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Financial Integration and Economic Growth: Should Asia Emulate Europe?

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Abstract The Asian financial crisis of 1997~1998 was the catalyst for the movement toward regional cooperation between Asian countries, having triggered the common interests and vulnerabilities among the affected nations. As a result, policymakers have resorted to financial integration to unleash their potentials. Nevertheless, this approach is still in its infancy, largely underpinned by the heterogeneity in institutional and structural characteristics of the financial systems between countries. The authorities are cautious, as there is a trade-off between liquidity of capital markets and financial/economic stability. Considering these scenarios, the present study attempts to examine the dynamic relationship between financial integration and growth in Asian regions. Specifically, this study aims to investigate the financial-growth nexus pre-crisis (1980~1995) and post-crisis (1998~2015) as well as throughout the study period (1980~2015). The results of this study show a significant financial-growth relationship pre-crisis, but the impact wanes in the post-crisis and overall time periods. The results indicate to policymakers the heterogeneous characteristics of each country and to what extent financial integration should be emulated from their European counterparts.

Keywords: Financial Integration, Economic Growth, Asia, Europe

JEL Classifications: F15, O47, C23

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I. Introduction

Since the mid-1980s, volumes of financial flows have increased exponentially, with significant acceleration in the early 2000s, indicating early signs of financial integration among developing countries. Financial integration is deemed a vital factor in spurring a more efficient financial system (Obstfeld 2009), and Law *et al.* (2013) stresses the notion of “better finance, more growth,” following the financial breakdown that led to the 2008 financial crisis. Financial openness and

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integration can be considered a double-edged sword. On one hand, the nexus enhances economic growth through technology and capital accumulation, while on the other hand, it has resulted in increasing vulnerabilities that may lead to financial crisis (Osada and Saito 2010, Mahajan and Verma 2015). Theoretically, financial integration provides countries with more opportunities, leading to higher economic growth; an integrated financial system allows capital to flow freely, and participating countries can benefit through return of portfolio diversification (Mahajan and Verma 2015). However, these gains do not come without significant risks. Existing literature such as Ramey and Ramey (1995) and Hoxha *et al.* (2013) find that due to country-specific characteristics, financial integration is imperfect and may cause volatility in the economy. This may occur in developing countries with weak governance, feeble financial stability, or marginal creditworthiness, whereby volatile capital flows run the risk of drying up their liquidity, which can result from capital reversal in the event of an economic shock or downturn (Aziakpono 2013). Furthermore, according to Agenor (2003), inflationary pressures, monetary expansion, and exchange rate appreciation as a result of large and rapid capital inflows can negatively affect the stability of a small and developing economy.

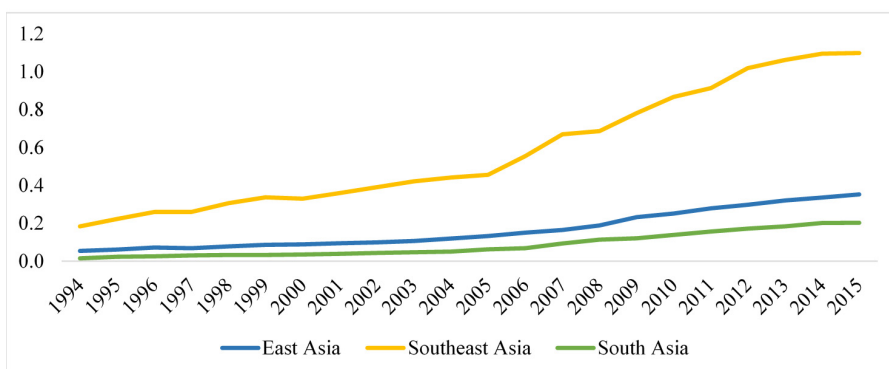
Financial integration in Europe was largely driven by the general aim of trade and financial reforms that was motivated by integration within the global markets. As Asian countries increasingly adopt liberalization regimes, trade and capital flows have been surging exponentially, and the European Union (EU) framework has been proposed as a reputable model, undoubtedly due to their regional integration advancements (Rosamond 2005). However, the EU model is not flawless, and this study attempts to analyze the effects of financial integration on economic growth in Asia, as well as to capture some lessons from the EU's perspective.

Financial integration in the European region accelerated significantly in the 1980s, during the emergence of the EU Single Market Program; expansion of trade among EU countries generated pressures for coordination of financial integration policies among member countries (Park and Bae 2002). The Single Market Program provided a more integrated marketplace, which encouraged a platform for innovation and competitiveness among European businesses (Baele *et al.* 2004, Ilzkovitz *et al.* 2007). The EU accounts for 21% of global economic output; hence, not only does the EU common market provide a large domestic market, it also has fostered trade and competition within the EU (Veld 2019). However, the European financial integration effect on growth has not always been rosy. The 2007 global financial crisis caused a dramatic decline in the European financial markets, to an extent that the instable periods resulted in consideration of a Euro break (Dyson and Maes 2017, Maudos and Guevera 2015). The crisis had affected not only financial flows, but also the financial integration progress in the EU. Reduction in banking activities and market values further exacerbated distrust between institutions, and crisis-triggered fragmentation of the financial market led to high credit cost, which prevented recovery in some EU countries. According to the European Central Bank (2012), the magnitude

of financial activity slowdown resulted in the reversal of financial integration activities in many EU countries. Southern EU countries were most affected, as loss of investors' faith in the European banking system caused downgrades in government bonds, in turn causing banking failures (Meeteren 2018). This disintegration subsequently led to the bailouts of Greece, Portugal, and Spain. In light of the abovementioned issues, the notion of the EU providing a perfect template for financial integration is indeed questionable.

