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Does Financial Integration Matter for Financial Development? Evidence from the East Asian and Pacific Region

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Abstract This paper assesses the impact of financial integration on financial development and establishes thresholds for materializing gains of financial advances from financial globalization using a sample of 34 countries from the East Asian and Pacific region. Following the approaches of Kose *et al.* (2011) and Asongu and De Moor (2016), we test non-linearity within the financial openness and financial development nexus through semi-parametric ordinary least-squares regression, and then, we develop threshold dynamics models. According to our findings, the effect of financial integration on financial development significantly changes across different financial inflows. When using external debt as a proxy for financial openness, there exists a robust significant inverted U-shaped relationship between financial integration and financial development. The empirical findings also suggest that the financial integration-development nexus is contingent on the level of trade openness, national income, and institutional quality. The results are robust to different measures of financial development and integration, the inclusion of other determinants of financial development, and considerations of endogeneity.

Keywords: Financial integration, Financial development, Trade openness, GDP per capita, East Asian and Pacific region

JEL Classifications: F36, F40, O16, O55

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I. Introduction

The notion “more finance, more growth” is generally supported by many research studies (Arestis *et al*. 2014, Beck *et al*. 2000b, Rajan and Zingales 2003, Baltagi *et al*. 2009, Kose

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et al. 2006). However, the 2008 financial crisis revealed that malfunctioning financial systems could result in under-investment and misallocation of resources. Therefore, many have argued that "better finance, more growth" would be more accurate (Law *et al.* 2013). Increasing attention has been paid in recent years to examine what constitutes better finance.

Financial integration[1)] is an aspect of advanced financial systems. In theory, the liberalization of financial systems facilitates financial development by ensuring more transparency and competition in the financial sector (Obstfeld 2008), allowing capital and resources to be efficiently allocated (Kose *et al*. 2009a) and encouraging the formation of best practices of regulation (Kose *et al*. 2009a). Thus, the liberalization of the financial market contributes to increasing stock market liquidity, improving the efficiency of the banking system (Levine 2001), and reducing the cost of capital (Stultz 1999). However, there is a growing concern that too much integration could be harmful to the development of financial systems. Higher financial openness could lead to excessive risk-taking (Kose *et al*. 2009a), capital flight, vulnerability to self-fulfilling crises (David *et al*. 2015), and higher contamination risk among interlinked economies (Kose *et al*. 2009), eventually imposing detrimental impacts on long-term financial development (Kose *et al*. 2009). Hence, there is possibly an association between the development of financial systems and integration, which may vary based on the integration levels.

Empirical evidence about the nexus between financial integration and development has never reached a consensus. On the one hand, the first strand of research (Levine 2001, Klein and Olivei 2008, Baltagi *et al*. 2009, Ozkok 2015, T.-H. Le *et al.* 2017) documented a positive linkage between the openness of financial sector and its development. For instance, Baltagi *et al.* (2009), using a broad sample of countries, provided evidence regarding financial integration being an important catalyst for banking sector development. Similarly, Klein and Olivei (2008) found that financial liberalization is linked to greater financial sector depth, regardless of economic settings. Levine (2001) proved that liberalizing restrictions on international portfolio flows could improve stock market liquidity and that the efficiency of a banking system could be enhanced by a stronger presence of foreign banks in the domestic market.

On the other hand, another strand of literature revealed weak or no direct links between financial openness and development. Both Menya *et al.* (2014) and David *et al.* (2015) showed that financial integration had no developmental effects on most African countries in their sample. Furthermore, Hauner *et al.* (2013) and Ashraf (2018), while emphasizing the role of trade openness for financial development, found no evidence of a financial integration effect. Instead, they found that financial account liberalization could force credit providers to increase risk-taking owing to intense credit-market competition. In such a scenario, the costs of higher risk-taking

1) Financial integration generally refers to a country's approach toward restrictions on capital and current account transactions. In this study, the terms "financial integration," "financial openness," "financial engineering," and "financial liberalization" are used interchangeably.

to the financial sector could outweigh the benefits associated with larger volume and lower credit costs. Rodrik and Subramanian (2009) concluded that in the wake of the sub-prime financial crisis, claims that recent financial engineering generated large gains sounded less plausible.

The explanations for these inconclusive results are threefold. First, previous studies have considered different elements of financial system. Baltagi *et al.* (2009) and Ashraf (2018) examined the linkage within the banking sector and produced opposite findings. Meanwhile, Demetriades and Law (2006) and Chinn and Ito (2006) focused on equity and stock markets. Ozkok (2015) provided a comprehensive look at most financial system components, including banking, bond, and stock markets.

Second, extant literature has relied on different measurements of financial integration and development. Regarding financial development, finance-growth literature has suggested numerous indicators. For instance, money aggregates (e.g., M2 and M3) as a ratio of Gross Domestic Product (GDP) (Odhiambo 2008) are traditionally used. However, the superiority of these indicators has been questioned because they underestimate the contributions of foreign funds in the financial system. An additional popular measure of financial development is the ratio of liquid liabilities in the financial system to GDP (King and Levine 1993). Nevertheless, it is believed to overestimate economies with underdeveloped financial markets (T.-H. Le *et al*. 2017). Other standard measures are the ratios of private domestic credit provided from deposit banks and those from financial institutions to GDP (King and Levine 1993). These indicators, however, are criticized for focusing solely on private sector claims (Beck *et al.* 2000a). In recent literature, a composite index of financial development constructed from different finance indicators has been largely used (David *et al*. 2015, Ozkok 2015, T.-H. Le *et al*. 2017) to capture the multidimensional nature of the financial sector rather than solely focusing on one aspect.

Financial integration, as summarized in Kose *et al.* (2006), has been widely measured by two broad measures: de jure and de facto. De jure measurements (Quinn 2003, Mody and Murshid 2004) evaluate the integration level of a financial market on the basis of the removal of legal restrictions and controls on capital accounts. However, these measures have long been criticized for their over-reliance on the degree of restriction abolishment related to foreign exchange transactions (Kose *et al*. 2006). In addition, they do not consider the extent of integration into the global markets. Whereas, de facto indicators observe countries' actual integration into the world financial markets through flow and stock variables, including foreign direct investment (% of GDP) (Asongu and De Moor 2016), portfolio investment flows (% of GDP) (Kose *et al.* 2011), and international debt issues (% of GDP) (Kose *et al*. 2011). Literature on financial flows distinguishes foreign direct investment (FDI) from portfolio and debt flows (Kose *et al*. 2011). It is widely believed that the former generates more indirect benefits than debt.

Finally, the financial integration-development nexus is contingent upon certain conditions of national and institutional development[2] (Rodrik and Subramanian 2009, David *et al*. 2015, Asongu and De Moor 2016). Industrialized countries with more stable macro conditions and developed financial markets have been the main beneficiaries of financial globalization (Kose *et al.* 2011). Although developing countries have experienced robust economic growth, many are still lagging behind in terms of financial system advances (David *et al.* 2015). This difference between countries can be largely explained through differences in institutional quality (Law *et al*. 2013), macroeconomic policies (Boyd *et al*. 2001), levels of trade openness (Do and Levchenko 2004), population density (Allen *et al*. 2012), and national income (Jaffee and Levonian 2001).

