

The Impact of Domestic Credit to the Private Sector on Economic Growth in North African Arab Countries: A Dynamic Panel Data Analysis

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Abstract:

This study investigates the impact of domestic credit to the private sector on economic growth in four North African Arab countries, Algeria, Egypt, Libya, and Tunisia, using a Dynamic Panel Data Analysis estimated through the Feasible Generalized Least Squares (FGLS) method over the period 1990–2023. The aim is to assess whether financial deepening through increased private credit effectively contributes to economic performance in the region.

The empirical results reveal a negative and statistically significant effect of domestic credit to the private sector on economic growth, indicating that credit expansion has not been efficiently directed toward productive sectors. In contrast, Foreign Direct Investment (FDI) shows a positive influence, while government consumption expenditure exerts a negative effect. The findings suggest that credit alone cannot foster growth without institutional reforms that enhance financial efficiency, improve governance, and promote productive investment.

Keywords: Domestic Credit; Private Sector; Economic Growth; Panel Data.

Jel Classification Codes: C23; E44; O16; O55.

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1. INTRODUCTION

The relationship between financial development and economic growth has long been a central theme in economic research. Among the key indicators of financial development, domestic credit to the private sector plays a crucial role as it reflects the extent to which financial institutions support private investment and productive activities. By providing funds for businesses and households, domestic credit can stimulate capital accumulation, technological innovation, and ultimately, sustainable economic growth. However, the effectiveness of credit allocation in driving growth varies significantly across countries and regions, depending on institutional quality, financial infrastructure, and macroeconomic stability.

In North African Arab countries, financial systems differ in depth, efficiency, and accessibility. While some economies have made notable progress in expanding credit to the private sector, others still face structural and regulatory barriers that limit the effectiveness of financial intermediation. Understanding how domestic credit influences economic growth in this regional context is therefore essential for policymakers aiming to enhance financial sector contributions to development.

Against this background, the present study examines the impact of domestic credit to the private sector on economic growth in

North African Arab countries, employing a Dynamic Panel Data Analysis as the main methodological approach.

1.1. The Question of the Study :

This study seeks to answer the following question:

To what extent does domestic credit to the private sector influence economic growth in North African Arab countries, and how can this relationship be effectively analyzed using a dynamic panel data framework?

1.2. Hypothesis:

The study hypothesizes that:

An increase in domestic credit to the private sector positively contributes to economic growth in North African Arab countries.

However, this effect may differ across countries depending on financial system development, institutional capacity, and macroeconomic conditions.

1.3. The Objective of the Study:

The objective of this research is to empirically assess the relationship between domestic credit to the private sector and economic growth in selected North African Arab countries. Specifically, the study aims to:

- Quantify the effect of domestic credit on GDP growth;
- Examine the dynamic nature of this relationship using panel data;

- Provide evidence-based insights for enhancing financial sector policies that support sustainable growth.

1.4. The Importance of the Study:

This study is important for several reasons.

First, it contributes to the existing literature on finance–growth nexus by focusing on North African Arab countries, a region that has received limited empirical attention despite its economic potential and financial diversity.

Second, it offers quantitative evidence using advanced econometric techniques, which enhance the reliability of the findings.

Third, the results can help policymakers and financial authorities understand how credit expansion strategies should be designed to foster productive investment and avoid financial instability.

Finally, the study provides regional insights that can inform harmonized financial reforms and cross-country learning within the Arab world.

1.5. Methodology:

The research adopts a quantitative approach based on panel data covering selected North African Arab countries.

The empirical investigation is carried out using R statistical software, which allows for efficient estimation and diagnostic testing.

The results aim to provide a robust understanding of the credit–growth relationship in the region and support evidence-based economic policy formulation.

2. The Conceptual Framework of Economic Growth

2.1. Definition of Economic Growth:

Economic growth represents one of the fundamental concepts in economics. It refers to the long-term expansion of real output, that is, the increase in production adjusted for inflation. This phenomenon reflects a continuous rise in an economy's productive capacity, leading to higher levels of national income. It is typically associated with improvements in per capita output and overall productivity, particularly labor productivity. (Cisse & Kangjuan, 2018)

2.2. Methods of Measuring Economic Growth:

Economic growth reflects the advancement of a nation in terms of production, income generation, and overall well-being. The Gross Domestic Product (GDP) remains the principal indicator used to evaluate this progress. Nevertheless, relying solely on GDP provides an incomplete picture, as it does not encompass the broader aspects of human and environmental development. Consequently, complementary indicators such as the Human Development Index (HDI) and the Genuine Progress Indicator

(GPI) have been introduced, integrating dimensions like education, health, and environmental sustainability.

