Theoretical and Applied Economics
Volume XXXII (2025), No. 1(642), Spring, pp. 103-124

Quantitative insights into the impact of financial inclusion on economic growth: an econometric evaluation of Arab countries (2011-2022)

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Abstract. *This study aims to analyze the influence of financial inclusion on economic growth in Arab countries between 2011 and 2022, focusing on key indicators such as bank account ownership, access to financial services, and borrowing trends. The study highlights the main role of financial inclusion in promoting economic stability and supporting underserved communities across the region.*

Using Feasible Generalized Least Squares (FGLS) within a fixed effects framework, the research addresses econometric challenges, including heteroskedasticity and autocorrelation, to accurately capture relationships within the data. Cluster analysis further categorizes countries based on financial inclusion performance, identifying leaders like the UAE, Bahrain, and Saudi Arabia, with Iraq ranking lower.

Findings reveal a statistically significant positive impact of access to bank accounts on economic growth, affirming the role of financial inclusion in driving economic stability. While access to financial services strongly correlates with growth, other indicators, such as borrowing levels, show weaker or insignificant effects, suggesting that broader financial access alone may not fully drive economic growth without supportive policies.

Keywords: Financial Inclusion, Economic Growth, Feasible Generalized Least Squares, Cluster Analysis, Arab Countries.

JEL Classification: G21, O40, C13, C38, O53.

Introduction

Financial inclusion has emerged as a significant factor in promoting economic development by providing access to basic financial services for all members of community. It refers to the process of ensuring that individuals and businesses, particularly those from underserved communities, can access affordable and appropriate financial products and services. These services include banking, credit, insurance, and savings, which are necessary for improving financial security and fostering economic growth. In recent years, the global movement towards financial inclusion has gained pace, particularly in developing regions, as policymakers recognize its potential to reduce poverty, improve social equity, and promote sustainable development.

In the Arab region, financial inclusion efforts have produced inconsistent outcomes. While countries such as the United Arab Emirates and Bahrain have made significant advancements in expanding access to financial services, others like Algeria and Iraq continue to face challenges in fully integrating their populations into the formal financial system. The disparities in financial inclusion across the region are influenced by various factors, including economic development levels, technological infrastructure, financial literacy, and regulatory environments. Understanding these differences is very important for identifying effective strategies to enhance financial inclusion and, in turn, promote economic growth.

This study aims to highlight the impact of financial inclusion on economic growth across a group of Arab countries during the period 2011-2022. By examining key financial inclusion indicator, such as bank account ownership, access to financial services, and borrowing trends, this research seeks to uncover the relationship between financial inclusion and economic development. The study employs econometric techniques, including feasible generalized least squares (FGLS) and cluster analysis, to analyze data from multiple Arab nations, providing insights into how financial inclusion contributes to growth and highlighting the region's leading and lagging performers.

Study Objectives

The objectives of this study are as follows:

1. To investigate the impact of financial inclusion on economic development within a selected group of Arab countries during the period 2011-2022.
2. To analyze the role of financial inclusion in promoting financial and economic stability across Arab nations, highlighting its contribution to sustainable growth.
3. To assess the disparities in financial inclusion levels among Arab countries, with a focus on the leading economies such as the United Arab Emirates, and the lagging performance of countries like Algeria.
4. To evaluate the influence of innovative banking technologies on enhancing financial inclusion and their effectiveness in reaching underserved populations.
5. To explore the potential of financial inclusion as a driver for poverty reduction and economic growth in Arab economies, examining the mechanisms through which it supports development.

Literature Review

Financial inclusion (FI) has emerged as a critical factor in promoting economic growth and development. Siddiki and Bala-Keffi (2024) highlight the theoretical benefits of FI, arguing that increased financial intermediation accelerates money circulation, thus fostering economic growth. They suggest that FI plays a pivotal role in facilitating economic activity and productivity, providing a theoretical foundation for understanding the various dimensions of FI's impact on economic growth.

Several studies have established a positive relationship between FI and economic growth. Kim, Yu, and Hassan (2018) highlight how global commitments to FI, particularly in the Organization of Islamic countries, result in long-term income growth and sustainable development. Using a panel vector autoregression (VAR) model, they reveal a bidirectional relationship between FI and economic growth in OIC countries. Mallick et al. (2016) explore the non-linear relationship between financial development and economic growth, concluding that FI contributes to resource efficiency, thereby enhancing economic development. Chauvet and Jacolin (2017) find that FI positively impacts firm performance, particularly in emerging markets, by improving competitiveness and productivity.

Regional and country-specific studies further support these findings. Van Dinh and Nguyen (2019) prove that FI promotes economic development in Asia-Pacific countries by improving socioeconomic outcomes through enhanced financial services. Adedokun and Aga (2021) focus on Sub-Saharan Africa, demons (Smith, et al., 2003) suggesting that FI significantly fosters economic development in the region. Hasan et al. (2024) show that FI has a significant positive impact on economic growth in Bangladesh, demonstrating a strong correlation between FI and GDP growth. Their study concludes with policy recommendations emphasizing the role of FI in poverty reduction and economic development in developing nations. Additionally, Hussain et al. (2024) provide comparative evidence from developed and developing Asian countries, finding a strong long-term positive relationship between FI and economic growth, with the effects more pronounced in developing nations.

However, the impact of FI may vary across different economic levels. Sahay et al. (2015) suggest that while increased financial access can stimulate economic growth, this effect may diminish or even turn negative in certain developed countries. This finding reinforces the need for tailored FI policies, a conclusion supported by Karim et al. (2022), who argue that FI has a stronger growth-enhancing effect in developing and emerging markets compared to developed economies.

Various factors influence the effectiveness of FI in promoting economic growth. Demirgüc-Kunt and Klapper (2013) argue that FI levels vary across countries due to income differences, which further impact economic growth. Zins and Weill (2016) show that factors such as wealth, education, and gender significantly influence FI in Africa, which in turn affects economic outcomes. Owen and Pereira (2018) focus on variables such as bank concentration and financial stability, finding that these factors significantly affect economic growth by enhancing financial access.

The banking sector and financial regulation play crucial roles in shaping the impact of FI. Anarfo et al. (2020) examine the role of financial regulation in enhancing FI, showing that

effective regulation improves financial stability, which subsequently supports economic growth. Kebede et al. (2021) emphasizes that an excessive presence of foreign banks can reduce FI, potentially limiting economic growth. This suggests that FI must be balanced with appropriate banking policies to maximize its benefits. Ahamed et al. (2021) further show that inclusive banking improves overall bank performance, emphasizing the importance of the banking sector in fostering FI.

Technological advancements have also significantly influenced the relationship between FI and economic growth. Pradhan and Sahoo (2021) find that mobile financial services, in combination with FI, contribute to economic growth by increasing access to banking in underserved regions. Yakubi et al. (2020) find that digital financial inclusion drives socio-economic development, particularly in low-income countries.

Governance and human capital are additional factors that shape the impact of FI. Emara and El Said (2021) argue that good governance intensifies the positive effects of FI on growth, especially in countries with underdeveloped financial sectors. Boachie and Adu-Darko (2024) confirm the positive relationship between FI and economic growth, emphasizing the role of human capital in encouraging economic development.

The impact of FI extends beyond direct economic growth to broader social and economic outcomes. Neaime and Gaysset (2018) demonstrate that FI helps reduce income inequality and improve financial stability, both of which are essential for long-term economic growth. Khan et al. (2022) show that FI reduces poverty and income inequality in African countries, which further stimulates economic growth. Datta and Singh (2019) compare FI with the Human Development Index (HDI), demonstrating that FI significantly contributes to societal well-being by improving human development indicators. This corresponds with Sahay et al.'s (2015) findings, which highlight FI's dual impact on both economic growth (GDP) and social development (HDI).

