



Towards sustainable economic growth: Threshold effects of bank-based financial development and recommendations for Vietnam

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ABSTRACT

This paper investigates the relationship between bank-based financial development and economic growth in 14 Asia-Pacific economies over the period 2010-2021. Using a panel data framework with Pooled OLS and System GMM estimators to address potential endogeneity, the results reveal nonlinear patterns: certain measures of financial development exhibit an inverted U-shaped relationship with growth, while another measure shows a U-shaped relationship. These findings suggest that both insufficient and excessive financial development can be detrimental, and that the growth-enhancing effects may emerge only beyond specific thresholds. Policy recommendations for Vietnam emphasize strict supervision of credit institutions, encouraging commercial banks to adopt digital transformation, inflation stability, stock market deepening, and targeted attraction of high-quality foreign direct investment.

Keyword: nonlinear finance-growth nexus, panel data analysis, banking system, Asia-Pacific economies, Vietnam

1. Introduction

In the era of globalization, understanding the relationship between financial development and economic growth has become a central concern in national development strategies. Sustained and robust economic growth remains the overarching objective of virtually all economies worldwide. Economies that achieve strong growth typically enjoy higher per capita income, improved social welfare, rising inflows of foreign direct investment, and a range of other benefits.

The nexus between finance and economic growth has attracted extensive scholarly attention ([Anwar and Cooray, 2012](#); [Ustarz and Fanta, 2021](#); [Gizaw et al., 2024](#)). Financial development contributes to economic growth through both direct and indirect channels ([Anwar and Cooray, 2012](#)). A well-functioning financial system can optimize the mobilization and allocation of capital within the economy, while also encouraging capital accumulation, promoting technical innovation, and enhancing investment efficiency, thereby accelerating economic development ([Bui and Doan, 2025](#); [Abdullah et al., 2025](#)). More specifically, it expands the supply of capital while improving the allocation of financial resources. Efficient allocation, combined with innovation, serves as a central driver of economic opportunities, benefiting households in their saving and investment activities and supporting governments in economic management ([Palcau and Pop Silagh, 2025](#)). The debate continues to revolve around two competing perspectives: the supply-leading hypothesis and the demand-following hypothesis, with modern research introducing further nuances to these views.

The Asia-Pacific region is selected as the focus of this study because it represents one of the world's most dynamic engines of growth, generating 60% of global GDP and two-thirds of global growth ([Borrell, 2022](#)).

Over recent years, and particularly during the COVID-19 pandemic, the region has demonstrated remarkable resilience in sustaining economic performance ([ESCAP, 2024](#)). This study's analysis of bank-based financial development across Asia-Pacific economies provides insights to craft policy recommendations for Vietnam, an emerging economy where the banking sector, despite supporting sustained growth since Doi Moi, currently faces challenges with high non-performing loans.

This paper seeks to address three research gaps. First, the relationship between financial development and economic growth has been rarely, if ever, studied in the Asia-Pacific context. Second, this study adopts a distinct approach by employing bank-based indicators of financial development. Third, it explores the potential existence of a threshold effect in the finance-growth relationship.

Based on these gaps, the following research questions (RQ) are posed:

RQ1: How does bank-based financial development affect economic growth in Asia-Pacific economies during 2010-2021?

RQ2: Does there exist a threshold level at which the effect of financial development on economic growth changes sign?

RQ3: What policy recommendations can be drawn for Vietnam in the current context?

To address these questions, the study employs panel data from 14 Asia-Pacific economies and three bank-based measures of financial development: the ratio of liquid liabilities to GDP, deposit money bank assets to GDP, and bank deposits to GDP. To capture potential threshold effects, the squared term of the financial development variable is included in the econometric specification, following the approach of Ustarz and Fanta ([2021](#)), Abdullah et al. ([2025](#)).

