

Financial inclusion and bank performance among Asia-Pacific countries: Evidence from autoregressive distributed lag-pooled mean group



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ABSTRACT

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To address the relationship between financial inclusion and bank performance, a balanced panel dataset of nineteen Asia-Pacific countries (2004–2022) was employed, including three financial inclusion dimensions: penetration, availability, and usage. Weighting schemes, arithmetic, geometric, and entropy, were used to construct the Financial Inclusion Index (FII). Banking performance was proxied by return on equity, return on assets, and net interest margin. The results show that Malaysia and Japan reached higher levels of inclusion in the early 2000s, followed by Thailand and Bangladesh. The findings indicate a negative long-run relationship between the Financial Inclusion Index and bank performance. In contrast, the short-run relationship is positive, suggesting a structural trade-off. The study also shows that return on equity and return on assets return to long-run equilibrium rapidly after shocks, while net interest margin indicates a moderate speed of recovery. These results imply that a balanced regulatory approach is essential to ensure that inclusion positively impacts bank performance. This research contributes by providing cross-country evidence on financial inclusion, employing the autoregressive distributed lag-pooled mean group method on a multidimensional measure of financial inclusion. It recognizes the differences between short-run and long-run effects of financial inclusion on bank performance over time.

Contribution/ Originality: This study contributes to the literature by constructing a Financial Inclusion Index to capture the penetration, availability, and usage of Asia-Pacific countries over nineteen study periods (2004–2022). Second, the panel autoregressive distributed lag-pooled mean group framework is employed, which enables the heterogeneous short-run dynamics and imposes long-run equilibrium restrictions. Third, it examines multiple profitability indicators to provide a comprehensive overview of bank performance rather than depending on a single-metric approach.

1. INTRODUCTION

Financial inclusion has obtained prominence and become a central driver of economic growth in developing and emerging economies owing to its perceived role in reducing poverty, enhancing economic resilience, and supporting sustainable growth globally (Demirguc-Kunt, Klapper, Singer, Ansar, & Hess, 2018). Banks act as the channels for implementing financial inclusion initiatives. However, the impact of financial inclusion on bank performance is empirically debated across countries and remains theoretically ambiguous. Based on financial intermediation theory,

broad access to financial services should enhance bank performance, especially through deposit mobilisation. Banks' profitability improved (Feghali, Mora, & Nassif, 2021). However, focusing on unbanked populations may reduce bank efficiency. The increase in operating costs, credit risk, and monitoring demand for these communities, which often lack credit histories, may impair banks' capital (Ozili, 2022). Empirical studies showing positive, negative, or insignificant results depend on the country context.

Asia is experiencing rapid economic expansion, with its large population showing disparities in access to financial services (Park & Mercado, 2018). It is a definitive setting examining the relationship in this context. Digital financial transformation has been rapidly growing over the past two decades, combining advanced financial systems, especially for the mostly unbanked population. This region is unique for its economic diversity, sizable unbanked population, swift digital revolution, and coexistence of sophisticated financial systems (Allen, Demircuc-Kunt, Klapper, & Peria, 2016; Durai & Stella, 2019; Park & Mercado, 2018). However, the evidence on the relationship between financial inclusion and bank performance remains unclear across the Asia-Pacific countries.

This study differs from previous work by measuring the financial inclusion for the banking sector across Asia-Pacific countries in two ways. First, earlier studies often focused on traditional dimensions, such as financial access and usage metrics (Amidzic, Mialou, & Massara, 2017; Nguyen, 2021; Shahzadi, Anwar, Riaz, & Makhdum, 2024). This study captures three dimensions, namely penetration, availability, and usage. Second, past studies confine their scope to a narrow set of countries and a static time span; this study constructs the Financial Inclusion Index from 2004 to 2022, covering 19 Asia-Pacific economies. Evidence of the relationship between financial inclusion and bank performance remains inconclusive. This study contributes to the literature. Firstly, the Financial Inclusion Index is being constructed to capture the penetration, availability and usage of Asia-Pacific countries over nineteen study periods (2004–2022). Second, the panel autoregressive distributed lag-pooled mean group framework is employed, which enables the heterogeneous short-run dynamics and imposes long-run equilibrium restrictions. Third, it examines multiple profitability indicators to provide a comprehensive overview of bank performance rather than relying on a single-metric approach. The question is: Does financial inclusion enhance or undermine bank profitability in the long run? How do short-run dynamics differ across countries? How fast does it adjust toward the long-run equilibrium? The following section reviews past studies on financial inclusion and bank performance, especially the relationship between these indicators. The methodology and results are presented, followed by concluding remarks.

2. LITERATURE REVIEW

2.1. Financial Inclusion

Financial inclusion includes individuals' participation in financial activities, for example, savings, credit, payments, and insurance (Park & Mercado, 2018). Past literature often uses single proxies, such as bank branch numbers or account ownership, to measure financial inclusion (Sarma & Pais, 2011). The multidimensional nature of inclusion involves not only physical access but also the readiness for financial usage, which these measures do not capture in past literature (Gharbi & Kammoun, 2023; Nguyen, 2021).

Past studies support the integration of multiple dimensions of inclusion, which are often focused on penetration dimensions, for example, the number of deposit accounts, the readiness of bank branches, together with the usage, such as outstanding deposits and loans (Khera, Ng, Ogawa, & Sahay, 2021; Shahzadi et al., 2024). Nguyen (2021) constructs a financial inclusion index to investigate the degree of financial inclusion using Principal Component Analysis (PCA). Besides, prior studies used entropy weighting (Gharbi & Kammoun, 2023) and equal-weight aggregation (Sarma & Pais, 2011). Although the weightings differ, multidimensional indices represent financial inclusion more comprehensively than a single proxy.

According to Demircuc-Kunt et al. (2018), perceptions of financial inclusion are often viewed as a multidimensional concept consisting of penetration, availability, and usage. In general, penetration refers to the products and services offered to the target population in the financial services sector. Availability refers to the

readiness of services that are reliable and accessible to users, such as automated teller machines, bank branches, and mobile money agents, and the outreach of the financial readiness outreach, either in digital or physical ways (Sarma & Pais, 2011). Usage reflects how actively individual users and business participants engage with financial services and products, as measured by transaction volumes of the outstanding deposits and loans. All in all, these dimensions offer a comprehensive view of financial inclusion by capturing its use and access (Azimi, 2022).

Despite the advancement, limitations persist in the literature. First, existing indices mainly focus on the access and availability, with limited attention to actual financial services, according to Demirguc-Kunt et al. (2018). Second, most of the studies focused on single-country settings with a short time horizon, restricting their ability to capture structural changes in financial system (Nguyen, 2021; Shahzadi et al., 2024). These shortcomings motivate the construction of a Financial Inclusion Index, which includes three dimensions across Asia-Pacific countries.

2.2. Financial Inclusion and Bank Performance

Financial intermediation theory predicts that the increment of financial services access should enhance the intermediation role of banks in mobilizing deposits, most importantly improving the efficiency of banks through the widening of customer segments (Feghali et al., 2021; Gorton & Winton, 2002). In this viewpoint, the relationship between financial inclusion and bank performance is positively driven by increased lending activity, suggesting that outreach innovation can improve bank performance by increasing the transaction volumes and diversifying the banks' streams of revenue (Kou, Olgu Akdeniz, Dinçer, & Yüksel, 2021). Studies focusing on fintech adoption and the expansion of banks also report efficiency gains associated with the wider access to financial services (Misati, Anne, Leonard, & Lewis, 2020).

