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Enhancing economic growth through financial inclusion: An ARDL analysis

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ABSTRACT

This study explores the crucial relationship between financial inclusion and economic growth, which has become a primary focus for policymakers, economists, and development practitioners worldwide. Financial inclusion aims to provide fair and unrestricted access to financial services, particularly for marginalised populations without traditional banking access. This study investigates how financial inclusion promotes economic growth by empowering individuals and businesses, fostering financial security, and stimulating entrepreneurship, innovation, and investment. Using rigorous analysis methods, the Autoregressive Distributed Lag (ARDL) approach, this study examines the cointegration effect between financial inclusion and economic growth in Malaysia's short- and long-term perspectives. The results indicate a positive impact of financial inclusion on economic growth, mainly through the number of mobile and internet banking transactions (MOBILE), Automatic Teller Machines (ATM), and the number of institutions of commercial banks (ICB). However, compared to other financial inclusion proxies, ICB shows a stronger association with long-term economic growth. Similarly, the initial income (A), trade openness (TRADE), and capital (K) significantly contribute to economic growth in the long run. Interestingly, labour appears to adversely affect economic growth in the long run for both Model 1 and 2. This phenomenon could be attributed to fluctuations in labour market conditions, including changes in workforce skill levels or demographic shifts. The findings underscore the transformative potential of financial inclusion in achieving sustainable development and poverty reduction.

INTRODUCTION

In recent years, stimulating inclusive economic growth has become a top priority for policymakers, economists, and development practitioners worldwide. At the core of this effort is the concept of financial

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inclusion - a comprehensive approach that aims to provide equitable and unrestricted access to financial services for all society's consumers, especially those demoted and lacking access to traditional banking services. As a result, the relationship between financial inclusion and economic growth has gained significant attention and has been subject to extensive empirical research (Chen et al., 2023; Ifediora et al., 2022; Jima & Makoni, 2023; Menyelim et al., 2021; Azimi, 2022; Nwisienyi & Obi, 2020; Emara & El Said, 2021; Ozili, 2020). Countries increasingly recognise the importance of inclusive financial systems in driving economic development and reducing social and economic inequalities.

Financial inclusion is witnessing a global upswing. From 2014 to 2017, approximately 515 million adults across the world initiated the process of account opening either at financial institutions or via mobile money platforms. This denotes an elevation from 62% to 69% of the adult population being account holders. Yet, even as this progress unfolds, the reality remains that a staggering 1.7 billion adults remain unbanked and prevailing disparities persist (Global Findex, 2021). In economies that are still developing, nearly 39% of adults or 57% of those who hold financial institution accounts undertook their inaugural account initiation with the specific intention of receiving wage payments or government disbursements. This percentage surges in certain economies. Notably, in India, Malaysia, and South Africa, a substantial 70% of account holders inaugurated their initial accounts at financial institutions for the sake of wage or government payments.

Numerous evidence from empirical studies has revealed the positive correlation between the extent of financial inclusiveness and economic growth (Obayori & George-anokwuru, 2020; Sethi & Sethy, 2018). The importance of financial inclusion in promoting economic growth and in reducing poverty levels within households and fostering cannot be overstated. Providing individuals and businesses with access to formal financial services fosters financial security and unlocks numerous opportunities for entrepreneurship, innovation, and investment. By efficiently allocating financial resources, financial inclusion can stimulate a positive cycle of economic progress, leading to sustainable development and poverty reduction.

In this research, we thoroughly investigate the relationship between financial inclusion and economic growth. Through rigorous analysis and empirical evidence using the Autoregressive Distributed Lag (ARDL) approach, we aim to determine whether there is any evidence of a cointegration effect between financial inclusion and economic growth in the long and short run.

This paper is organised as follows: first is an introduction. Followed by a comprehensive review of the relevant literature on financial inclusion and its relationship with economic growth. Next are the details of the methodology employed in this study, and continues with discussing our empirical findings and analysis. While the next part discusses the implications of our findings, and finally, the last part will offer policy recommendations and conclusions.

LITERATURE REVIEW

Financial inclusion positively impacts economic growth. Most previous studies support the positive relationship between financial inclusion and economic growth. They highlight that providing access to formal financial services, such as banking, credit, and insurance, contributes to increased productivity, investment, entrepreneurship, and overall economic development (Obayori & George-anokwuru, 2020; Sethi & Sethy, 2018). Additional research conducted by Babajide et al. (2015) in Nigeria found that the number of commercial bank branches per 1000 km2 or per 100,000 adults and commercial bank deposits (CMBD) significantly positively impacted total factor productivity. Various studies, including those by Sulong & Bakar (2018) and Sharma (2016), have employed diverse indicators, particularly in the banking sector, such as commercial bank branches, credit facilities, and Automatic Teller Machines (ATMs), all of which concur that financial inclusion stimulates growth in the respective countries. Additionally, an increase in bank branches (an indicator of financial inclusion) has been shown to enhance banking efficiency and overall economic growth (Beck et al., 2007).

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Numerous empirical studies have explored the impact of financial inclusion on economic growth in different contexts. For instance, Menyelim et al., (2021) examined the relationship between financial inclusion and economic growth in 48 Sub-Saharan African countries from 1995 to 2017. Using financial access indicators as proxies for financial inclusion, they found a negative effect of financial inclusion on the link between income inequality and economic growth. Similarly, Nwisienyi & Obi (2020) conducted a study in Nigeria from 2004 to 2018 to investigate the relationship between financial inclusion and economic growth. Employing the ARDL bounds test for cointegration and error correction model (ECM), they measured financial inclusion by the number of borrowers. Their findings also suggested an adverse effect of financial inclusion on economic growth in the Nigerian context.