The remainder of this study is organized as follows: Section 2 presents the theoretical framework and reviews prior studies to establish the research foundation. Section 3 describes the data sample, methodology, and research models employed. Section 4 reports the empirical results and provides a discussion of the findings. Section 5 concludes the study, offers policy recommendations for Vietnam based on the analysis, and acknowledges the limitations of the research.

2. Review of the Literature

According to Ono ([2017](#)), financial development refers to the improvement in both the quantity and quality of financial intermediation services, which is reflected in monetary aggregates and outstanding bank credit through transactions between financial institutions and non-financial entities. Similarly, Gizaw et al. ([2024](#)) emphasize that financial development encompasses the advancement of capital markets and financial institutions that collectively reduce information, transaction, and enforcement costs. Building on these perspectives, bank-based financial development can be understood as the improvement in the scale and efficiency of financial intermediation primarily conducted by the banking system, manifested through money supply and credit expansion. In this context, banks serve as the dominant financial intermediaries, mobilizing savings, allocating capital, and mitigating transaction and information costs within the economy.

Originating from Schumpeter's ([1934](#)) contribution, the mainstream economic view considers finance as a supply-leading force, playing a beneficial role in promoting economic growth. In this perspective, financial institutions first mobilize idle capital from the economy. They then assess the profitability of investment projects during the loan approval process, fulfilling their second function of evaluating and selecting viable business ventures. After disbursement, banks perform a monitoring function to ensure repayment capacity. Powerful banks can induce firms to disclose information and repay more reliably compared to perfectly competitive markets ([Rajan and Zingales, 1998](#)). Fourth, depositors entrust their funds to banks with the expectation of earning returns at relatively low risk, benefiting from the banks' diversified portfolios. Finally, banks provide deposit and transaction services to various economic agents. Supporting this argument, King and Levine ([1993](#)) find that higher levels of financial development are associated with faster growth rates, greater accumulation of physical capital, and improved economic efficiency.

Conversely, Robinson ([1952](#)) argues that financial sector development is endogenously driven by the expansion of the real economy. As the real economy grows, the demand for financial services rises, prompting

the expansion of such services. This view aligns with Coase theorem and much of the New Institutional Economics, which holds that institutions adapt to market imperfections in a manner that maximizes individual benefits. Patrick (1966) further notes that supply-leading and demand-following effects can interact in practice, as markets are dynamic and the prevailing causal direction can shift in response to evolving market transactions.

Lucas (1988) cautions that the importance of financial development in promoting economic growth has been overstated. Critics in this line of thought contend that the role of finance in fostering growth is more pronounced in advanced economies with efficient and well-functioning financial markets than in developing economies.

The literature presents mixed evidence on the relationship between financial development and economic growth. Anwar and Cooray (2012), focusing on South Asian economies and employing OLS, FEM, and GMM estimators, found that financial development measured by money supply, assets relative to GDP, and credit relative to GDP raises per capita GDP and attracts foreign direct investment. They also noted that political rights and civil liberties, when strengthened, amplify the positive effect of financial development on growth. In contrast, Gizaw et al. (2024), drawing on data from emerging Asian and African economies over four decades, reported a positive but statistically insignificant effect in both the short and long run. Their findings suggest that in many cases financial development has not yet reached the level required to sustain economic expansion.

Evidence from sectoral and nonlinear perspectives offers additional insights. Ustarz and Fanta (2021), examining sub-Saharan Africa, showed that financial development supports growth in agriculture and services, while in industry it initially has a negative impact before turning positive once a threshold is reached. Wen et al. (2021), analyzing a global sample of 120 countries, also documented that excessive financial development can reduce growth. Their results further highlighted the importance of macroeconomic conditions, including inflation, employment, and investment, in shaping sustainable performance. Palcau and Pop Silagh (2025), investigating 27 European Union countries, identified Granger causal links between finance and growth, though the strength of these links varied across financial structures. In particular, bank-oriented systems displayed strong causal effects from banking indicators to economic growth, suggesting that institutional arrangements condition the finance-growth nexus.