Currently, a major debate surrounds the idea that certain thresholds of national and institutional development need to be met by an economy for its financial sector to benefit from its greater global integration. Attempts have been made to assess these thresholds in the finance-growth nexus. For example, Yilmazkuday (2011) found that the magnitudes of finance-growth relationship varied according to levels of trade openness and per capita income. Accordingly, high-income countries perhaps need lower levels of trade openness for the benefits of financial development on economic growth to be promoted. By contrast, higher levels of trade openness are required for low-income countries to obtain similar results. Moreover, the catch-up effects *via* the finance-growth nexus are higher for moderate per capita income levels. Furthermore, Kose *et al.* (2011), Law *et al*. (2013), and David *et al*. (2015) found that the effects of international financial integration were more pronounced for financial development in countries with better institutional quality. However, thresholds for the financial integration and development nexus have been underlooked in the extant literature.

The East Asian and Pacific region has become the main growth driver of the global economy in recent years (World Bank 2017). Most countries in this region follow export-led growth strategies and thus demonstrate superior trade integration (Fry-McKibbin *et al*. 2018) and financial integration (Boubakri and Guillaumnin 2015). Nevertheless, economies in the region are diverse as regards financial sector development. According to the World Economic Forum's (2012) Financial Development Report, as of 2012, Singapore scored well in financial stability, foreign exchange, derivatives, and equity markets, but they lacked a well-developed bond market and strong financial information disclosure assurances. Meanwhile, Hong Kong had an efficient banking system but performed less effectively in public debt management. By comparison, the financial systems of Vietnam, Laos, and Mongolia remain underdeveloped with a lack of liquidity, low auditing and accounting standards, low transparency, and inadequate financial structure (Didier *et al*. 2017). These dynamic and diverse development patterns make the region

2) National development is the progression from simple living conditions to more complex ones. It is defined by the 3-dimensional enhancement of economic, environmental, and social indicators.

an interesting case with which to revisit the nexus of financial engineering and development.

The central objectives of this paper are to empirically examine the financial integration and development nexus in a sample of 34 countries from the East Asian and Pacific region during 1996~2017. To this end, we aim to answer two broad questions. First, does a nonlinear relationship between financial integration and development exist in the East Asian and Pacific region? Second, are there prerequisite threshold conditions that countries in the region need to reach? For the latter question, we focus on three threshold variables: trade openness, national income level, and institutional quality.

We apply two research approaches. First, following Asongu and De Moor (2016), we use a standard semi-parametric approach to test for the existence of U- or inverted U-shaped relationships. Generalized method-of-moments (GMM) estimation is employed to deal with endogeneity issues in this econometrics research. Inspired by Kose *et al*. (2011), we use fixed effect techniques for consistency checking. We develop a dynamic panel threshold model to find the threshold conditions of national development for the rewards of financial integration on financial development to take effect. Details of these techniques are provided in Section III.B. To our knowledge, this is the first study to combine these two approaches to investigate non-linearity within the financial liberalization and development nexus.

Regarding finance measurements, as noted by Kose *et al*. (2009a), the influence of financial globalization may vary significantly, depending on the types of external assets and liabilities used. Thus, in this paper, when measuring financial integration, we distinguish between FDI inflows and external debt. This allows us to account for possible differences in the nature and threshold conditions of different types of cross-border flows. Regarding dependent variables, we were inspired by David *et al*. (2015), Ozkok (2015), and Le *et al*. (2017) to use principle component analysis to construct an indicator of financial development. This method enables us to capture different attributes of financial sectors, providing more comprehensive analyses and plausible thresholds for policy implications. Details of this technique are discussed in Section III.A.1

To this end, we contribute to the existing literature in various ways. First, finance literature has primarily focused on the financial development-growth nexus. Thus, we are among the few studies to investigate the nonlinear relationship between financial integration and sector development. Second, we provide a relatively comprehensive overview of the nexus by employing various financial integration measurements and a composite finance indicator to proxy the financial development in a broad sense. Lastly, we account for the role of trade openness, national income, and institutional quality in financial development, an issue that has not been thoroughly examined.

The remainder of this paper is structured as follows. Section II provides information on data and methodology. Section III presents the empirical findings, and Section IV concludes

with a final discussion and direction for further research.

II. Methodology

This section specifies the methodology used in this study to investigate the financial integration and development nexus and the necessary national conditions through which a country could benefit from financial openness.

A. Data and sample

Our panel dataset includes 34 countries (Appendix 1) from the East Asian and Pacific region for the period 1996~2017. Details of all variables and their sources are provided in Appendix 2.

1. Dependent variables

As discussed in the Introduction, literature on this matter has introduced several single ratios, such as money aggregates (e.g., M2 and M3) to GDP, liquid liabilities in the financial system, and private domestic credit, provided from deposit banks and institutions as shares of GDP. However, these measures only serve as rough estimates and offer information on a particular aspect of the financial sector. Given that the financial sector comprises a variety of financial institutions, markets, and products, and that financial development is a multidimensional concept, the adoption of a single variable cannot fully capture all aspects of financial development.

In this study, we follow a number of prior studies to address this shortcoming (David *et al*. 2015, Ozkok 2015, T.-H. Le *et al*. 2017) and employ an array of variables related to financial development to construct an aggregate index. Because most countries in our sample are bank dominated and statistics on central and commercial banks are more readily available compared with those on stock and bond markets (T.-H. Le *et al*. 2017), the financial indicators primarily associated with bank sector development are considered in the present study. Specifically, finance ratios, including broad money supply to GDP, liquid liabilities to GDP, private domestic credit from deposit banks, and private domestic credit from financial institutions to GDP are used. By combining different measures of financial development into a single index, we aim to summarize the comprehensive nature of the financial sector as opposed to focusing on a single aspect. Our composite index helps avoid conflicting results owing to the adoption of individual variables from the literature (Ozkok 2015) and allows for the examination of the multifaceted nature of financial system, which individual variables do not capture (Abiad and Mody 2005).

For creating our financial development index (*FIN_DEVELOPMENT*), we adopt principal

component analysis (PCA) (David *et al*. 2015, Ozkok 2015, T.-H. Le *et al*. 2017). PCA is a simple and effective method that reduces a dataset to lower dimensions while retaining as much information from the original set as possible. It also helps mitigate multi-collinearity.

Table 1 provides information on PCA for our financial development index. In this analysis, we use the first component criterion to decide how many components to retain. Components with Eigen values greater than 1 are selected.