It is clearly stated in the aforementioned studies that financial inclusion contributes to increased productivity, investment, entrepreneurship, and overall economic growth. However, due to inconclusive results, investigating using different proxies to understand situations in which financial inclusion might have an adverse effect or varying impact could provide valuable insights. Additionally, potential model specification issues in the empirical modelling of these studies could contribute to the adverse effect observed.

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THEORETICAL FRAMEWORK, DATA, AND METHODOLOGY

Theoretical Framework

As mentioned earlier, the objective of this study is to assess the influence of financial inclusion on economic growth in Malaysia while considering the effects of initial income (A), capital (K), labour (L), and trade. The study applies the Solow economic theory to examine the impact of financial inclusion on Malaysia's economic growth, utilising various proxies (MOBILE, ICB, ATM, and GVA). The essential Solow-Swan production function can be expressed as follows:

$$Y = AKL \qquad (1)$$

where:
Y = Output
A = Initial income
K = Capital
L = Labor

Hence, considering our study's objectives to assess financial inclusion's impacts on economic growth, we developed the following model based on Solow et al. (1956).

$$Y = A + \beta_1 K + \beta_2 L + \beta_3 FI + \beta_4 trade + \epsilon_t \qquad (2)$$

where:
Y = Economic Growth
A = Initial Income
K = Capital
L = Labor
FI = Financial Inclusion

In equation (2), the economic growth variable is represented by Y. For this study, proxies for financial inclusion (FI), namely MOBILE, ICB, ATM, and GVA, will be utilised. Additionally, other explanatory

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variables, including initial income (A), capital formation (K), labor force (L), and trade openness, are included as control measures in equation (2).

The term β_0 represents the constant, while β_1, β_2, β_3, β_4, and β_5 are the coefficients of the explanatory variables. Furthermore, following the approach of Liu et al. (2020), He et al. (2022), and Ansari & Villanthenkodath (2022), all the variables are transformed into log form to reduce skewness and attain more reliable results.

Data

The annual time-series data ranges from 2004 to 2021. The economic growth, initial income, capital formation, labour and trade data are derived from the World Development Indicators database (Demirgüç-Kunt, et al., 2022). All the financial inclusion data, including the number of mobile and internet banking transactions (MOBILE), number of institutions of commercial banks (ICB), number of Automated Teller Machines (ATMs) and gross value added as banks price (GVA) were obtained from the International Financial Statistic Database (IFS). Table 1 of supplementary material represents the detailed description and source of each variable used in this study.

Table 1. Description of data

Acronym	Variables Description	Data Source	Year
Y	GDP per capita	WDI	2004 - 2021
A	Initial Income	WDI	2004 - 2021
K	Capital Formation	WDI	2004 - 2021
L	Total population to represent labor force	WDI	2004 – 2021
Trade	X + M as a percentage of GDP	WDI	2004 – 2021
	Proxy for Financial Inclusion (FI):		
Mobile	(i) number of mobile and internet banking transactions		
ICB	(ii) number of institutions of commercial banks		
ATM	(iii) number of Automated Teller Machines		
GVA	(iv) gross value added as banks price		

Notes: World Development Indicator (WDI), World Bank; International Financial Statistic (IFS), International Monetary Fund (IMF)

Source: Authors' Estimation

Estimation Techniques

In empirical research, avoiding spurious outcomes is crucial. Spurious regression occurs when the regression factors lack constant means and variance, leading to erroneous results (Gujarati 2003). While panel unit root tests are commonly used to assess the stationarity properties of variables in econometrics, it has been discovered that a dynamic panel data approach is effective regardless of whether the evaluated variables are integrated at order zero (I(0)) or order one (I(1)). However, it is essential to note that none of the variables should be in the second difference (Pesaran and Smith 1995). The ARDL technique, proposed by Pesaran et al. (2001), represents a novel approach to detecting cointegration. If the F-statistic value from the bounds test is lower than the lower bound value in the Pesaran table, the null hypothesis indicates the absence of cointegration. On the other hand, if the F-statistic value exceeds the upper bound value, the cointegration model can be confirmed, indicating a long-run equilibrium.

In this study, the ARDL bound test has been utilised instead of the Johansen cointegration test as ARDL offers numerous advantages over the previously mentioned cointegration test. Several other studies have also employed a similar method to examine the relationship between financial inclusion and economic growth (Obayori & George-Anokwuru, 2020; Sethi & Acharya, 2018; Lenka & Sharma, 2017; Wakdok, 2018). One of the strengths of the ARDL model is its consistency with small datasets, making it applicable regardless of whether the variables are I(0) or I(1), or a combination of both. Moreover, it effectively addresses the issues of serial correlation and endogeneity of variables and estimates the short-run

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relationship by generating an error correction model (ECM) through a simple linear transformation (Ali et al., 2020; Xiong et al., 2023). The following equation represents the ARDL bounds test:

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} \Delta Y_{ti-1} + \sum_{i=1}^{n} \beta_{2i} \Delta A_{1\,ti-1} + \sum_{i=1}^{n} \beta_{3i} \Delta K_{2\,ti-1} + \sum_{i=1}^{n} \beta_{4i} \Delta L_{3\,ti-1} + \sum_{i=1}^{n} \beta_{5i} \Delta trade_{4\,ti-1} + \sum_{i=1}^{n} \beta_{6i} \Delta FI_{5\,ti-1} + \beta_{7i} Y_{ti-1} + \beta_{8i} A_{1\,ti-1} + \beta_{9i} K_{2i\,t-1} + \beta_{10i} L_{3i\,t-1} + \beta_{11i} trade_{4i\,t-1} + \beta_{12i} FI_{5i\,t-1} + e_t \quad (3)$$

In equation (3), Y denotes the dependent variable, X represents explanatory variables, and Δ shows the first difference. A long-run cointegration among variables exists in a specified model only if the null hypothesis of *β7 = β8 = β9 = β10 = β11 = β12*= 0 is rejected by the Wald test. As depicted in equation (3), after confirmation of cointegration association among variables through the bound testing approach, the short and long-run coefficients of equation (2) are estimated by employing *p1, q1, q2, ..., qn* ARDL models.

