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Structural Impacts of Inflationary Pressures on Financial Inclusion Pathways in the Arab Region: An Econometric Study for the Period 2016–2024

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Abstract:

Financial inclusion represents a fundamental pillar within modern development strategies, given its pivotal role in improving economic growth indicators and achieving social equity by integrating marginalized groups into the formal banking system. In this context, this study seeks to investigate the correlational relationship and the quantitative impact of inflation rates on levels of financial inclusion in the Arab region during the period 2016–2024.

Relying on an econometric approach using panel data models, the study finds a statistically significant inverse relationship, indicating that stability in the general price level is a key prerequisite for strengthening confidence in the financial system. Specifically, the results show that a one-unit decrease in the inflation rate leads to a noticeable improvement in financial inclusion indicators in Arab countries by 0.64 units, reflecting the sensitivity of access to and use of financial services to fluctuations in purchasing power..

Keywords: *Financial inclusion, Inflation, panel models.*
Jel Classification Codes **: *C22,G21, F43.***

Introduction:

Financial inclusion is considered one of the key issues that has received growing attention from researchers, financial institutions, as well as international organizations, due to its vital role in supporting and achieving economic and social development goals. The concept of financial inclusion is based on enabling access to a wide range of financial and banking services such as bank accounts, savings services, credit, and insurance for all segments of society, including low-income and marginalized groups, at an affordable and reasonable cost. This approach contributes to enhancing financial stability, reducing economic disparities, and supporting inclusive and sustainable growth.

Given its importance, many countriesboth developed and developing have rapidly adopted effective policies and strategies aimed at developing their financial and banking systems and strengthening their capacity to expand service provision to reach the largest possible number of individuals and institutions. These efforts have also focused on improving financial infrastructure, adopting modern technologies, and promoting financial literacy among individuals, thereby contributing to raising levels of financial inclusion within the economy.

However, achieving this objective faces a range of economic challenges, with inflation being one of the most prominent factors that may hinder the effectiveness of the financial system. Rising inflation rates erode individuals' purchasing power and increase economic uncertainty, which negatively affects the ability of individuals and institutions to engage with banking services, whether in terms of saving or borrowing. Inflation may also limit the capacity of banks and financial institutions to provide their services efficiently, due to higher operational costs and increased financial risks.

Based on the above, the importance of examining the relationship between inflation and financial inclusion becomes evident, particularly in Arab countries that seek to achieve sustainable economic development amid varying economic challenges. Accordingly, the main research question can be formulated as follows: **How do inflation levels affect financial inclusion in Arab countries during the period 2016–2024?**

Sub-questions: To clarify the content of the main research question mentioned above, the following sub-questions can be posed:

-What is meant by financial inclusion, and what is its significance in the economy?

-What is meant by inflation, and what are its most important types?

-Do low inflation rates contribute to supporting financial inclusion policies in Arab countries?

Hypotheses: To analyze and answer the main research question, the following hypotheses can be formulated:

-Low inflation rates in the economy contribute to the wider provision of financial services in Arab countries.

-Higher levels of GDP in Arab countries enhance the ability of financial institutions to expand the delivery of their financial services within the economy.

Research Importance: The importance of this study stems from the pivotal role that financial inclusion plays in supporting and promoting economic development by expanding access to financial services for all segments of society, particularly vulnerable and marginalized groups. In this context, most Arab countries strive to develop and implement mechanisms that support the adoption of financial inclusion policies, with particular emphasis on strategies aimed at reducing inflation rates, given their direct impact on enhancing the effectiveness of these policies and improving their economic and social outcomes.

Research Objective: Through this study, we aim to achieve several objectives: understanding the theoretical foundations of the study variables, namely financial inclusion and inflation; analyzing empirical evidence that demonstrates the impact of inflation on financial inclusion; and constructing an econometric model to clarify the nature of the relationship between these variables in Arab countries.

Research Scope: To answer the main research question and achieve the study's objectives, the spatial and temporal scope must be defined as follows:

Spatial Scope: This study focuses on a sample of Arab countries, including Algeria, Jordan, Egypt, the United Arab Emirates, Sudan, Oman, Kuwait, Qatar, and Morocco.

Temporal Scope: The study covers the period from 2016 to 2024.