FI also plays a role in promoting financial stability and mitigating the effects of economic crises. Ahamed and Mallick (2019) conclude that higher FI levels promote bank stability, which is critical for sustained economic growth. Lopez and Winkler (2019) provide evidence that higher levels of FI help reduce the adverse effects of financial crises, stabilizing economies during turbulent times.

Sector-specific impacts of FI have also been observed. Hu et al. (2021) examine the effect of FI on agricultural productivity, finding that FI significantly boosts productivity, especially in areas with higher financial access. This highlights FI's potential to drive growth in specific economic sectors. Furthermore, Hajilee and Niroomand (2019) investigate the short-term impact of FI on trade openness, showing that FI plays a crucial role in stimulating economic growth through its influence on trade activities.

While the benefits of FI are well-documented, it's equally important to consider the consequences of financial exclusion. Andreoni et al. (2008) draw attention to the severe consequences of financial exclusion, which exacerbates poverty and inequality. Their work highlights that individuals or regions lacking access to financial services face compounded issues, including unemployment, low income, and unstable environments. This financial

exclusion leads to further social disparity, reinforcing the gap between rich and poor, and ultimately hindering national economic development.

In conclusion, the literature consistently demonstrates a positive relationship between FI and economic growth, with particular emphasis on its impact in developing and emerging economies. However, the effectiveness of FI is influenced by various factors, including socioeconomic conditions, banking sector characteristics, technological advancements, and governance. As Le et al. (2019) point out, there is a positive relationship between FI and financial efficiency, underscoring that an inclusive financial system enhances resource allocation, which is crucial for economic growth.

Study Methodology

This study investigates the relationship between financial inclusion and economic growth across Arab countries over a specified period. Data on various financial inclusion indicators were collected for the years 2011, 2014, 2017, and 2021, covering countries such as Algeria, Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Saudi Arabia, Tunisia, and the UAE. The financial inclusion indicators included the percentage of adult individuals owning bank accounts, access to financial services such as credit cards and ATMs, usage of bank accounts for payments, savings in official financial institutions, and borrowing from these institutions.

To assess the suitability of the data for analysis, the Kolmogorov-Smirnov test was applied to determine whether the variables followed a normal distribution. Given that the variables did not exhibit normal distribution behavior, a hierarchical clustering method was employed. This clustering was based on the squared Euclidean distance to group countries with similar financial inclusion characteristics.

For the econometric evaluation, the study explored different models to determine the most appropriate one for analyzing the relationship between financial inclusion and economic growth. To address potential issues of heteroskedasticity and autocorrelation in the panel data, the Feasible Generalized Least Squares (FGLS) method was employed. These issues are prevalent when analyzing economic data across countries and time periods, where variances and correlations within each country's data points can vary significantly. Unlike Ordinary Least Squares (OLS), which assumes homoscedasticity and no autocorrelation, FGLS corrects for both by adjusting the standard errors, leading to more precise parameter estimates. This adjustment is essential because the variability in economic characteristics across countries (heteroskedasticity) and the temporal relationships within each country's data (autocorrelation) could otherwise distort the results. FGLS was chosen because it efficiently handles these challenges, ensuring that the econometric model accurately captures the relationship between financial inclusion indicators and economic growth, thereby enhancing the reliability of the study's findings.

The F-test, Breusch-Pagan test, and Hausman test were applied to evaluate model fit and specification. Based on these tests, the fixed effects model was selected for the analysis, allowing for a robust examination of the potential link between financial inclusion and economic growth across the selected countries.

Financial Inclusion Indicators in Arab Countries

Financial inclusion plays a crucial role in fostering economic development, particularly in the Arab region. Key indicators that measure financial inclusion in these countries include the percentage of personal bank account holders in official financial institutions, which demonstrates the basic access to financial services. Another essential metric is access to accounts, highlighting the availability and ease with which individuals can open and use financial accounts. The utilization of bank accounts further illustrates the frequency of account usage for transactions. Additionally, savings in formal financial institutions provide insight into financial security and economic behavior, while borrowing from official financial institutions show access to credit and financing opportunities. These indicators collectively assess the financial integration of populations across Arab nations.

1. Personal Bank Account Holders in Official Financial Institutions

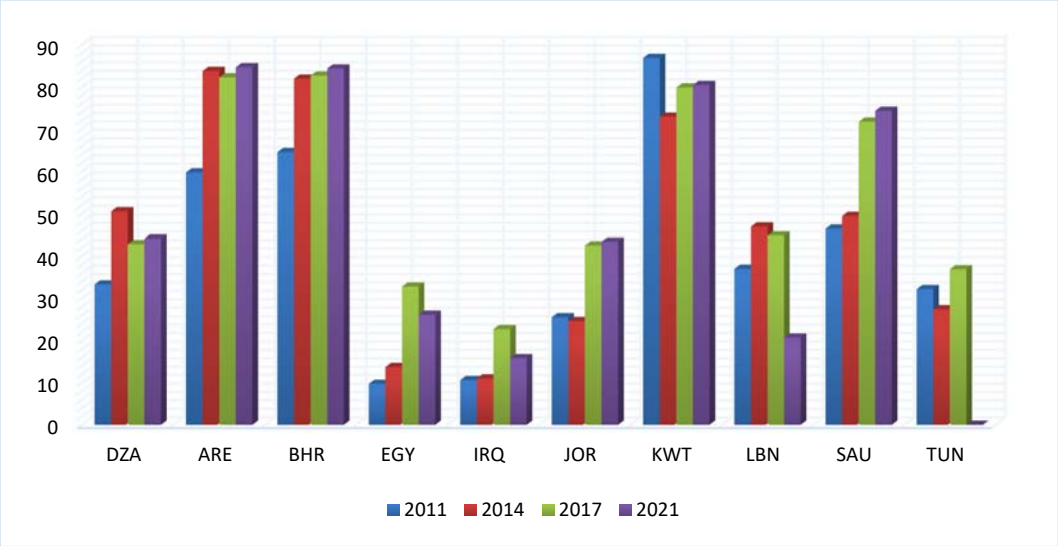
The percentage of personal bank account holders in official financial institutions measures the proportion of individuals with access to formal banking services. It reflects the level of financial inclusion and economic participation. In Arab countries, increasing account ownership is vital for improving access to financial resources and fostering economic growth.

Table 01. *Personal Bank Account Holders in Official Financial Institutions*

	Algeria	UAE	Bahrain	Egypt	Iraq	Jordan	Kuwait	Lebanon	Saudi Arabia	Tunisia
2011	33.3	59.7	64.5	9.7	10.6	25.5	86.8	37.0	46.4	32.2
2014	50.5	83.7	81.9	13.7	11.0	24.6	72.9	46.9	49.4	27.4
2017	42.8	82.2	82.6	32.8	22.7	42.5	79.8	44.8	71.7	36.9
2021	44.1	84.6	84.3	26.1	15.8	43.4	80.4	20.7	74.3	35.7

Source: World Bank Open Data (2024).

Figure 01. *Trends in Bank Account Ownership Among Arab Countries*



Source: World Bank Open Data (2024).

