income level. Although the study considers a sample of Asian countries, these policy implications apply to other developing and developed countries of the world because of the economic similarities of countries in the same category of income level.

Disclosure statement

No potential conflict of interest was reported by the authors.

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