The 1997 Asian financial crisis' (AFC) primal cause was the lack of a strong financial market policy in the region. Since then, policymakers have tended to focus on developing an efficient regional financial policy and a stable exchange rate system. Unsurprisingly, the success and positive results from the EU experience visibly emerges as an inspiration. To date, Asia has had several mechanisms for the pursuance of integration. First, the Chiang Mai Initiative (CMI) aimed to create a regional fund to help member countries overcome extreme currency value volatility. This initiative was followed by the promotion of local currency bond market through the Asian Bond Market Initiative (ABMI) in 2003. This initiative was signed by the ASEAN+3 Finance Minister with the aim to unite cross-border bond transaction regulations. Next, the 2010 Chiang Mai Initiative Multilateralization (CMIM) aimed to provide liquidity support for countries in crisis (Kawai *et al.* 2016). Through CMI and CMIM, monetary and fiscal authorities in the region agreed to a regional surveillance. As such, these initiatives can be considered a precursor to further financial integration. Figure 1 illustrates the stock flows of foreign assets and liabilities based on three different regions in Asia: East Asia, Southeast Asia, and South Asia.

Figure 1. Financial integration index (region-wise) in Asia

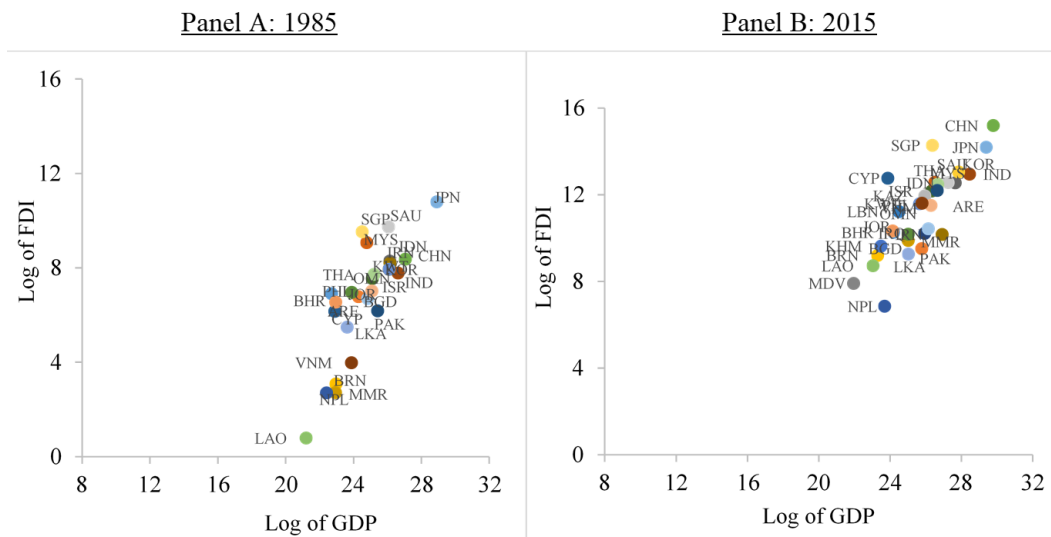


(Source) Lane and Melisi-Ferretti (2018)

One important lesson drawn from the EU crisis entails danger in adopting a single currency, particularly in a region like Asia where countries have a wide diversity of income levels and domestic policies. The widely heterogeneous characteristics of exchange rate, wages, and trade

competitiveness between Asian countries presents cause for caution in committing to a monetary union, as should be learned from the aftermath of the European crisis (Estrada *et al.* 2010, Akyüz 2011). According to Capanelli and Filippini (2009), in 2007, the GDP and trade levels of ASEAN+3 (China, Japan, and South Korea) were more diverse compared to their EU counterparts. Financial integration in Asia has many views, as the benefits and costs of integration are often debated (Genberg 2017). Nevertheless, there are considerable developments in the area. Figure 2 (panel A and B) shows a visualization of the log of total Foreign Direct Investment (FDI) stock of asset and liability over the log of GDP for two years: 1985 and 2015. Over the 30-year period, there was an apparent shift in FDI-GDP of the Asian countries, whereby most top-performing countries being East Asian. Singapore and Japan have been consistent in leading the pack over the years, but unsurprisingly, China had a tremendous surge in FDI flows in 2015, compared to 1985. Notably, Southeast Asian countries including Cambodia, Lao PDR, Myanmar, and Vietnam have shown improvements over the years, as have South Asian countries, albeit at a low degree with the exception of India which has shown high FDI-GDP rates.

Figure 2. FDI-GDP in Asia



(Source) Lane and Melisi-Ferretti (2018)

Despite the high commitment levels to pursue integration activities in Asia, several factors must be considered. Firstly, the strength of a country’s ability to weather possible threats caused by financial integration is largely dependent on a country’s institutional development and stability level (Aziakpono 2013, Bhattacharya *et al.* 2018). Secondly, it is crucial to assure that all countries within a region will benefit from financial integration. According to Mishkin

(2007), most financial integration activities are concentrated around rich countries, whereas limited capital flows into lower income countries, causing these countries to be disregarded and their growth to be stunted. Therefore, the question of financial integration's impact on economic growth is a vital one that will contribute to the existing literature.