The pace of economic growth is primarily influenced by factors such as productivity, consumer demand, and investment in infrastructure, innovation, and human capital. Productivity contributes to improved efficiency, consumption supports business activity, and investment secures long-term expansion. Collectively, these elements determine the trajectory of economic development within an increasingly dynamic and interconnected global economy.

2.2.1. The Main Indicator of Economic Growth (GDP):

As a key macroeconomic variable, economic growth must be quantified through an indicator that accurately reflects changes in national output — a function fulfilled by Gross Domestic Product (GDP). GDP measures the total monetary value of all final goods and services produced within a country's borders during a specified period. Despite its importance in capturing economic performance, GDP alone does not provide a complete assessment of social welfare, as it offers only a partial view of material living conditions. (Mankiw Gregory, 2020)

Each country computes its GDP in its domestic currency. For cross-country comparisons, these figures must be converted into a common currency. However, using current exchange rates for this

conversion can distort comparisons, as they may not reflect the real purchasing power or actual volume of goods and services represented by GDP across nations.

2.2.2. Genuine Progress Indicator (GPI):

The Genuine Progress Indicator (GPI) offers an alternative to the traditional Gross Domestic Product (GDP) by assessing economic growth through a broader and more sustainable lens. Unlike GDP, which focuses solely on economic output, the GPI incorporates social and environmental dimensions, accounting for factors such as crime costs, environmental degradation, climate change, and the depletion of natural resources. (World Social Protection Report, 2017)

Composed of 26 sub-indicators, the GPI integrates variables related to education, family cohesion, pollution, and other aspects of social welfare. Its methodology involves offsetting the negative effects of economic activity against the positive contributions, thereby providing a clearer picture of whether growth genuinely enhances societal well-being.

Rooted in green economy principles, this indicator views the economy as an integral component of the larger ecosystem. Supporters of the GPI argue that it serves as a more accurate and holistic measure of sustainable development than conventional

GDP, as it reflects the true balance between economic progress and environmental as well as social sustainability.

2.2.3. Human Development Index (HDI) :

The Human Development Index (HDI), introduced by the United Nations in 1990, is a composite measure that evaluates and compares countries' levels of social and economic development. It encompasses three fundamental dimensions — health, education, and standard of living — assessed through four key indicators: life expectancy at birth, mean years of schooling, expected years of schooling, and Gross National Income (GNI) per capita.

Unlike conventional economic measures such as Gross Domestic Product (GDP), the HDI adopts a broader approach by emphasizing the role of human capabilities and opportunities in shaping overall well-being. It provides valuable insights into development patterns over time, facilitates the assessment of public policy outcomes, and helps identify disparities between nations with similar income levels but differing human development achievements.

By integrating multiple aspects of human welfare, the HDI offers a more comprehensive framework for understanding development. It also encourages evidence-based policy discussions aimed at enhancing education, healthcare, and living conditions, thereby promoting sustainable improvements in quality of life.

3. The Conceptual Framework of Domestic Credit to the Private Sector

3.1. Definition of Domestic Credit to the Private Sector:

Domestic credit to the private sector refers to the financial resources supplied by financial institutions within a country to non-governmental economic agents, such as firms, households, and nonprofit organizations. These resources are typically provided through loans, trade credit, the purchase of non-equity securities, and other receivables that generate claims for repayment. In some contexts, this measure may also include credit directed to state-owned enterprises that operate commercially.