However, few researchers expressed doubt that financial inclusion has a detrimental effect on the banking sector. Some studies argue that financial inclusion increases operational costs and credit risks due to outreach expenses. Earlier unbanked customers tended to conduct low-value transactions and take out loans. Serving rural communities often requires extra work and funding. Many financially excluded individuals lack credit histories, increasing information asymmetry, which weakens banks' ability to assess credit risk. Banks may struggle with operational inefficiencies and higher provisioning costs when serving financially underserved populations, amid a weak institutional regulatory environment (Ozili, 2022; Sami, Candelon, & Mugrabi, 2024). These factors may compress the banks' profitability (Chakraborty & Abraham, 2021).

Chhaidar, Abdelhedi, and Abdelkafi (2023) focused on the relationship between the level of financial technology and banks' profitability across 23 European banks, and the results indicate that banks maintain profitability by introducing a diverse range of products and services. Matching findings were reported by Kou et al. (2021), who found that financial innovation increased European banks' financial performance. Studies show that financial inclusion influences bank performance positively by improving mobilization and generating efficiency gains. Meanwhile, others report negative or insignificant effects, especially in emerging economies (Bhattacharyya, Wright, & Rahman, 2021; Liu, Li, & Li, 2024). The findings from Eldomiaty, Hammam, and El Bakry (2020) showed that institutional quality, regulatory frameworks, and market maturity are the main drivers of financial inclusion affecting banks and hence no systematic relationship is observed. The results are mixed, indicating that the relationship between inclusion and bank performance is changing over time and varies by context (Ozili, 2022; Sarma & Pais, 2011). Short-run gains from expansion may be offset in the long run by the higher risk and costs imposed.

The Asia-Pacific region offers a particularly suitable setting for examining this relationship. The region combines advanced financial systems with large unbanked populations and has experienced rapid digital financial transformation over the past two decades (Park & Mercado, 2018). The Asia-Pacific region consists of both highly developed financial systems and financially excluded populations and is experiencing rapid growth in digital financial services (Allen et al., 2016; Park & Mercado, 2018). However, cross-country evidence on how financial inclusion relates to bank performance in this region remains fragmented. Most studies focus on smaller subsets of countries

using static estimation and do not distinguish between long-run equilibrium and short-run adjustments (Kamal, Hussain, & Khan, 2021; Nguyen, 2021). The proxies were narrow and limited in capturing the complex channels which inclusion affects the bank performance (Khera et al., 2021; Shahzadi et al., 2024). These features suggest that Asia-Pacific economies may face a trade-off between inclusion goals and the sustainability of banks. Banks initially benefit from inclusion-driven expansion but gradually experience profitability pressures as cost and risk factors materialize (Barajas, Beck, Belhaj, & Naceur, 2020; Ozili, 2022). These dynamic perspectives have received little attention.

Despite the growing literature on the Financial Inclusion Index and its relationship with bank performance, gaps remain. First, existing studies focus on a single indicator, which fails to capture the multidimensional nature of financial inclusion (Khera et al., 2021; Sarma & Pais, 2011). Second, limited attention to cross-country heterogeneity in adjustment processes in most existing studies, which rely on single-country analyses, especially in the Asia-Pacific context (Park & Mercado, 2018; Shahzadi et al., 2024). Third, most studies overlook the distinction between short-run dynamics and long-run equilibrium using static or short panels. Addressing these gaps requires financial inclusion to be in multidimensional approaches, and a dynamic framework is mandatory to differentiate both long-run and short-run effects. A broader regional sample is important to reflect structural diversity.

3. METHODOLOGY

3.1. Data

A balanced annual panel dataset for 19 Asia-Pacific economies was used in this study. These include Singapore, China, Indonesia, India, Japan, Vietnam, Laos, Korea, Pakistan, Malaysia, Thailand, Myanmar, Mongolia, Bangladesh, Nepal, Sri Lanka, Papua New Guinea, the Philippines, and Cambodia, covering the period from 2004 to 2022. The sample is determined by financial inclusion indicators and bank performance measures, subject to data availability. Bank performance metrics include return on equity, return on assets, and net interest margin obtained from the World Bank's database.

Table 1. Description of variables.

Indicators	Linkage	Data source	Denotation
Financial Inclusion Index	It is a composite measure that captures the individuals' and businesses' access to formal financial services in an economy.	Author's source	FII
Inflation Rate	It refers to the percentage of change in the price level of goods and services over a time period in an economy.	World Bank	INF
Interest Rate	It is the return earned on savings or investments.	World Bank	IR
Exchange Rate	It is the currency price of one country in terms of another.	World Bank	ER
Return on Equity	It is about the financial performance ratio of the bank's profitability relative to shareholders' equity.	Federal Reserve Economic Data	ROE
Return on Assets	It measures bank efficiency in the use of assets to generate income.	Investing.com	ROA
Net Interest Margin	It measures the interest income generated from loans or other interest-earning or paid-out assets.	Investing.com	NIM

Financial inclusion is measured by the Financial Inclusion Index, and macroeconomic variables include the inflation rate, lending interest rate, and exchange rate as the control variables. All the variables are expressed in logarithmic form as described in Table 1. The Financial Inclusion Index serves as the main variable of interest, and the control variables consist of the inflation rate (INF), which reflects changes in the general price level; the interest rate (IR), which represents the return on savings; and the exchange rate (ER). The exchange rate was considered as a control variable due to its potential influence on bank performance through its effects on banks' intermediation theory (Naser & Pitchay, 2026). On this note, bank performance is measured using return on equity, return on assets, and net interest margin. Exchange rate was initially included as a control variable due to its potential influence on bank performance through its effects on banks' intermediation activities, particularly the cost of liabilities and interest

margins, which represent key channels in financial intermediation theory (Naser & Pitchay, 2026). However, during the estimation process, the exchange rate variable exhibited strong correlations with other macroeconomic variables, particularly inflation and interest rates. When multiple lags were incorporated into the autoregressive distributed lag-pooled mean group framework, high correlation among them led to multicollinearity and a singular design matrix. Consequently, the estimation procedure automatically dropped the exchange rate variable. To maintain model stability and avoid multicollinearity issues, the exchange rate was excluded from the final specification reported in Table 5. The empirical model, therefore, includes three variables: financial inclusion, inflation, and interest rate as the retained explanatory variables. The exclusion of the exchange rates does not alter the interpretation of the results, as inflation and interest rates capture related macroeconomic effects that influence banking performance.

3.2. Financial Inclusion Index

Financial inclusion is conceptualized as a multidimensional financial access encompassing penetration, availability, and financial services usage (Demirguc-Kunt et al., 2018; Sarma & Pais, 2011). The Financial Inclusion Index includes penetration, availability, and usage as the dimensions. Thus, the indicators for each dimension are shown in Table 2. All indicators are normalized using the min-max transformation to ensure comparability over time and across countries. To minimize reliance on a single weighting scheme, three aggregation approaches are employed: arithmetic mean, geometric mean, and entropy weighting. The Financial Inclusion Index is computed as the average of these three composite measures, thereby reducing potential bias arising from any individual method and enhancing robustness to alternative index-construction strategies; the dimensions of the Financial Inclusion Index are shown in Table 2.

Table 2. Financial inclusion index (FII) variables.