The data on the possession of bank accounts from 2011 to 2021 reveals distinct trends in financial inclusion across several countries. Tunisia's account ownership fluctuated, starting at 32.2% in 2011, dropping to 27.4% in 2014, then rising to 36.9% by 2017, before a slight decrease to 35.7% in 2021. In contrast, Saudi Arabia showed consistent growth, with account ownership rising from 46.4% in 2011 to 74.3% by 2021. Lebanon experienced a mixed trend, with a rise from 37% in 2011 to 46.9% in 2014, followed by a sharp drop to 20.7% by 2021, likely due to the country's financial and political challenges. Kuwait maintained high levels of account ownership, ranging from 86.8% in 2011 to a slight dip at 81.7% in 2021, while Jordan made notable progress, increasing from 25.5% in 2011 to 43.4% in 2021.

Comparing the countries, Tunisia and Lebanon faced greater instability, indicating challenges in sustaining financial inclusion efforts. Saudi Arabia and Kuwait exhibited stronger performance, with steady and high levels of account ownership. Iraq and Egypt started with lower levels, with Iraq growing modestly from 10.6% in 2011 to 15.8% by 2021, while Egypt saw an increase from 9.7% in 2011 to 32.8% in 2017, followed by a decline to 26.1% in 2021. Bahrain and the UAE demonstrated consistently high financial inclusion, with Bahrain rising from 64.5% in 2011 to 84.3% in 2021, and the UAE maintaining account ownership rates in the 80% range throughout the period. Algeria, after a notable rise from 33.3% in 2011 to 50.5% in 2014, showed a slight decline to 44.1% by 2021.

In conclusion, the data highlights diverse outcomes in financial inclusion across the region. Saudi Arabia, Kuwait, Bahrain, and the UAE demonstrated consistent improvement, while Tunisia, Lebanon, and Algeria experienced more fluctuations. These trends reflect varying success in financial inclusion initiatives and the influence of political and economic stability on financial access across the region.

2. Access To Accounts in Official Financial Institutions

Access to accounts in official financial institutions enhances the ease with which individuals can open and maintain financial accounts. It indicates the availability of banking services and infrastructure, helping to reduce financial exclusion. Improved access is essential for economic empowerment and broader financial inclusion in Arab countries.

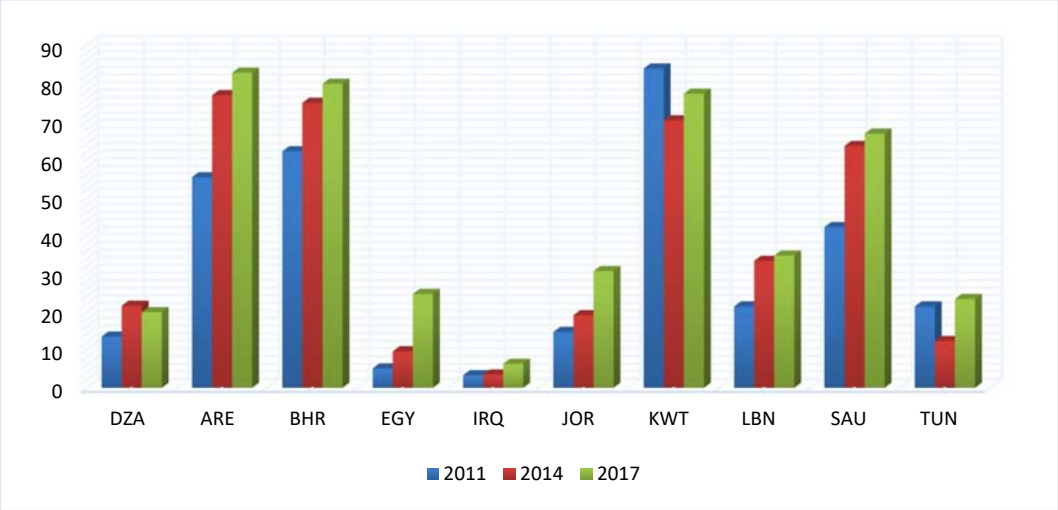
Table 02. *Index of Access to Accounts in Official Financial Institutions*

	Algeria	UAE	Bahrain	Egypt	Iraq	Jordan	Kuwait	Lebanon	Saudi Arabia	Tunisia
2011	13.5	55.4	62.2	5.1	3.3	14.7	83.9	21.4	42.3	21.4
2014	21.6	76.9	74.9	9.6	3.5	19.1	70.3	33.4	63.6	12.3
2017	19.9	82.8	79.9	24.7	6.3	30.7	77.3	34.8	66.8	23.4

Source: World Bank Open Data (2024)

The data highlights trends in access to accounts in official financial institutions across ten countries from 2011 to 2017. Tunisia experienced fluctuations, with access dropping from 21.4% in 2011 to 12.3% in 2014, then increasing to 23.4% in 2017, showing inconsistent progress. Saudi Arabia demonstrated substantial growth, with access rising from 42.3% in 2011 to 66.8% by 2017, indicating significant strides in financial inclusion. Lebanon also showed improvement, increasing from 21.4% in 2011 to 34.8% in 2017, despite political and economic challenges.

Figure 02. *Accessibility of Financial Accounts in Arab Countries*



Source: World Bank Open Data (2024)

In comparison, Kuwait maintained high levels of access, starting at 83.9% in 2011 and stabilizing at 77.3% in 2017, with only minor dips in between. Jordan more than doubled its access rate, from 14.7% in 2011 to 30.7% in 2017, reflecting strong improvements in financial outreach. Iraq's progress was slow, rising from 3.3% in 2011 to just 6.3% by 2017. Egypt showed notable growth, from 5.1% in 2011 to 24.7% in 2017. Bahrain and the UAE consistently performed well, with Bahrain increasing from 62.2% to 79.9%, and the UAE from 55.4% to 82.8% over the same period. Algeria saw an initial rise from 13.5% in 2011 to 21.6% in 2014, followed by a slight decline to 19.9% in 2017.

In conclusion, the data reveals varying progress in financial inclusion. Saudi Arabia, Bahrain, and the UAE showed consistent growth, reflecting successful initiatives. Jordan and Egypt made significant advancements, while Lebanon and Kuwait experienced moderate but stable improvements. Tunisia, Algeria, and Iraq, however, displayed slower or inconsistent progress, highlighting the need for further efforts in these regions.

3. The Use of Bank Accounts

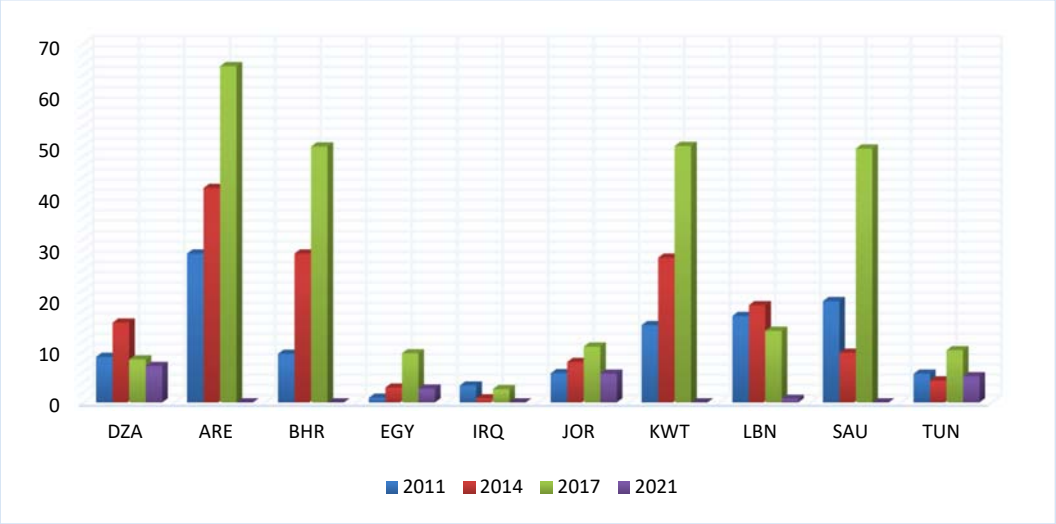
The use of bank accounts measures how frequently individuals engage in financial transactions such as deposits, withdrawals, or payments through official financial institutions. This indicator provides the practical integration of banking services into daily life. In Arab countries, increasing account usage is key to enhancing financial literacy and fostering economic stability.