Building on this line of inquiry, Abdullah et al. (2025), using a sample of 77 high-income countries and the Panel Quantile Regression (PQR) approach, underscored the necessity of accounting for potential non-linear effects across the growth distribution. Consistent with this perspective, the present study also identifies non-linear patterns, particularly at the 50th and 75th quantiles, where financial development initially stimulates economic growth but turns detrimental beyond certain thresholds. These findings further substantiate the view that the finance-growth relationship is contingent not only on structural and institutional conditions but also on the degree of financial deepening within an economy.

3. Data and research model

3.1. Data collection and sample

This paper examines the impact of bank-based financial development on economic growth by analyzing panel data from 14 economies in the Asia-Pacific region over the period 2010-2021. Following Wen et al. (2021) and Kien et al. (2023), annual GDP growth rate is employed as the proxy for economic growth. Financial development is captured using three bank-based indicators, namely: the ratio of liquid liabilities to GDP, deposit money bank assets to GDP, and bank deposits to GDP, as suggested by Odhiambo and Musakwa (2024). A detailed description of these variables is presented in Table 1.

Table 1. Overview of the variables

Classification	Variable	Code	Measurement
Dependent variable	Economic growth	EGR	Annual GDP growth rate (%)
	Liquid liabilities	LL	Ratio of liquid liabilities to GDP (%)
Independent variables	Deposit money bank assets	DOMC	Ratio of deposit money bank assets to GDP (%)
	Bank deposits	BD	Ratio of bank deposits to GDP (%)

Control variables	Trade openness Government consumption expenditure Inflation	TO GEXP INF	(Exports + Imports)/ GDP (%) General Government consumption expenditure to GDP (%) Consumer price index
Additional control variables	Foreign direct investment Government effectiveness	FDI GOV	Ratio of foreign direct investment to GDP (%) The index scale ranges from -0.25 to 0.25

Source: Author's building

3.2. Econometric model

Using alternative measures of financial development, this study aims to investigate its impact on economic growth in Asia-Pacific economies over the period 2010-2021. The empirical relationship between bank-based financial development and economic growth is specified as follows:

$$EGR_{i,t} = \alpha_0 + \alpha_1 FD_{i,t} + \alpha_2 FD_{i,t}^2 + \sum_{k=1}^n \delta_k Controls_{i,t,k} + \varepsilon_{i,t} \#(1)$$

Where:

$EGR_{i,t}$ = annual GDP growth rate of country i in year t .

$FD_{i,t}$ = financial development, measured alternatively by liquid liabilities (LL), deposit money bank assets (DOMC), and bank deposits (BD) as a percentage of GDP.

$FD_{i,t}^2$ = squared term of financial development to capture the potential non-linear effects of financial development on economic growth.

This study controls for variables commonly found in the literature to influence economic growth, including trade openness (TO), government consumption expenditure (GEXP), and inflation (INF) ([Anwar and Cooray, 2012](#); [Wen et al., 2021](#); [Ustarz and Fanta, 2021](#); [Doğan et al., 2020](#)). $Controls_{i,t,k}$ represents the vector of control variables, and $\varepsilon_{i,t}$ denotes the error term.

To address potential endogeneity concerns, the System GMM estimator of Arellano and Bond ([1991](#)) is employed. A key advantage of this estimation technique lies in its efficiency, as it utilizes multiple instruments during model estimation. Following the approach of Ustarz and Fanta ([2021](#)) and Wen et al. ([2021](#)), the econometric model can be expressed as:

$$EGR_{i,t} = \alpha_0 + EGR_{i,t-1} + \alpha_1 FD_{i,t} + \alpha_2 FD_{i,t}^2 + \sum_{k=1}^n \delta_k Controls_{i,t,k} + \varepsilon_{i,t} \#(2)$$

4. Empirical results and Discussion

4.1. Descriptive statistics

The analysis begins with descriptive statistics for the variables used in the regression models. Table 2 reports the descriptive statistics for the period 2010-2021. As noted, economic growth during this period exhibited considerable volatility. Due to the impact of the COVID-19 pandemic, most economies in the sample experienced negative growth in 2020, with the exception of China and Vietnam. The bank-based financial development indicators also display substantial variation across economies. Trade openness levels are heterogeneous among the sample countries, ranging from a minimum of 8.22 in Pakistan to a maximum of 221.61 in Hong Kong. Government consumption expenditure fluctuated between 7.85% and 22.39% of GDP. In summary, the descriptive statistics reveal significant heterogeneity across the sample in terms of economic indicators.