Table 1. Principal component analysis for financial development index (1996~2017)

Principle component	Eigenvalue	Cumulative (%)
Component 1	3.030	0.757
Component 2	0.817	0.962
Component 3	0.133	0.995
Component 4	0.020	1.000

(Note) Extraction method: Principal component analysis
(Source) Authors' compilation

The Eigen value in Table 1 indicates that the first principal component is a more relevant measure of financial development. Thus, only information related to the first component is considered to form a composite indicator. The financial development index (*FIN_DEVELOPMENT*) is obtained by averaging component finance indicator corresponding to the factor score coefficient.

Table 2. Component score coefficient matrix (1996~2017)

Variables	Component 1 (factor score coefficient)
Private domestic credit from financial institutions (% of GDP)	0.5459
Private domestic credit from deposit banks (% of GDP)	0.2942
Liquid liabilities (% of GDP)	0.5537
Broad money supply (% of GDP)	0.5557

(Note) Extraction method: Principal component analysis
(Source) Authors' compilation

2. Financial integration indicators

Owing to their ignorance of the extent of financial system integration, de jure measurements do not fully reflect the degree of financial openness. However, de facto measures, which possibly involve measurement errors, remain the superior measurement of financial integration (Kose *et al*. 2006) and have been widely used in the literature (Rodrik and Subramanian 2009, Kose *et al*. 2011, Ozkok 2015, Asongu and De Moor 2016). Therefore, we rely on de facto measurements as proxies for financial integration, including FDI inflows as a share of GDP (%) (*FDIItoGDP*) and the ratio of external debt to GDP (%) (*EXDEBTtoGDP*).

The use of FDI inflows as a proxy for financial integration has been largely performed in finance literature (Rodrik and Subramanian 2009, Ozkok 2015, Asongu and De Moor 2016). FDI inflows comprise equity capital, reinvestment of earnings, and other long-term capital (World Bank 2007). As most countries in our sample are developing economies, FDI inflows prove to be more significant than outflows. Thus, we focus on the impact of the inward flows of FDI rather than that of outward or aggregate flows.

The literature on financial flows also distinguishes FDI from portfolio flows and debt (Kose *et al*. 2011). When debt liabilities constitute the primary form of financial integration, the risks of financial integration seem to be higher. Moreover, the 2008 sub-prime financial crisis and the ongoing public debt crisis reveal that more attention needs to be placed on external debt. Thus, it is worth looking further at the impact of external debt on financial development. In our study, external debt stocks are the sum of public, publicly guaranteed, and private non-guaranteed long-term debt, International Monetary Fund (IMF) credit, and short-term debt (World Bank 2007).

3. Threshold variables and other control variables

This study aims to assess prerequisite conditions that a country should reach before the rewards of financial openness can materialize. For each threshold category, we must choose an appropriate measure that is conceptually sound and for which data for our broad sample of countries are available. Therefore, we focus on three indicators: trade openness (*TRADE OPENNES*[3]); per capita GDP (current international US dollar) in logarithm form (*GDPPC*), indicating the level of a country's income; and institutional quality (*IQ*[4]). The literature suggests that these variables are inextricably related to the levels of integration of the financial market (Kose *et al*. 2011, Lane and Milesi-Ferreti 2017). Moreover, our study employs *INFLATION*, which captures the degree of variation in consumer price inflation as a control variable. High inflation is speculated to discourage financial intermediation (Mishkin 2009, Boyd *et al*. 2001) and can be used as a proxy for macroeconomic policies.

Descriptive statistics for the main variables are reported in Table 3, and a correlation matrix is provided in Table 4.

3) Measured by the sum of exports and imports of goods and services, expressed as a ratio to GDP

4) In line with previous literature (Kose *et al*. 2011, T.-H. Le *et al*. 2017), we computed institutional quality index (IQ) by averaging together six dimensions of governance obtained from the World Bank's Worldwide Governance Indicators (WGI): voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption.

Table 3. Descriptive statistics

Variable	No. of obs.	Mean	Median	St. Dev.	Max	Min
FIN_DEVELOPMENT	453	139.302	112.655	82.044	389.593	26.486
EXDEBTtoGDP	344	46.274	38.467	36.704	246.628	0
FDIItoGDP	641	5.073	2.568	12.892	217.920	-56.465
TRADE OPENNESS	601	112.847	100.240	78.946	442.620	0.167
INFLATION	584	4.9614	3.032	8.967	125.272	-4.009
GDPPC	663	8.952	8.623	1.206	11.850	6.584
IQ	734	0.156	0.155	0.841	1.862	-1.752

Table 4. Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) *FIN_DEVELOPMENT*	1						
(2) *FDIItoGDP*	0.03	1					
(3) *EXDEBTtoGDP*	-0.28	-0.03	1				
(4) *TRADE OPENNESS*	0.1	0.65	-0.09	1			
(5) *INFLATION*	-0.34	-0.02	0.39	-0.12	1		
(6) *GDPPC*	0.63	0.11	-0.15	0.33	-0.32	1	
(7) *IQ*	0.58	0.1	-0.11	0.32	-0.34	0.69	1

B. Methodology

1. Baseline regressions

To better examine the relationship between financial integration and development based on the theoretical arguments presented above, this study proposes the following empirical model:

$$FD_{it} = \delta_0 + \delta_1 FI_{i,t} + \delta_2^j X_{i,t}^j + \varepsilon_{it}, \tag{1.1}$$

where FD_{it} represents financial market development of a country i in year t, and FI_{it} denotes the extent of financial market integration. Specifically, *FI* is measured *via FDIItoGDP* and *EXDEBTtoGDP*. $X_{i,t}^j$ = a set of control variables for country i in year t (*GDPPC*; *INFLATION*; *TRADE OPENNESS*, and *IQ*). ε_{it} is an idiosyncratic error term. To investigate the nonlinear relationship between financial integration and development, we add the quadratic term of financial integration in Eq. (1.1). Thus, the new model takes the following form:

$$FD_{it} = \delta_0 + \delta_1 FI_{i,t} + \delta_2 FI\_square_{i,t} + \delta_2^j X_{i,t}^j + \varepsilon_{it}, \tag{1.2}$$

where $FI\_square_{i,t}$ denotes squared term of FI_{it}

We adopt an endogeneity-robust GMM (Arellano and Bover 1995, Blundell and Bond 1998)

as an empirical strategy because it is preferred for difference estimation (Bond *et al*. 2001, p.3-4), in the sense that it mitigates small sample biases from the previous version. Moreover, this approach does not eliminate cross-country variations and controls for potential endogeneity in our regressions. Furthermore, instead of using one-step system GMM, this study employs an extension (i.e., two-step GMM) developed by Roodman (2009), who defines two-step system GMM as being more efficient and robust to heteroscedasticity and autocorrelation problems in econometrics research. In addition, we provide basic fixed effects estimates for consistency checking.

2. Panel threshold regression (PTR)

To examine the potential presence of thresholds in some selected prerequisite conditions from which the rewards of financial openness can materialize, we use the threshold regression approach suggested by Hansen (2000). This approach leverages compare-and-contrast analysis of the single- and multiple-threshold models, and in this study, we adopt both models.