Dimensions	Indicators	Data Source
Penetration (D1)	Number of Deposit Accounts with Commercial Banks, Credit Unions, and Credit Cooperatives, per 1000 adults	World Bank
Availability (D2)	Number of Commercial Banks, Credit Unions and Credit Cooperatives, and all the Microfinance Institution Branches, per 1000 adults	Federal Reserve Economic Data
	Number of Automated Teller Machines (ATMs), per 100000 adults	World Bank
	Number of Insurance Corporations per 100000 adults	World Bank
Usage (D3)	Outstanding Deposits with Commercial Banks, Credit Unions, and Credit Cooperatives, Percentage of GDP	World Bank
	Outstanding Loans from Commercial Banks, Credit Unions, Credit Cooperatives, Percentage of GDP	World Bank
	Value of Mobile Money Transactions, Percentage of GDP	International Monetary Fund

The steps are as follows:

Step 1: Outlier Detection

First, outliers should be detected; if skewness exceeds 2 and kurtosis exceeds 3.5, this indicates the presence of outliers (Demirguc-Kunt et al., 2018). If outliers are present, the variables are being winsorised.

$$Skewness = \frac{\sum_{i=1}^N (Y_i - \bar{Y})^3 / N}{s^3} \quad (1)$$

$$Kurtosis = \frac{\sum_{i=1}^N (Y_i - \bar{Y})^4 / N}{s^4} \quad (2)$$

Step 2: Correlation Analysis

To test for correlation, Pearson's correlation coefficient is used to assess the extent to which two variables are linearly related.

$$r_{xy} = \frac{\sum_i (x_i - \bar{x})(y_i - \bar{y})}{(n-1)s_x s_y} \quad (3)$$

Step 3: Discriminant Analysis

Next, discrimination analysis is checked; the smaller the coefficient of variation, the weaker the discrimination. Therefore, the financial inclusion indicators with lower discriminative power are removed.

$$\text{Coefficient of Variation} = \frac{S_i}{\bar{x}} \quad (4)$$

Step 4: Data Normalization

The variables are being normalized via min-max normalization (Centre for the Study of Globalisation and Regionalisation, 2012). Min-max normalization is a method for normalizing financial inclusion data to a range (Shi, Liang, & Pezzuolo, 2024; Trung, Ersoy, Dua, & Thinh, 2025).

$$I_q^t = \left(\frac{x_q^t - \min(x_q)}{\max(x_q) - \min(x_q)} * 99 \right) + 1 \quad (5)$$

$$I_q^t = 99 - \left(\frac{x_q^t - \min(x_q)}{\max(x_q) - \min(x_q)} * 99 \right) + 1 \quad (6)$$

The normalised data are aggregated using the arithmetic means to obtain the dimension scores.

$$\text{Arithmetic Mean} = \frac{\sum x_i}{n} \quad (7)$$

$$\text{Geometric Mean} = \sqrt[n]{x_1 \dots x_n} \quad (8)$$

Three different aggregations, arithmetic mean aggregation, geometric aggregation, and the entropy method, are used to obtain the overall Financial Inclusion Index (Libório et al., 2024; Rahma, Fauzi, Juanda, & Widjojanto, 2019). The arithmetic mean aggregation is straightforward to compute and treats all dimensions equally (Moreno-Garcia, Yáñez-Araque, Hernández-Perlines, & Rodríguez-Benitez, 2022). The geometric mean aggregation is often used in decision-making to give a balanced score that penalizes extremely low values. The entropy method allows data-driven weighting (Karagiannis & Karagiannis, 2020); the weight is calculated using Equation 9.

$$w_j = \frac{(1-E_j)}{n - \sum_{i=1}^n E_j} \quad (9)$$

Where E_{ij} is calculated based on

$$E_{ij} = -k \sum_{i=1}^m p_{ij} \ln p_{ij} \quad (10)$$

Where k and p_{ij} are

$$k = \frac{1}{\ln(m)} \quad (11)$$

$$p_{ij} = \frac{x_{ij}}{\sum_{i=1}^m x_{ij}} \quad (12)$$

The entropy weight is multiplied by each dimension's score to obtain the final entropy score. All scores are calculated based on three methods. The values are averaged to obtain the Financial Inclusion Index score.

To examine both short-run and long run relationship between financial inclusion and bank performance, a panel autoregressive distributed lag with pooled mean group estimation is employed. This approach is appropriate for panels with mixed integration orders of $I(0)$ and $I(1)$, and it allows the error-variances and short-run dynamics to be varied across countries while imposing homogeneity on long-run coefficients. The long-run relationship is specified as:

$$BP_{it} = \alpha_i + \beta_1 FII_{it} + \beta_2 X_{it} + \varepsilon_{it} \quad (13)$$

Where BP_{it} denotes the bank performance metrics in the country as i and at time, t . Meanwhile, FII_{it} is the Financial Inclusion Index, and x_{it} is the control variable's vector: inflation rate and interest rate. The

corresponding error-correction representation captures short-run adjustments toward long-run equilibrium.

3.3. Diagnostic Tests

The Pesaran CD test aimed to examine the cross-sectional dependence among variables in the model. The Breusch–Pagan test is used to detect heteroscedasticity; a large chi-square statistic indicates the presence of heteroscedasticity and non-constant variance. The null hypothesis accepted implies homoscedasticity in the model. The Wooldridge LM test is used to assess autocorrelation. A standardized average of individual Augmented Dickey-Fuller statistics is used to examine the pooled unit root null against the heterogeneous alternative, the Im, Pesaran and Shin (CIPS) test.

$$CIPS = \frac{1}{N} \sum_{i=1}^N CADF_i \quad (14)$$

Where $CADF_i$ is the cross-sectional Augmented Dickey-Fuller statistic, for i -th as the cross-sectional unit, defined as the t-ratio of β_1 in the model (Gengenbach, Palm, & Urbain, 2009). The test hypothesis is shown below.

$H_0: \alpha = 0$; Cross-section series contain a unit root.

$H_1: \alpha < 0$; No unit root in cross-section time series.

When the p-value is greater than 5 per cent or the t-statistic is larger than the Augmented Dickey-Fuller critical value. Since the null hypothesis is accepted, the series exhibits a unit root and is non-stationary.

Prior to estimation, panel unit root tests determine the integration orders of the variables. Pedroni cointegration tests are then applied to the presence of a long-run relationship among indicators. Given evidence of cointegration, the autoregressive distributed lag-pooled mean group estimator is used to obtain both long-run coefficients and short-run dynamics. To assess the validity of the long-run homogeneity restriction imposed by the pooled mean group estimator, the Hausman test is used to compare pooled mean group and mean group (MG) estimates. Robust standard errors are used to account for serial correlation and heteroskedasticity in the model. Model stability is evaluated by assessing whether the error-correction term must be statistically significant and negative. Pedroni cointegration test model as shown below.

$$y_{it} = \alpha_i + \delta_i t + \beta_1 x_{it} + \dots + \beta_k x_{k,it} + \varepsilon_{it} \quad (15)$$

Where α_i refers to the individual fixed effects while δ_i refers to individual time trends. $t = 1, \dots, T$; $i = 1, \dots, N$ requiring β_1 to be heterogeneous across cross-sections. There are seven testing statistics under Pedroni cointegration test, which are panel rho-statistic, panel PP-statistic, panel v-statistic, and panel Augmented Dickey-Fuller statistic (within dimension) and PP-statistic, rho-statistic, and Augmented Dickey-Fuller statistic (between dimension). If any of the Pedroni cointegration tests are statistically significant, H_0 is rejected when the p-value is less than a five percent significance level, $\alpha = 0.05$, demonstrating that the variables are long-run cointegrated. The hypothesis is shown below.

H_0 : No-cointegration for all cross-section entities with residuals.

H_1 : Cross-section entities with residuals cointegrated.