Table 03. *The Indicator of the Use of Bank Accounts*

	Algeria	UAE	Bahrain	Egypt	Iraq	Jordan	Kuwait	Lebanon	Saudi Arabia	Tunisia
2011	8.9	29.1	9.5	0.9	3.3	5.7	15.1	16.9	19.8	5.6
2014	15.6	41.8	29.1	2.9	0.8	7.9	28.3	19.0	9.7	4.3
2017	8.4	65.6	49.9	9.6	2.6	10.9	50.0	14.0	49.5	10.2
2021	7.1	-	-	2.7	3 .2	5.6	-	0.7	-	5.1

Source: Source: World Bank Open Data (2024).

Figure 03. *Usage Frequency of Bank Accounts in Selected Arab Countries*



Source: World Bank Open Data (2024)

The data reveals varying patterns in the use of bank accounts across the observed countries from 2011 to 2021. Tunisia displayed an inconsistent trend, with account usage fluctuating over the years. Saudi Arabia experienced substantial growth, peaking in 2017, reflecting successful financial inclusion efforts. In contrast, Lebanon saw an initial increase, followed by a sharp decline to nearly negligible levels by 2021, likely due to economic instability. Kuwait showed steady growth, reaching its highest point in 2017, while Jordan demonstrated moderate progress, though account usage slightly decreased by 2021. Iraq remained relatively stagnant, with minimal usage throughout the observed period, likely due to political instability. Egypt saw a rise in account usage until 2017, but a notable decline followed. Bahrain and the UAE showed strong performance, with consistent increases in account usage until 2017, though data for 2021 is unavailable. Algeria, similar to Tunisia, experienced fluctuations, with an increase in 2014 followed by a decline by 2021.

In comparison, countries like Saudi Arabia, Kuwait, and the UAE showed strong and steady growth in bank account usage, highlighting effective financial inclusion strategies. Jordan and Egypt also made moderate progress, though both experienced declines by 2021. Conversely, Lebanon and Iraq struggled with limited or declining account usage, reflecting the challenges of economic and political instability. Tunisia and Algeria showed inconsistent patterns, with usage rising at certain points but declining again later on.

In conclusion, the data demonstrates mixed outcomes in financial inclusion efforts across the region. While countries like Saudi Arabia, Kuwait, and the UAE made significant advancements in increasing bank account usage, others, particularly Lebanon and Iraq, faced setbacks or stagnation. These trends highlight the varied success of financial inclusion initiatives and the influence of broader socio-economic conditions on account usage in these regions.

4. Savings in Formal Financial Institutions

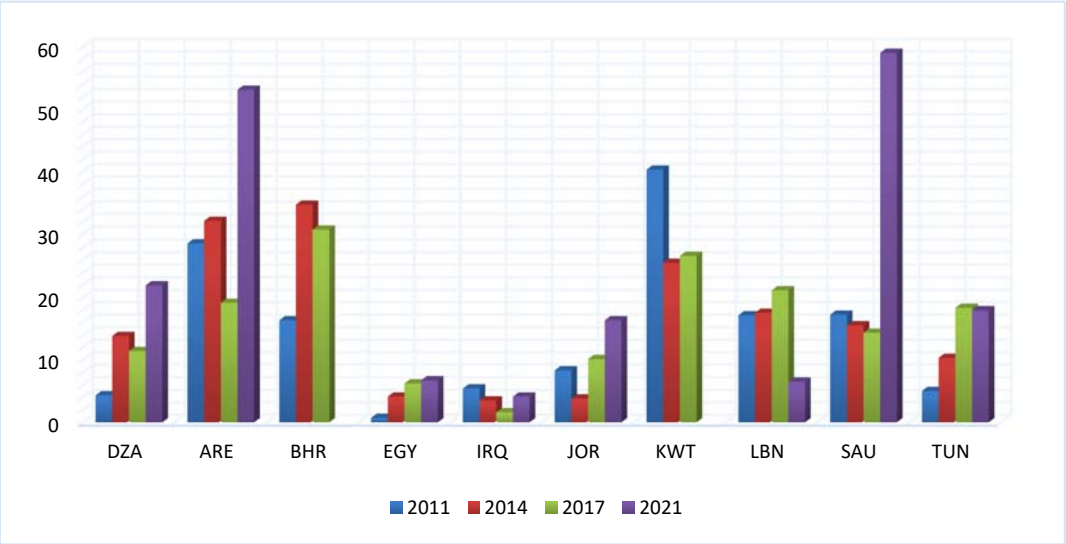
Savings in formal financial institutions track the percentage of individuals who securely store their funds in official banking systems. This indicator reflects financial security and long-term planning. In Arab countries, promoting savings in formal institutions is crucial for strengthening economic resilience and fostering personal financial growth.

Table 04. *The Index of Saving in Official Financial Institutions*

	Algeria	UAE	Bahrain	Egypt	Iraq	Jordan	Kuwait	Lebanon	Saudi Arabia	Tunisia
2011	4.3	28.6	16.3	0.7	5.4	8.3	40.3	17.1	17.2	5
2014	13.8	32.1	34.7	4.1	3.5	3.8	25.5	17.5	15.5	10.3
2017	11.4	19.1	30.7	6.2	1.6	10.1	26.6	21.1	14.3	18.3
2021	21.9	53.1	-	6.7	4.1	16.3	-	6.5	59	17.9

Source: World Bank Open Data (2024).

Figure 04. *Savings Behavior in Formal Financial Institutions Across Arab Countries*



Source: World Bank Open Data (2024)

Table 04 and Figure 04 present the savings index in official financial institutions across various countries from 2011 to 2021, revealing significant variations in savings behavior influenced by socio-economic conditions. In 2011, Kuwait led with the highest savings index at 40.3%, followed by the UAE at 28.6%, and Saudi Arabia at 17.2%, reflecting strong savings cultures and the high-income levels among citizens in these countries. On the lower end, Egypt 0.7% and Algeria 4.3% exhibited weaker savings behavior, likely due to economic challenges or limited access to financial services.

By 2014, there were notable fluctuations across countries. Bahrain saw a substantial rise from 16.3% to 34.7%, while Kuwait experienced a sharp decline to 25.5% Tunisia's savings index increased from 5% to 10.3%, showing improvement in financial inclusion, while Egypt made a modest recovery, rising to 4.1%. These variations reflect differing impacts of economic policies and reforms on savings behavior.

In 2017, Tunisia and Lebanon continued their upward trends, with Tunisia reaching 18.3% and Lebanon 21.1%. However, savings in Saudi Arabia and Kuwait declined further, and the UAE and Bahrain also saw decreases compared to 2014. Egypt's savings index showed slight improvement to 6.2 %, possibly due to latest macroeconomic reforms. By 2021, Saudi Arabia's index reached an impressive 59%, signaling a robust financial system, though data were missing for Kuwait and Bahrain. Lebanon's index dropped drastically to 6.5%, likely due to its ongoing economic crisis, while Tunisia, Jordan, and Algeria showed stability or slight improvements.

In conclusion, the savings index data reveal diverse trends across countries, with Saudi Arabia and the UAE showing significant progress in financial inclusion, while Lebanon and Iraq faced notable struggles. Economic stability, policy reforms, and improved access to financial services are key factors that have shaped the savings behavior across the region.