The single-threshold model takes the following form:

$$FD_{it} = \mu_i + \theta X_{i,t}^{j} + \beta_1 FI_{it}(TH_{it} < c) + \beta_2 FI_{it}(TH_{it} \geq c) + \varepsilon_{it}, \tag{2.1}$$

where FD_{it} represents financial market development of country i in year t, μ_i is the fixed effect by country, $X_{i,t}^{j}$ are control variables[5], FI_{it} denotes the financial market integration of a country i in year t, TH_{it} are threshold variables, and c is an unknown threshold parameter. The sign of regression coefficients β_1 and β_2 changes the impact of financial openness on dependent variables below and above threshold c. ε_{it} is an idiosyncratic error term.

The double-threshold model takes the following form:

$$FD_{it} = \mu_i + \theta X_{i,t}^{j} + \beta_1 FI_{it}(TH_{it} < c_1) + \beta_2 FI_{it}(c_1 \leq TH_{it} < c_2) + \beta_3 FI_{it}(TH_{it} \geq c_2) + \varepsilon_{it}, \tag{2.2}$$

where c_1 and c_2 are two unknown threshold parameters. The sign of regression coefficients β_1, β_2, and β_3 changes the impact of financial openness on dependent variables below threshold c_1, between c_1 and c_2, and above threshold c_2.

Panel threshold regression (PTR) is a simple and straightforward method of capturing nonlinear behavior of finance phenomena (Hansen 2000). Additionally, this method includes several desirable extensions in comparison to other least-squared estimation techniques, including allowing

5) For threshold variable being trade openness, control variables are GDPPC in logarithm form, inflation and institutional quality. For threshold variable being GDPPC (in logarithm form), control variables are trade openness, inflation and institutional quality. For threshold variable being institutional quality, control variables are GDPPC in logarithm form, inflation and trade openness

for asymptotic distribution, non-linearity, and endogenous variables (Hansen 1999).

PTR notably requires a strictly balanced dataset. Therefore, the adoption of this technique should significantly reduce our sample size[6]. With our limited number of observations, we use bootstrap methods to increase the reliability of our hypothesis (Mackinnon 2002). Furthermore, we employ Eicker-Huber-White standard errors to remove the problem of heteroscedasticity that can cause bias to our estimators. The resampling technique is applied 1,000 times to generate empirical *t*-statistics, and we use them to test for the statistical significance of the regression coefficients.

III. Empirical Results

A. Financial integration and financial development nexus

1. Baseline analyses

Table 5 shows the ordinary least-squares regressions with fixed effect (FE) and GMM estimations. Columns (1) and (2) present our baseline results without main explanatory variables. Columns (3), (4), (7), and (8) report estimation outcomes of Eq. (1.1) with *FDIItoGDP* and *EXDEBTtoGDP* being the variables of main interest. Finally, columns (5) and (6) and columns (9) and (10) provide estimated results of Eq. (1.2) with quadratic terms of *FDIItoGDP* (*FDIItoGDP*square*) and *EXDEBTtoGDP* (*EXDEBTtoGDP*square*).

Based on the three information criteria, we assess the validity of the estimated outcomes. First, the null hypothesis of the first-order Arellano and Bond autocorrelation test (AR(1)) should be rejected. Second, the null hypothesis of the second-order autocorrelation (AR(2)) for the absence of autocorrelation in the residuals should not be rejected. Thus, from the data presented in Table 5, it is clear that our models do not have an autocorrelation problem. Third, the Hansen *J*-test should not be significant because the null hypothesis states that the instruments are valid. As such, the instruments in our models are valid, as evidenced by their high *p-value* across models. Moreover, to restrict identification and limit the proliferation of instruments, we ensured that the number of instruments was lower than the number of groups in all models.

In columns (1) and (2), most control variables, except institutional quality, are reported to have a significant impact on the dependent variable. In line with the current literature (Asongu and De Moor 2016), significant positive relationships with financial development are found in trade openness and GDP per capita in both estimations. Based on GMM estimations, inflation has a significant negative correlation with financial development, similar to the empirical findings of Boyd *et al.* (2001). Notably, institutional quality is positively correlated with financial

6) Details of countries included in the PTR are provided in Appendix 2

Table 5. Baseline analysis

	Dependent variable: *FIN_DEVELOPMENT*									
	Baseline		***With FDIItoGDP***		***With FDIItoGDP*square***		***With EXDEBTtoGDP***		***With EXDEBTtoGDP*square***	
	FE	GMM	FE	GMM	FE	GMM	FE	GMM	FE	GMM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
TRADE OPENNESS	0.182***	0.694*	0.177***	-0.075	0.177***	-0.043	0.342***	0.822***	0.322***	0.675**
	(3.47)	(1.87)	(3.37)	(-0.57)	(3.36)	(-0.29)	(5.16)	(0.329)	(4.99)	(2.35)
INFLATION	0.178*	-0.586*	0.177*	0.161*	0.177*	0.137	0.066	-0.287	0.165	-0.494***
	(1.73)	(-1.55)	(1.73)	(1.63)	(1.73)	(0.97)	(0.66)	(0.380)	(1.63)	(-2.60)
GDPPC	47.458***	57.064***	47.420***	59.981***	47.398***	61.592***	45.594***	69.896***	51.308***	64.684***
	(17.63)	(6.36)	(17.52)	(5.75)	(17.26)	(5.07)	(15.73)	(10.752)	(16.15)	(6.56)
IQ	2.716	-23.344	2.925	-1.006	2.938	-1.664	3.761	-1.075	6.685	9.639
	(0.58)	(-0.94)	(0.62)	(-0.05)	(0.63)	(-0.06)	(0.82)	(20.424)	(1.48)	(0.64)
FDIItoGDP			0.157	-1.367	0.152	-1.611				
			(0.78)	(-1.33)	(0.68)	(-1.09)				
*FDIItoGDP*square*					0.000	0.007				
					(0.05)	(0.24)				
EXDEBTtoGDP							0.215***	-0.390	0.678***	0.878**
							(4.49)	(0.240)	(5.36)	(1.99)
*EXDEBTtoGDP*square*									-0.002***	-0.005***
									(-3.94)	(-3.03)
CONSTANT	-302.621***	-432.971***	-301.926***	-385.626***	-301.734***	-399.455***	-308.404***	-515.236***	-366.724***	-501.370***
	(-12.74)	(-4.75)	(-12.67)	(-4.13)	(-12.50)	(-3.63)	(-13.17)	(90.290)	(-13.48)	(-5.79)
No. of Obs.	428	428	426	426	426	426	292	292	292	292
R^2 Overall	0.343		0.348		0.348		0.159		0.148	