$$Y_t = \sigma_0 + \sum_{i}^{p1} \sigma_{1i}\, Y_{ti-1} + \sum_{i=0}^{q1} \sigma_{2i}\, A_{1\,ti-1} + \sum_{i=0}^{q2} \sigma_{3i}\, K_{2\,ti-1} + \sum_{i=0}^{q3} \sigma_{4i}\, L_{3\,ti-1} + \sum_{i=0}^{q4} \sigma_{5i}\, trade_{4\,ti-1} + \sum_{i=0}^{q5} \sigma_{6i}\, FI_{5\,ti-1} + e_t \quad (4)$$

The long-run dynamics of equation (2) are estimated by using the ARDL technique in equation (4), where long-run relationships in equation (1) are calculated using subsequent formulas, where *j = 1, 2, ..., 4* and *m = 2, 3, … ….,6.*

$$\sigma_0 = \frac{\sigma_0}{1 - \sum_{i=1}^{p\,ti} \sigma_{1\,j}} \quad (5)$$

$$\sigma_j = \frac{\sigma_m}{1 - \sum_{i=1}^{p\,ti} \sigma_{1\,j}} \quad (6)$$

The short-run dynamics of equation *(2)* are estimated using equation *(*7).

$$\Delta Y_t = \gamma_0 + \sum_{i=1}^{n} \sigma_{1i}\, Y_{ti-1} + \sum_{i=1}^{n} \sigma_{2i}\, \Delta A_{1\,ti-1} + \sum_{i=1}^{n} \sigma_{3i}\, \Delta K_{2\,ti-1} + \sum_{i=1}^{n} \sigma_{4i}\, \Delta L_{3\,ti-1} + \sum_{i=1}^{n} \sigma_{5i}\, \Delta trade_{4\,ti-1} + \sum_{i=1}^{n} \sigma_{6i}\, \Delta FI_{5\,ti-1} + \sum_{i=1}^{n} \sigma_{ni}\, ECT_{ti-1} + e_t \quad (7)$$

Various diagnostic tests, such as the Jarque-Bera (JB) test of normality, the Breusch-Pagan-Godfrey test of heteroskedasticity, and the Breusch-Godfrey LM test of serial correlation, are employed to identify any

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potential issues in the model. The study's estimation process is illustrated in Figure 1 based on Irfan et al. (2023).

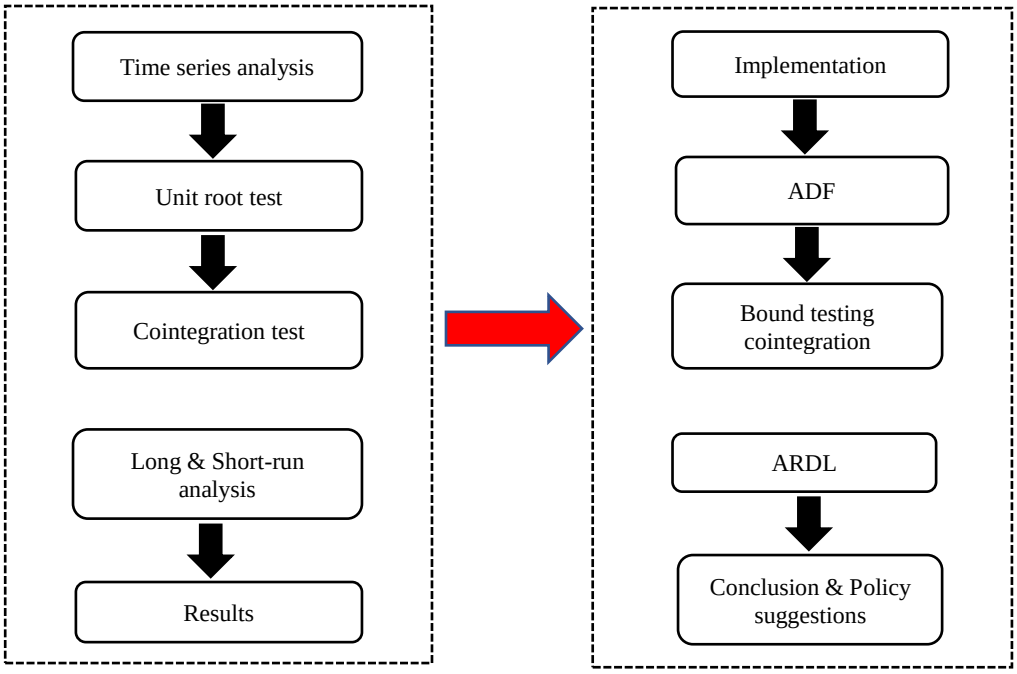

Fig. 1. Estimation flow of the study

Source: Adopted from Irfan et al. (2023)

RESULTS

Before conducting the estimation, all variables were transformed into logarithms to reduce the problem of heteroskedasticity in the data set. Table 2 presents the descriptive statistics of the main variables used in our analyses. Table 2 illustrates the mean, minimum, maximum and standard deviation for 18 observations.