Methodology: To clarify and interpret the relationship between inflation and financial inclusion, the study relies on the deductive method to analyze and explain the study variables,

and the inductive method to estimate the nature of the relationship between these variables using statistical techniques.

Research Structure: To address the content of this study, it is divided into two main sections:
-Theoretical Section: addresses the theoretical framework of financial inclusion and inflation.
-Applied Section: aims to estimate and analyze the relationship between inflation indicators and financial inclusion.

1.Theoretical Framework of Financial Inclusion and Economic Stability

Most developed countries strive to strengthen mechanisms that support financial inclusion due to its crucial role in achieving economic development goals. This is primarily accomplished by providing banking services to the widest possible segment of the economy. However, for financial institutions to fulfill this role effectively, a stable economic environment is required one free from high inflation rates. Based on this premise, the following key elements can be explored:

1.1 Financial Inclusion

This section aims to highlight the fundamental aspects of financial inclusion as follows:

1.1.1 Concept of Financial Inclusion

According to the World Bank, financial inclusion refers to the extent to which individuals and institutions are able to access financial services provided by banks at affordable costs that meet their needs (Louzri, 2021, p. 15). Meanwhile, the Organisation for Economic Co-operation and Development (OECD) defines financial inclusion as the process of facilitating and providing banking services to broader segments of society in a timely manner and at reasonable costs, through innovative methods that enhance financial awareness and literacy (Shenbi & Ben Lakhdar, 2019, pp. 106–107).

From a monetary policy perspective, financial inclusion is viewed as a framework that activates the efficiency of monetary policy. There is an inverse relationship between inflation levels and the volume of bank credit as a percentage of GDP. This indicates that providing greater access to credit at low interest rates can stimulate investment and help reduce inflation indicators. In other words, the more society—especially marginalized groups—can access formal financial services, the more financial stability is achieved, which is a primary goal of financial inclusion strategies (Wafaa & Bouzana, 2021, p. 75).

The Bank of Algeria defines financial inclusion as granting access to all banking services provided by financial institutions to various social strata, particularly marginalized groups, through official channels and at low cost (Naïmi & Ben Sassi, 2021, p. 373).

Based on the above definitions, the key aspects underpinning financial inclusion can be summarized as follows:

-Focus on societal segments, especially low-income groups.
-Provision of banking services through accessible channels at affordable costs for individuals.
Innovation in banking products, designed to meet the needs and preferences of the population.
This framework establishes the foundation for understanding how financial inclusion not only broadens access to financial services but also contributes to economic stability by integrating wider segments of society into the formal financial system.

1.1.2. Importance of Financial Inclusion

The importance of financial inclusion is highlighted in the works of **Slaimi & Tabaibia (2023, pp. 197–198)** and **Bernieh, Obeid, & Aatia (2019, pp. 4–6)**. Financial inclusion plays a multifaceted role in fostering economic and social development, as detailed below:

-Enhancing GDP and Reducing Unemployment**:** Implementing financial inclusion policies in any country can lead to higher levels of gross domestic product (GDP), which in turn helps reduce unemployment rates within the economy. By expanding access to financial services, individuals and businesses gain more opportunities for investment and income generation.

-Increasing Competitiveness Among Financial Institutions**:** Financial inclusion stimulates competition among banks and financial institutions to offer higher-quality financial products. Institutions focus on improving service standards and product innovation to attract a larger client base, thereby improving overall efficiency and service delivery.

-Reducing Poverty Rates: Financial inclusion aims to decrease poverty levels by facilitating access to affordable credit and financial services for disadvantaged and marginalized groups. This enables these groups to participate in economic activities that were previously inaccessible to them.

-Formalizing Informal Financial Channels**:** By integrating informal financial outlets into the official financial system, financial inclusion helps regulate financial transactions and ensures greater transparency and security.

-Lowering the Cost of Accessing Financial Services**:** Expanding financial inclusion reduces the cost and difficulty associated with accessing banking and financial services, particularly for individuals in remote or underserved areas.

-Enhancing Banking Intermediation and Efficiency**:** Financial inclusion increases the effectiveness of banks in mobilizing savings from vulnerable groups who engage with the formal financial system. This not only raises the institutions' revenues but also improves their operational efficiency and capacity for investment.