Table 2. Descriptive Statistics

Variable	Mean	Std. dev.	Min	Max
EGR	4.08	3.38	-9.52	14.52
LL	130.40	90.06	31.63	454.65
DOMC	120.18	60.51	29.32	283.17
BD	105.01	88.40	11.34	415.75
TO	58.39	59.84	8.22	221.61
GEXP	13.16	3.82	7.85	22.39
FDI	5.94	10.40	-0.99	58.52
INF	3.35	3.00	-1.14	18.68

GOV	0.65	0.86	-0.83	2.28
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Source: Authors' computation

4.2. Discussion of results

The results on the impact of financial development on economic growth are presented in Table 3. Models (1) to (3) are estimated using Pooled OLS, while Models (4) to (6) employ the System GMM estimator. The necessary assumptions for Pooled OLS are verified prior to estimation, and post-estimation diagnostics are performed to validate the System GMM results.

Table 3. Estimation Results of Pooled OLS and System-GMM Regressions

	Pooled OLS Regression			System-GMM Regression		
	Dependent variable: Economic Growth (EGR)					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Constant	6.842***	6.733***	6.577***	4.669**	2.911	-3.883
EGR(-1)				0.201	-0.711***	0.215**
LL	0.0425***			0.113***		
LL2	-0.000103***			-0.000254***		
DOMC		0.0625***			0.341***	
DOMC2		-0.000198***			-0.000982***	
BD			-0.0215*			-0.160***
BD2			0.0000155			0.000340***
TO	-0.00915	-0.0144*	0.00968	-0.0280***	-0.0358	0.0457***
GEXP	-0.440***	-0.476***	-0.102	-0.751***	-1.653**	0.958***
INF	0.143	0.127	0.0671	0.465***	1.412***	0.615***
Breusch-Pagan test: p-value	0.1110	0.2920	0.8514			
Wooldridge test: p-value	0.5008	0.4501	0.5034			
AR1: p-value				0.041	0.045	0.031
AR2: p-value				0.260	0.583	0.312
Hansen test: p-value				0.722	0.163	0.359
F test: p-value				0.000	0.000	0.000

Note: *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Source: Authors' computation

Two key assumptions for the validity of Pooled OLS are the absence of heteroskedasticity and autocorrelation in the model residuals. The Breusch-Pagan test is used to detect heteroskedasticity, yielding p-values of 0.1110, 0.2920, and 0.8514 for Models (1) through (3), respectively. As all p-values exceed the 5% significance level, the null hypothesis cannot be rejected, indicating no heteroskedasticity problem. Similarly, the Wooldridge

test for autocorrelation yields p-values of 0.5008, 0.4501, and 0.5034 for Models (1) through (3), all greater than 5%, suggesting the absence of serial correlation.

As noted earlier, the three proxies for bank-based financial development are LL, DOMC, and BD. When LL and DOMC are used as the independent variables, the results indicate a positive and statistically significant relationship between bank-based financial development and economic growth. The coefficients for these variables are positive and significant at the 1% level in both Pooled OLS and System GMM estimations, as shown in Models (1), (2), (4), and (5) of Table 3. This finding supports the supply-leading hypothesis, implying that financial development fosters economic growth. The results are consistent with previous studies (Ustarz and Fanta, 2021; Gizaw et al., 2024; Anwar and Cooray, 2012).