5. Borrowing from Official Financial Institutions

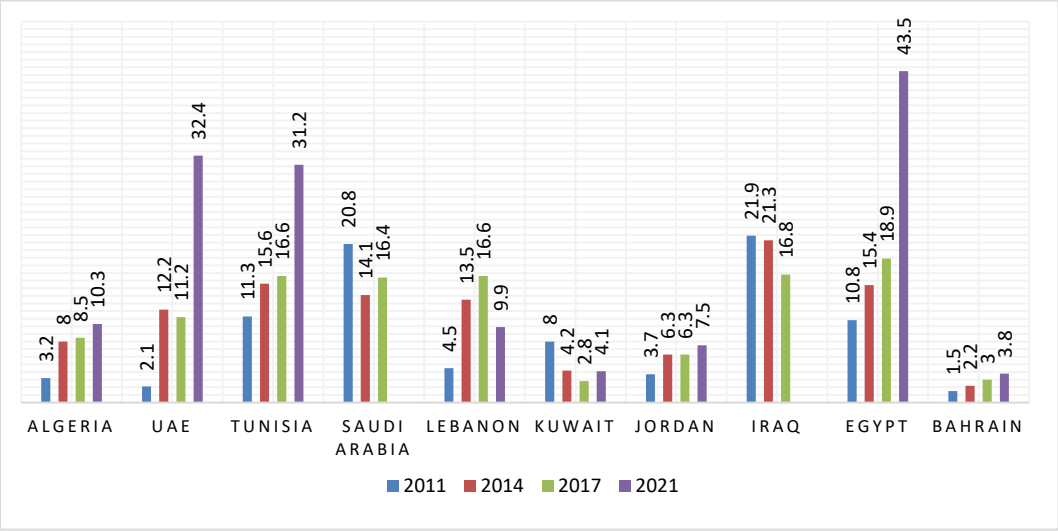
Borrowing from official financial institutions measures the extent to which individuals access credit through formal banking channels. This indicator reflects the availability of financing for personal or business needs. In Arab countries, increasing access to borrowing supports economic development by enabling investments and fostering entrepreneurship.

Table 05. *Index of Borrowing from Official Financial Institutions*

	Algeria	UAE	Bahrain	Egypt	Iraq	Jordan	Kuwait	Lebanon	Saudi Arabia	Tunisia
2011	1.5	10.8	21.9	3.7	8.0	4.5	20.8	11.3	2.1	3.2
2014	2.2	15.4	21.3	6.3	4.2	13.5	14.1	15.6	12.2	8.0
2017	3.0	18.9	16.8	6.3	2.8	16.6	16.4	16.6	11.2	8.5
2021	3.8	43.5	-	7.5	4.1	9.9	-	31.2	32.4	10.3

Source: World Bank Open Data (2024).

Figure 05. *Borrowing Trends from Official Financial Institutions in Arab Countries*



Source: World Bank Open Data (2024).

The data on borrowing from official financial institutions from 2011 to 2021 reveals diverse trends across several countries, influenced by economic conditions, financial access, and credit policies. In 2011, Kuwait had the highest borrowing index at 20.8 %, followed by Bahrain at 21.9%, indicating strong borrowing activity in these countries. Lebanon 11.3% and Iraq 8 % also showed relatively high borrowing rates, while Algeria 1.5%, Tunisia 3.2%, and Egypt 3.7 % recorded much lower levels, likely reflecting limited access to credit or less developed financial infrastructure.

By 2014, borrowing increased in most countries, with Saudi Arabia rising significantly to 12.2 % and Jordan following closely at 13.5 %, both signaling improved credit access. Tunisia saw a notable jump to 8 %, while Kuwait's index declined to 14.1%, indicating reduced borrowing activities. Algeria and Iraq continued to show low borrowing levels, with only slight improvements. In 2017, Lebanon, Jordan, and the UAE experienced consistent growth, with Lebanon and Jordan both reaching 16.6 %, while the UAE increased to 18.9 %, reflecting rising reliance on financial institutions. Kuwait rebounded to 16.4% after its 2014 dip, while Iraq's borrowing index decreased slightly, likely due to ongoing economic instability.

By 2021, significant developments occurred, particularly in Saudi Arabia, where borrowing surged to 32.4%, and Lebanon's index jumped to 31.2% despite the country's economic challenges. The UAE saw the most substantial increase, reaching 43.5%, indicating strong financial activity, while Tunisia's borrowing continued to rise to 10.3%. Missing data for Kuwait and Bahrain limit analysis for these countries. Algeria's borrowing index remained low at 3.8%.

Overall, the data shows increased credit access in countries like Saudi Arabia, Lebanon, and the UAE, but also persistent disparities in borrowing levels, with Algeria and Iraq lagging behind. This underscores the divergent pace of financial inclusion and credit expansion across the region, influenced by a range of factors including economic growth, regulatory reforms, variations in banking culture, and the prevailing types of financial institutions) whether conventional or Islamic) shaped by religious and cultural consideration.

The Impact of Financial Inclusion of Economic Growth in Arab Countries 2011-2022

This study employs cluster analysis on Financial Inclusion indicators for Arab countries. The analysis encompasses the following variables:

- **X1:** Index of adult individuals owning bank accounts in official financial institutions.
- **X2:** Index of access to accounts in official financial institutions.
- **X3:** The index of bank account usage.
- **X4:** Savings index in official financial institutions.
- **X5:** Index of borrowing from official financial institutions.
- **X6:** Indicator of individuals owning debit cards issued by financial institutions.
- **X7:** Indicator of individuals owning credit cards issued by financial institutions.

The analysis was conducted for the following countries: Algeria, Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Saudi Arabia, Tunisia, and the UAE. The detailed results are presented in the following table.

Table 06. *Classification of Countries According to the Highest and Lowest Value of Financial Inclusion Indicators*

Indicators	X1	X2	X3	X4	X5	X6	X7
Lowest value	Iraq	Iraq	Iraq	Iraq	Iraq	Iraq	Iraq
Highest value	Bahrain	UAE	UAE	Bahrain	UAE	Bahrain	UAE

Source: World Bank Open Data.

It appears from the above table that the United Arab Emirates and Bahrain occupy the top of the Arab countries in their application of financial inclusion according to the selected indicators, while Iraq is in the last ranks among the Arab countries selected in their application of financial inclusion.

1. Cluster Analysis of Financial Inclusion Indicators

Cluster analysis of financial inclusion indicators provides a powerful tool for identifying patterns and grouping countries based on their financial inclusion characteristics. By analyzing key indicators such as personal bank account ownership, access to financial accounts, usage of banking services, savings behavior, and borrowing trends, this method allows for a deeper understanding of how different nations in the Arab region compare and contrast. This approach helps policymakers target interventions more effectively by identifying clusters of countries with similar financial inclusion profiles, guiding efforts to improve access to and use of financial services across the region.

1.1. Testing The Normal Distribution of Data

It is important to verify in advance that the selected measurements and indicators follow a normal distribution. Several statistical tests can be used for this purpose, and in this case, the Kolmogorov-Smirnov test was applied. The results are presented in the table 07:

Table 07. *Results of the Kolmogorov-Smirnov Test*

One-Sample Kolmogorov-Smirnov Test								
N		x1	x2	x3	x4	x5	x6	x7
		10	10	10	10	10	10	10
Normal Parametersa,b	Mean	53,88	44,66	27,07	15,94	11,71	41,94	14,67
	Std. Deviation	22,74	28,87	23,57	9,015	6,16	27,95	14,40
Most Extreme Differences	Absolute	0,255	0,234	0,310	0,103	0,276	0,204	0,200
	Positive	0,255	0,234	0,310	0,093	0,122	0,204	0,200
	Negative	-0,183	-0,179	-0,229	-0,103	-0,276	-0,158	-0,186
Kolmogorov-Smirnov Z		0,807	0,739	0,981	0,326	0,874	0,646	0,633
Asymp. Sig. (2-tailed)		0,533	0,645	0,291	1,000	0,429	0,798	0,818

Source: SPSS Outputs.