Table 2. Descriptive statistics

Variables	Mean	Max.	Min.	St.Dev
Y	3.9456	4.0466	3.6923	0.1121
A	12.012	12.154	11.841	0.1032
K	1.3625	1.4229	1.2854	0.0405
L	1.6246	2.3034	1.0794	0.3883
TRADE	2.1817	2.3229	2.0676	0.0819
MOBILE	2.0576	2.1667	1.7609	0.1208
ICB	1.5875	1.6335	1.3979	0.0694
ATM	4.0010	4.1388	3.6938	0.1455
GVA	11.413	11.567	11.090	0.1470

Source: Authors' Estimation

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The ADF is used to ascertain the existence of the unit root of the data. The ADF is used to identify stationary at level or first difference. The results of the time series unit root test for the variables are summarised and presented in Table 3. According to the results from Table 3, the ADF test indicates that economic growth (Y), labour (L), initial income (A), gross value added as banks price (GVA), and capital formation (K) are stationary at level (I(1)) with significance levels of 1 percent. In addition, Table 3 also shows that all other variables, such as TRADE, MOBILE, ICB, and ATM, are stationary at level I(0) as well. Table 3 revealed that all variables are found stationary at level I(0) or at their first difference I(1), which satisfies the assumption of the ARDL model application. The output (Y) is stationary at I(1), fulfilling the requirement ARDL (Pesaran et al., 2001).

Table 3. Unit root test at level (with intercept and trend)

	ADF		
	Level	1st Diff	Integration Order
Y	-2.5766	-3.9278***	I(1)
A	-1.5319	-3.6920**	I(1)
K	-0.7991	-2.9417*	I(1)
L	-1.4255	-3.7289**	I(1)
TRADE	-3.1109**		I(0)
MOBILE	-4.2319***		I(0)
ICB	-4.7319***		I(0)
ATM	-3.5669**		I(0)
GVA	-2.5835	-3.8203**	I(1)

H_0: Unit Root; H1: No Unit Root.

Notes: *, ** and *** the t-value is significant at 1%, 5% and 10% significant level respectively

Source: Authors' Estimation

Before conducting the long- and short-run analysis, we performed bounds cointegration testing to examine the cointegration relationship between the explanatory variables and financial inclusion and economic growth. The aim is to determine if the variables in the study exhibit cointegration in the long run. The results in Table 4 show that all four estimated models are cointegrated. This conclusion is drawn from the fact that the calculated value of F surpasses the respective upper bound critical values at both the 1 percent and 5 percent levels of significance.

Table 4. Bound testing cointegration results

ARDL Model	F-stat	Lag order	Critical bound values			Cointegrate
			L-U (1%)	L-U (5%)	L-U (10%)	
Y (Y|A, K, L, TRADE, MOBILE)	7.7959***	1,1,1,1,1,1	4.13-5.76	2.91-4.19	2.40-3.51	*YES*
Y (Y|A, K, L, TRADE, ICB)	11.637***	1,0,1,1,1,0	4.13-5.76	2.91-4.19	2.40-3.51	*YES*
Y (Y|A, K, L, TRADE, ATM)	26.494***	1,1,1,0,1,1	4.13-5.76	2.91-4.19	2.40-3.51	*YES*
Y (Y|A, K, L, TRADE, GVA)	313.81***	1,1,1,0,1,1	4.13-5.76	2.91-4.19	2.40-3.51	*YES*

Notes: The unrestricted constant assumption is used in all models. Terms "L" and "U" respectively denote lower critical bound values and upper critical bound values.

Likewise, *** and ** respectively represent a cointegration relationship at 1% and 5% levels of significance.

Source: Author's Estimation

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Long and Short-run Estimates

This section presents the empirical results concerning both long-run and short-run dynamics. To examine the relationship between financial inclusion variables (MOBILE, ICB, ATM, and GVA), population (L), initial income (A), capital formation (K), TRADE, and economic growth (Y) in Malaysia, we employed the ARDL approach.

The findings presented in Table 5 reveal that the coefficients obtained from ARDL estimates for Model 1 indicate a positive and statistically significant association between A, TRADE, and MOBILE. The results indicates that the upward trends in initial income, trade, and financial inclusion in Malaysia positively influence economic growth (Y) in the long run.

Table 5. Long and short-run results

Variables	**Model 1**	**Model 2**	**Model3**	**Model 4**
Long run				
C	-12.3451*** (2.3518)	-4.9329 (4.7001)	-16.807*** (1.3382)	9.5264 (294.33)
A	0.7737*** (0.1726)	0.1596 (0.3385)	0.9697*** (0.0822)	-1.3096 (22.723)
K	0.0745 (0.1908)	0.4932 (0.3504)	0.1377 (0.0856)	-4.1012 (83.782)
L	-0.1798* (0.0849)	-0.4881** (0.1885)	0.0831* (0.0396)	1.2741 (25.469)
TRADE	2.1510*** (0.3338)	2.2965** (0.8823)	1.7346*** (0.2007)	-10.699 (217.97)
MOBILE	1.2201*** (0.0973)	-	-	-
ICB	-	1.3186*** (0.2736)	-	-
ATM	-	-	1.2500*** (0.0463)	-
GVA	-	-	-	3.0655 (42.606)
Short run				
ΔA	-0.6721** (0.2236)	-	0.9686*** (0.0806)	0.0157** (0.0005)
ΔK	-0.1737 (0.1007)	0.0685 (0.1453)	-0.0326*** (0.0579)	-0.0059** (0.0022)
ΔL	0.0748* (0.0372)	0.0463 (0.0535)	-	-
ΔTRADE	1.5419*** (0.1548)	0.9451*** (0.1954)	1.4057*** (0.0818)	-0.0191*** (0.0032)
ΔMOBILE	1.5859*** (0.1138)	-	-	-
ΔICB	-	-	-	-
ΔATM	-	-	1.0434*** (0.0573)	-
ΔGVA	-	-	-	1.0032*** (0.0016)
ECT	**-1.7808***** (0.1625)	**-0.9386***** (0.0763)	**-1.7613***** (0.0915)	**-0.0037***** (0.0000)
Diagnostics				
JB-Norm	0.4548 **(0.7966)**	0.3141 (0.8547)	2.0510 0.3586	1.3827 0.5009
LM Test	5.4426 (0.1004)	1.6519 (0.2813)	1.5949 (0.3095)	1.4157 (0.3428)
ARCH test	0.4831	1.4630	0.3609	0.7633

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	(0.8538)	(0.3150)	(0.9255)	(0.6640)
RAMSEY TEST	0.7955 (0.4228)	0.1199 (0.7410)	0.2642 (0.9688)	3.8463 (0.1071)

Notes: Standard errors are in parenthesis. *, **, and *** represent the level of significance at 10,5, and 1%, respectively.