3.2. Importance of Domestic Credit to the Private Sector in the Economy:

Domestic credit plays a central role in supporting economic activity, as it facilitates capital accumulation, technological progress, and innovation — all of which are essential drivers of large-scale production, specialization, and long-term development. In developing economies, access to credit is particularly significant, as it provides the necessary financing to sustain higher levels of investment and growth while also strengthening the effectiveness of monetary policy. (Atadiose, Eleje, Ambam, & Onwumere, 2024)

3.2.1. Sustaining Long-Term Economic Growth:

Domestic credit to the private sector is often regarded as a key foundation for sustained economic growth, especially in developing countries. Empirical studies consistently highlight a positive and significant relationship between credit expansion and GDP growth. By improving access to financial resources, credit allows firms to invest in capital-intensive assets such as machinery and modern technologies, which raise productivity and output. On the household side, credit supports consumption smoothing, thereby reinforcing aggregate demand. Moreover, small businesses and startups, which are critical engines of job creation and innovation, rely heavily on access to credit to finance their operations and expand into new markets.

3.2.2. Enabling Investment and Expanding Output:

Credit availability enhances capital formation by financing investments in infrastructure, equipment, and technological upgrades. Such investments expand a country's production capacity and raise economic output. In parallel, a well-functioning credit system contributes to the accumulation of both physical and human capital, which are cornerstones of sustainable economic growth.

3.2.3. Stabilizing Demand and Enhancing Resilience:

One of the stabilizing functions of credit is its ability to smooth household consumption during income fluctuations. By

maintaining stable demand, credit reduces cyclical volatility, encourages firms to sustain production levels, and increases resilience against external shocks such as global crises or commodity price fluctuations.

3.2.4. Strengthening Private Sector Development:

An efficient credit system fosters private sector development by facilitating access to finance for enterprises — particularly small and medium-sized firms. This access stimulates innovation, competitiveness, and business expansion. In developing economies, where the private sector is often the primary source of employment and growth, credit is essential for deepening financial inclusion and encouraging entrepreneurship.

3.2.5. Promoting Efficient Capital Allocation:

When properly regulated, credit markets channel funds toward the most productive economic uses. By allocating scarce resources to high-return projects, credit ensures that investment supports strategic development priorities and maximizes overall economic welfare.

3.2.6. Supporting Economic Diversification:

In resource-dependent economies, such as those of many Arab countries, domestic credit can be an important tool for reducing reliance on volatile commodity sectors. Redirecting credit flows toward non-oil industries encourages diversification, improves

trade balances, and broadens the productive base of the economy. This process ultimately enhances macroeconomic stability and fosters sustainable growth.

4. Study Methodology:

The study adopted a quantitative methodology based on panel data models to examine the relationship between domestic credit to the private sector and economic growth. Panel data was particularly suitable as it combines cross-country and time-series observations, enabling the analysis of growth dynamics across nations and over time. For model estimation and statistical testing, the study relied on R software, which offers powerful tools for data management and advanced econometric analysis.

5. Sample and Study Period:

The study focuses on the period from 1990 to 2023 and examines a sample of four North African Arab countries:

- Algeria
- Egypt
- Libya
- Tunisia

These countries were selected due to the availability of consistent and comprehensive economic data, as well as their strategic geographical location and shared economic characteristics within the North African region.

6. Data Sources:

The data used in this study were collected from multiple reputable international sources, most notably the World Bank database (World Bank, 2025).

7. Study Variables:

At the initial stage, the study incorporates a set of key variables essential for analyzing the economic dynamics of the selected countries. Table 1 provides a detailed overview of the variables included in the model:

Table (1): Variables Included in the Study Model

Variable Code	Variable Name	Variable Type	Variable Data Description
GDP	Gross Domestic Product	Dependent Variable	Annual growth rate of GDP per capita (%)
DCP	Domestic Credit to the Private Sector	Main Independent Variable	Domestic credit as a percentage of total GDP
FDI	Foreign Direct Investment	Independent Variable	Share of foreign direct investment in GDP (%)
GCE	Government Consumption Expenditure	Independent Variable	Government consumption as a percentage of GDP

Source: Prepared by the researcher

8. Study Model:

To analyze the role of domestic credit to the private sector in promoting economic growth, the study employs a dynamic panel model in which economic growth (GDP) serves as the dependent variable. The explanatory variables include domestic credit to the private sector (DCP) as the main independent variable, foreign direct investment (FDI), government consumption expenditure (GCE), and the lagged value of GDP (GDP_lag1) to capture the dynamic behavior of economic growth.