The goal of this study is to investigate the impact of financial integration of growth in Asia countries from 1980 to 2015. While a bulk of empirical studies has focused on the EU countries, past studies in the Asian context appear to be limited (Guillaumin 2009, Maudos and Guevera 2015). Furthermore, there is a mushrooming number of Free Trade Agreements (FTAs) being established in the Asian region, and policymakers are in talks to set up a region-wide FTA. Since the 1997 AFC, regional leaders have pledged to work together in areas of trade and investment to achieve stable and sustainable economic growth (Kawai and Wignaraja 2011). However, the extent of effectiveness of these agreements is still unknown. Hence, this study aims to examine the dynamic relationship between financial integration and growth in Asia. The paper is structured as follows: Section II provides an overview of the financial integration literature, comprising of some theories and empirical work. Section III describes the methodology. Section IV provides detailed analysis and discussion of financial integration in Asia. Section V offers summary and concluding remarks.

II. Literature Review

Financial integration can be defined two ways. Firstly, it could entail setting up a form of monetary union, wherein there exists a regional central bank that supervises the regulatory functions of member countries. One such example is the European Central Bank, which manages the Euro and keep prices stable among member states. Another type of integration is institutional, through the adoption of a strict and coordinated exchange rate mechanism, such as the Asian Currency Unit in East Asia and the Exchange Rate Management system in Europe (Pontines 2015). Broadly, financial integration is an integral section in international financial systems, which embodies intricate interactions and co-movements of various financial markets (Lucey *et al.* 2018).

Theoretically, financial integration is to a degree by which economies are fully integrated and comes without any forms of cross-border restrictions (Baele *et al.* 2004); barriers pertaining to international investments and capital mobility are removed (Lee *et al.* 2017). Theoretical studies provide inconclusive evidence of the nexus between financial integration and economic growth. Some theories indicate that financial integration plays an eminent role in enhancing capital accumulation and productivity through risk sharing, which benefits product specialization (Obstfeld 1994, Acemoglu and Zilibotti 1997, Von Furstenberg 1998). Other studies suggest

financial integration increases efficiency in domestic financial systems through heightened competition and financial service imports (Levine 2001, Klein and Olivei 2008). According to Stavárek, Řepková, and Gajdošová (2011), financial integration is vital in providing support and opportunities for risk sharing and capital investment allocations within and between regions. Despite these positive views, pessimistic findings show that financial integration distorts growth, as countries with less developed institutions are susceptible to economic shocks (Boyd and Smith 1992).

Given the large number of studies on cross-country analysis, many have examined the direct and indirect effect of financial integration on economic growth. For instance, Bekaert *et al.* (2005) and De Nicolo and Juvenal (2014) examine the direct effect of the financial-growth nexus and find that financial integration increases economic growth across various sets of variables. Several studies have also been conducted on indirect effects. For instance, Mmolainyane and Ahmed (2015) analyzes the direct and indirect effect of financial integration and growth. They find that integration directly and positively impacts growth, while indirectly their observations indicate integration impact growth through higher levels of financial access. In a similar vein, Brezigar-Masten *et al.* (2010) postulates that after a certain degree of financial development, financial integration asserts a positive effect on growth. Edison (2002) proves that the integration-growth nexus is dependent on factors such as GDP per capita, banking sector development, and low levels of corruption.

Ambiguous results are found in the stream of past empirical studies on the effects of financial integration on economic growth. Earlier empirical studies on the integration-growth nexus focuses on the effects of capital restrictions on economic growth (Alesina, Gilli and Milesi-Ferretti 1994, Grilli and Milesi-Ferretti 1995); both suggest there is no robust impact of financial integration on growth. Klein (2003) finds that capital account openness benefits 85 middle income countries, but this effect is not observed in high income and least developed countries. Interestingly, Prasad *et al.* (2007) measures the effect of financial integration in developed and developing countries and the results show financial integration increases consumption activities in several developing countries. In this vein, De Nicolo and Juvenal (2014) offer evidence of the positive nexus between financial integration and macroeconomic stability. It is noteworthy to mention that studies such as Pungulescu (2013) demonstrate an increased degree of financial integration pre-crisis; however, a significant integration reversal is found during the post-crisis period in both new and old EU member states. Coeurdacier *et al.* (2019) find ambiguity in the financial-growth nexus, that is, the effectiveness of financial integration is heterogeneous and dependent on factors such as country size, risk levels, and capital insufficiencies.

In the case of developing countries, the integration-growth nexus is found to be unclear (Eichengreen 2002, Saafi *et al.* 2016). Despite the limited work on the region, the financial integration process has been widely debated across Asia, Middle East, and Latin America.

Despite conflicting views, countries started prioritizing integration in their financial systems. For instance, East Asian, South Asian, and African countries undertook several liberalization regimes in the 1990s through easing of their capital markets and interest rates (Juraev 2014). Didier *et al.* (2016) documents the financial integration process in East Asia and the Pacific. Their findings suggest that the region has been financially integrated since the 1990s, although a majority of intraregional and outward investments were accounted for by East Asian countries rather than South Asian ones. Full liberalization hampers growth, while partial liberalization is associated with positive growth outcomes in East Asia (Gamra 2009). Capanelli and Fillipini (2009) compare integration activities between ASEAN+3 and the EU and find that financial integration activities were more dispersed among ASEAN+3 countries. Nonetheless, given the heterogeneous nature of ASEAN countries, it is vital for countries to unite integration policies, starting with identifying and correcting harmful imbalances (Estrada *et al.* 2010). Recent studies such as Vo and Ellis (2018) find that in the Vietnamese context, financial integration linkages grow stronger during and after a global financial crisis. This study attempts to fill the research gap in the current literature by analyzing the effect of financial integration on economic growth in Asia.