Source: Authors' Estimation

The results from Model 1 demonstrate that a 1 percent increase in A leads to a 0.77 percent increase in economic growth in the long run. However, in the short run, there is a 0.67 percent decrease in economic growth, when GDP increase by 1 percent.

A 1 percent increase in financial inclusion (MOBILE) leads to a 1.22 percent rise in long run Malaysia's economic growth. In the short run, the increase in financial inclusion drives economic growth to rise by 1.59 percent, which is slightly higher than in the long run. The other proxies for financial inclusion, such as ICB and ATM, also demonstrate a positive and significant impact on Malaysia's economic growth in the long run (except for insignificant GVA). The results show that a 1 percent increase in commercial banks (ICB) is associated with a long-run acceleration of Malaysia's economic growth by 1.32 percent. However, this financial inclusion proxy does not significantly impact the short-run relationship. The number of Automated Teller Machines (ATMs) also displays a positive and significant relationship with economic growth in the long and short run. A 1 percent increase in ATM enhances economic growth in the long run by 1.25 percent and 1.04 percent in the short run. In the long run, gross value added as banks' prices (GVA) appear insignificant and have a positive relationship with economic growth. However, GVA shows a positive and significant impact in the short run, even at the 1 percent significance level. This means that a 1 percent increase in GVA will lead to a 1.00 percent rise in Malaysia's economic growth.

The TRADE exhibits a positive and significant impact on Malaysia's economic growth in both the long and short run for Models 1, 2, and 3. However, in Model 4, TRADE shows contrary results, indicating a different relationship with economic growth. Likewise, a 1 percent increase in TRADE affects the economic growth of Model 1, Model 2, and Model 3 by 1.54 percent, 0.95 percent, and 1.41 percent and reduces by 0.02 percent in Model 4 in the short run. In contrast, in the long term, a 1 percent upsurge in TRADE affects the economic growth of Model 1, Model 2, and Model 3 by 2.15 percent, 2.30 percent, and 1.74 percent, respectively.

In the long run, capital (K) positively correlates with Malaysia's economic growth in Models 1, 2, and 3; however, the association is statistically insignificant. In contrast, Model 4 yields different results but is still insignificant. In the short run, K demonstrates a negative relationship with Malaysia's economic growth in all Models except for Model 2. Only Model 3 and Model 4 exhibit significant relationships between K and economic growth in the short run. A 1 percent rise in K affects the Y of Model 3 and 4 inversely by 0.03 percent and 0.01 percent, respectively, in the short run.

In Models 1 and 2, labour (L) reveals a negative and significant relationship with economic growth in the long run, indicating an adverse impact on economic growth. A 1 percent increase in L drives economic growth to decline by 0.18 percent of Model 1, 0.48 percent of Model 2. However, in Model 3, the relationship between labour (L) and Malaysia's economic growth is positive and significant in the long run. A 1 percent rise in POP increases economic growth by 0.08 percent. Regarding the short-run relationship, the labour force (L) only shows a positive and significant association in Model 1. A 1 percent increase in L and 0.08 percent in economic growth will increase in the short run.

While ensuring robust and accurate results, several diagnostic tests have been conducted. The Jarque-Bera test statistics indicate that the residuals of all four models follow a normal distribution. Additionally, the F-statistics demonstrate that all the models are well-fitted. Furthermore, the Breusch Pagan-Godfrey and LM tests reveal that all models are free from heteroskedasticity and serial correlation. Moreover, all models' Error Correction Term (ECT) coefficients are significant and negative at the 1 percent level, which

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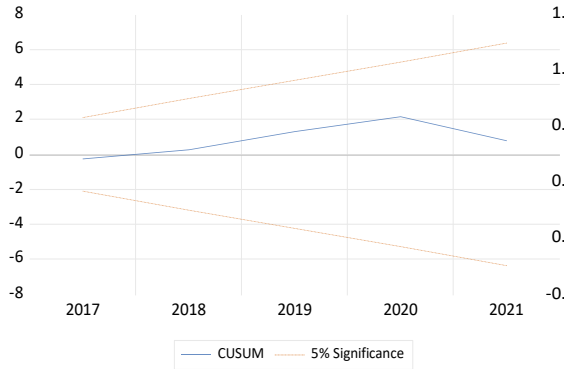
aligns with the assumptions of the ARDL approach. The ECT value provides insight into the speed of adjustment towards long-run equilibrium following a shock (Xiong et al., 2023). Additionally, to ensure the robustness of our models, we tested their stability using the cumulative sum of recursive residual (CUSUM) and cumulative sum of recursive residual square (CUSUMSQ) methods (Brown et al., 1975). Figure 2 displays the graphical results for CUSUM and CUSUMSQ, which indicate dynamic stability across all the models.