From the results shown in table 07, it is evident that the chosen indicators for the study follow a normal distribution, as indicated by the Kolmogorov-Smirnov Z values, which are all less than the critical value. Furthermore, the probability values (Asymp. Sig. (2-tailed)) for all indicators exceed 0.05, further confirming the acceptance of the assumption that the data follow a normal distribution.

1.2. Presentation and Analysis of Results

The statistical software SPSS25 was used to perform cluster analysis on a group of Arab countries, applying variables related to financial inclusion using the Hierarchical Clustering method. Based on this approach, the following results were obtained:

- *Proximity Matrix*

The proximity matrix was derived using the clustering method based on the squared Euclidean distance. The results are summarized in the table below:

Table 08. *The Results of the Proximity Matrix*

Proximity Matrix										
Case	Correlation between Vectors of Values									
	1:dza	2:bhr	3:egy	4:irq	5:jor	6:kwt	7:lbn	8:sau	9:tun	10:are
1:dza	1,000	,811	,931	,937	,887	,839	,940	,772	,934	,686
2:bhr	,811	1,000	,931	,630	,852	,965	,867	,982	,656	,929
3:egy	,931	,931	1,000	,828	,968	,940	,965	,910	,825	,826
4:irq	,937	,630	,828	1,00	,797	,699	,824	,615	,890	,579
5:jor	,887	,852	,968	,797	1,000	,843	,951	,838	,769	,696
6:kwt	,839	,965	,940	,699	,843	1,000	,850	,961	,751	,931
7:lbn	,940	,867	,965	,824	,951	,850	1,000	,802	,862	,696
8:sau	,772	,982	,910	,615	,838	,961	,802	1,000	,595	,947
9:tun	,934	,656	,825	,890	,769	,751	,862	,595	1,000	,527
10:are	,686	,929	,826	,579	,696	,931	,696	,947	,527	1,000

Source: SPSS Outputs.

From the above table, it can be observed that the smallest distance, indicating the highest similarity in financial inclusion indicators, is between Tunisia and the United Arab Emirates (0.527). Conversely, the largest distance (0.982) is between Saudi Arabia and Bahrain, highlighting the greatest divergence in financial inclusion indicators between these countries.

- *Distribution of Group Members (Agglomeration Schedule)*

The agglomeration schedule provides insights into how countries are grouped based on their financial inclusion indicators through hierarchical clustering. The clustering process follows the square of the Euclidean distance method, and the results are outlined in the following table:

Table 09. *The Results of the Agglomeration Schedule*

Agglomeration Schedule						
Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	2	8	,982	0	0	3
2	3	5	,968	0	0	4
3	2	6	,963	1	0	6
4	3	7	,958	2	0	8
5	1	4	,937	0	0	7
6	2	10	,936	3	0	9
7	1	9	,912	5	0	8
8	1	3	,851	7	4	9
9	1	2	,759	8	6	0

Source: SPSS Outputs.

From the table, we observe that in the initial step, Saudi Arabia (8) and Bahrain (2) were grouped together with a Euclidean distance of 0.982, indicating the largest distance between them. In step 3, Kuwait (6) joins this group, with a linkage coefficient of 0.963. In step 6, the United Arab Emirates (10) is added to the same group with a distance of 0.936. Finally, in step 9, Bahrain (2) is linked with Algeria (1) at a distance of 0.759,

completing the clustering process. This hierarchical approach highlights how countries are progressively combined into groups based on their financial inclusion characteristics.

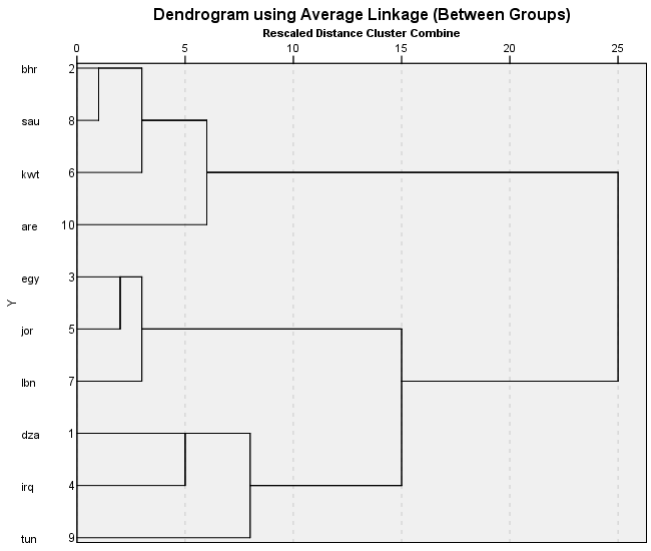
- *Distribution of Vocabulary as Members of Groups (Cluster Membership)*

Table 10. *Distribution of Vocabulary as Members of Groups (Cluster Membership)*

Cluster Membership			
Case	Clusters 4	Clusters 3	Clusters 2
1:dza	1	1	1
2:bhr	2	2	2
3:egy	3	3	1
4:irq	1	1	1
5:jor	3	3	1
6:kwt	2	2	2
7:lbn	3	3	1
8:sau	2	2	2
9:tun	4	1	1
10:are	2	2	2

Source: SPSS Outputs.

Figure 06. *Hierarchical Clustering Dendrogram of Arab Countries*



Source: SPSS Outputs.

From the above table and figure, it can be observed that Algeria and Iraq consistently belong to the first group when the countries are divided into four, three, or two clusters. Bahrain, Kuwait, Saudi Arabia, and the United Arab Emirates are categorized into the second group across all divisions, whether into four, three, or two groups. Egypt, Jordan, and Lebanon are assigned to the third group when divided into four or three groups, but they merge into the first group when only two groups are considered. Finally, Tunisia belongs to the fourth group when divided into four clusters, but joins the first group when the countries are grouped into three or two clusters.

2. Econometric Study of Variables

This section delves into a detailed econometric analysis to understand the relationships between specific variables over a defined period. This section is structured to provide a comprehensive framework for the study, starting with the presentation of the study model, which outlines the theoretical foundation and chosen econometric approach. The following subsections introduce the study community and period, describing the scope and temporal framework of the research. Additionally, the study variables are specified to clarify the key indicators analyzed and their expected impacts. The analysis concludes with a presentation of the study results, including a diagnostic evaluation of the Random Effects Model to ensure its robustness and reliability in explaining the observed data patterns.

2.1. Presenting the Study Model:

This study aims to measure the impact of financial inclusion indicators on the Economic growth across a group of Arab countries during the period from 2011 to 2021. To achieve this, the following model has been proposed:

$$\mathrm{GDP} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \varepsilon_i$$

2.2. Community and Period of Study

- *Study Community*

The study sample includes 10 Arab countries, each of which is assigned a specific code and number as follows:

Table 11. *Countries Represented by the Study Community*

Number	Country	Code	Number	Country	Code
1	Algeria	DZA	1	Kuwait	KWT
2	Bahrain	BHR	2	Lebanon	LBN
3	Egypt	EGY	3	Saudi Arabia	SAU
4	Iraq	IRQ	4	Tunisia	TUN
5	Jordan	JOR	5	UAE	ARU

Source: Compiled by the Authors.

