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Investigating the Impact of the McKinnon-Shaw Theory on Economic Growth in Algeria During the Period 2000-2022

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Abstract:

The objective of this research is to evaluate the soundness of the McKinnon-Shaw theory in Algeria by analyzing the influence of financial liberalization indicators on economic growth from 2000 to 2022, using the Autoregressive Distributed Lag (ARDL) model.

The results establish a notable adverse influence of interest rates and domestic credit extended to the private sector on economic growth, while foreign investment does not have a substantial long-term effect on economic growth, which does not support the theory. The research determines that the process of financial liberalization in Algeria is still partial and unfinished. It emphasizes the need to enact suitable policies to convert the financial sector into an accelerator for viable economic Growth.

Keywords: Mckinnon-Shaw Theory; Financial Liberalization; Economic Growth; ARDL Model.

Jel Classification Codes: O16,O40, F36, C32.

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1. Introduction

During the 1970s, Ronald McKinnon and Edward Shaw developed the "McKinnon-Shaw Hypothesis," which has since underpinned discussions on financial development and banking sector reforms. This hypothesis posits that restrictive financial policies impede growth, especially in developing economies, while financial liberalization fosters development by improving resource allocation, boosting savings, and enhancing investment.

In response to global and domestic economic pressures, many developing countries embarked on financial liberalization in the latter part of the 20th century. These reforms were part of broader adjustment strategies aimed at reducing state intervention and enhancing the financial sector's role in resource distribution. The objective was to stimulate both local and foreign investment and improve the sector's efficiency to spur economic growth.

Algeria, following this global trend, initiated financial sector reforms in the late 1980s and early 1990s. These reforms included allowing free determination of interest rates, easing lending restrictions, encouraging private sector participation, and restructuring the economy's heavy reliance on gas and oil. The reforms aimed to enhance resource allocation, increase investment, and stimulate savings, in alignment with the McKinnon-Shaw Hypothesis. This raises questions about the effectiveness of financial liberalization in promoting economic growth in Algeria as posited by the approach.

The present work aims to address the following fundamental inquiry: **To what extent did financial liberalization policies in Algeria between 2000 and 2022 impact economic growth? And did the results support the McKinnon-Shaw theory?**

To address this issue, the following hypothesis will be investigated: **There exists a long-term equilibrium relationship**

between indicators of internal and external financial liberalization and economic growth in Algeria from 2000 to 2022, thereby supporting the McKinnon-Shaw theory.

Research Methodology:

Scientific research requires the adoption of sufficient methodologies and tools to achieve results as expected. Therefore, this research adopts both deductive and inductive approaches to establishing a theoretical framework for financial liberalization and the McKinnon-Shaw theory. The adopted theoretical framework was further substantiated through an empirical analysis that assessed the variables of internal and external financial liberalization as well as economic growth from Q1 2000 to Q4 2022. The research utilizes the Autoregressive Distributed Lag (ARDL) model to guarantee precision in the results and to provide relevant predictions within the study's parameters.

2. Economic Growth as Conceptualised by the McKinnon-Shaw Theory

Following the end of World War II, many countries implemented stringent financial policies to exert greater control over their financial systems, particularly to address government deficits and invest in the public sector. These policies typically included interest rate regulations, credit constraints, and requirements for banks to buy government securities at low interest rates. Although these measures met some immediate goals, they eventually led to inefficiencies in the financial system and hindered long-term economic growth.

In response to these issues, the 1970s and 1980s saw a wave of economic reforms aimed at mitigating financial repression and enhancing financial sector performance. The primary focus of these reforms was financial liberalization, designed to counteract the negative impacts of restrictive financial policies. Economists Stanley McKinnon and Ronald Shaw championed this approach through their

theory, which posits that financial constraints hinder economic development by diminishing the effectiveness of the financial system.

2.1 An Overview of the Concept of Financial Liberalization

As defined by McKinnon and Shaw (1973), financial liberalization is "the optimal strategy for overcoming financial repression and a rapid approach to accelerating economic growth in developing countries" (Hamdaoui, 2017, p. 54). Financial liberalization is thus often conceptualized in contrast to financial repression, which involves government-imposed controls on interest rates and has negative repercussions for both the financial sector and the wider economy.

E. Murat Ucer argues that financial liberalization should not be narrowly defined as mere interest rate deregulation. Instead, he supports a broader interpretation, viewing it as a comprehensive reform process aimed at removing constraints across the financial sector. This includes easing banking industry restrictions, restructuring the external sector, and revising the institutional framework governing monetary policy (Murat, 2000, p. 1).