The functional form of the model is expressed as:

$$\mathbf{GDP_t = f (GDP_{t-1}, DCP_t, FDI_t, GCE_t)}$$

This specification was selected to take into account both the dynamic persistence of growth and the influence of key macroeconomic and financial factors. In particular:

- GDP_lag1 captures the effect of past economic performance on current growth.
- DCP highlights the importance of domestic credit to the private sector in financing investment and production.
- FDI measures the impact of foreign capital inflows on economic development.
- GCE reflects the role of government expenditure in stimulating aggregate demand.

Through this model, the study seeks to provide a comprehensive and reliable assessment of how domestic credit to the private sector contributes to economic growth in North African countries.

9. Stability Analysis of Study Variables:

We proceed to assess the stationarity of the variables included in the study model by applying the Im-Pesaran-Shin (IPS) Unit Root Test (2003).

Table (2): Results of Unit-Root Test on Study Variables

Variable	Im-Pesaran-Shin Unit-Root Test (p-value)	Decision at 5%
DCP	0.0444	Stationary
GDP	4.47e-13	Stationary
FDI	0.000102	Stationary
GCE	0.6395	Non-stationary

Source: Prepared by the researcher based on R software

The IPS unit root test results indicate that three variables—domestic credit to the private sector (DCP), economic growth (GDP), and foreign direct investment (FDI)—are stationary at level, as their p-values fall below the 5% significance threshold. This finding implies that these variables fluctuate around a constant mean over time without exhibiting stochastic trends. In economic terms, the stability of DCP suggests that domestic credit to the private sector does not follow a random walk, but rather shows a degree of mean reversion, making it a reliable explanatory variable when assessing its role in economic growth. Similarly, the

stationarity of GDP and FDI highlights the consistency of these indicators across the study period, reinforcing their robustness as dependent and explanatory variables.

By contrast, the government expenditure variable (GCE) shows non-stationarity at level, with a p-value exceeding 0.05. This outcome suggests the presence of a unit root, meaning that government spending evolves through time with persistent shocks and does not revert to a long-run mean. From a methodological perspective, including a non-stationary series in its raw form would risk generating spurious regression results. Therefore, the variable GCE must be transformed into its first difference to achieve stationarity and ensure the validity of econometric estimations.

10. Panel Data Model Estimation and Selection:

In order to examine the dynamic relationship between economic growth and its main determinants, different panel data estimation techniques were employed. Specifically, three models were estimated: the Pooled OLS model, the Fixed Effects (FE) model, and the Random Effects (RE) model.

The choice among these models is crucial, as each specification makes different assumptions regarding the heterogeneity across countries. The Pooled OLS assumes homogeneity and ignores country-specific effects, while the Fixed Effects model controls for unobserved time-invariant heterogeneity by allowing intercepts to

vary across countries. The Random Effects model, on the other hand, treats these country-specific effects as random and uncorrelated with the regressors.

The results of the three estimated models are summarized in the following table:

Table (3): Results of Panel Data Models Estimation

Explanatory Variables	Pooled OLS Model	Fixed Effects Model	Random Effects Model
Constant	1.4136	–	3.1958
GDP_lag1	-0.2128 (***)	-0.2208 (***)	-0.2166 (***)
DCP	-0.0249	-0.1204 (.)	-0.0734
FDI	0.9041 (**)	0.7303 (*)	0.8202 (*)
dGCE	-2.0185 (***)	-2.0100 (***)	-2.0149 (***)
R²	0.6780	0.6846	0.6810
Adj. R²	0.6679	0.6667	0.6710
F/Chi² Statistic	66.87 (***)	67.27 (***)	271.16 (***)

Source: Prepared by the researcher based on R software

To determine the most appropriate panel data specification, three standard diagnostic tests were conducted: the Hausman test (Fixed vs. Random Effects), the Breusch-Pagan Lagrange Multiplier (LM) test (Pooled vs. Random Effects), and the F-test for individual effects (Pooled vs. Fixed Effects). These tests allow us to statistically compare the competing models and identify the specification that best fits the data.