Model 1

CUSUM



CUSUMSQ

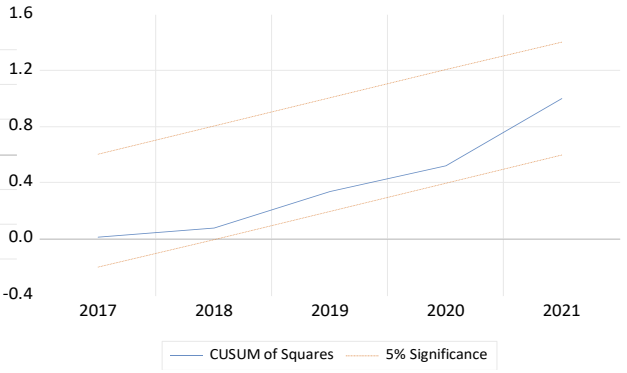
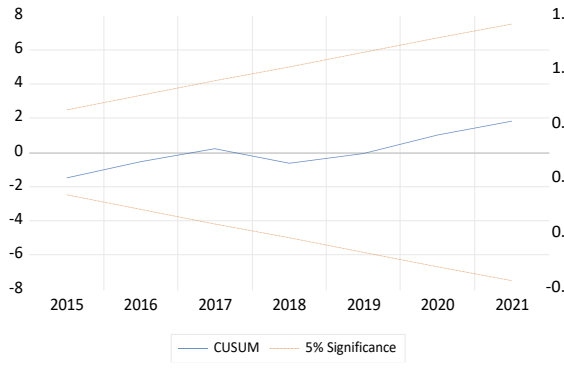


Fig. 2. CUSUM and CUSUMSQ for Model 1

Source: Authors' Estimation

Model 2

CUSUM



CUSUMSQ

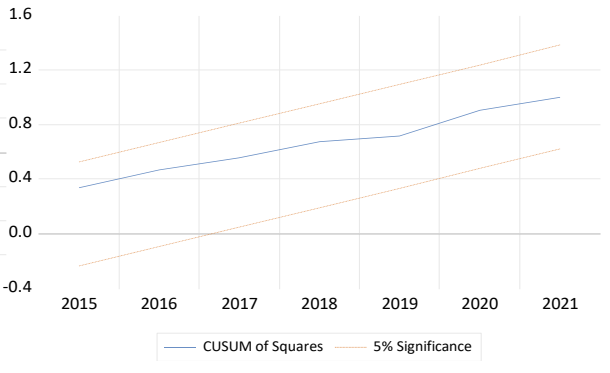


Fig. 3. CUSUM and CUSUMSQ for Model 2

Source: Authors' Estimation

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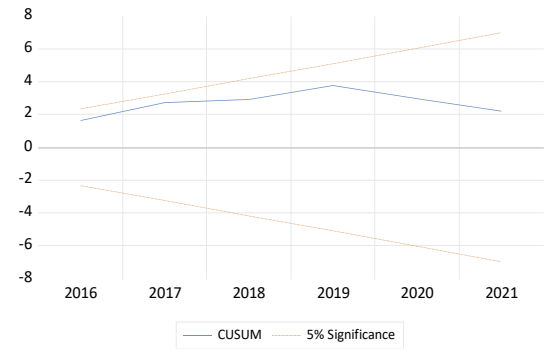
Model 3

CUSUM



CUSUMSQ

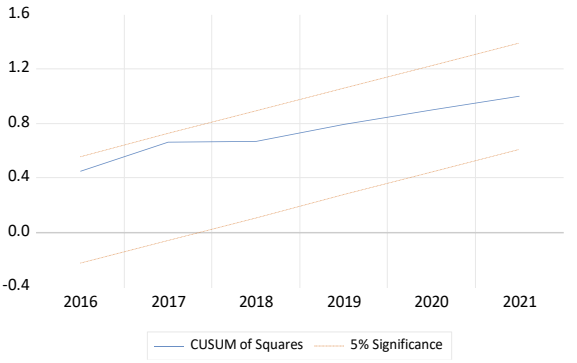
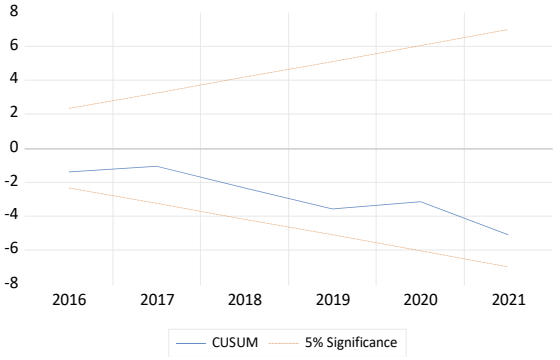


Fig. 4. CUSUM and CUSUMSQ for Model 3

Source: Authors' Estimation

Model 4

CUSUM



CUSUMSQ

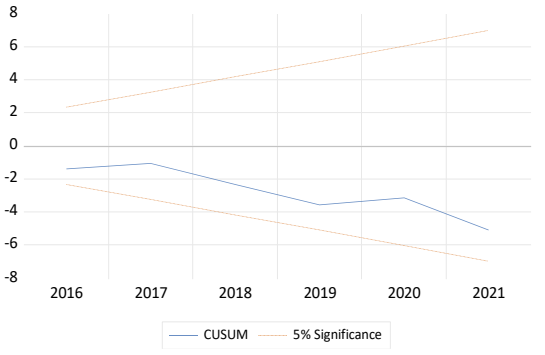


Fig. 5. CUSUM and CUSUMSQ for Model 4

Source: Authors' Estimation

DISCUSSION

The expansion of financial inclusion will substantially contribute to economic growth by fostering investment, entrepreneurship, consumption, and economic stability, lowering income inequality and

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allowing individuals and communities to engage more actively in the economy. The role of governance and policy environment, initiatives implemented by the government, the contextual factors such as internal conflicts, regional dynamics, institutional settings, tailored policies, and the short-run and long-run relationships across different regions or countries have led researchers to explore the role of financial inclusions in promoting economic growth.