Against the backdrop of mixed empirical findings, this study examines the mitigating effect of financial integration on growth in Asia, based on various time frames and measurements. In particular, this study aims to investigate whether financial integration impacts economic growth prior to or after the AFC. The analysis examines the direct impact of financial integration on economic growth, as well as controlling for growth-influencing factors such as trade openness (TO), population growth, and crisis. In doing so, this study contributes to literature in three ways. First, while a vast number of literatures examine aggregate capital inflows and outflows as a proxy for financial integration, this study uses a more robust measure of integration, i.e., the volume-based and equity-based approach. Secondly, this study considers various time frames to add to the robustness of analysis, examining three sample periods: pre-crisis, post-crisis, and overall. Finally, this study attempts to discuss the findings of financial integration in Asia, using the European experience as a benchmark, in hopes of providing a more robust policy recommendation.

III. Research Methodology

A. Data collection

To estimate the impact of financial integration on economic growth, this study uses a panel data of 33 Asian countries from 1980 to 2015 (as shown in Appendix 1). Given that the term “Asian Miracle” was given to commemorate the region’s strong economic expansion in the

1980s (Fogel 2009), this research opted to utilize the study period of 1980 to 2015. Initially, 50 Asian countries were identified but due to unavailability of data, 17 countries were dropped. Since most of the countries were affected by the 1997 AFC, this study performs the analysis on three different time periods: pre-crisis, post-crisis, and overall. The AFC crisis is benchmarked for the consideration of sub-sampling primarily due to the heightened government-led integration activities since the AFC, with establishment of initiatives such as the CMI and ABMI (Lee *et al.* 2013, Ananchotikul *et al.* 2015). This study employs the dynamic panel model General Method of Moments (GMM) estimators, whereby a larger sample of countries (N) over time periods (T) is essential. If the entire sample is taken without averages, there will be instrumental issues (Roodman 2009). Time periods were averaged into three-year intervals for pre-crisis and post-crisis, and four-year intervals for the overall sample. Pre-crisis average years consist of 1980~1982, 1983~1985, 1986~1988, 1989~1991, and 1992~1995, whereas post-crisis periods are 1998~2000, 2001~2003, 2004~2006, 2007~2009, 2010~2012, and 2013~2015. As a robustness test, the 2SLS method and system GMM using country group classifications were also employed to test the financial-growth nexus.

A reasonable way to measure the degree of financial integration is to employ the volume-based approach by Lane and Milesi-Ferretti (2003). This measure judges the integration degree using the level of international asset crossholdings, whereby a highly financially integrated country will have high levels of external assets and liabilities. The reasoning behind this is that in order for countries to be financially integrated with global markets, there are increased demands in foreign assets and liabilities to help acquire gains from portfolio diversification (Jeon *et al.* 2006). This study also considers equity-based measure of financial integration, as international trade in debt measures could be driven by factors such as portfolio equity assets and liability (Lane and Milesi-Ferretti 2003). This measure is an indicator of equity levels of crossholdings.

To examine the dynamics of financial integration on economic growth over time and across groups, annual gross domestic product per capita (*GDPPC*), converted to US dollars based on 2010 constant prices, have been employed as a dependent variable. *GDPPC* is calculated as the sum of GDP divided by population. The control variables *TO* and population growth (*POP*) are used as an indicator for trade and human capital, respectively. *TO* is the sum of exports and imports divided, and trade is expected to lead to higher economic growth. Population growth acts as a control variable, taking inspiration from various studies that justify the importance of the variable for differences in growth performance (Schularick and Steger 2006, Osada and Saito 2010). Data for dependent and control variables are taken from the World Development Indicator database. Within the overall sample, this research also included dummy variables to account for the AFC and the Global Financial Crisis, which takes on the value of 1 and 0, for crisis and non-crisis periods, respectively.

B. Econometric analysis

To examine the financial-growth nexus, two proxies of financial integration are used. First, the volume-based measure of financial integration is:

$$IFIGDP_{it} = \frac{(FA_{it} + FL_{it})}{GDP_{it}} \quad (1)$$

where FA_{it} and FL_{it} denoted the stock of foreign assets and liabilities over individual and time, respectively. Next, the equity-based measure is calculated as follows:

$$GEQGDP_{it} = \frac{(PEQA_{it} + PEQL_{it} + FDIA_{it} + FDIL_{it})}{GDP_{it}} \quad (2)$$

where $PEQA_{it}$ and $PEQL_{it}$ refers to the stock of portfolio equity asset and liability while $FDIA_{it}$ and $FDIL_{it}$ are the stock of FDI assets and liabilities.

To econometrically investigate the dynamic link between financial integration and economic growth, this study uses the GMM-system estimator, popularized by Arellano and Bover (1995) and Blundell and Bond (1998). Specifically, financial integration influencing the cross-sectional and time series patterns of growth is investigated, with TO and population as control variables. Specification of the econometric model is as follows:

$$Y_{it}^* = \alpha + \beta Y_{it-1}^* + \gamma X_{it}^* + \delta_i + \varepsilon_{it} \quad (3)$$

where Y is the dependent variable, X denotes the set of explanatory variables, δ is the time invariant individual specific effect, and ε is the error term for individual i and time t , respectively. Estimating model (3) causes potential endogeneity issues in the independent variables. Furthermore, lagged dependent variable and the time invariant individual specific effect will likely result in estimates of the ordinary least squares model to be biased and inconsistent (Hsiao 2014).