Table (4): Panel Model Specification Tests

Test	Statistic	df	p-value	Decision (5%)
Hausman Test (FE vs. RE)	1.397	4	0.8447	Fail to reject H0 → RE valid
Breusch-Pagan LM Test (Pooled vs. RE)	1.5735	1	0.2097	Fail to reject H0 → Pooled
F-test for Individual Effects (Pooled vs. FE)	0.9908	3	0.3995	Fail to reject H0 → Pooled

Source: Prepared by the researcher based on R software

The test results provide consistent evidence in favor of the Pooled OLS model. Specifically, the F-test indicates that individual (country) effects are not statistically significant, which means the Fixed Effects specification is not necessary. Similarly, the Breusch-Pagan LM test fails to reject the null hypothesis, implying that Random Effects are not superior to the Pooled model. Finally, the Hausman test suggests no significant difference between Fixed and Random Effects, but since both FE and RE were not validated by the other tests, the Pooled OLS model emerges as the most appropriate specification for the dataset under study.

11. Diagnostic Tests of the Estimated Model:

Since the previous specification and selection tests suggested that the pooled OLS model provides the most appropriate baseline for our dataset, we proceed to conduct a series of diagnostic tests to verify the validity of the classical regression assumptions. These

tests are essential to ensure the reliability of the estimated coefficients and to identify whether corrective estimation techniques are required.

Table (5): Diagnostic Tests on the Pooled Model

Test	Statistic	df	p-value	Decision at 5%
Breusch-Pagan test for heteroskedasticity	34.412	4	6.135e-07	Heteroskedasticity detected
Wooldridge/Breusch-Godfrey test for serial correlation	43.508	33	0.1043	No serial correlation
Breusch-Pagan LM test for cross-sectional dependence	13.513	6	0.03557	Cross-sectional dependence detected

Source: Prepared by the researcher based on R software

the diagnostic tests reveal two important econometric issues that affect the pooled OLS model.

First, the Breusch-Pagan test strongly rejects the null of homoskedastic errors ($p < 0.01$), indicating that error variances are not constant across observations. This problem biases the standard errors and undermines the validity of statistical inference.

Second, the LM test provides evidence of significant cross-sectional dependence among panel units ($p < 0.05$). This result suggests that shocks in one country spill over to others, which is plausible given the economic interconnections within the region.

Failure to address this issue can lead to efficiency distortions and misleading test results.

By contrast, the Wooldridge/Breusch-Godfrey test shows no evidence of serial correlation ($p > 0.10$), meaning that the residuals are not systematically correlated over time.

Taken together, these findings confirm that while the pooled OLS was initially selected as the most suitable baseline specification, the presence of heteroskedasticity and cross-sectional dependence requires more robust estimation methods. Accordingly, the Feasible Generalized Least Squares (FGLS) estimator, provides an appropriate solution, as it corrects for both issues and ensures more efficient and reliable parameter estimates.

12. Final Estimation and Results Interpretation:

In this section, we present the results of the final estimation using the Feasible Generalized Least Squares (FGLS) approach applied to the dynamic panel model. This specification was chosen to address the econometric problems identified earlier, particularly heteroskedasticity and cross-sectional dependence.

Table (6): FGLS Estimation Results

Variable	Estimate	Std. Error	z-value	p-value	Signif.
GDP_lag1	-0.191526	0.052639	-3.6385	0.0002742	***
DCP	-0.130592	0.016061	-8.1312	4.252e-16	***
FDI	0.768652	0.219114	3.5080	0.0004515	***
dGCE	-2.048145	0.054542	-37.5515	< 2.2e-16	***
Model fit	Multiple R-squared = 0.68459				

Source: Prepared by the researcher based on R software

12.1. Statistical Interpretation:

- Overall fit: The model explains around 68.5% of the variation in GDP growth, which is relatively strong for a macro-panel dataset;
- Significance: All variables are highly significant at the 1% level, providing strong evidence of robust effects;
- Correction: By using FGLS, the estimates are more efficient and reliable, since heteroskedasticity and cross-sectional dependence were present in the baseline model.

12.2. Economic Interpretation:

- ❖ **Domestic Credit to the Private Sector (DCP: -0.131, highly significant):**

The negative and highly significant coefficient for DCP is a striking result. It indicates that, in the sampled countries, an

increase in private sector credit is associated with a reduction in GDP growth.