-Promoting Social and Economic Stability**:** Financial inclusion contributes to overall social and economic stability by focusing on vulnerable groups while also targeting specific demographics, such as women and youth. By empowering these groups financially, it fosters equitable participation in the economy and strengthens social cohesion.

In summary, financial inclusion is a strategic tool that not only broadens access to financial services but also supports economic growth, reduces poverty, enhances the efficiency of financial institutions, and promotes social and economic stability across society.

1.1.3. Requirements for Enhancing Financial Inclusion

The key requirements for successfully implementing a financial inclusion policy can be summarized as follows:

-Providing Adequate Infrastructure: This includes:

- Establishing an appropriate legal framework to support and regulate the implementation of financial inclusion policies.
- Expanding the network of bank branches across all regions, particularly in remote areas, to facilitate easier access to banking services for all members of society.

- Promoting the adoption of digitalization in the banking sector to improve efficiency, accessibility, and convenience in service delivery.

- Protecting Consumers of Banking Services: This involves:

-Ensuring transparency and fairness in the financial services offered to clients, as well as the ease of access to these services.

-Providing all necessary and relevant information about the financial products being offered to clients.

-Establishing dedicated mechanisms to handle customer complaints effectively.

-Enhancing financial literacy and consumer education, helping clients understand their rights and obligations, and ensuring they are well-informed about the services they use.

-Developing Banking Products that Meet Community Needs: This entails:

-Innovating financial products that cater to the needs and preferences of clients, considering aspects such as pricing, quality, and insurance coverage.

-Reducing service delivery costs to make financial products more affordable and accessible.

Training and qualifying bank staff to provide high-quality services that meet client expectations.

-Financial Education: Financial education is a fundamental pillar in supporting financial inclusion policies. Educating clients about financial concepts, responsible use of financial products, and the benefits of engaging with formal financial systems strengthens trust in the financial sector and empowers individuals to make informed economic decisions.

In essence, enhancing financial inclusion requires a holistic approach that combines infrastructure development, consumer protection, innovative products, staff training, and financial literacy. These elements work together to create an inclusive, efficient, and resilient financial system capable of serving all segments of society.

1.2 Inflation

In this section, we will discuss the key concepts related to inflation, as well as the main indicators used to measure its levels.

1.2.1. Concept of Inflation

The term economic inflation" has become widely used, although it was not commonly known before the last war except in some economics textbooks. Despite its prevalence, economists have not reached a consensus on a single definition, as inflation cannot be attributed to a single factor. This divergence arises from differing views on the concept of inflation, which is used to describe several different phenomena (Suweih & Ben Thabit, 2020, p. 100):

-Excessive increases in the general price level.

-Increases in monetary income or components of monetary income, such as wages or profits.

Rising production costs.

-Excessive accumulation of monetary balances.

-Based on this, a definition that combines several criteria can be adopted. Inflation can be defined as:

Any increase in the money supply that leads to a rise in aggregate effective demand exceeding the total supply of goods and products during a given period, resulting in a general increase in price levels. This definition reflects the gap between the increase in circulating money and the

quantity of goods and products available in the market; thus, inflation is the outcome of this gap, and rising prices are its main indicator" (Suweih & Ben Thabit, 2020, p. 100).

1.2.2. Causes of Inflation

From the comprehensive definition above, examining the causes of inflation involves identifying factors that push aggregate demand upward on one hand, and factors that reduce aggregate supply on the other (Daami & Tabbani, 2020, p. 172).

1.2.2.1. Factors Driving Aggregate Demand Upwards

The most important factors increasing aggregate demand include:

Increased total spending (both consumption and investment) without a corresponding increase in the supply of goods.

Expansion of commercial banks in granting credit and financing to investors.

Deliberate government budget deficits to finance productive projects and utilize idle productive factors, with the deficit financed by central bank borrowing or increased public spending through money creation for purposes such as war operations.

Increases in monetary wages that exceed productivity gains.

Individuals' expectations and psychological conditions, which influence consumption and saving behaviors.

1.2.2.2. Factors Reducing Aggregate Supply

The main factors causing a decline in aggregate supply include:

-Reaching full employment levels that are below total demand.

-Insufficient flexibility and capacity of the production system to supply the market with high-demand goods and services.

-Shortages in physical capital used at full employment levels.