To account for the econometric issues, first differenced GMM estimator was introduced to disregard the time invariant individual specific effect in Equation 3 (Arellano and Bond 1991). The Arellano and Bond's (1991) GMM constructs estimators based on moment restrictions from lagged levels of Y_{it}^* and first differenced errors. Assuming that ε_{it} are independent and identically distributed over i and t , there are no serial correlation of errors. This method created moment restrictions using lagged levels of Y_{it}^* against the first differences of ε_{it} . Moreover, first differences of exogenous variables X_{it}^* are also used to create moment conditions (Law 2018).

However, Arellano and Bond's (1991) estimator is presented with several weaknesses. First,

there is downward bias if the sample size is small, which causes parameter restrictions to be oversized (Law 2018). Second, having too many instruments results in the rise in the number of moment restrictions, due to increases in exogenous variables and time series observations (Chen 2006). Lastly, when lagged dependent and independent variables are persistent over time, lagged values of these indicators are weak instruments for the differenced regression (Blundell and Bond 1998). Therefore, to address these challenges, Arellano and Bover (1995) and Blundell and Bond (1998) propose the system-GMM estimator, which combines moments restrictions of the differenced models with the level models. Moreover, system GMM controls for omitted variables and addresses the issue of endogeneity in the context of small sample panel data (Kukenova *et al.* 2009, Abdallah *et al.* 2015). This estimator has proven to be more precise and less biased, as Arellano and Bover (1995) modified their approach by including lagged levels and differences, while maintaining the regressing differences of the level and independent variables.

To ensure consistency, two specification tests are applied: the Sargan test and the serial correlation test. The Sargan test accounts for overidentifying restrictions, where failure to reject the null hypothesis implies that the instruments are valid and precisely specified. Arellano and Bond's (1991) serial correlation test accounts for disturbances and tests the presence of second order serial correlation (AR2) and the first differenced error term (AR1).

To ensure robustness and to address the endogeneity problem that may exist in a financial integration nexus with economic growth, this study also employs the two-stage least square (2SLS) method to re-estimate the endogenous variable (*IFIGDP* and *GEQGDGP*). Bureaucracy quality and law and order are used as Instrumental Variables (IV) to financial integration in the 2SLS method, as postulated by Wei (2006) and Kılınç *et al.* (2017). Data for the IVs are obtained from the International Country Risk Guide database. An additional robustness test on integration-growth nexus is performed to address the heterogeneous issue of advanced and low-income countries. Therefore, the study uses the system-GMM model to examine the nexus based on country group classifications.

IV. Results and Discussion

Tables 1 and 2 present the descriptive statistics and correlation matrix of the variables employed in the analysis for the overall sample, i.e., for 33 Asia countries from 1980 to 2015. The historical dataset comprises Bahrain, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, Cyprus, India, Indonesia, Iran, Iraq, Israel, Japan, Jordan, Kazakhstan, Korea, Kuwait, Lao PDR, Lebanon, Malaysia, Maldives, Myanmar, Nepal, Oman, Pakistan, Philippines, Saudi Arabia, Singapore, Sri Lanka, Thailand, Turkey, United Arab Emirates, and Vietnam.

Table 1. Descriptive statistics

	N	Mean	Std. Dev.	Min	Max
<i>LRGDPPC</i>	33	8.38	1.57	5.26	11.54
<i>LFIGDP</i>	33	-2.54	1.72	-7.87	2.79
<i>LGEQGD</i>	33	-2.14	1.81	-7.87	2.82
<i>LTO</i>	33	4.25	0.74	-0.65	6.02
<i>LPOP</i>	33	0.61	0.68	-2.89	2.48

(Note) *LRGDPPC* represents log of real GDP per capita. *LFIGDP* represents log of volume-based financial integration. *LGEQGD* represents the log of equity-based measure of financial integration. *LTO* represents log of openness to trade scaled by GDP. *LPOP* represents log of population growth.

Table 2. Correlations

	<i>LRGDPPC</i>	<i>LFIGDP</i>	<i>LGEQGD</i>	<i>LTO</i>	<i>LPOP</i>
<i>LRGDPPC</i>	1.00				
<i>LFIGDP</i>	0.46	1.00			
<i>LGEQGD</i>	0.57	0.95	1.00		
<i>LTO</i>	0.45	0.63	0.62	1.00	
<i>LPOP</i>	0.01	-0.001	0.01	0.23	1.00

(Notes) *LRGDPPC* represents log of real GDP per capita. *LFIGDP* represents log of volume-based financial integration. *LGEQGD* represents the log of equity-based measure of financial integration. *LTO* represents log of openness to trade scaled by GDP. *LPOP* represents log of population growth

The descriptive statistic for the dataset is presented in Table 1 above. As shown, the standard deviations of all variables except population growth are dispersed around the mean, implying that there is variation across the selected cross-sectional sample. Table 2 displays the correlations of the variables. As shown in Table 2, both the financial integration variables are positive for economic growth, with equity integration correlating higher with growth than financial integration. The economic growth determinants also demonstrate that equity integration has the highest correlation, followed by financial integration and *TO*.

A. Empirical results

The empirical results of Equation 3 using dynamic system panel GMM is presented in Table 3. There are six different regression results presented, whereby the table is divided into pre-crisis, post-crisis, and overall period. There are two models presented utilizing the two proxies of financial integration, Model 1 uses the volume-based measure while Model 2 employs the equity-based measure of financial integration.