The autoregressive distributed lag long-run coefficients are employed to examine the long-run impacts of independent variables on the dependent variable by estimating the long-run coefficients of $\ln(x)$. The final lag order is decided by the Akaike information criterion (AIC). A general specification of the autoregressive distributed lag long-run model is computed.

$$Y_t = \sum_{i=1}^p b_i Y_{t-i} + \sum_{j=0}^q b_j x_{t-j} + \dots + \varepsilon_t \quad (16)$$

The autoregressive distributed lag short-run dynamics can be captured by constructing a Pooled Mean Group model as follows:

$$\Delta Y_{it} = \gamma_i + \sum_{j=1}^{p-1} \beta_{i,j} \Delta Y_{i,t-j} + \sum_{k=0}^{q-1} \delta_{i,k} \Delta X_{i,t-k} + \lambda_i (Y_{i,t-1} - \theta X_{i,t-1}) + u_{it}$$

$$ECT_{it} = Y_{i,t-1} - \theta X_{i,t-1} \quad (17)$$

Where λ represents the group-specific error correction speed. The ECT_{t-1} have to be negative and statistically significant to confirm the model's speed of adjustment. As a result, the higher the error correction term, the faster the λ (Narayan, 2005).

The autoregressive distributed lag model is well-suited to Asia-Pacific banking data, as the pooled mean group estimator extends it by combining long-run pooling with short-run heterogeneity. It respects differences in short-run dynamics and speed of adjustment among units. It allows the intercept and error variances to remain different across groups. Finally, autoregressive distributed lag models perform well in the presence of heteroskedasticity and autocorrelation with the robust standard error estimates (Nkoro & Uko, 2016). Next, the Wald test is used to confirm the long-run homogeneity in the pooled mean group model.

$$W = (\theta^* - \theta_0)' \text{Var}(\hat{\theta})^{-1} (\hat{\theta} - \theta_0) \quad (18)$$

Where θ refers to the vector of estimated long-run coefficients, θ_0 is the value under H_0 , while $\text{var}(\hat{\theta})$ is the covariance matrix of $\hat{\theta}$. The hypothesis is shown below.

H_0 : Long-run homogeneity does not hold.

H_1 : Long-run homogeneity is valid.

4. RESULTS AND DISCUSSIONS

4.1. Financial Inclusion Index

For the Financial Inclusion Index, the normalized values were averaged to compute the dimension scores; the dimensions were aggregated using arithmetic, geometric, and entropy methods. Figure 1 shows the Financial Inclusion Index results for 2022, while Figure 2 shows the results for 2004–2022; the full Financial Inclusion Index scores are reported in Appendix B. Table B1 and asymmetry, suggesting nonlinearity, warrant the use of the wavelet transform to model returns and examine their temporal correlation.

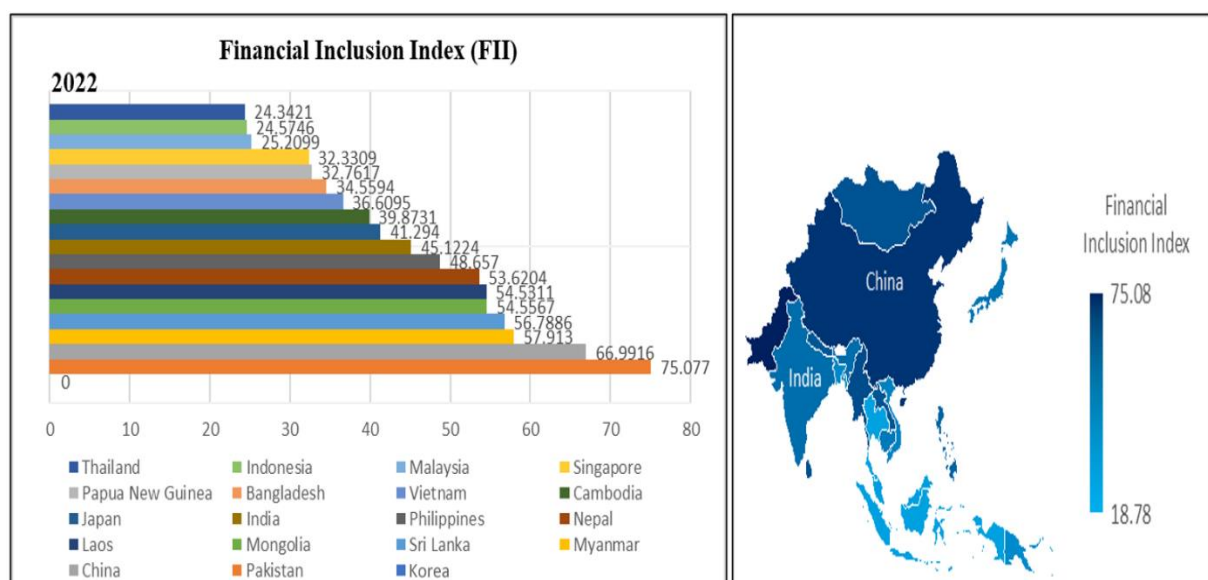


Figure 1. Financial Inclusion Index (FII) Scores 2022.

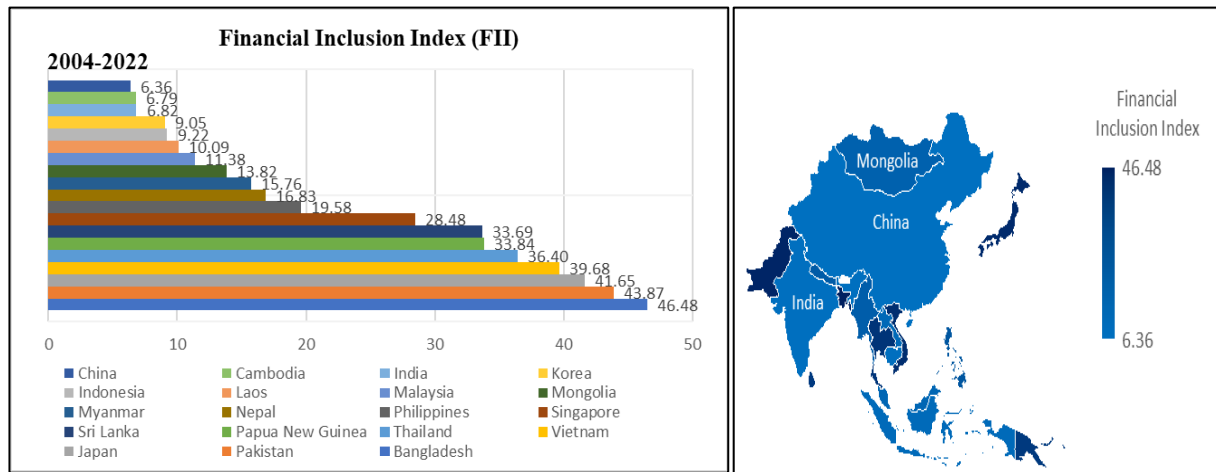


Figure 2. Financial inclusion index (FII) Scores 2004-2022.

Based on the result, the Financial Inclusion Index exhibits a sustained upward trend across the 19 Asia-Pacific economies over the sample period, although substantial cross-country variation persists. According to Ofori-Abebrese, Baidoo, and Essiam (2020), a score of 51% to 100% implies higher financial inclusion; 31% to 50% score indicates a medium level, while 30% or less indicates a low financial inclusion level. Japan and Malaysia achieved a higher financial inclusion level in the early sample period, reflecting advanced financial infrastructure in the early adoption of financial innovations (Long, Morgan, & Yoshino, 2023). Bangladesh and Thailand show the effectiveness of microfinance programmes, especially in expanding access to financial services through rural outreach. Recent improvements in Pakistan and Papua New Guinea highlight the importance of policy interventions in accelerating financial inclusion (Khan & Siddiqui, 2023). These patterns confirm that financial inclusion is dynamic and evolves with institutional development, technological progress, and policy strategy responses.