To further assess the core variable-financial development-the results from Models (1) and (4) show that LL stimulates economic growth initially, but beyond thresholds of 206.31% (Model 1) and 222.44% (Model 4), higher LL levels are associated with a decline in economic growth. Similarly, when DOMC is used as the financial development proxy, it initially promotes growth, but its effect reverses after the thresholds of 157.83% (Model 2) and 173.63% (Model 5). This phenomenon can be explained by the fact that, beyond certain thresholds, the financial sector tends to focus excessively on financial activities rather than real economic development. Overregulation discourages innovation and obstructs capital flows into productive investments, while excessive risk-taking by financial institutions undermines stability (Abdullah et al., 2025). Moreover, inefficient financial markets restrict firms' access to necessary capital, thereby impeding sustainable growth.

When BD is employed as the proxy, the empirical results reveal that financial development negatively affects economic growth. This finding aligns with the demand-following hypothesis and corroborates Wen et al. (2021). Although the coefficient in Model (3) is only weakly significant, the effect becomes strongly significant in Model (6). The precise turning point for BD is estimated at 235.29% in Model (6), suggesting that BD levels exceeding this threshold benefit economic growth.

Regarding the control variables, trade openness (TO) is found to have a negative impact on economic growth when LL and DOMC are used as the independent variables. This result is consistent with Ustarz and Fanta (2021), who observed a negative association between trade openness and growth in the services sector. Conversely, TO exhibits a positive relationship in Model (6), consistent with findings from Southeast European economies (Fetahi-Vehapi et al., 2015), non-emerging market economies (Sahu, 2021), and 32 European countries (Doğan et al., 2020). Government consumption expenditure is found to have a negative and significant effect on economic growth in Models (1) through (4), suggesting a crowding-out effect whereby inefficient government spending reduces the resources available for productive investment. This result is in line with Anwar and Cooray (2012) and Wen et al. (2021). In contrast, Model (6) reports a positive and significant relationship between government consumption and growth. Finally, contrary to the empirical evidence from Nigeria in Lin and Benjamin (2018), inflation is found to have a positive effect on economic growth in this study.

Table 3 also reports post-estimation diagnostic tests for the System GMM models, including the Sargan test, F-test, and AR(1) and AR(2) tests. The Sargan test indicates that all instruments are valid. The AR(1) test rejects the null hypothesis of no first-order serial correlation, while the AR(2) test fails to reject the null of no second-order serial correlation. Therefore, the requirements for the validity of the GMM estimations are satisfied, as confirmed by the p-values.

4.3. Robustness Checks

To test the robustness of the results and address potential endogeneity concerns, additional control variables are incorporated into the model. In the baseline specification, the control variables include trade openness, government consumption expenditure, and inflation. For the robustness check, two more control variables: foreign direct investment (FDI) and government effectiveness (GOV) are added, following the suggestions of previous studies (Adom and Amoani, 2021; Sahu, 2021). The results are reported in Table 4.

Table 4. Robustness Check Results

	With additional control variables		
	Model (1)	Model (2)	Model (3)
Constant	-9.830*	6.536	7.629**
EGR(-1)	0.280	-0.432	0.0777
LL	0.0970***		
LL2	-0.000225***		
DOMC		0.534***	
DOMC2		-0.00148***	
BD			-0.131***
BD2			0.000309***
TO	-0.0555	-0.232**	-0.126***
GEXP	0.396	-2.924*	0.326
FDI	0.617***	0.513***	0.452***
INF	0.646*	2.208***	0.428*
GOV	-3.649	4.600	3.575**
AR1: p-value	0.034	0.034	0.020
AR2: p-value	0.446	0.221	0.369
Hansen test: p-value	0.984	0.737	0.916
F test: p-value	0.000	0.000	0.000

Note: *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Source: Authors' computation