This outcome reflects structural issues in the financial systems of the studied North African/Arab countries:

- Credit misallocation: Banks often channel loans to unproductive sectors (e.g., consumption, real estate, or politically connected firms) rather than growth-enhancing activities such as SMEs or productive investment.
- Weak financial intermediation: Limited transparency, underdeveloped capital markets, and concentrated banking systems reduce the efficiency of credit in driving economic growth.
- High non-performing loans: In several countries, a significant share of private credit does not translate into productive investment but adds financial vulnerability.
- Thus, while in developed economies DCP usually stimulates growth, in the case of our sample, the inefficiency of financial intermediation transforms domestic credit into a drag on growth. This aligns with the "finance–growth paradox" observed in some developing regions.

❖ **Lagged GDP (–0.192):**

The negative sign suggests some mean-reverting dynamics, where exceptionally high growth in one year tends to slow down in

the following year. This reflects structural constraints that prevent sustained high growth trajectories in the sample countries.

❖ **Foreign Direct Investment (FDI: +0.769):**

FDI has a strong and positive effect on growth, consistent with the idea that foreign capital inflows bring technology transfer, managerial expertise, and new market opportunities.

However, the effectiveness of FDI often depends on absorptive capacity, institutional quality, and the ability of local economies to integrate foreign investment into domestic value chains.

❖ **Government Expenditure (Δ GCE: -2.048):**

The very large and negative effect indicates that increases in government spending (as a share of GDP) tend to crowd out growth. This can be explained by fiscal inefficiencies, dominance of current expenditures over investment expenditures, and the heavy burden of subsidies and public wage bills in the studied economies.

12.3. Key Insight:

The most policy-relevant result is the negative role of domestic private credit (DCP) on economic growth. For the countries in the sample, this highlights a structural weakness in financial intermediation, where credit expansion does not automatically translate into productive investment. Instead, it may reinforce

consumption-led patterns or rent-seeking activities, thereby constraining long-term growth.

This finding strongly suggests that financial sector reforms, improving credit allocation, strengthening banking supervision, and developing capital markets, are crucial prerequisites if domestic credit is to serve as a true driver of economic development in the region.

13. CONCLUSION

This study investigated the relationship between domestic credit to the private sector and economic growth in four North African Arab countries—Algeria, Egypt, Libya, and Tunisia—over the period 1990–2023. Using a Dynamic Panel Data Analysis estimated through the Feasible Generalized Least Squares (FGLS) method, the study sought to capture both the temporal dynamics of growth and the structural characteristics of financial development in the region.

The empirical findings revealed a negative and highly significant effect of domestic credit to the private sector (DCP) on economic growth. This result stands in contrast to traditional economic theories, which generally predict a positive finance–growth relationship. The negative coefficient suggests that, in the studied countries, credit expansion has not effectively translated into productive investment capable of driving sustainable growth. Instead, the findings indicate that credit misallocation, inefficient financial intermediation, and institutional weaknesses have constrained the developmental role of domestic credit. Much of the credit has been directed toward non-productive sectors, such as consumption, real estate, or politically connected enterprises, rather than to innovation and enterprise development.

In contrast, Foreign Direct Investment (FDI) was found to exert a strong and positive effect on economic growth, highlighting the importance of external capital inflows as a catalyst for technology transfer and industrial expansion. Meanwhile, government consumption expenditure (GCE) displayed a significantly negative impact, reflecting fiscal inefficiencies, the predominance of recurrent expenditures, and the crowding-out effect on private investment. The lagged GDP term confirmed a mean-reverting growth pattern, consistent with structural rigidities that limit sustained growth in the region.

Overall, these results underline a key insight: financial deepening alone is insufficient to foster economic growth unless accompanied by institutional reforms that ensure credit is allocated efficiently and productively. Policymakers in North African Arab countries should therefore focus on:

- Enhancing the efficiency and transparency of financial institutions;
- Strengthening regulatory frameworks and banking supervision;
- Expanding access to finance for small and medium-sized enterprises (SMEs);
- Developing capital markets to diversify financing sources beyond the banking sector.

From a broader perspective, the findings support the existence of a “finance–growth paradox” in developing economies, where excessive or misdirected credit can hinder rather than stimulate growth. This paradox calls for a reorientation of financial policies from quantity-based expansion toward quality-based intermediation that supports innovation, entrepreneurship, and productive investment.

Finally, the study acknowledges certain limitations related to data constraints and variable coverage. Future research could expand the sample to include other Arab regions, integrate institutional and governance indicators, and employ alternative estimation techniques such as the System GMM to further validate the dynamic relationship between finance and growth.

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