To assess the robustness of a composite index, different normalization measures, min-max estimation, and the distance to group leader method are compared (Gharbi & Kammoun, 2023). The sensitivity analysis results for the most recent five years of the study period (2018-2022). Regardless of the normalization methods used, the ranking of the Financial Inclusion Index among Asia-Pacific countries remains unchanged as reported in Appendix A. (Figure A1). To validate the use of autoregressive distributed lag-pooled mean group for the Financial Inclusion Index (FII) and bank performance, unit root testing and cointegration tests are mandatory. Im, Pesaran, and Shin (2003) test is used to assess stationarity in the data. It allows for cross-country differences, whereas the Pedroni test examines cointegration to ensure a long-term relationship in the model and can handle non-stationary panel variables.

Table 3. Summary of Im, Pesaran, and Shin Test Results.

Panel unit root test	Individual Intercept	Individual Intercept and Trend
Level		
Financial Inclusion Index (FII)	(4.780)	(0.946)
Return on Equity	(-5.549)***	(-7.040)***
Return on Assets	(-6.724)***	(-5.434)**
Net Interest Margin	(-2.824)***	(-0.783)
Inflation Rate	(-7.230)***	(-6.917)***
Interest Rate	(-5.608)***	(-6.607)***
Exchange Rate	(2.693)	(2.259)
1 st Difference		
Financial Inclusion Index (FII)	(-6.823)***	(-5.483)***
Return on Equity	(-17.266)***	(-13.61)***
Return on Assets	(-14.950)***	(-13.512)***
Net Interest Margin	(-13.422)***	(-12.818)***
Inflation Rate	(-16.930)***	(-14.578)***
Interest Rate	(-17.728)***	(-14.652)***

Panel unit root test	Individual Intercept	Individual Intercept and Trend
Exchange Rate	(-5.483)***	(-4.250)***
2 nd Difference		
Financial Inclusion Index (FII)	(-13.862)***	(-10.704)***
Return on Equity	(-21.896)***	(-18.931)***
Return on Assets	(-20.954)***	(-17.677)***
Net Interest Margin	(-20.397)***	(-17.735)***
Inflation Rate	(-18.138)***	(-14.817)***
Interest Rate	(-20.161)***	(-17.302)***
Exchange Rate	(-14.953)***	(-15.199)***

Note: (**) and (***) indicate the respective 5% and 1% significance.

Table 3 presents the result for the Im, Pesaran, and Shin test. Panel unit root tests indicate the variables are stationary in level or after first differencing, satisfying the requirements for autoregressive distributed lag estimation. Pedroni cointegration tests ensure a long-run relationship in the model. The results justify the use of a panel autoregressive distributed lag-pooled mean group framework to estimate the coefficients in the model.

Table 4. Summary of Pedroni cointegration test results.

Panel Cointegration Test		Statistic	Weighted Statistic	Statistic	Weighted Statistic
		Individual Intercept		Individual Intercept and Trend	
Model 1: Return on Equity and the Financial Inclusion Index					
Panel v-Statistic	Within-dimension	(0.045)	(-1.149)	(-1.586)	(-2.999)
Panel rho-Statistic		(-0.004)	(1.023)	(1.041)	(2.301)
Group PP-Statistic		(-6.000)***	(-4.900)***	(-5.684)***	(-4.838)***
Group ADF-Statistic		(0.307)	(-2.658)***	(1.844)	(-2.368)***
Group rho-Statistic	Between-dimension	(2.487)	-	(3.441)	-
Group PP-Statistic		(-5.225)***	-	(-4.883)***	-
Group ADF-Statistic		(-0.765)	-	(-0.311)	-
Model 2: Return on Assets and the Financial Inclusion Index					
Panel v-Statistic	Within-dimension	(-1.565)	(-1.317)	(-1.207)	(-3.133)
Panel rho-Statistic		(2.303)	(1.383)	(2.784)	(2.828)
Panel PP-Statistic		(-0.731)	(-4.037)***	(-1.857)**	(-4.181)***
Panel ADF-Statistic		(0.912)	(-2.830)***	(-0.119)	(-2.259)**
Group rho-Statistic	Between-dimension	(2.727)	-	(3.741)	-
Group PP-Statistic		(-5.807)***	-	(-7.224)***	-
Group ADF-Statistic		(-2.240)**	-	(-1.473)*	-
Model 3: Net Interest Margin and the Financial Inclusion Index					
Panel v-Statistic	Within-dimension	(-0.670)	(-0.726)	(-2.342)	(-2.517)
Panel rho-Statistic		(1.858)	(0.777)	(2.930)	(2.096)
Panel PP-Statistic		(-1.699)**	(-4.225)***	(-1.213)	(-3.465)***
Panel ADF-Statistic		(0.474)	(-0.414)	(1.335)	(0.513)
Group rho-Statistic	Between-dimension	(2.203)	-	(3.512)	-
Group PP-Statistic		(-4.790)***	-	(-3.311)***	-
Group ADF-Statistic		(-0.961)	-	(0.643)	-

Note: (*), (**), and (***) indicate the respective 10%, 5% and 1% significance.

Table 4 presents the result for the Pedroni cointegration test. Although not all Pedroni statistics are significant, most of the powerful tests are significant. The results show that the null hypothesis of no cointegration in the cross-sectional time series can be rejected.

Hence, cointegration exists in the cross-section time series. The long-run relationship exists in the model. Table 5 presents the results for the pooled mean group cointegration test.

Table 5. Summary of the Pooled mean group cointegration test result.

Models	Return on Equity (ROE)			Return on Assets (ROA)			Net Interest Margin (NIM)		
	Coefficient	S.E	p-value	Coefficient	S.E	p-value	Coefficient	S.E	p-value
Long Run Elasticities:									
Financial Inclusion Index	-0.240***	0.012	0.000	-0.024***	0.007	0.001	-0.047***	0.011	0.000
Inflation Rate	-0.039***	0.013	0.002	-0.072***	0.028	0.010	0.002	0.012	0.887
Interest Rate	-0.032	0.023	0.163	-0.051***	0.011	0.000	-0.043**	0.019	0.020
Short Run Estimates:	(2, 2, 2, 2)			(2, 2, 2, 2)			(1, 1, 1, 1)		
Bank Performance: (ΔROE_{t-1} , ΔROA_{t-1} , ΔNIM_{t-1})	-0.017	0.084	0.837	0.009	0.086	0.919			
Financial Inclusion Index (ΔFII_t)	0.237**	0.113	0.037	0.286**	0.120	0.019	0.055	0.059	0.349
Financial Inclusion Index (ΔFII_{t-1})	0.044	0.190	0.816	-0.032	0.172	0.855			
Inflation Rate (ΔINF_t)	0.120*	0.071	0.093	0.102	0.088	0.247	-0.025	0.026	0.324
Inflation Rate (ΔINF_{t-1})	-0.021	0.083	0.804	-0.005	0.113	0.962			
Interest Rate (ΔIR_t)	-0.101	0.106	0.343	-0.045	0.064	0.482	0.040***	0.015	0.006
Interest Rate (ΔIR_{t-1})	-0.204**	0.088	0.022	-0.205***	0.073	0.005			
Error Correction Term (ECT_{t-1})	-0.591***	0.090	0.000	-0.594***	0.100	0.000	-0.401***	0.066	0.000
Diagnostic Tests:									
Cross-Dependency Test:	10.400***			2.589***			3.816***		
Pesaran CD Test	(0.000)			(0.000)			(0.000)		
Heteroskedasticity:	99.981***			367.579***			192.160***		
Breusch-Pagan Test	(0.000)			(0.000)			(0.000)		
Serial Correlation:	11.749***			3.812***			0.503		
Wooldridge LM Test	(0.000)			(0.000)			(0.671)		
Robustness Test:	9.356			1.9863			-1.438		
Wald Test	(0.112)			(0.105)			(0.152)		

Note: (*), (**), and (***) indicate the respective 10%, 5% and 1% significance.