- *Study Period*

The study period was divided into intervals based on the availability of financial inclusion variables, specifically for the years 2011, 2014, 2017, and 2021.

2.3. Study Variables

In this study, all variables that represent indicators of financial inclusion are included, alongside a variable representing economic growth. These variables are as follows:

- *Dependent Variable:*

GDP: Economic Growth, represented by gross domestic product measured at current prices (US Dollar) (unit = million)

- *Independent Variables:*

X1: The indicator of adult individuals owning bank accounts in official financial institutions is measured by the number of adult individuals (15) years and older who own bank accounts in official financial institutions. (Unit =thousands);

X2: Index of access to accounts in official financial institutions this index measures the ability of individuals aged (15) years and older to access financial services in official financial institutions such as credit cards and ATMs. (Unit =thousands);
X3: Bank account usage index this indicator measures the number of individuals aged 15 years and over for their use of Financial Services (Unit = thousands);
X4: Savings index in official financial institutions, this index measures the number of individuals aged 15 years and over for approaching and saving in official financial institutions. (Unity = thousands);
X5: Borrowing index from official financial institutions, this index measures the extent to which individuals aged 15 and over borrow from official financial institutions. (Unity= thousands).

2.4. Study Results

Table 12 presents the results of estimating static panel models using the following methods: cumulative regression (Pooled), fixed effects (Fixed), and random effects (Random). To determine the best-fitting model, a series of tests should be conducted, including the following:

1. *F-Test* (for Fixed Effects): To assess whether the fixed effects model is more appropriate than the pooled regression model.
2. *Breusch-Pagan Lagrange Multiplier (LM) Test*: To determine whether the random effects model is preferable to the pooled regression model.
3. *Hausman Test*: To compare the fixed effects and random effects models, determining which one provides a better fit based on the consistency and efficiency of estimators.

These tests will help in selecting the most suitable model for the data and ensure robust and reliable results.

Table 12. *Differential Test for the Selection of a Suitable Static Panel Model*

The test	The trade-off between	Calculated value	Probability	Resolution
Fisher	Pooled/Fixed	12,16	0,0000	Fixed
Breusch and Pagan	Pooled/Random	5,80	0,008	Random
Husman	Fixed/Random	23,15	0,0003	Fixed

Source: STATA Outputs.

From the above table, it is evident that the best model for estimating the static panel model is the fixed effects model (Fixed), as compared to the pooled model (Pooled). This conclusion is based on the significance of the Fisher statistic, with a probability value at the 1% level, indicating heterogeneity across the cross-sectional units. When comparing the random effects model to the pooled model using the Breusch and Pagan test, the alternative hypothesis was accepted, suggesting that the random effects model is superior to the pooled model. However, when comparing the fixed effects model to the random effects model using the Hausman test, the alternative hypothesis was also accepted, indicating that the fixed effects model is the best choice for estimating the static panel model.

2.5. Diagnostic Tests of the Random Effects Model

To ensure the validity and relevance of the random effects model, a series of diagnostic tests were performed, as summarized in the following table:

Table 13. *Diagnostic Tests of the Random Effects Model*

The test	Name of the test	Value	Probability
Self-Association	Wooldridge test	80,104	0,000
Heterogeneity of contrast	Wald Test	265,32	0.000
Autocorrelation between syllables	Pesaran CD test	0.970	0,3321

Source: STATA Outputs.

From the diagnostic tests in table 13, the Wooldridge test for autocorrelation shows the presence of autocorrelation, as the null hypothesis is rejected due to the probability value being less than 5%. The Wald test for heteroskedasticity indicates no heteroskedasticity problem, as the null hypothesis was accepted due to the probability value being greater than 5%. The Pesaran CD test shows no cross-sectional dependence, as the null hypothesis cannot be rejected.

To address the issues of autocorrelation and cross-sectional dependence, the generalized least squares (FGLS) method was applied to correct the standard errors of the parameters. The results are as follows:

The variable representing the ownership of bank accounts (measured by the number of individuals aged 15 and above who own accounts) has a negative impact on economic development. This indicates that an increase in the ownership of bank accounts does not contribute to GDP growth in the Arab countries, reflecting a negative effect.

The results reveal a positive and statistically significant relationship between the index of access to bank accounts and economic development. This suggests that an increase in access to bank accounts contributes to higher GDP. Access to financial services, such as credit cards and ATMs, plays a pivotal role in fostering financial inclusion, combating poverty, and promoting financial stability. The availability of financial services enhances economic performance, benefiting market efficiency, job creation, and overall economic growth.

Furthermore, the results indicate a direct relationship between the savings index in financial institutions and economic growth. However, there is an inverse relationship between the borrowing index from financial institutions, the use of bank accounts, and economic growth, although these variables are statistically insignificant. The insignificance of the use of bank accounts suggests that this indicator does not have a meaningful impact on economic growth in this context.

Conclusion

This study aimed to address the research problem concerning the impact of financial inclusion on the economic growth of a sample of Arab countries. The analysis covered basic concepts of financial inclusion, its objectives, importance, and the challenges impeding its implementation. Additionally, the study examined different indicators of

financial inclusion across a sample of Arab countries, particularly focusing on the empirical aspect, where the relationship between financial inclusion and economic growth was assessed. Five financial inclusion indicators were used as independent variables, with gross domestic product (GDP) serving as the dependent variable representing economic growth.

This study identifies financial inclusion as the process of ensuring that all segments of society have timely and affordable access to regulated financial products and services, achieved through both conventional and innovative methods. Financial inclusion is essential in supporting entrepreneurship, particularly for startups, by providing necessary financing and support to develop small and medium-sized enterprises (SMEs), which, in turn, generate business opportunities and create employment.

However, financial inclusion faces significant obstacles in the Arab region, primarily due to underdeveloped financial infrastructure. Limited access to finance is compounded by low competitiveness among financial and banking institutions and high credit concentration rates, which restrict credit availability for individuals and businesses alike.

The study finds that, according to financial inclusion indicators, the United Arab Emirates and other Gulf nations lead in promoting access to financial services, reflecting substantial progress compared to other Arab countries. This research highlights that strengthening financial inclusion is important for economic growth in the region and suggests that overcoming these barriers could greatly improve financial access and foster economic development.

The econometric analysis, utilizing the feasible generalized least squares (FGLS) method, confirmed that access to financial services significantly impacts economic growth, with access to bank accounts emerging as a particularly influential variable. Interestingly, while access to financial services was linked to economic development, other indicators like borrowing and account usage showed weaker or statistically insignificant relationships, suggesting that mere access alone may not guarantee substantial economic gains without supportive policies.

To address the disparities revealed in the study, several recommendations are proposed. First, policies should focus on expanding financial inclusion infrastructure in countries with lower access levels. Developing mobile and digital banking options, particularly in Iraq and similarly underserved areas, could increase accessibility and foster economic participation. Additionally, integrating financial literacy programs and encouraging savings behaviors may boost the effectiveness of financial inclusion efforts, as these factors were found to enhance economic stability.

Further, promoting regional collaboration on financial policy standards could improve regulatory frameworks across Arab countries. By fostering consistency in financial policies and services, Arab nations may achieve a more unified approach to financial inclusion that benefits both advanced and lagging economies.

This study's findings suggest several avenues for future research. Expanding the dataset to include newer indicators of digital financial inclusion, such as mobile banking usage, fintech adoption rates, and the impacts of financial literacy initiatives, could provide a more

nuanced perspective on the evolving role of financial inclusion. Future studies might also benefit from a comparative analysis across other developing regions, as this would reveal whether similar patterns exist in different economic contexts.