-Rising costs of production inputs and increases in import prices.

1.2.3. Types of Inflation

Inflation can take several forms (Adboub & Lsb'a, 2021, pp. 40-41):

-Moderate or Creeping Inflation: Characterized by small, continuous price increases, often occurring during periods of low demand.

-Accelerating Inflation: Marked by continuous and compounding increases in the general price level.

-Repressed Inflation: Occurs when prices cannot rise due to quantitative or qualitative restrictions; once these restrictions are removed, prices surge rapidly.

-Galloping Inflation: A very rapid rise in prices, usually occurring during wars or severe political and social crises.

-Cyclical Inflation: Results from fluctuations in aggregate demand and supply associated with economic cycles.

1.3 Empirical Study of the Relationship between Financial Inclusion Indicators and Inflation

Most empirical studies on financial inclusion have concluded that inflation is among the factors that hinder the ability of financial and banking institutions to provide their services in the economy. For instance, the study by (Nurettin & Karagoz, 2012, pp. 81-87) found that low inflation levels contribute to improving the performance of banking institutions in delivering

their services. In contrast, the study by (Farahani, Ghabel, & Reza, 2021, pp. 465-475) concluded that high inflation levels limit the ability of banking institutions to provide financial services, as inflation reduces the real interest rate, decreases the incentive to save, and consequently increases withdrawals from the financial system, which can destabilize the financial sector.

High inflation rates also affect the ability of financial institutions to expand and provide services to vulnerable groups in the economy. This is because rising inflation can impose additional costs on financial institutions to attract deposits and influences nominal interest rates, which are often regulated. Therefore, high inflation combined with low interest rates necessarily reduces invested funds and, consequently, lowers the returns achieved by financial institutions (Ozturk & Karagoz, 2012).

Furthermore, elevated inflation hampers the capacity of financial institutions to expand their services in the economy because it often triggers the imposition of various financial control measures by governments to restrict the sector. Such measures may include setting maximum interest rates on deposits and loans, establishing special regulations for credit allocation, and imposing taxes on the profits of intermediary financial institutions (Rousseau & Wachtel, 2001, pp. 309-324; Alshuwribji, 2006, p. 10). These constraints reduce the activity of financial institutions in fulfilling their economic roles, ultimately leading to lower levels of financial inclusion.

2.Estimating the Relationship between Inflation and Financial Inclusion Levels

To determine the nature of the relationship between inflation and financial inclusion levels in countries, we follow the steps to build a standard econometric model as follows:

2.1 Methodology and Tools Used: Answering the main research question requires specifying the methods and tools applied in the analysis, as follows:

2.1.1 Sample and Study Period: Due to the unavailability of statistical data on economic stability and financial inclusion indicators for all Arab countries which generally consist of 22 countries the study relied on a purposive sample. This sample includes countries where the necessary statistical indicators are available, specifically: Algeria, Egypt, Sudan, Jordan, Morocco, Iraq, Saudi Arabia, Oman, and the United Arab Emirates, for the period from 2016 to 2024.

2.1.2 Clarification of Study Variables: The independent variables for this study were identified based on previous research that addressed the topics of inflation and financial inclusion

Table 1. Standard study variables

y	Financial inclusion
x_1	inflation
x_2	economic growth

Source: Prepared by researchers

2.1.3 Study Data and Tools: The data for the study variables were obtained from the Arab Economic Report covering the period 2014–2022, published by the Arab Monetary Fund. This data was used to construct a panel model to examine the nature of the relationship between the studied variables for the selected sample. Panel data techniques were employed in the analysis.

2.1.4. Presentation and Analysis of Results: In this section, we present and analyze the outputs of the three estimated panel models, as shown in the table below:

2.1.4.1 Comparison Between Panel Models: To compare the three panel models—namely, the pooled model, the fixed effects model, and the random effects model—it is necessary to examine the outputs of these three models using the software (Stata 15), as shown in the following table:

Table 2. Estimation results of the panel model.

explanatory variables	Pooled Regression Model (PME)	Fixed Effects Model (PEM)	Random Effects Model (REM)
X_1	- 0.6160839 (0.000)	-0.0123737 (0.871)	-0.0435984 (0.572)
X_2	0.8960201 (0.000)	0.5937017 (0.000)	0.6606545 (0.000)
Constant (c)	50.99438 (0.000)	50.86978 (0.000)	50.03424 (0.000)
Number of obsevation	81	81	81
R-squared	0.5207	0.9300	-
Adjusted R-squared	0.5085	0.9199	-
Prob (F-Stat)	0.0000	0.0013	0.0001