Table 5 presents the autoregressive distributed lag-pooled mean group estimates for three bank performance models. For return on equity (ROE), the Financial Inclusion Index is negative. One percent increase in the Financial Inclusion Index decreases the return on equity at 0.2401% in the long run, *ceteris paribus*. One percent increase in the inflation rate decreases the return on equity at 0.0394% in the long run, *ceteris paribus*. This implies that persistent inflationary pressures reduce firm profitability in the long run, likely by raising production costs. Shihadeh (2020) notes that the expansion of services to underbanked communities often requires new infrastructure, technology, and outreach programs. The implementation cost increases the equity base without immediate revenue, causing the default rates to rise while return on equity declines (Yang & Masron, 2024). Profit margins are low for new customers, especially those from the unbanked population. Subsidized products can also compress banks' profit margins. Based on financial intermediation theory, intermediation must balance efficiency and inclusion. Meanwhile, inflation negatively affects bank performance in the long run as the persistent price increases, rising operating costs and weaker performance follow. The short-run model shows that lagged changes in financial inclusion significantly affect bank performance, though the magnitude and direction of these effects vary across countries. Lagged values of return on equity do not significantly affect current levels. This suggests limited persistence in profitability dynamics beyond the long-run adjustment process. The estimated error-correction terms are negative. It shows a stable long-run relationship. They are statistically significant for all three performance measures. The adjustment coefficients imply relatively rapid convergence toward the long-run equilibrium. Deviations in return on equity are adjusted within about one and a half years.

As for return on assets (ROA), a one percent decrease in the Financial Inclusion Index decreases return on assets by 0.0235% in the long run, *ceteris paribus*. The expansion of financial inclusion increases operational costs for higher-risk customers, reducing overall performance. Additionally, a one percent increase in the inflation rate decreases return on assets by 0.0719% in the long run, *ceteris paribus*. A one percent increase in the interest rate

decreases return on assets by 0.0505% in the long run, *ceteris paribus*. This indicates a negative relationship between interest rate and bank performance, reflecting tighter monetary conditions. Effective asset management enables banks to improve profitability. An increase in interest rate reduces a bank's return on assets when it lends at a higher rate while keeping funding costs constant. Lagged values of return on assets do not significantly affect the current level of return on assets, suggesting limited persistence in profitability dynamics beyond the long-run adjustment process. The estimated error-correction terms for the adjustment coefficients imply relatively rapid convergence toward the long-run equilibrium. Deviations in return on assets are corrected within about one and a half years.

For net interest margin (NIM), the Financial Inclusion Index is negative. A one percent increase in the Financial Inclusion Index reduces the interest margin by 0.0469% in the long-run, *ceteris paribus*. A one percent increase in the interest rate reduces the interest margin by 0.0433% in the long-run, *ceteris paribus*. Financial inclusion enhances access to banking services, but its long-term impact on bank performance is negative due to higher operating costs, increased credit risk, and a lower interest margin based on financial intermediation theory. Sometimes, asset expansion does not proportionally increase bank profits. Lagged values of interest margin do not significantly affect the current net interest margin, suggesting limited persistence in profitability dynamics beyond the long-run adjustment process. They are statistically significant for all three performance measures, confirming a stable long-run relationship, including in the interest margin model. The net interest margin adjusts within about two years.

These results suggest that banks benefit from inclusion-driven expansion initially but gradually face profitability pressures as associated costs and risks emerge. To ensure the robustness of the findings, alternative specifications are estimated using different weighting schemes for the Financial Inclusion Index and other alternatives, including long-run estimators such as fully modified ordinary least squares and dynamic ordinary least squares. Across all specifications, the relationship between financial inclusion and bank profitability remains unchanged, yielding a negative result. These findings indicate that the main conclusions are not driven by the method or estimation of index construction.

Diagnostic tests are necessary to ensure robust results. The Pesaran CD test shows a significant result, indicating that residuals are correlated across countries. The Breusch-Pagan test indicates heteroskedasticity, where the variances are not constant in the model, leading to biased standard errors. Hence, the model is corrected for heteroskedasticity using White's heteroskedasticity-consistent standard errors to ensure that statistical inferences remain valid. Next, serial correlation is detected using the Wooldridge LM test. The results imply that serial correlation existed in the model. Hence, the models are corrected for heteroskedasticity by using the robust standard errors to ensure the results are valid. The Wald test is insignificant, which means the regressors are jointly significant. The variables are valid in the long-run relationship. The model is well specified for explaining bank performance. Next, individual-level estimation for nineteen countries using the pooled mean group is underway. The pooled mean group of individual cross-sectional estimates helps identify which variables adjust faster or more slowly to shocks, as reported in Appendix B. Table B2.

5. CONCLUSIONS

This study focuses on the relationship between financial inclusion and bank performance among nineteen Asia-Pacific countries from 2004 to 2022 by using a panel autoregressive distributed lag and pooled mean group framework. A multidimensional Financial Inclusion Index has been created, and its short-run and long-run effects have been distinguished. The findings indicate that financial inclusion negatively affects bank profitability in the long run but has a positive or neutral effect in the short run. Based on the findings, inclusion-driven expansion may improve bank performance initially, especially through deposit mobilization and scale effects, but it can also reduce banks' profitability. The main reasons could be operating costs and credit risk among underserved users. This study highlights the trade-off between banks and social inclusion objectives. Regarding the literature, this study contributes in three main ways. First, it captures the value of multidimensional measures of financial inclusion despite the

complexity of financial advancement; second, it shows the region focused on specific insights into heterogeneous financial systems in Asia-Pacific countries; third, it provides dynamic evidence on the relationship between financial inclusion and bank performance in the long run and short run. Additionally, several limitations, such as data constraints, limit the ability to differentiate between traditional and digital forms of financial inclusion. The analysis relies on country-level aggregates, which mask important heterogeneity at the bank level. For future research, using bank-level data that incorporates explicit measures of digital financial services is suggested. The framework can be extended to focus on nonlinear or threshold effects across different stages of financial growth. Overall, the findings suggest that to strengthen the banking sector's efficiency and risk management, financial inclusion should be pursued alongside policy measures. Without such measures, inclusion strategies may weaken the overall long-term sustainability of financial services.

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Data Availability Statement: Upon a reasonable request, the supporting data of this study can be provided by the corresponding author.

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Appendix A.