Table 3. Results of dynamic panel GMM estimation (Dependent variable: Real GDP per capita)

Variables	Pre-Crisis		Post-Crisis		Overall Sample	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
<i>In RGDP</i> _{it-1}	0.756 *** (0.034)	0.721 *** (0.034)	0.911 *** (0.012)	0.906 *** (0.012)	0.888 *** (0.008)	0.886 *** (0.009)
<i>In IFIGDP</i> _{it}	0.064 *** (0.013)	-	0.002 (0.006)	-	0.001 (0.005)	-
<i>In GEQGD</i> _{it}	-	0.068 *** (0.011)	-	0.008 (0.006)	-	0.004 (0.005)
<i>In TO</i> _{it}	0.116 *** (0.019)	0.107 *** (0.033)	0.112 *** (0.023)	0.104 *** (0.021)	0.093 *** (0.026)	0.085 *** (0.026)
<i>In POP</i> _{it}	-0.002 (0.013)	0.008 (0.014)	-0.031 *** (0.007)	-0.031 (0.007)	-0.061 *** (0.013)	-0.058 *** (0.012)
<i>DUM</i> _{1997-1998;2007-2009}	-	-	-	-	-0.011 *** (0.002)	-0.014 *** (0.003)
Constant	1.752 *** (0.365)	2.046 *** (0.445)	0.355 ** (0.151)	0.439 *** (0.152)	0.674 *** (0.098)	0.737 *** (0.098)
Specification tests						
Sargan test	13.12 (0.438)	13.21 (0.431)	15.40 (0.283)	15.37 (0.285)	25.95 (0.131)	26.11 (0.127)
Arellano-Bond tests for AR(1)	-1.32 (0.187)	-1.40 (0.162)	-1.72 (0.066)	-1.69 (0.069)	-2.57 (0.01)	-2.55 (0.01)
Arellano-Bond tests for AR(2)	-0.019 (0.984)	-0.036 (0.971)	-1.554 (0.120)	-1.54 (0.124)	-1.59 (0.113)	-1.162 (0.105)
Observations	121	121	156	156	222	222
Number of Country	28	28	33	33	33	33

(Note) Standard errors are in parentheses. ***, **, * represents significance at $p < 0.01$, $p < 0.05$, $p < 0.1$ respectively. *RGDP* represents real GDP per capita. *IFIGDP* represents volume-based financial integration. *GEQGD* represents the equity-based measure of financial integration. *TO* represents openness to trade scaled by GDP. *POP* represents population growth and *DUM* is a time dummy variable to represent the AFC and Global Financial Crisis. All columns report the results of two-step Blundell and Bond (1998) system-GMM estimator.

The coefficient of lagged dependent variable in all specifications is less than one, positive signed, and statistically significant at 1%. This implies that the models are dynamic and indicates conditional convergence, providing evidence that dynamic GMM is an appropriate estimator. Therefore, the statistical estimator provides reliable results.

The results shown in Table 3 reveals that prior to the 1997~1998 pre-crisis periods, financial integration (proxied by *IFIGDP* and *GEQGD*) within the region is significant and positive to economic growth, albeit at a low degree. A small estimated coefficient implies a low impact of financial integration of economic growth in Asia. Contrary to prediction, the results of the post-crisis and overall samples show that financial integration and growth nexus is insignificant, and this is consistent for both volume-based and equity-based indicators. The results imply that there is no impact of financial integration on growth, which is consistent with the findings

of Kramer (2006), Pak, Park and Wyplosz (2010), and Schüller and Wogart (2017).

Estimated parameters of variables besides financial integration offer reasonable findings. Specifically, TO is positive and significant to growth across all sample periods and models, indicating that trade leads to higher economic growth. Furthermore, although population growth is insignificant during the pre-crisis periods (for both Model 1 and Model 2), the post-crisis and overall samples show that it has a significantly negative impact on economic growth. Despite some inconsistent results, the parameters are similar to empirical findings of King and Levine (1993) and Osada and Saito (2010).

Furthermore, the diagnostic tests for all six models present satisfactory results. The Sargan test, which tests for overidentifying restrictions shows a high p -value, indicating that the null hypothesis fails to be rejected. This affirms that all specifications across all six regressions are accurately specified. Next, the Arellano and Bond's serial correlation test also meets the criteria. For pre-crisis and post-crisis, both first and second order correlation failed to reject the null hypothesis for Model 1 and Model 2. As for the overall sample, the first order serial correlation rejects the null hypothesis, while the second order fails to reject the null hypothesis. This denotes that the indicators utilized in the models are free from autocorrelation problems and thus are suitable for the estimation.

B. Robustness test

For the purpose of robustness, Table 4 presents the results of the 2SLS method on the impact of financial integration on economic growth in the pre-crisis, post-crisis, and overall samples. The findings offer support to the results of the system GMM; prior to the 1997~1998 pre-crisis periods, financial integration (proxied by $IFIGDP$ and $GEQGDP$) is significant and positive to economic growth, but this effect wanes off in the findings of the post-crisis and overall sample periods. The findings of TO are shown to be insignificant in all models and population growth is significant in all study periods, except for Model 1 of the overall sample. The Sargan test of overidentifying restrictions shows a high p -value affirms that all specifications across all six regressions are accurately specified. Overall, the findings of the system GMM yields better results than the 2SLS method, largely due to the difficulty in identifying external exogenous instrumental variables, as postulated by Abdallah *et al.* (2015).