Table 5. Continued

	Dependent variable: *FIN_DEVELOPMENT*									
	Baseline		***With FDIItoGDP***		***With FDIItoGDP*square***		***With EXDEBTtoGDP***		***With EXDEBTtoGDP*square***	
	FE	GMM	FE	GMM	FE	GMM	FE	GMM	FE	GMM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
R^2 Within	0.479		0.484		0.484		0.578		0.600	
R^2 Between	0.370		0.367		0.367		0.092		0.086	
AR(1)		0.006		0.009		0.010		0.009		0.011
AR(2)		0.688		0.506		0.384		0.295		0.415
Hansen *J*-test *p*-value		0.409		0.904		0.735		0.185		0.289
No. of instruments		7		9		11		10		11
No. of groups		24		24		24		16		16

(Note) *FDIItoGDP* and *EXDEBTtoGDP* are the main variables of interest and are measured as the share of FDI inflows and external debt to GDP (%), respectively. *FDIItoGDP*square* and *EXDEBTtoGDP*square* are the squared term of *FDIItoGDP and EXDEBTtoGDP* and are added to the model to evaluate the nonlinear relationship between financial integration and development. Columns (1) and (2) report the results of the baseline model; columns (3) to (6) show the results for FDI inflows; and columns (7) to (10) present the results for external debt. Standard errors in parentheses, ***, **, * denotes significance at the 1%, 5%, and 10%, respectively. FE means fixed effects and GMM means system GMM

development. Yet, the impact is insignificant, which is in line with the findings of David *et al*. (2015). The lack of significance of institutional quality could be attributable to the overall low level of institutional development in the examined countries. Otherwise, its effect can be assumed to have been overshadowed by that of GDP per capita.

From columns (3) to (6), the signs and significance of the control variables are generally unchanged compared with those observed in the preceding models. However, the coefficient interactions of FDI inflows and the squared term with financial development are all insignificant. Generally, our findings are in line with those of Asongu and De Moor (2016) who reported insignificant impact of FDI flows on both financial depth and banking sector on the full sample.

Conversely, as shown in the models from column (7), when we use external debt inflows to account for financial integration, another picture is captured. Generally, FE and system GMM estimation methods produce consistent outcomes. External debt can boost financial development as evidenced by its robustly positive coefficients. Furthermore, coefficients on almost all other control variables are significant and consistently report their expected signs.

When the quadratic relationships are considered, significantly negative signs appear in both FE and GMM estimations, indicating that there is an inverted U-shaped relationship between financial openness and development. Accordingly, there is a diminishing marginal effect to the negative threshold of 87.8% (0.878/(2*0.005)). In other words, more external debts will initially boost financial development until it reaches 87.8% of GDP. Subsequently, the positive effect of debt liabilities to financial development decreases, implying that more cross-border debts would be harmful to the financial system.

2. Robustness check

To assess the robustness of the results obtained, we test a number of alternative specifications. First, we consider specifications that include additional regressors identified in the literature as potentially associated with financial development: government expenditure[7] (*GOV_EXPENDITURE*), population density[8] (*POP_DENSITY*), public investment[9] (*PUB_INVESTMENT*), and foreign aid[10] (*FOREIGN AID*). The results of these regressors are reported Table 6. The inclusion of the additional explanatory variables does not change the basic findings presented in Table 5. Furthermore, the additional control variables do not present coefficients that are statistically significantly different from zero in most specifications.

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7) Government expenditure is general government final consumption expenditure as a share of GDP. Inflation and government expenditure add up to macro policies.

8) Population density is measured by dividing the total population by the total area. It provides information on a country's size and market potential.

9) Public investment is measured by gross public investment as a ratio to GDP

10) Foreign aid is total net official development assistance to GDP. Foreign aid is required to reduce the investment-financing gap that less developed countries face.

Table 6. Robustness check: Additional regressors

	Dependent variable: *FIN_DEVELOPMENT*									
	Baseline		***With FDIItoGDP***		***With FDIItoGDP*square***		***With EXDEBTtoGDP***		***With EXDEBTtoGDP*square***	
	FE	GMM	FE	GMM	FE	GMM	FE	GMM	FE	GMM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
TRADE_OPENNESS	0.322***	0.280*	0.321***	0.211	0.321***	0.592**	0.385***	0.121	0.352***	-0.075
	(5.35)	(1.39)	(5.30)	(0.79)	(5.30)	(2.13)	(5.50)	(0.44)	(5.26)	(-0.28)
INFLATION	0.404**	0.210	0.399**	-0.929*	0.404**	-5.816***	0.327*	-2.025**	0.394**	-1.860***
	(2.13)	(0.57)	(2.10)	(-1.51)	(2.11)	(-4.02)	(1.76)	(-2.04)	(2.23)	(-3.87)
GDPPC	49.195***	64.375***	49.103***	52.575***	48.982***	29.582***	43.533***	45.886***	47.350***	70.335***
	(15.94)	(5.63)	(15.83)	(5.41)	(15.66)	(2.74)	(10.60)	(3.13)	(11.92)	(5.36)
IQ	4.467	32.409*	4.560	20.073	4.677	23.216	7.574	45.077**	10.389**	1.990
	(0.85)	(1.68)	(0.87)	(0.97)	(0.89)	(1.13)	(1.48)	(2.35)	(2.12)	(0.09)
POP_DENSITY	0.037**	-0.019	0.037**	0.008	0.037**	-0.000	0.419***	1.197***	0.565***	-0.013
	(2.12)	(-0.73)	(2.12)	(0.41)	(2.13)	(-0.73)	(3.52)	(3.72)	(4.84)	(-0.12)
GOV_EXPENDITURE	0.920***	-0.262*	0.911***	-0.217	0.905***	-3.285**	0.877***	0.575***	0.964***	0.361*
	(4.11)	(-1.46)	(4.05)	(-1.11)	(4.00)	(-2.09)	(4.05)	(3.18)	(4.67)	(1.92)
FOREIGN_AID	-0.173	0.515	-0.160	0.150	-0.143	2.070**	-0.073	2.072**	-0.160	1.051*
	(-0.60)	(0.89)	(-0.55)	(0.32)	(-0.48)	(1.97)	(-0.26)	(2.37)	(-0.59)	(1.58)
FDIItoGDP			0.081	-0.532	0.057	-1.512				
			(0.37)	(-1.15)	(0.25)	(-1.00)				
*FDIItoGDP*square*					0.002	0.031				
					(0.33)	(0.82)				
EXDEBTtoGDP							0.261***	1.386**	0.932***	1.267**
							(4.89)	(2.47)	(6.53)	(2.41)