Source: Prepared by researchers based on the results of the program (stata.15), Appendix1

To select the best estimated model among the three panel models, we rely on a set of tests as follows:

-Breusch and Pagan Test: The results of this test are used to compare the random effects model with the pooled model. The outcomes of this test are as follows:

Table 03: Results of the Breusch and Pagan Test

chibar2(01)	148.50
Prob > chibar2	0.0000

Source: Prepared by the researchers based on the output results from **Stata 15**.

Based on the results of this test, we can prefer the random effects model over the pooled model, since the value of Prob > chi-bar2 is less than 5%.

-Hausman Test: The output of this test is used to compare the best model between the fixed effects model and the random effects model. The results of this test are as follows:

Table 04: Results of the Hausman Test

chi2(2)	6.20
Prob>chi2	0.0450

Source: Prepared by the researchers based on the output results from **Stata 15**.

From our review of the results of this test, it is clear that the fixed effects model is better than the random effects model, as the Prob > chi² value for this test is below the 5% significance level.

-Restricted F-Test: The results of this test allow us to compare the fixed effects model with the pooled model. The results of this test are as follows:

Table 05: Results of the Restricted F-Test

F(8, 70)	51.115
Prob> F	0.0000

Source: Prepared by the researchers based on the output results from **Stata 15**.

From the results of this test, we conclude that the fixed effects model is superior to the pooled model, as the F(8,80**) =** 51.115 is significant at the 5% level **(since** Prob > F = 0.0000 < 0.05**).**

2.1.4.2. Testing the Validity of the Optimal Model: The preliminary tests conducted allow us to select the optimal model for the study. Based on the results of these tests, the fixed effects model is better compared to the other models. However, before relying on these results, it is necessary to ensure that the optimal model (fixed effects model) does not suffer from standard issues such as heteroscedasticity and autocorrelation of errors**.**

Autocorrelation: This test allows us to determine the extent to which the values of the same variable are correlated over time. There are several tests to detect this issue, with the most well-known being the Wooldridge test (Jilali Al-Toumi, 2018, p. 239). Using the command xtserial in Stata 15, the results of this test were as follows:

```
xtserial y x1 x2
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
  F(  1,      8) =     22.686
       Prob > F =      0.0014
```

Source: Prepared by the researchers based on the output results of the xtserial command in Stata 15.

The results of this test showed that the estimated model suffers from **autocorrelation of errors**, as the **p-value of the test was less than 0.05**.

-Test for Heteroscedasticity: This test allows us to determine whether the variance is homogeneous or not. For this purpose, the Modified Wald test is used, which is implemented through the xttest3 command in Stata 15, as indicated by the output shown below:

```
xttest3
Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model
H0: sigma(i)^2 = sigma^2 for all i
chi2 (9)  =    2.8e+05
Prob>chi2 =     0.0000
```

Source: Prepared by the researchers based on the output results of the **xttest3** command in Stata 15.

From our review of the test results, it is clear that the estimated model suffers from **heteroscedasticity**, as the statistical significance value **(**Prob > F**)** is less than 5%.

3.Analysis and discussion of the results

Through conducting all the previous tests, it became evident that the estimated model suffers from standard issues, namely autocorrelation of errors and heteroscedasticity, To address these problems in the estimated model, we can use the (xtpcse) method (Danie, 2007, p. 285). This method is particularly applicable when the number of cross-sectional units exceeds the number of time periods. It is also commonly employed in panel data analyses where the number of observations is relatively small (Srir & Elifi, 2020, p. 47). By applying the values within the (xtpcse) command, the results were as follows:

xtpcse y x1 x2

Linear regression, correlated panels corrected standard errors (PCSEs)

```
Group variable:   ind                     Number of obs     =        81
Time variable:    YEAR                    Number of groups  =         9
Panels:           correlated (balanced)   Obs per group:
Autocorrelation:  no autocorrelation                  min =         9
                                                      avg =         9
                                                      max =         9
Estimated covariances      =        45    R-squared         =    0.5207
Estimated autocorrelations =         0    Wald chi2(2)      =    193.16
Estimated coefficients     =         3    Prob > chi2       =    0.0000
------------------------------------------------------------------------------
             |         Panel-corrected
           y |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          X1 |  -.6160839    .158712    -3.88   0.000    -.9271537   -.3050141
          X2 |   .8960201   .0956508     9.37   0.000     .7085479    1.083492
       _cons |   50.99438   2.490201    20.48   0.000     46.11368    55.87509
------------------------------------------------------------------------------
```