Recently, financial inclusions have been recognised as a new possibility to increase access of credit and capital and boost economic growth. The increased access to credit and capital through financial inclusion empowers entrepreneurs and small enterprises, initiating a cycle of economic activity, job creation, innovation, and poverty reduction. This function is an essential driver of economic growth and development in any community of a country. Nevertheless, easy access to credit contributes to several negative impacts, such as high levels of debt, increased non-performing loans if borrowers cannot pay for the debt, reduced saving influenced by increased investment, and the implementation of financial inclusion initiatives can be costly for the government, financial institutions, and other stakeholders. Despite the disadvantages, financial inclusion still contributes positively to economic growth in the long run. Our empirical result regarding the role of financial inclusions in short run and long run can be supported by several empirical studies (Dai et al., 2022; Huang et al., 2021; Ifediora et al., 2022; Jima, 2023; Menyelim et al., 2021; Azimi, 2022; Obayori & George-anokwuru, 2020) conducted by taking overall relationship of financial inclusion and economic growth in difference aspect.

Our study focused on the impact of various financial inclusion proxies, trade, capital, and labour on Malaysia's economic growth in both the short and long run. Our findings highlight the crucial role of financial inclusion in driving economic growth in Malaysia. MOBILE positively impact economic growth in the short run and the long run, but the impact is even more pronounced in the short run. Similarly, proxies such as ICB and ATM exhibit significant and positive relationships with economic growth in the long run, underlining the importance of access to formal financial services in stimulating economic activity.

While TRADE demonstrates a positive and significant impact on economic growth in Models 1, 2, and 3, Model 4 shows a contrasting result, with a marginal decrease in economic growth due to TRADE. This deviation in Model 4 could be attributed to various external factors, such as changes in global trade dynamics or trade policy shifts, impacting Malaysia's economic performance differently. To fully understand this discrepancy, policymakers may need to investigate these external factors and their implications on the country's economic growth. Our analysis indicates an insignificant relationship between capital and economic growth in the long run in Models 1, 2, and 3. This observation could be linked to other factors not considered in the models, such as technological advancements or the efficiency of investment utilisation. However, in the short run, Models 3 and 4 demonstrate significant relationships between capital and economic growth, highlighting the importance of short-term capital investments in influencing financial performance.

The relationship between labour (L) and economic growth exhibits varying patterns across models. Models 1 and 2 suggest a negative impact in the long run, while Model 3 demonstrates a positive relationship. These contrasting results could be attributed to fluctuations in labour market conditions, such as changes in workforce skill levels or demographic shifts. In the short run, Model 1 shows a positive and significant relationship, indicating that short-term increases in labour contribute to economic growth. Our findings align with previous research that highlights the positive impact of financial inclusion on economic growth. However, the actual results related to TRADE and capital (K) warrant further investigation and comparison with existing literature to identify potential factors contributing to the variation.

CONCLUSIONS AND POLICY RECOMMENDATIONS

As mentioned earlier, our results emphasise the significance of promoting financial inclusion, as it plays a crucial role in fostering economic growth in both the short and long term. Therefore, to strengthen economic

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activity, policymakers should focus on initiatives that enhance access to formal financial services, such as mobile banking and increased ATM availability. Moreover, understanding the factors influencing trade dynamics and capital formation can inform targeted policies to maximise their positive contributions to economic growth. Addressing labour force challenges and ensuring appropriate workforce skill development is essential for sustaining economic growth in the long run.

One limitation of our study is the reliance on specific proxies to measure financial inclusion, trade, and capital formation. Future research could explore alternative proxies and methodologies to validate the robustness of our findings. Additionally, the study's scope may not capture all relevant variables affecting economic growth, necessitating further investigations into additional determinants. Further research could focus on the dynamic relationship between financial inclusion and economic growth, considering changes in the financial landscape over time. Additionally, exploring the impact of specific trade policies and examining capital allocation efficiency could provide valuable insights for policymakers seeking to optimise economic growth strategies. In conclusion, our research underscores the vital role of financial inclusion in driving economic growth in Malaysia. Understanding the complex relationships between financial inclusion, trade, capital formation, and the labour force is critical for formulating effective policies that promote sustainable economic development and reduce socio-economic disparities.

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CONFLICT OF INTEREST STATEMENT

The authors agree that this study was conducted without any self-interest, commercial, or financial conflicts.

AUTHORS' CONTRIBUTIONS

Shahiszan Ismail provided technical expertise, conducted literature review, and wrote the manuscript. Jamilah Laidin helped to data analysis and interpretation, wrote the manuscript and submission the manuscript.

REFERENCES

Ali, S., Zhang, J., Azeem, A., & Mahmood, A. (2020). Impact of electricity consumption on economic growth: An application of vector error correction model and artificial neural networks. *The Journal of Developing Areas, 54*(4). https://doi.org/10.1353/jda.2020.0039

Azimi, M. N. (2022). New insights into the impact of financial inclusion on economic growth: A global perspective. *PLoS ONE, 17*(11), 1–25. https://doi.org/10.1371/journal.pone.0277730

Ansari, M. A., & Villanthenkodath, M. A. (2022). Does tourism development promote ecological footprint? A nonlinear ARDL approach. *Anatolia, 33*(4), 614–626. https://doi.org/10.1080/13032917.2021.1985542

Babajide, A. A., Adegboye, F. B., & Omankhanlen, A. E. (2015). Financial inclusion and economic growth in Nigeria. *International Journal of Economics and Financial Issues, 5*(3), 629–637. https://doi.org/10.38157/business-perspective-review.v2i2.149

Beck, T., Demirguc-Kunt, A., & Martinez Peria, M. S. (2007). Reaching out: Access to and use of banking services across countries. *Journal of Financial Economics, 85*(1), 234–266. https://doi.org/10.1016/j.jfineco.2006.07.002

Brown, R. L., Durbin, J., & Evans, J. M. (1975). Techniques for testing the constancy of regression relationships over time. *Journal of the Royal Statistical Society, Series B (Methodological), 37*(2), 149–192. http://www.jstor.org/stable/2984889