Another robustness test is performed on the impact of financial integration and economic growth to account for the heterogeneous effect of advanced and low-income countries. Using the system-GMM method, Table 5 presents the financial-growth nexus of the overall sample. Following the income level classification by the World Bank, the countries are segregated into two groups: low and lower-middle income countries and upper-middle and high income countries. The findings are consistent with the results of the 2SLS and the system GMM (Table

Table 4. Results of two-stage least squares method (2SLS) (Dependent variable: Real GDP per capita)

Variables	Pre-Crisis		Post-Crisis		Overall Sample	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
<i>In RGDPPC_{it-1}</i>	0.964*** (0.008)	0.956*** (0.011)	0.971*** (0.007)	0.974*** (0.011)	0.935*** (0.021)	0.913*** (0.033)
<i>In IFIGDP_{it}</i>	0.041** (0.021)	-	-0.016 (0.021)	-	0.151 (0.113)	-
<i>In GEQGD_{it}</i>	-	0.038** (0.019)	-	-0.015 (0.019)	-	0.124 (0.084)
<i>In TO_{it}</i>	0.007 (0.026)	0.015 (0.023)	0.001 (0.011)	0.0001 (0.009)	-0.159 (0.156)	-0.105 (0.106)
<i>In POP_{it}</i>	-0.098*** (0.019)	-0.103*** (0.019)	-0.043*** (0.008)	-0.043*** (0.009)	-0.037 (0.038)	-0.051** (0.026)
<i>DUM_{1997-1998;2007-2009}</i>	-	-	-	-	-0.09 (0.063)	-0.067 (0.044)
Constant	0.548*** (0.196)	0.564*** (0.201)	0.321** (0.125)	0.308** (0.137)	1.374** (0.663)	1.554** (0.867)
Specification tests						
Sargan test	1.95 (0.162)	1.57 (0.21)	1.62 (0.203)	1.63 (0.202)	0.114 (0.736)	0.041 (0.839)
Observations	121	121	159	159	185	185
Number of Country	28	28	33	33	33	33

(Notes) Standard errors are in parentheses, ***, **, * represents significance at $p < 0.01$, $p < 0.05$, $p < 0.1$ respectively. *RGDPPC* represents real GDP per capita. *IFIGDP* represents volume-based financial integration. *GEQGD* represents the equity-based measure of financial integration. *TO* represents openness to trade scaled by GDP. *POP* represents population growth and *DUM* is a time dummy variable to represent the AFC and Global Financial Crisis. Instrumental variables include bureaucracy quality and law and order. All columns report the results of 2SLS.

3), whereby financial integration does not impact economic growth for both country groups. It is, however, important to note that in the case of low and lower-middle income countries, equity-based financial integration is negative and significantly impacts growth, indicating that financial integration is harmful to growth. This result is similar to the findings of Soto (2003) and Chidinma *et al.* (2018). Estimated parameters of control variables offer reasonable findings. Specifically, *TO* is positive and significant to growth across both country groups, and population growth shows a significantly negative impact on economic growth. Diagnostic tests for both country groups present satisfactory results.

The findings shown in Tables 3, 4, and 5 above are in tandem with the postulations of Cavoli *et al.* (2004), which finds an apparent divergence of financial integration in Asia. The dissimilarities of financial cooperation intensities between advanced countries (Japan, Singapore, and South Korea) and low-income countries (Brunei, Lao PDR, Myanmar, and Vietnam) explains the insignificant financial-growth nexus (Cavoli *et al.* 2004). Since the 1997 AFC, several Asian countries have pledged their commitment towards greater financial cooperation,

Table 5. Results of dynamic panel GMM estimation (Dependent variable: Real GDP per capita)

Variables	Low Income and Lower-middle Income		Upper-middle Income and High Income	
	Model 1	Model 2	Model 1	Model 2
<i>In RGDP</i> _{<i>it</i>-1}	-0.129 (0.398)	0.389 (0.244)	0.861*** (0.009)	0.859*** (0.014)
<i>In IFIGDP</i> _{<i>it</i>}	-0.015 (0.024)	-	0.003 (0.004)	-
<i>In GEQGD</i> _{<i>it</i>}	-	-0.022** (0.008)	-	0.002 (0.005)
<i>In TO</i> _{<i>it</i>}	0.518*** (0.089)	0.477*** (0.057)	0.086*** (0.016)	0.07*** (0.027)
<i>In POP</i> _{<i>it</i>}	-0.964*** (0.33)	-0.192* (0.114)	-0.058*** (0.01)	-0.057*** (0.012)
<i>DUM</i> _{1997-1998;2007-2009}	-0.108*** (0.032)	-0.081*** (0.019)	-0.012*** (0.004)	-0.015*** (0.003)
Constant	6.078** (2.961)	2.61 (1.936)	1.032*** (0.126)	1.116*** (0.133)
Specification tests				
Sargan test	3.95 (0.98)	7.72 (0.98)	19.09 (0.451)	18.87 (0.462)
Arellano-Bond tests for AR(1)	0.52 (0.61)	-1.26 (0.21)	-2.46 (0.01)	-2.44 (0.01)
Arellano-Bond tests for AR(2)	-0.57 (0.56)	0.67 (0.51)	-1.32 (0.19)	-1.41 (0.158)
Observations	73	74	149	149
Number of Country	10	10	22	22

(Notes) Standard errors are in parentheses, ***, **, * represents significance at $p < 0.01$, $p < 0.05$, $p < 0.1$ respectively. *RGDP* represents real GDP per capita. *IFIGDP* represents volume-based financial integration. *GEQGD* represents the equity-based measure of financial integration. *TO* represents openness to trade scaled by GDP. *POP* represents population growth and *DUM* is a time dummy variable to represent the AFC and Global Financial Crisis. All columns report the results of two-step Blundell and Bond (1998) system-GMM estimator.

as benchmarked by the European experience. However, as problems impeding the financial systems in EU start to mount, Asian countries have proceeded to take critical stock and move with caution. Signs of imbalances in terms of currency strength, dependency on the banking sector, FDI inflows, and banking sector regulations continue to persist in the majority of the countries (Lim and Lim 2012).