Table 6. Continued

	Dependent variable: *FIN_DEVELOPMENT*									
	Baseline		***With FDIItoGDP***		***With FDIItoGDP*square***		***With EXDEBTtoGDP***		***With EXDEBTtoGDP*square***	
	FE	GMM	FE	GMM	FE	GMM	FE	GMM	FE	GMM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
*EXDEBTtoGDP*square*									-0.003***	-0.006*
									(-5.03)	(-1.88)
CONSTANT	-352.248***	-422.914***	-351.552***	-330.434***	-350.638***	-105.205	-351.852***	-451.962***	-415.733***	-498.467***
	(-13.03)	(-4.53)	(-12.95)	(-4.04)	(-12.82)	(-0.87)	(-12.64)	(-4.64)	(-14.17)	(-4.99)
No. of Obs.	276	276	276	276	276	261	247	247	247	247
R^2 Overall	0.137		0.136		0.135		0.184		0.164	
R^2 Within	0.599		0.600		0.600		0.658		0.693	
R^2 Between	0.233		0.233		0.232		0.179		0.172	
AR(1)		0.056		0.113		0.077		0.443		0.059
AR(2)		0.416		0.684		0.174		0.269		0.513
Hansen *J*-test *p*-value		0.464		0.185		0.755		0.183		0.750
No. of instruments		13		15		17		15		15
No. of group		18		18		18		15		15

(Note) *FDIItoGDP* and *EXDEBTtoGDP* are the main variables of interest and are measured as the share of FDI inflows and external debt to GDP, respectively. *FDIItoGDP*square* and *EXDEBTtoGDP*square* are the squared term of *FDIItoGDP and EXDEBTtoGDP* and are added to the model to evaluate the nonlinear relationship between financial integration and development. Columns (1) and (2) report the results of the baseline model; columns (3) to (6) show the results for FDI inflows, and columns (7) to (10) present the results for external debt. Standard errors in parentheses, ***, **, * denotes significance at the 1%, 5%, and 10%, respectively. FE means fixed effects and GMM means system GMM

Alternatively, we use different measurements of financial development and integration. Specifically, we employ financial depth (*FIN_DEPTH*), which is measured by the ratio of aggregate private domestic credit from deposit banks and financial institutions to GDP. This measurement has been widely used as a proxy for financial development (King and Levine 1993, Asongu and De Moor 2016). For financial integration, we follow the construction of Lane and Milesi-Ferretti (2017) to calculate a financial integration index as a share of the aggregate stock of external assets and liabilities to GDP. The corresponding results are shown in Table 7.

Table 7. Robustness check: Other measurements of financial integration and development

	Dependent variable: *FIN_DEPTH*					
	Baseline		***With FILANE***		***With FILANE*square***	
	FE	GMM	FE	GMM	FE	GMM
	(1)	(2)	(3)	(4)	(5)	(6)
TRADE OPENNESS	0.094**	0.479**	0.115**	0.221	0.115**	0.138
	(1.99)	(2.01)	(2.46)	(0.94)	(2.44)	(0.61)
INFLATION	0.085	-0.285	0.074	-0.313*	0.074	-0.353**
	(0.92)	(-1.29)	(0.87)	(-1.54)	(0.87)	(-1.90)
GDPPC	33.270***	41.053***	27.232***	36.970***	27.347***	34.181***
	(13.78)	(5.17)	(11.09)	(4.04)	(10.23)	(3.61)
IQ	3.819	-8.125	-0.991	-4.511	-1.002	2.344
	(0.90)	(-0.51)	(-0.23)	(-0.29)	(-0.23)	(0.15)
FILANE			8.189***	6.201*	7.853**	12.721**
			(7.43)	(1.50)	(2.42)	(1.99)
*FILALNE*square*					0.040	-1.092*
					(0.11)	(-1.85)
CONSTANT	-154.496***	-259.307***	-123.351***	-213.619**	-123.905***	-185.680**
	(-7.25)	(-3.18)	(-5.59)	(-2.38)	(-5.46)	(-2.05)
No. of Obs.	432	432	330	330	330	330
R^2 Overall	0.443		0.428		0.429	
R^2 Within	0.352		0.457		0.457	
R^2 Between	0.471		0.438		0.439	
AR(1)		0.001		0.005		0.007
AR(2)		0.155		0.224		0.147
Hansen *J*-test *p*-value		0.437		0.700		0.884
No. of instruments		7		9		11
No. of groups		24		18		18

(Note) Financial integration index (*FILANE)*, which is calculated in line with Lane and Milesi-Ferretti (2017), is the main variable of interest. *FILANE*square* is the squared term of *FILANE* and is added to the model to evaluate the nonlinear relationship between financial integration and development. Columns (1) and (2) report the results of the baseline model; columns (3) and (4) show the results for our mainstream model; and columns (5) and (6) present the results with squared term. Standard errors in parentheses, ***, **, * denotes significance at the 1%, 5%, and 10%, respectively. FE means fixed effects and GMM means system GMM

Results obtained from both robustness tests confirm our main findings in Table 5. The detailed outcomes are not presented here to conserve space but are available upon request.

B. Threshold analyses

1. Trade openness as a threshold

Table 8 presents the PTR results determining the thresholds of trade openness that allow for the positive relationship between financial integration and development. Columns (1) and (2) report the results of the TPR with *FDIItoGDP* as a measure of financial integration, whereas columns (3) and (4) show the results for *EXTDEBTtoGDP*

In columns (1) and (2), PTR results indicate that at the preliminary stage of trade openness, successive FDI inflows could robustly enhance financial development. However, once trade openness surpasses the threshold of 140.437% as a share of GDP, this effect becomes negative and insignificant. *F*-test results show that the single-threshold model is appropriate at a significance level of 5%. The result is consistent with the few studies that discovered a positive impact of FDI inflows on stock-market developments (Raza *et al*. 2015, Abzari *et al*. 2011, Adam and Tweneboah 2009, El-Wassal 2005).

Regarding external debt as a measurement of financial integration, similar threshold effects are reported. From columns (3) and (4), it is evident that only the single-threshold model is significantly reliable. The PTR model indicates that the impact of external debt always exerts a positive impact on financial development when countries open their domestic markets. Interestingly, when trade openness reaches a threshold of 144.615%, the magnitude of positive effect becomes robustly stronger. In short, opening up the domestic market could be a driving force for the financial sector to benefit from its integration into the world.

2. GDP per capita as a threshold

To examine the contribution of financial integration to financial development conditioned on the level of GDP capital a country needs to reach, we further employ the PTR method using the logarithm of *GDPPC* as a threshold variable. Results from these estimations are reported in Table 9. Columns (1) and (2) show the results of PTR with *FDIItoGDP* as a measure of *FI*; and columns (3) and (4) show the results for *EXTDEBTtoGDP*.