After addressing the standard issues, namely autocorrelation of errors and heteroscedasticity, in the estimated model, we can express the regression equation as follows:

$$y = 50.99438 - 0.66160839x_1 + 0.8960201x_2$$

The results of the regression equation confirm that the first hypothesis is valid, indicating that a one-unit decrease in inflation rates leads to an increase in financial inclusion by 0.64 units. This finding is consistent with the majority of previous studies ((KHAN, SENHADJI, & SMITH, 2001) (Moore, 1986) as high inflation rates are often accompanied by contractionary policies, which negatively affect the ability of financial institutions to provide banking services. The regression results also support the second hypothesis, which states that higher levels of GDP in Arab countries enhance the capacity of financial institutions to expand their financial services in the economy. This aligns with the dependent-demand theory, which posits that the development of financial inclusion is closely linked to the growth of GDP levels.

Finally, the regression results reject the third hypothesis, which proposed that higher unemployment rates in Arab countries limit financial inclusion, as this indicator was found to be statistically insignificant in the economic model.

Conclusion:

The analysis of the relationship between the structural implications of inflationary pressures and the trajectories of financial inclusion in the Arab region during the period 2016–2024 has deepened the understanding of the interactions between macroeconomic variables and the performance of the financial sector. This analysis adopted a comprehensive approach combining two integrated aspects: the first being the theoretical framework, which aimed to explain the channels and mechanisms through which inflation affects the behavior of individuals and financial institutions; and the second being the applied study, which relied on real data and quantitative indicators to measure the extent of this impact within the Arab context. The integration of the theoretical and applied perspectives enabled the derivation of several key findings reflecting the nature of the relationship between inflation and financial inclusion, which can be summarized as follows:

-Economic Policies and Stability**:** Arab countries have generally implemented appropriate economic policies that have positively contributed to a degree of economic stability by controlling inflation rates and promoting GDP growth. This has improved individuals' purchasing power, which in turn has increased demand for various financial products and services, supporting the expansion of financial inclusion.

-Price Stability as a Pillar of Financial Inclusion**:** Price stability is a fundamental pillar for enhancing financial inclusion, as it provides a stable economic environment that encourages individuals and institutions to engage with the formal financial system and strengthens confidence in banking and financial services.

-GDP per Capita and Credit Provision**:** The Arab countries under study show a suitable level of GDP per capita at constant prices, reflecting the characteristics and structures of their economies. This level positively influences the volume of domestic credit directed to the private sector, thereby enhancing its role in supporting economic activity and expanding financial inclusion.

Based on these findings, and in order to strengthen opportunities and mitigate risks associated with implementing financial inclusion policies in Arab countries, the following recommendations are proposed:

-Strengthening Economic Stability Mechanisms: Efforts should focus on developing and enhancing mechanisms that support economic stability, with particular attention to strategies aimed at reducing and controlling inflation, as this has a direct impact on improving the efficiency of the economic environment.

-Enhancing Central Bank Independence: Reinforcing the independence of central banks is crucial for enabling them to implement monetary policy effectively, particularly regarding achieving price stability and lowering inflation levels, which positively reflects on improving individuals' living standards.

-Promoting Financial Awareness: Intensifying efforts to raise financial literacy by adopting effective strategies to educate clients on the importance of using digital financial technologies in banking transactions will help expand the base of beneficiaries of modern financial services.
-Learning from International Best Practices**:** Arab countries should benefit from successful international experiences in financial inclusion by studying the policies and practices adopted by leading countries and adapting them to the specific characteristics of Arab economies, aiming to enhance the effectiveness of financial inclusion programs.

This integrated approach emphasizes that financial inclusion, supported by stable macroeconomic conditions, robust institutional frameworks, and informed consumers, can significantly contribute to sustainable economic growth, social equity, and financial sector resilience in the Arab region.