Contrary to the field of trade, where there has been considerable integration progress in Asia, financial integration development in the region has been lackluster. This is attributed to the reasoning that Asian countries are very heterogeneous in terms of history, economics, politics, and culture as compared to their European counterparts (Lim and Lim 2012). This explains the lack of pursuit of financial integration in the region. While European countries pushed for establishing a single market via the Single European Act in 1986, the banking sector

reforms have been sluggish in the aftermath of the crisis (Pak, Park and Wyplosz 2010). Concerns over shareholder protection schemes, creditor rights, deficiency of credit rating agencies, and regulatory capacities are confounding reasons for the slow progress of the banking sector reform. Another underpinning factor of the slow progress of financial integration is incomplete capital account liberalization, driven by difficulties in coordinating an effective exchange rate mechanism. While some Asian countries practice an open capital account and exchange rate regimes, others practice pegged currency exchange and closely monitored capital account activities.

V. Conclusion

This study examines the impact of financial integration and economic growth in 33 Asian countries from 1980~2015, using three different time periods: pre-crisis, post-crisis, and overall. Financial integration is measured using two approaches: volume-based and equity-based measures. The dynamic panel model provides a few insights. Firstly, the financial integration for both volume-based and equity-based measures significantly impacts economic growth in Asia during the pre-crisis period. However, this effect is rather low. Secondly, the empirical results of post-crisis and the aggregate sample finds that there is no relationship between financial integration and economic growth. Third, capturing control variables, *TO* has a positive impact on economic growth for all time periods while population growth presents mixed findings.

As Asia and the EU continue to strengthen ties, regional integration and globalization activities continue to take precedence in policymakers' growth agenda. Asia has used the European integration as a benchmark for policymaking. A key question is whether there are notable lessons that Asia can draw from the European financial integration process. It is argued that the European way cannot be directly emulated into the Asian case. Heterogeneous economic conditions, historical, and political regimes mean that the approaches must differ between the two regions. Small Asian economies are confronted with susceptible capital flows, which implied economic stability. Although the CMIM is a vital step towards financial integration, the progress has been sluggish, in its infancy, and very much dependent on the International Monetary Fund.

From an economic standpoint, a financial integration in Asia with the absence of a fiscal, monetary, and political union poses danger to the member countries, and thus does not provide a strong logical basis for the pursuit of financial cooperation. As it stands, barriers to international financial transactions have ceased to exist across the majority of Asian countries. Unlike the EU bureaucracy framework in which interest groups do not have a stronghold on public policy, in Asia, political linkages and elite families influence policies, in turn making the financial integration policy more difficult to implement. This would be especially true if an elite group finds that the policy is working against them. However, financial integration

is inevitable, and now it is only a question of time and pace. Initiatives such as China's Belt and Road Initiative, which has been endorsed by over 150 countries, call for an important undertaking of financial integration. Although the Belt and Road Initiative has stumbled upon various roadblocks, the concept itself is adequate to jumpstart and provide momentum for a well-integrated financial system. Therefore, more effort is needed towards refining coordination in exchange rate mechanisms and capital flows, in order to minimize liquidity crisis. Instead, of structuring the financial regulatory infrastructures to solely focus on long-term investment flows, pursuance of financial development policies are also vital, as is macroeconomic restructuring, to reap the benefits of financial integration. Since profound differences drive the financial integration structures between EU and Asia, understanding the variances between the two regions allows for important policy lessons to be drawn.

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Appendix 1. Country sample

No.	Pre-crisis	Post crisis	Overall Sample
1	Bahrain	Bahrain	Bahrain
2	Bangladesh	Bangladesh	Bangladesh
3	Bhutan	Bhutan	Bhutan
4	Brunei Darussalam	Brunei Darussalam	Brunei Darussalam
5	-	Cambodia	Cambodia
6	China	China	China
7	Cyprus	Cyprus	Cyprus
8	India	India	India
9	Indonesia	Indonesia	Indonesia
10	Iran	Iran	Iran
11	-	Iraq	Iraq
12	Israel	Israel	Israel
13	Japan	Japan	Japan
14	Jordan	Jordan	Jordan
15	-	Kazakhstan	Kazakhstan
16	Korea	Korea	Korea
17	-	Kuwait	Kuwait
18	Lao PDR	Lao PDR	Lao PDR
19	Lebanon	Lebanon	Lebanon
20	Malaysia	Malaysia	Malaysia
21	-	Maldives	Maldives
22	Myanmar	Myanmar	Myanmar
23	Nepal	Nepal	Nepal
24	Oman	Oman	Oman
25	Pakistan	Pakistan	Pakistan
26	Philippines	Philippines	Philippines
27	Saudi Arabia	Saudi Arabia	Saudi Arabia
28	Singapore	Singapore	Singapore
29	Sri Lanka	Sri Lanka	Sri Lanka
30	Thailand	Thailand	Thailand
31	Turkey	Turkey	Turkey
32	United Arab Emirates	United Arab Emirates	United Arab Emirates
33	Vietnam	Vietnam	Vietnam

Appendix 2. Variables descriptions and data sources

Variable	Definition	Source
Growth	Real GDP per Capita (calculated in logarithmic terms)	World Development Indicators
Volume-based measure	Stock of foreign assets and liabilities divided by GDP	Lane and Milesi-Ferretti (2018)
Equity-based measure	Sum between stock of portfolio equity asset-liability and stock of foreign direct investment (FDI) assets - liabilities divided by GDP	Lane and Milesi-Ferretti (2018)
Trade openness	Sum of exports and imports to GDP	World Development Indicators
Population growth	Annual population growth rate	World Development Indicators