From columns (1) and (2), the two *GDPPC* thresholds are 1,880.33 US dollars (*lnGDPPC* = 7.5392) and 36,497.53 US dollars (*lnGDPPC* = 10.505). When the *GDPPC* of the economy remains below the standard, the effect of FDI inflows on financial development is negative and statistically significant. After achieving the lower *GDPPC* threshold, the impact becomes positive and statistically significant. It is clear that all countries in our sample display GDP per capita higher than the lower bound, meaning that they have all the prerequisites to realize

Table 8. Panel threshold regression with trade openness as a threshold variable

	Trade Openness as threshold - Dependent variable: FIN_DEVELOPMENT			
	FDIItoGDP as FI		*EXTDEBTtoGDP as FI*	
	Single threshold	Double threshold	Single threshold	Double threshold
	(1)	(3)	(1)	(2)
CONSTANT	-429.703***	-406.576***	-306.468***	-335.949***
	(-12.12)	(-10.94)	(-11.18)	(-12.37)
TRADE OPENNESS	0.578***	0.496***	0.176***	0.101
	(8.20)	(6.07)	(2.67)	(1.54)
INFLATION	0.568**	0.491**	0.228	0.164
	(2.46)	(2.12)	(1.31)	(0.98)
GDPPC	58.723***	56.978***	47.027***	52.049***
	(15.37)	(14.61)	(14.30)	(15.48)
IQ	23.842***	22.441***	0.596	6.178
	(3.05)	(2.87)	(0.14)	(1.44)
FIxThreshold				
0	264.432***	257.524***	0.160***	-0.859***
	(5.10)	(4.99)	(4.03)	(-3.60)
1	-0.051	-0.068	1.776***	0.122***
	(-0.21)	(-0.28)	(8.95)	(3.12)
2		2.217*		1.723***
		(1.86)		(9.04)
Number of Obs.	220	220	220	220
R^2 Overall	0.451	0.463	0.387	0.425
R^2 Within	0.632	0.639	0.731	0.754
R^2 Between	0.429	0.440	0.263	0.307
Thresholds and threshold effects				
Threshold-1	140.437	140.437	144.615	144.615
Threshold-2		20.041		50.180
RSS	62700	61100	42700	39100
MSE	316.418	308.459	215.463	197.260
F-stat	28.83	5.110	67.91	18.27
P-value	0.036	0.853	0.008	0.153

(Note) *FDIItoGDP* and *EXDEBTtoGDP* are the main variable of interest and are measured as the share of FDI inflows and external debt to GDP, respectively. *FI* stands for financial integration. Panel threshold regression (PTR) is employed to examine prerequisites that a country needs to achieve before the rewards of financial integration are materialized. Trade openness (TO) is employed as a threshold variable. Columns (1) and (2) report the results of the PTR with FDIItoGDP as a measure of *FI*; and columns (3) and (4) show the results for external debt. Standard errors in parentheses, ***, **, * denotes significance at the 1%, 5%, and 10%, respectively.

the advantages of FDI inflows on financial development

External debt shows interesting findings. Results from columns (3) and (4) indicate that at substandard GDP per capita, the effect of external debt on financial development is negative.

Table 9. Threshold panel regression with per capita GDP as a threshold variable

	GDPPC as threshold - Dependent variable: FIN_DEVELOPMENT			
	FDIItoGDP as FI		*EXTDEBTtoGDP as FI*	
	Single threshold	Double threshold	Single threshold	Double threshold
	(1)	(2)	(3)	(4)
CONSTANT	-368.152***	-324.513***	-198.992***	-342.701***
	(-10.16)	(-8.75)	(-6.49)	(-10.05)
TRADE OPENNESS	0.561***	0.479***	0.107*	0.031
	(7.95)	(6.66)	(1.67)	(0.54)
INFLATION	0.453*	0.398*	0.114	0.043
	(1.96)	(1.77)	(0.69)	(0.29)
GDPPC	52.304***	48.445***	36.170***	53.175***
	(13.33)	(12.28)	(10.32)	(13.48)
IQ	18.208**	17.977**	-5.735	-3.660
	(2.33)	(2.37)	(-1.39)	(-0.99)
FIxThreshold				
0	-0.074	-5.304***	-0.747***	-0.408***
	(-0.30)	(-3.72)	(-7.80)	(-4.15)
1	10.213***	0.023	0.242***	0.520***
	(4.93)	(0.09)	(6.27)	(9.97)
2		10.820***		0.147***
		(5.37)		(3.96)
Number of Obs.	220	220	220	220
R^2 Overall	0.392	0.396	0.206	0.196
R^2 Within	0.630	0.654	0.760	0.808
R^2 Between	0.361	0.363	0.079	0.081
Thresholds and threshold effects				
Threshold-1	10.505	10.505	8.017	8.017
Threshold-2		7.5392		9.1648
RSS	64000	58600	38000	30400
MSE	323.118	295.760	191.980	153.589
F-stat	24.12	18.310	100.440	49.490
P-value	0.330	0.273	0.000	0.022

(Note) *FDIItoGDP* and *EXDEBTtoGDP* are the main variable of interest and are measured as the share of FDI inflows and external debt to GDP, respectively. *FI* stands for financial integration. Panel threshold regression (PTR) is employed to examine prerequisites that a country needs to achieve before the rewards of financial integration materialized. Per capita GDP (*GDPPC*) in logarithm form is employed as a threshold variable. Columns (1) and (2) report the results of the PTR with *FDIItoGDP* as a measure of *FI*; and columns (3) and (4) show the results for external debt. Standard errors in parentheses, ***, **, * denotes significance at the 1%, 5%, and 10%, respectively

However, it turns positive if the economy accomplishes the *GDPPC* threshold of 3,032.07 US dollars (*lnGDPPC* = 8.017). Beyond the upper threshold of 9,554.81 US dollars (*lnGDPPC* = 9.1648), the impact remains positive and significant, but the magnitude of the effect weakens

evidently. All countries in our sample have already achieved the "required" threshold for financial sector to benefit from its openness. Specifically, the GDP per capita of countries in our sample are all higher than the lower threshold (3,032.07 US dollars). The results of the *F*-test show that both the single-threshold and double-threshold models are statistically significant.

3. Institutional quality as a threshold

We repeat the PTR using institutional quality as a threshold variable. Columns (1) and (2) show the estimation outcomes with *FDIItoGDP* as a measure of *FI*, whereas columns (3) and (4) reveal the results for *EXTDEBTtoGDP*.

Regarding FDI inflows, it is clear from columns (1) and (2) that at the initial stage when average institutional score is lower, FDI inflows act as deterrence to the development of financial system. However, when an improvement is noted in the institutional quality is improved and it reaches a threshold of 0.258, the developmental effect of inward FDI turns positive and significant. The magnitude of this impact may become weaker when the upper threshold of 0.279 is achieved. This finding agrees with some prior studies (David *et al*. 2015) that showed that financial integration might be more important in countries with better institutional quality.

Regarding external debt, the PTR shows that when institutional quality is improved, cross-border debt liabilities consistently impose positive impacts on financial development. However, the strength and significance of this effect are contingent on the level of institutional quality. Specifically, the effect of financial openness on financial development is found to be significant if the institution quality score is below the lower threshold (-0.629) or above the upper threshold (0.154).