Given the non-normal distribution of certain variables, future research could employ non-parametric techniques or variable transformations to improve model fit and robustness. Additionally, analyzing country-specific factors and identifying the socioeconomic and regulatory conditions that foster successful financial inclusion could yield valuable insights for tailoring financial policies. Such tailored approaches will be essential for maximizing the economic benefits of financial inclusion and ensuring equitable growth across the Arab region.

References

Abdul Karim, Z., Nizam, R., Law, S.H. and Hassan, M.K. (2021). Does financial inclusiveness affect economic growth? New evidence using a dynamic panel threshold regression, *Finance Research Letters*, 44, p. 102364. <https://doi.org/10.1016/j.frl.2021.102364>

Adedokun, M.W. and Ağa, M. (2021). Financial inclusion: A pathway to economic growth in Sub-Saharan African economies, *International Journal of Finance & Economics*. <https://doi.org/10.1002/ijfe.2559>

Ahamed, M.M. and Mallick, S.K. (2017). Is financial inclusion good for bank stability? International evidence, *Journal of Economic Behavior & Organization*. <https://doi.org/10.1016/j.jebo.2017.07.027>

Ahamed, M.M., Ho, S.J., Mallick, S.K. and Matousek, R. (2021). Inclusive banking, financial regulation, and bank performance: Cross-country evidence, *Journal of Banking & Finance*, 124, p. 106055. <https://doi.org/10.1016/j.jbankfin.2021.106055>

Anarfo, E.B., Abor, J.Y. and Osei, K.A. (2020). Financial regulation and financial inclusion in Sub-Saharan Africa: Does financial stability play a moderating role?, *Research in International Business and Finance*, 51, p. 101070. <https://doi.org/10.1016/j.ribaf.2019.101070>

Anderloni, L., Bayot, B., Błędowski, P., Iwanicz-Drozdowska, M. and Kempson, E. (2008). Financial services provision and prevention of financial exclusion, *European Commission*.

Boachie, C. and Adu-Darko, E. (2024). The effect of financial inclusion on economic growth: The role of human capital development, *Cogent Social Sciences*, 10(1), p. 2346118. <https://doi.org/10.1080/23311886.2024.2346118>

Chauvet, L. and Jacolin, L. (2017). Financial inclusion, bank concentration, and firm performance, *World Development*, 97, pp. 1-13. <https://doi.org/10.1016/j.worlddev.2017.03.01>

Datta, D.S.K. and Singh, D.K. (2019). Variation and determinants of financial inclusion and association with human development: A cross-country analysis, *IIMB Management Review*. <https://doi.org/10.1016/j.iimb.2019.07.013>

Demirgüç-Kunt, A. and Klapper, L. (2013). Measuring financial inclusion: Explaining variation in use of financial services across and within countries, *Brookings Papers on Economic Activity*, 2013(Spring), pp. 279-340.

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

Hajilee, M. and Niroomand, F. (2018). On the link between financial market inclusion and trade openness: An asymmetric analysis, *Economic Analysis and Policy*. <https://doi.org/10.1016/j.eap.2018.10.001>

Hasan, A., Amena, R., Dowla, A. and Tarannum, R. (2024). Financial inclusion and economic growth in developing nations: A case study of Bangladesh, *Munich Personal RePEc Archive*, January, pp. 1-17.

Hu, Y., Liu, C. and Peng, J. (2021). Financial inclusion and agricultural total factor productivity growth in China, *Economic Modelling*, 96, pp. 68-82. <https://doi.org/10.1016/j.econmod.2020.12.021>

Hussain, S., Rehman, A.U., Ullah, S., Waheed, A. and Hassan, S. (2024). Financial inclusion and economic growth: Comparative panel evidence from developed and developing Asian countries, *SAGE Open*, 14(1). <https://doi.org/10.1177/2158244024123258>

Kebede, J., Selvanathan, S. and Naranpanawa, A. (2021). Foreign bank presence, institutional quality, and financial inclusion: Evidence from Africa, *Economic Modelling*, 102, p. 105572. <https://doi.org/10.1016/j.econmod.2021.105572>

Khan, I., Khan, I., Sayal, A.U. and Khan, M.Z. (2022). Does financial inclusion induce poverty, income inequality, and financial stability: Empirical evidence from the 54 African countries?, *Journal of Economic Studies*, 49(2), pp. 303-314. <https://doi.org/10.1108/JES-07-2020-0317>

Kim, D.-W., Yu, J.-S. and Hassan, M.K. (2018). Financial inclusion and economic growth in OIC countries, *Research in International Business and Finance*, 43, pp. 1-14. <https://doi.org/10.1016/j.ribaf.2017.07.178>

Le, T.-H., Chuc, A.T. and Taghizadeh-Hesary, F. (2019). Financial inclusion and its impact on financial efficiency and sustainability: Empirical evidence from Asia, *Borsa Istanbul Review*. <https://doi.org/10.1016/j.bir.2019.07.002>

Lopez, T. and Winkler, A. (2019). Does financial inclusion mitigate credit boom-bust cycles?, *Journal of Financial Stability*, 45, pp. 116-129. <https://doi.org/10.1016/j.jfs.2019.06.001>

Mallick, S., Matousek, R. and Tzeremes, N.G. (2016). Financial development and productive inefficiency: A robust conditional directional distance function approach, *Economics Letters*, 145, pp. 196-201. <https://doi.org/10.1016/j.econlet.2016.06.019>

Neaime, S. and Gaysset, I. (2018). Financial inclusion and stability in MENA: Evidence from poverty and inequality, *Finance Research Letters*, 24, pp. 230-237. <https://doi.org/10.1016/j.frl.2017.09.007>

Owen, A.L. and Pereira, J.M. (2018). Bank concentration, competition, and financial inclusion, *Review of Development Finance*, 8(1), pp. 1-17. <https://doi.org/10.1016/j.rdf.2018.05.001>

Pradhan, R.P. and Sahoo, P.P. (2020). Are there links between financial inclusion, mobile telephony, and economic growth? Evidence from Indian states, *Applied Economics Letters*, 28(4), pp. 1-5. <https://doi.org/10.1080/13504851.2020.1752893>

Sahay, R., Cihak, M., N'Diaye, P., Barajas, A., Pena, D.A., Bi, R., Gao, Y., Kyobe, A., Nguyen, L., Saborowski, C. and Svirydzenka, K. (2015). Financial inclusion: Can it meet multiple macroeconomic goals?, *IMF Staff Discussion Note, SDN/15/17*, *International Monetary Fund*.

Siddiki, J. and Bala-Keffi, L.R. (2024). Revisiting the relation between financial inclusion and economic growth: A global analysis using panel threshold regression, *Economic Modelling*, 135, p. 106707. <https://doi.org/10.1016/j.econmod.2024.106707>

The World Bank Group. (2024) 'World Bank Open Data', *NW Washington, DC: The World Bank*. <https://data.worldbank.org/>

Van, D.T.T. and Linh, N.H. (2019). The impacts of financial inclusion on economic development: Cases in Asian Pacific countries, *Comparative Economic Research. Central and Eastern Europe*, 22(1), pp. 7-16. <https://doi.org/10.2478/cer-2019-0001>

Yakubi, Y.A.Y., Basuki, B., Purwono, R. and Usman, I. (2022). The impact of digital financial inclusion on socio-economic development in low-income countries, *Applied Econometrics and International Development*, 22(2).

Zins, A. and Weill, L. (2016). The determinants of financial inclusion in Africa, *Review of Development Finance*, 6(1), pp. 46-57. <https://doi.org/10.1016/j.rdf.2016.05.001>