Chen, Z., Ali, S., Lateef, M., Imran Khan, A., & Khalid Anser, M. (2023). The nexus between asymmetric financial inclusion and economic growth: Evidence from the top 10 financially inclusive economies. *Borsa Istanbul Review, 23*(2), 368–377. https://doi.org/10.1016/j.bir.2022.11.004

Dai, X., Qian, S., & Zhang, J. (2022). Sustainable financial inclusion as a source of green environment? Evidence from selected regional comprehensive economic partnership countries. *Economic Research-Ekonomska Istrazivanja, 35*(1), 5719–5738. https://doi.org/10.1080/1331677X.2022.2035244

Demirgüç-Kunt, A., Klapper, L., Singer, D., & Ansar, S. (2022). The Global Findex Database 2021: Financial inclusion, digital payments, and resilience in the age of COVID-19. World Bank Publications. https://www.worldbank.org/en/publication/globalfindex/Report

Emara, N., & El Said, A. (2021). Financial inclusion and economic growth: The role of governance in selected MENA countries. *International Review of Economics & Finance, 75*, 34–54. https://doi.org/10.1016/j.iref.2021.03.014

Gujarati, D. N. (2003). *Basic econometrics*. McGraw-Hill Companies.

He, B., Li, L., Wang, J., Li, J., & Zhu, L. (2022). Investigating the influence of tourism on economic growth and carbon emissions: Evidence from Hainan Island, China. *Journal of Quality Assurance in Hospitality & Tourism, 24*(3), 237–252. https://doi.org/10.1080/1528008X.2022.2029666

Huang, R., Kale, S., Paramati, S. R., & Taghizadeh-Hesary, F. (2021). The nexus between financial inclusion and economic development: Comparison of old and new EU member countries. *Economic Analysis and Policy, 69*, 1–15. https://doi.org/10.1016/j.eap.2020.10.007

Ifediora, C., Offor, K. O., Eze, E. F., Takon, S. M., Ageme, A. E., Ibe, G. I., & Onwumere, J. U. J. (2022). Financial inclusion and its impact on economic growth: Empirical evidence from sub-Saharan Africa. *Cogent Economics and Finance, 10*(1). https://doi.org/10.1080/23322039.2022.2060551

Irfan, M., Ullah, S., Razzaq, A., Cai, J., & Adebayo, T. S. (2023). Unleashing the dynamic impact of tourism industry on energy consumption, economic output, and environmental quality in China: A way forward towards environmental sustainability. *Journal of Cleaner Production, 387*, 135778. https://doi.org/10.1016/j.jclepro.2022.135778

Jima, M. D., & Makoni, P. L. (2023). Financial inclusion and economic growth in Sub-Saharan Africa—A panel ARDL and Granger Non-Causality Approach. *Journal of Risk and Financial Management, 16*(6), 299. https://doi.org/10.3390/jrfm16060299

Lenka, S. K., & Sharma, R. (2017). Does financial inclusion spur economic growth in India? *The Journal of Developing Areas, 51*(3), 215–228. https://doi.org/10.1353/jda.2017.0069

Liu, M., Ren, X., Cheng, C., & Wang, Z. (2020). The role of globalisation in CO_2 emissions: A semi-parametric panel data analysis for G7. *Science of the Total Environment, 718*, 137379. https://doi.org/10.1016/j.scitotenv.2020.137379

https//doi.org/10.24191/smrj.v20i2.24316

Menyelim, C. M., Babajide, A. A., Omankhanlen, A. E., & Ehikioya, B. I. (2021). Financial inclusion, income inequality and sustainable economic growth in Sub-Saharan African Countries. *Sustainability*, *13*(4), 1780. https://doi.org/10.3390/su13041780

Nwisienyi, K.J. & Obi, O.A. (2020). An analysis of financial inclusion and economic growth in Nigeria; an ARDL approach. *International Journal of Research and Innovation in Social Science*, *4*(10), 126–134. https://doi.org/10.47772/IJRISS.2021.5113

Obayori, J. B., & George-Anokwuru Chioma Chidinma B. (2020). Financial inclusion and economic growth in Nigeria. *Business Perspective Review*, *2*(2), 46–56. https://doi.org/10.38157/business-perspective-review.v2i2.149

Ozili, P. K. (2020). Financial inclusion research around the world: A review. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3515515

Pesaran, M. H., & Smith, R. (1995). Estimating long-run relationships from dynamic heterogeneous panels. *Journal of Econometrics*, *68*(1), 79–113. https://doi.org/10.1016/0304-4076(94)01644-F

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, *16*(3), 289–326. https://doi.org/10.1002/jae.616

Sethi, D., & Acharya, D. (2018). Financial inclusion and economic growth linkage: some cross country evidence. *Journal of Financial Economic Policy*, *10*(3), 369–385. https://doi.org/10.1108/jfep-11-2016-0073

Sharma, D. (2016). Nexus between financial inclusion and economic growth: Evidence from the emerging Indian economy. *Journal of Financial Economic Policy*, *8*(1), 13–36. https://doi.org/10.1108/JFEP-01-2015-0004

Sulong, Z., & Bakar, H. O. (2018). The role of financial inclusion on economic growth: theoretical and empirical literature review analysis. *Journal of Business & Financial Affairs*, *7*(4), 2167–0234. https://doi.org/10.4172/2167-0234.1000356

Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, *70*(1), 65–94. https://doi.org/10.2307/1884513

Wakdok, S.S. (2018). The impact of financial inclusion on economic growth in Nigeria: An econometric analysis. *International Journal of Innovation and Research in Educational Sciences*, *5*(2), 237–245. https://www.ijires.org/administrator/components/com_jresearch/files/publications/IJIRES_1247_FINAL.pdf

Xiong, C., Khan, A., Bibi, S., Hayat, H., & Jiang, S. (2023). Tourism subindustry level environmental impacts in the US. *Current Issues in Tourism*, *26*(6), 903–921. https://doi.org/10.1080/13683500.2022.2043835