Table 10. Threshold panel regression with institutional quality as a threshold variable

	Institutional Quality as threshold - Dependent variable: FIN_DEVELOPMENT			
	FDIItoGDP as FI		*EXTDEBTtoGDP as FI*	
	Single threshold	Double threshold	Single threshold	Double threshold
	(1)	(2)	(3)	(4)
CONSTANT	-419.808***	-432.909***	-445.450***	-492.366***
	(-11.44)	(-12.12)	(-15.75)	(-18.23)
TO	0.564***	0.602***	0.344***	0.406***
	(7.72)	(8.44)	(5.31)	(6.75)
INF	0.491**	0.455*	0.055	-0.130
	(2.06)	(1.96)	(0.28)	(-0.72)
GDPPC	58.073***	59.312***	62.749***	66.943***
	(14.65)	(15.39)	(17.53)	(19.98)
IQ	9.639	5.809	16.593***	-0.087
	(1.11)	(0.68)	(3.31)	(-0.02)
FIxThreshold				
0	-0.232	-0.244	0.583***	0.541***
	(-0.88)	(-0.96)	(7.06)	(7.11)
1	2.370***	11.426***	0.018	0.001
	(2.92)	(4.71)	(0.37)	(0.03)
2		1.389*		0.564***
		(1.72)		(5.78)
Number of Obs.	220	220	220	220
R^2 Overall	0.387	0.380	0.328	0.382
R^2 Within	0.604	0.630	0.695	0.744
R^2 Between	0.360	0.348	0.220	0.276
Thresholds and threshold effects				
Threshold-1	0.258	0.258	-0.629	-0.629
Threshold-2		0.279		0.154
RSS	68400	63900	48400	40600
MSE	345.501	322.954	244.634	204.954
F-stat	9.73	13.820	36.200	38.330
P-value	0.539	0.192	0.119	0.029

(Note) *FDIItoGDP* and *EXDEBTtoGDP* are the main variable of interest and are measured as the share of FDI inflows and external debt to GDP, respectively. *FI* stands for financial integration. Panel threshold regression (PTR) is employed to examine prerequisites that a country needs to achieve before the rewards of financial integration materialized. Institutional Quality (*IQ*) is employed as a threshold variable. Columns (1) and (2) report the results of the PTR with *FDIItoGDP* as a measure of *FI*; and columns (3) and (4) show the results for external debt. Standard errors in parentheses, ***, **, * denotes significance at the 1%, 5%, and 10%, respectively

IV. Discussion and Conclusion

In this study, we examined the developmental influence of financial openness on the financial market and evaluated whether this effect varied with different threshold levels of national development. Using a comparatively comprehensive dataset covering 34 countries from the East Asian and Pacific region during the period 1996~2017, we provided empirical evidence showing the existence of a significant inverted U-shaped relationship between financial integration and development. This finding is mostly consistent across different empirical methodologies, even when controlling for endogeneity. In addition, we found a threshold of external debt of 87.8% of GDP, above which the globalization of the financial market fails to boost its development. This suggests that more integrated financial systems are not always better, and such a system can harm financial development after a certain point.

We also assessed the existence of national conditions for a financial market to benefit from its global integration. Our study revealed that for FDI inflows to facilitate advances in the financial market, the trade openness of a country should be below 140.437%. The rewards of external debt flows on financial development were positive regardless of thresholds; however, the magnitude was dependent on the level of trade openness. We further found that the impact of cross-border debt on financial development turned positive when GDP per capita surpassed 3,032.07 US dollars. However, this effect became less pronounced when the country reached 9,554.81 US dollars or more in GDP per capita. The effect of financial openness on financial development was found to be positively significant when institutional quality was below the lower threshold (-0.629) or over the upper threshold (0.154).

The analyses of these national economic thresholds suggest some important considerations for several policies toward more sustainable financial development in the examined countries. The main policy implication from our findings is that the threshold levels of certain variables are important determinants of the relationship between financial integration and development. Countries pursuing liberalization policies should prioritize these national developments in advance to understand what levels or thresholds are required for their economies to benefit from financial globalization.

As our study focused on the East Asian and Pacific region, our conclusions do not necessarily hold true for all countries. Given a wide divergence in terms of national conditions (e.g., institutional quality, financial reform, and regional details), country-specific studies are desirable. Furthermore, our financial development measures were constructed mainly from banking sector indicators. Because the equity market also plays an important role in allocating funds and firms increasingly rely on equity finance, especially in developed countries, it is pivotal to evaluate this aspect as regards the financial integration and development nexus. Moreover, owing to the high correlation among financial measures, the interactions between variables are interesting

subjects. Because of data availability, the number of countries in our research was relatively limited. Therefore, a study with a larger sample size is needed before the results can be considered conclusive. We leave these issues for future research.

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Appendix 1. Countries included in the study

Australia	Kiribati	Myanmar	Taiwan
Brunei Darussalam	Democratic People's Republic of Korea	Nauru	Thailand
Cambodia	Republic of Korea (South Korea)	New Zealand	Timor-Leste
China	Lao People's Democratic Republic	Palau	Tonga
Fiji	Macao	Papua New Guinea	Tuvalu
Guam	Malaysia	Philippines	Vanuatu
Hong Kong	Marshall Islands	Samoa	Vietnam
Indonesia	Micronesia, Fed. Sts.	Singapore	
Japan	Mongolia	Solomon Islands	

Appendix 2. Countries included in panel threshold regressions

Cambodia	Mongolia
Fiji	Philippines
Australia	Solomon Islands
Indonesia	Thailand
Japan	Tonga
Republic of Korea (South Korea)	Vanuatu
Malaysia	Vietnam

Appendix 3. Variable definitions and sources

Variables	Variable definitions	Sources
FIN_DEVELOPMENT	Financial development index constructed from the following four financial indicators (using PCA):	
	- Broad money supply (% of GDP)	World Bank (FDSD)
	- Liquid liabilities (% of GDP)	World Bank (FDSD)
	- Private domestic credit from financial institutions (% of GDP)	World Bank (FDSD)
	- Private domestic credit from deposit banks (% of GDP)	World Bank (FDSD)
FI	Financial integration, measured interchangeably *via* two indicators:	
	- FDI net inflows (% of GDP)	World Bank (WDI)
	- External debt (% of GDP)	World Bank (WDI)
FILane	Financial Integration, constructed *via* two finance indicators, following the construction of Lane and Milesi-Ferretti (2017)	
	- Total foreign assets	Lane and Milesi-Ferretti (2017)
	- Total foreign liabilities	Lane and Milesi-Ferretti (2017)
PUB_INVESTMENT	Gross public investment (% of GDP)	World Bank (WDI)
INFLATION	Consumer price index (annual %)	World Bank (WDI)
FOREIGN AID	Total net official development assistance (% of GDP)	World Bank (WDI)
TRADE OPENNESS	Trade imports plus exports in commodities (% of GDP)	World Bank (WDI)
GDPPC	Logarithm of GDP per capital, purchasing-power parity (current international US dollar)	World Bank (WDI)
POP_DENSITY	People per km^2 of land area	World Bank (WDI)
IQ	Institutional quality, constructed by simple averaging of six World Bank governance indicators	World Bank (GI)

(Note) WDI: World Bank Development Indicators. FDSD: Financial Development and Structure Database. GI: Governance Indicators.