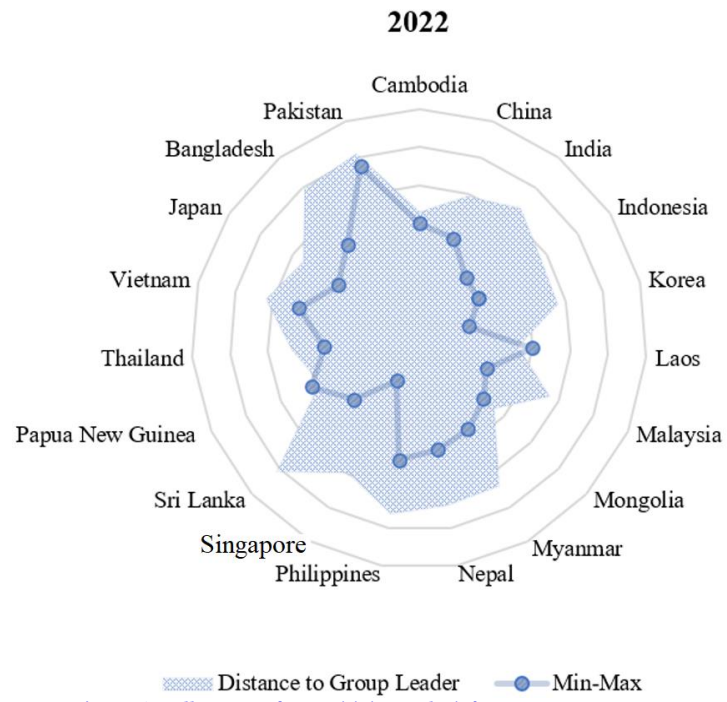


Figure A1. Illustrates the sensitivity analysis between 2018 to 2022.

Appendix B.

Table B1. Financial inclusion index (FII) scores.

Years	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Cambodia	0.856	0.858	2.852	3.542	5.500	6.686	11.324	14.314	13.803	16.232	21.683
China	8.157	3.347	6.406	10.147	11.858	8.449	2.975	10.583	10.659	16.220	21.019
India	2.312	2.931	6.363	10.485	8.655	9.212	9.735	9.679	10.683	12.650	16.115
Indonesia	1.197	1.091	1.479	1.933	2.594	3.410	3.852	7.624	11.653	13.552	15.184
Korea	8.653	8.797	11.928	16.690	17.132	15.780	15.142	15.618	14.874	12.232	12.026
Laos	1.600	0.855	1.371	3.108	3.619	6.488	8.858	11.839	12.311	12.932	13.322
Malaysia	29.795	17.078	14.031	26.031	21.498	16.981	20.182	21.173	25.681	25.969	28.570
Mongolia	4.646	2.416	2.627	6.546	8.309	9.632	12.082	14.886	17.943	21.060	23.450
Myanmar	2.187	2.707	2.068	2.477	3.034	3.504	4.431	7.188	10.566	6.615	8.419
Nepal	1.341	1.449	1.484	1.165	1.562	5.969	6.691	8.199	9.893	11.789	13.682
Philippines	0.957	3.943	5.578	6.536	5.689	6.930	7.676	9.232	11.089	14.240	16.953
Singapore	8.726	7.294	8.539	9.844	11.527	12.944	14.017	15.195	16.124	15.708	15.730
Sri Lanka	11.297	12.676	9.162	10.169	8.049	10.087	7.530	12.958	17.541	18.216	20.137
Papua New Guinea	10.964	12.563	7.425	11.098	10.910	15.181	13.706	17.018	18.456	19.338	16.171
Thailand	0.853	2.658	4.871	10.376	12.448	13.880	16.468	26.659	21.174	24.021	26.419
Vietnam	0.856	1.609	2.392	8.610	8.452	10.599	20.166	13.128	15.206	14.266	15.686
Japan	25.840	26.603	20.816	14.451	11.886	11.225	10.947	11.866	23.824	24.786	24.816
Bangladesh	6.830	10.846	15.374	15.909	11.903	17.190	21.109	24.112	24.958	24.630	34.644
Pakistan	0.855	1.198	4.729	6.213	7.389	7.444	9.253	11.233	12.930	15.366	27.999

Table B1. Continue

Years	2015	2016	2017	2018	2019	2020	2021	2022
Cambodia	37.977	43.476	36.818	41.994	47.259	54.288	67.805	39.873
China	30.561	33.171	35.109	67.871	62.880	64.791	66.500	66.992
India	13.709	15.836	18.876	23.444	28.875	31.239	32.042	45.122
Indonesia	32.209	26.607	30.274	32.786	35.332	24.724	25.553	24.575
Korea	23.651	24.385	25.322	25.958	26.526	27.654	29.799	18.778
Laos	15.364	47.718	50.633	33.794	33.992	38.934	47.199	54.531
Malaysia	22.600	30.649	15.403	20.481	25.143	29.953	22.895	25.210
Mongolia	25.193	26.988	28.763	31.357	27.808	48.382	59.778	54.557
Myanmar	10.187	12.390	19.064	20.866	55.469	55.729	57.913	57.913
Nepal	22.756	24.461	25.596	34.549	40.670	43.761	49.436	53.620
Philippines	29.758	33.014	35.582	38.365	48.165	47.828	48.657	48.657
Singapore	20.206	18.813	20.422	20.032	19.683	22.389	33.649	32.331
Sri Lanka	22.402	62.614	47.781	48.570	51.499	52.962	55.855	56.789
Papua New Guinea	59.222	65.397	62.557	58.215	53.720	57.136	54.025	32.762
Thailand	24.413	25.229	26.042	28.283	29.204	30.281	31.680	24.342
Vietnam	26.216	29.479	31.029	32.451	34.968	37.842	46.287	36.610
Japan	42.169	41.395	44.964	44.634	41.424	27.738	39.670	41.294
Bangladesh	37.873	30.862	33.639	34.280	34.315	31.610	39.904	34.559
Pakistan	44.654	47.705	55.029	53.723	57.042	64.151	74.418	75.077

Table B2. Pooled mean group of individual cross-sectional estimation for independent variables.

Models		Return on Equity (ROE)			Return on Assets (ROA)			Net Interest Margin (NIM)		
		Financial Inclusion Index	Inflation Rate	Interest Rate	Financial Inclusion Index	Inflation Rate	Interest Rate	Financial Inclusion Index	Inflation Rate	Interest Rate
China	(t)	0.358*** (0.000)	-0.037*** (0.000)	-0.023*** (0.000)	0.230*** (0.000)	0.009*** (0.001)	0.006*** (0.001)	-0.038*** (0.002)	0.048*** (0.000)	-0.003*** (0.002)
	(t-1)	0.234*** (0.000)	-0.105*** (0.000)	0.042*** (0.000)	0.195*** (0.000)	-0.077*** (0.000)	0.056*** (0.000)			
Japan	(t)	0.119 (0.496)	0.161*** (0.000)	-0.274 (0.365)	-0.068 (0.808)	0.172*** (0.000)	-0.420 (0.421)	-0.030*** (0.000)	0.004*** (0.000)	0.025*** (0.000)
	(t-1)	0.459* (0.094)	-0.114*** (0.000)	-0.712** (0.027)	0.238 (0.514)	-0.133*** (0.001)	-0.943* (0.053)			
India	(t)	-0.331 (0.576)	0.852* (0.059)	-0.131* (0.071)	-0.479 (0.677)	1.207 (0.127)	0.033 (0.745)	0.113*** (0.000)	-0.183*** (0.000)	-0.003*** (0.008)
	(t-1)	-0.135 (0.806)	1.116 (0.176)	-0.366*** (0.002)	-0.278 (0.804)	1.480 (0.344)	-0.199** (0.036)			