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Appendices

Appendix 1: Estimate of the three panel models

- Pooled Regression Model

reg y x1 x2

```
      Source |       SS       df       MS      Number of obs   =        81
-------------+------------------------------   F(2, 78)        =     42.38
       Model |  42469.0527     2  21234.5263   Prob > F        =    0.0000
    Residual |  39085.4647    78  501.095701   R-squared       =    0.5207
-------------+------------------------------   Adj R-squared   =    0.5085
       Total |  81554.5174    80  1019.43147   Root MSE        =    22.385
```

```
       y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        X1 |  -.6160839   .1282862    -4.80   0.000    -.8714822   -.3606856
        X2 |   .8960201   .1481958     6.05   0.000     .6009848    1.191055
     _cons |   50.99438   3.853163    13.23   0.000     43.32332    58.66544
------------------------------------------------------------------------------
```

- Fixed Effects Model

```
xtreg y x1 x2 , fe

Fixed-effects (within) regression               Number of obs      =        81
Group variable: ind                             Number of groups   =         9

R-sq:                                           Obs per group:
     within  = 0.1737                                         min =         9
     between = 0.4239                                         avg =       9.0
     overall = 0.3895                                         max =         9

                                                F(2,70)           =      7.36
corr(u_i, Xb)  = 0.3695                         Prob > F          =    0.0013

------------------------------------------------------------------------------
       y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        X1 |  -.0123737   .0759143    -0.16   0.871    -.1637799    .1390325
        X2 |   .5937017   .1550234     3.83   0.000     .2845173     .902886
     _cons |   50.86978   2.816577    18.06   0.000      45.2523    56.48727
-------------+----------------------------------------------------------------
    sigma_u |  26.627026
    sigma_e |  9.0339083
        rho |  .89677401   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(8, 70) = 51.12                     Prob > F = 0.0000

. areg y x1 x2 , absorb ( Country )

Linear regression, absorbing indicators         Number of obs      =        81
                                                F(   2,     70)    =      7.36
                                                Prob > F           =    0.0013
                                                R-squared          =    0.9300
                                                Adj R-squared      =    0.9199
                                                Root MSE           =    9.0339
```

```
------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          X1 |  -.0123737   .0759143    -0.16   0.871    -.1637799    .1390325
          X2 |   .5937017   .1550234     3.83   0.000     .2845173     .902886
       _cons |   50.86978   2.816577    18.06   0.000      45.2523    56.48727
-------------+----------------------------------------------------------------
     Country |         F(8, 70) =     51.115   0.000         (9 categories)
```

- Random Effects Model

```
xtreg y x1 x2 , re

Random-effects GLS regression                   Number of obs     =        81
Group variable: ind                             Number of groups  =         9

R-sq:                                           Obs per group:
     within  = 0.1723                                         min =         9
     between = 0.4484                                         avg =       9.0
     overall = 0.4106                                         max =         9

                                                Wald chi2(2)      =     19.94
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0000

------------------------------------------------------------------------------
           y |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          X1 |  -.0435984   .0770679    -0.57   0.572    -.1946488    .1074519
          X2 |   .6606545   .1499726     4.41   0.000     .3667137    .9545953
       _cons |   50.03424   7.619646     6.57   0.000     35.10001    64.96847
-------------+----------------------------------------------------------------
     sigma_u |  20.700433
     sigma_e |  9.0339083
         rho |  .84001492   (fraction of variance due to u_i)
```

Appendix 2: Trade-off between a Pooled Regression Model and a Random Effects Model

```
xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        y[ind,t] = Xb + u[ind] + e[ind,t]
```

Estimated results:

	Var	sd = sqrt(Var)
y	1019.431	31.92854
e	81.6115	9.033908
u	428.5079	20.70043

Test: Var(u) = 0

chibar2(01) = 148.50

Prob > chibar2 = 0.0000

Appendix 3: Trade-off between a Fixed Effects Model and a Random Effects Model
hausman fe re . hausman fe re, sigmamore

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
X1	-.0123737	-.0435984	.0312247	.0126739
X2	.5937017	.6606545	-.0669529	.0542798

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 6.20

Prob>chi2 = 0.0450