From the results in Table 4, when LL and DOMC are used as measures of financial development, an inverted U-shaped relationship is observed between financial development and economic growth. The regression coefficients in the models confirm this conclusion. When BD is used as the proxy, the results indicate a U-shaped relationship between financial development and economic growth. The estimated thresholds for these three cases are 215.56%, 180.41%, and 211.97%, respectively. Foreign direct investment (FDI) exerts a positive and statistically significant impact on growth, serving as a channel for technology transfer from developed to developing economies. FDI also constitutes an important source of supplementary capital, often accompanied by advanced management practices and environmentally sustainable technologies, thereby supporting countries in pursuing green growth objectives (Bui and Doan, 2025). This finding is consistent with Doğan et al. (2020), Lin and Benjamin (2018), Sahu (2021), Bui and Doan (2025). In Model (3) of Table 4, a 1% increase in government effectiveness leads to a 3.575% increase in economic growth, and this positive correlation is reinforced by Adom and Amoani (2021).

5. Conclusions, recommendations and limitations

This study has examined the role of financial development in economic growth using a sample of economies in the Asia-Pacific region over a 12-year period (2010-2021). Three alternative bank-based financial development indicators were used to test the relationship. When LL and DOMC are employed, financial development is found to promote economic growth. When BD is used, financial development becomes a positive contributor to growth only beyond a certain threshold. In other words, LL and DOMC exhibit an inverted U-shaped relationship with EGR, while BD exhibits a U-shaped relationship with EGR. The robustness checks confirm the consistency of these empirical findings.

Based on these results, the following policy recommendations are proposed for Vietnam:

First, as excessive financial development may adversely affect growth, Vietnam should adopt prudent development strategies. Given that the country's financial system is predominantly bank-based, banks remain a critical pillar of the economy. In the context of financial liberalization and global economic integration, the banking sector faces increasing risks, underscoring the need for the State Bank of Vietnam to strengthen its oversight of credit institutions.

Second, improve service quality by continuing to promote digital transformation in the banking sector. In Vietnam, both the Government and the State Bank have issued policy directives identifying banking as a leading sector in driving national digital transformation. Digitalization is not only inevitable but irreversible, optimizing internal operations while enhancing customer loyalty. Given the intangible nature of banking

products, commercial banks must continuously improve customer experience, thereby building and maintaining trust. This requires investments in technology such as digital banking services and AI-powered chatbots for information gathering and customer care.

Third, maintain inflation at a level conducive to growth. During the COVID-19 pandemic, Vietnam responded proactively and appropriately through traditional fiscal stimulus measures, such as tax exemptions and reductions. Going forward, fiscal policy should be assessed with caution, particularly tax and fee policies, and coordinated closely with monetary policy to stabilize inflation - since macroeconomic stability is a prerequisite for sustaining high growth.

Fourth, promote the development of the stock market to reduce excessive reliance on the banking and credit system. Currently, Vietnam's stock market is classified as a frontier market. For its further development, the Government and regulators should improve the legal framework, introduce preferential tax policies, modernize market infrastructure, develop new investment products, and expand market segments.

Fifth, continue to improve policies for attracting FDI inflows. As new investment modalities emerge alongside a global decline in FDI, Vietnam should focus on infrastructure development to attract high-quality projects, covering both basic and advanced infrastructure with high technological content. Moreover, incentives should target projects that generate high value-added products, commit to technology transfer, and create tangible spillover effects, enabling the country to transition away from a labor-intensive growth model.

Despite the comprehensive use of three proxies for bank-based financial development (liquid liabilities, deposit money bank assets, and bank deposits) and the application of the System GMM estimator and the Pooled OLS method, this study has several limitations. First, data quality and availability vary across the 14 Asia-Pacific economies, and these proxies may not fully capture credit allocation quality or private versus public lending. Second, the threshold estimates, although informative, are sensitive to model specification and may not fully explain the underlying economic mechanisms. Third, the generalization of findings to Vietnam should be made cautiously, considering country-specific banking structures and regulatory environments. Finally, while control variables are included, other unobserved factors may also influence economic growth, and causal interpretations remain conditional on the empirical model.

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