Models		Return on Equity (ROE)			Return on Assets (ROA)			Net Interest Margin (NIM)		
		Financial Inclusion Index	Inflation Rate	Interest Rate	Financial Inclusion Index	Inflation Rate	Interest Rate	Financial Inclusion Index	Inflation Rate	Interest Rate
Korea	(t)	0.130 (0.401)	0.207*** (0.000)	0.052*** (0.001)	0.454* (0.062)	0.073* (0.098)	0.073*** (0.001)	-0.076*** (0.004)	0.078*** (0.000)	0.097*** (0.000)
	(t-1)	0.256* (0.094)	0.015 (0.244)	0.083*** (0.001)	-0.731** (0.011)	-0.036** (0.036)	-0.216*** (0.000)			
Indonesia	(t)	0.083 (0.240)	-0.091 (0.230)	-0.127*** (0.009)	0.305 (0.141)	0.116 (0.549)	-0.126** (0.030)	0.190*** (0.000)	-0.096*** (0.000)	-0.008*** (0.000)
	(t-1)	0.208** (0.048)	0.038 (0.517)	-0.076** (0.013)	0.357* (0.066)	0.489** (0.049)	-0.003 (0.929)			
Thailand	(t)	-0.739 (0.103)	0.076*** (0.001)	-0.125** (0.048)	-0.745** (0.036)	0.065*** (0.001)	-0.149** (0.013)	0.077*** (0.000)	0.042*** (0.000)	0.034*** (0.000)
	(t-1)	0.201 (0.337)	0.064*** (0.005)	0.008 (0.781)	-0.025 (0.858)	0.111*** (0.000)	0.071** (0.031)			
Singapore	(t)	0.172*** (0.015)	0.054*** (0.000)	0.042*** (0.000)	0.409** (0.015)	0.036*** (0.000)	0.088*** (0.000)	-0.166 (0.114)	0.011*** (0.000)	0.074*** (0.000)
	(t-1)	-0.467*** (0.000)	0.042*** (0.000)	-0.014*** (0.000)	0.015 (0.859)	0.010*** (0.000)	0.071*** (0.000)			
Bangladesh	(t)	0.618*** (0.001)	0.747*** (0.000)	0.139*** (0.000)	0.622*** (0.004)	0.589*** (0.003)	0.135*** (0.001)	0.215** (0.046)	-0.281*** (0.005)	0.013 (0.194)
	(t-1)	-0.588*** (0.002)	-0.408*** (0.001)	0.150*** (0.000)	-0.612*** (0.004)	-0.826*** (0.001)	0.124*** (0.001)			
Philippines	(t)	0.386 (0.795)	0.384*** (0.009)	0.521*** (0.008)	0.328 (0.787)	0.006** (0.039)	0.385** (0.019)	-0.092*** (0.004)	-0.121*** (0.000)	-0.034** (0.021)
	(t-1)	-0.500 (0.141)	-0.276** (0.034)	-0.132* (0.091)	0.053 (0.564)	-0.132* (0.081)	-0.141 (0.165)			
Vietnam	(t)	0.077 (0.292)	0.281*** (0.001)	-0.084** (0.022)	0.302** (0.028)	0.463*** (0.000)	0.167*** (0.005)	-0.190*** (0.000)	0.011* (0.093)	0.089*** (0.000)
	(t-1)	-0.410*** (0.008)	0.177*** (0.003)	-0.094** (0.041)	-0.048 (0.556)	0.127** (0.028)	-0.026 (0.461)			
Malaysia	(t)	0.947* (0.090)	0.225*** (0.003)	0.085 (0.141)	0.470 (0.245)	0.119** (0.015)	0.040 (0.371)	-0.075 (0.159)	-0.009** (0.046)	-0.003 (0.332)
	(t-1)	0.047 (0.878)	0.009 (0.702)	-0.032 (0.165)	-0.097 (0.737)	-0.129*** (0.006)	-0.129*** (0.004)			
Pakistan	(t)	0.586 (0.425)	-0.527 (0.2736)	0.072 (0.638)	1.081 (0.195)	-0.584 (0.286)	-0.362 (0.110)	-0.057 (0.138)	-0.129** (0.014)	0.105*** (0.000)
	(t-1)	-2.398** (0.017)	-0.696 (0.172)	-0.570** (0.021)	-2.314** (0.035)	-0.936 (0.158)	-0.614** (0.012)			
Sri Lanka	(t)	-0.050 (0.268)	-0.034** (0.041)	0.060*** (0.008)	0.416*** (0.005)	0.160*** (0.003)	-0.149*** (0.003)	0.080*** (0.000)	0.019*** (0.000)	-0.058*** (0.000)
	(t-1)	0.388***	0.036*	0.005	-0.198*	0.109**	-0.301***			

Models		Return on Equity (ROE)			Return on Assets (ROA)			Net Interest Margin (NIM)		
		Financial Inclusion Index	Inflation Rate	Interest Rate	Financial Inclusion Index	Inflation Rate	Interest Rate	Financial Inclusion Index	Inflation Rate	Interest Rate
		(0.001)	(0.063)	(0.467)	(0.075)	(0.014)	(0.000)			
Myanmar	(t)	1.462 (0.246)	-0.256 (0.234)	0.537 (0.292)	1.514 (0.136)	-0.272 (0.117)	0.518 (0.181)	1.004*** (0.002)	-0.037* (0.053)	0.121*** (0.004)
	(t-1)	1.993 (0.129)	0.205 (0.345)	-0.894** (0.016)	1.683 (0.106)	0.198 (0.255)	-0.880*** (0.008)			
Nepal	(t)	0.057 (0.808)	0.033 (0.153)	-0.085* (0.085)	0.637*** (0.004)	-0.101*** (0.001)	0.038** (0.028)	0.030* (0.075)	-0.090*** (0.000)	0.010** (0.038)
	(t-1)	0.054 (0.686)	-0.138** (0.046)	0.177 (0.179)	0.387*** (0.003)	-0.226*** (0.000)	-0.130** (0.026)			
Papua New Guinea	(t)	0.264*** (0.000)	0.025*** (0.008)	-0.005*** (0.009)	0.021*** (0.000)	0.080*** (0.000)	0.011*** (0.000)	0.154 (0.327)	0.253*** (0.007)	0.166*** (0.000)
	(t-1)	0.368*** (0.000)	0.041*** (0.002)	-0.037*** (0.000)	0.015*** (0.000)	0.025*** (0.000)	0.005*** (0.000)			
Cambodia	(t)	-0.040 (0.464)	0.014 (0.161)	-1.638 (0.442)	0.122*** (0.000)	0.088*** (0.000)	-0.311 (0.405)	0.031*** (0.000)	-0.004*** (0.000)	-0.010 (0.617)
	(t-1)	0.068 (0.149)	0.015* (0.068)	-0.029 (0.941)	0.131*** (0.001)	0.047*** (0.001)	0.028 (0.712)			
Mongolia	(t)	0.713 (0.009)	0.046 (0.005)	-0.161 (0.000)	0.289 (0.117)	-0.037** (0.011)	-0.151*** (0.000)	-0.138*** (0.003)	0.005 (0.123)	0.006*** (0.008)
	(t-1)	0.996 (0.000)	0.082 (0.002)	-0.130 (0.000)	0.744*** (0.000)	0.034** (0.014)	-0.124*** (0.000)			
Laos	(t)	-0.303 (0.286)	0.124 (0.010)	-0.076 (0.629)	-0.483 (0.315)	-0.474*** (0.001)	-0.678 (0.785)	0.024 (0.288)	-0.002 (0.180)	0.138 (0.111)
	(t-1)	0.068 (0.606)	-0.496*** (0.001)	-1.246* (0.081)	-0.1160 (0.626)	-0.237* (0.066)	-0.536 (0.514)			

Note: (*), (**) and (***) indicate the respective 10%, 5% and 1% significance.

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