From a broader perspective, financial liberalization involves implementing policies to dismantle or reduce regulatory controls over various aspects of the financial system and markets, both nationally and internationally (Chandrasekhar, 2004, p. 2). Kaminsky and Schmukler further support this view, suggesting that financial liberalization focuses on removing restrictions and control mechanisms that impede the domestic banking sector, financial markets, and external capital flows. According to Schmukler and Kaminsky, such liberalization fosters economic development by leveraging the benefits of deregulating real interest rates, thereby promoting higher investment levels, efficient resource allocation, and enhanced financial intermediation. Additionally, financial liberalization boosts the capacity of financial markets to mobilize

savings, advances technological development in financial and banking systems, and increases competition, all contributing to long-term economic growth (Schmukler & Kaminsky, 2003, pp. 6-7).

From the above, financial liberalization can be understood in different ways depending on the context and application areas:

- **Financial Liberalization as the Removal of Restrictions**: This perspective views financial liberalization as the removal of constraints that limit the functioning of financial markets, allowing markets to set interest rates and credit levels based on supply and demand forces.

- **Financial Liberalization as Market Efficiency Improvement**: Here, financial liberalization is seen as enhancing market efficiency by increasing competitiveness and providing a more transparent environment.

- **Financial Liberalization as a Component of Structural Reform:** This perspective views financial liberalization as an integral aspect of structural reforms, encompassing the comprehensive revamping of regulatory and supervisory frameworks to foster effective and stable financial markets.

- **Financial Liberalization as a Facilitator of Financial Market Openness:** This strategy places a major priority on financial liberalization as the process of opening financial markets, which facilitates the influx of foreign investment and enhances market liquidity.

- **Financial Liberalization as a Tool for Economic Development**: This perspective sees financial liberalization as a tool to support economic development by improving the financial system's capacity to finance investment projects.

2.2 McKinnon-Shaw Theory

The McKinnon-Shaw Hypothesis, introduced in the early 1970s, is a key economic theory exploring the link between financial development and economic growth. It emerged in the context of developing economies where governments exercised substantial control over financial sectors through interventionist policies. These policies included financial repression, such as capping interest rates and imposing fixed rates on savings and investments, aimed at controlling inflation and maintaining economic stability. However, McKinnon and Shaw challenged this approach, arguing that such financial repression could inhibit economic growth by restricting financial efficiency and resource allocation. Their hypothesis posits that financial liberalization, rather than control, is essential for fostering economic development.

2.2.1 Ronald McKinnon's Analysis

The 1973 study conducted by Ronald McKinnon greatly enhanced the comprehension of the influence of financial sectors on the economic progress of emerging nations. His investigations on financial repression and financial liberalization introduced the concept of integrating money and capital, emphasizing their complementary roles in fostering investment and economic growth.

To elucidate this relationship, McKinnon proposed several key hypotheses:

a. **Fragmented Economy**: This hypothesis highlights a pronounced divide between the business sector (including companies and institutions) and the household sector. Such fragmentation can impede economic efficiency and growth.

b. **Dependence on Self-Financing**: McKinnon noted that economic units often rely on their own resources to finance projects, rather than accessing external funding. This self-

reliance can constrain investment opportunities and economic expansion.

c. **Types of Savings**: He identified two main categories of savings: (a) real assets that are non-productive and (b) real money balances, such as bank deposits, which are positively correlated with real interest rates. This distinction underscores the importance of effective financial mechanisms in mobilizing savings for productive investment. (Baptiste, 2004, p. 19).

McKinnon formulated the integration hypothesis in the demand function as follows (Christopher, 1995, p. 29) :

$$\frac{M}{P} = F(Y, \frac{I}{Y}, d - \pi^*)$$

where:

- $\frac{M}{P}$: Real money holdings, which include savings, time deposits, demand deposits, and circulating currency, and depend on real income.
- Y: Real GDP.
- $\frac{I}{Y}$ :: Ratio of total investment to GDP.
- $d - \pi^*$:Real interest rate on deposits, where d is the nominal interest rate on deposits and $\pi*$ the expected inflation rate.

Integration in this context refers to the concept that the money supply has a first-order impact on choices about savings and investments. The integration hypothesis may be formulated using the investment function in the following manner (Christopher, 1995, p. 29):

$$\frac{I}{Y} = F(Y^t, d - \pi^*)$$

where Y^t represents the average return on physical capital.
The following partial derivatives show integration.

$$\frac{\partial(M/P)}{\partial(I/Y)} > 0 \; ; \frac{\partial(M/P)}{\partial(d-\pi^*)} > 0$$

The analysis indicates that in economies experiencing financial repression, investment decisions are less influenced by the cost of capital and more by the availability of financing sources. Thus, the availability of credit becomes a crucial determinant of investment, independent of the self-financing motive associated with holding money. Consequently, credit levels and real interest rates on deposits are determined simultaneously (Tomoe, 2010, p. 261).

Financial liberalization often leads to an increase in real interest rates, which can create a positive differential between domestic and foreign interest rates. In an open economy without capital flow restrictions, this interest rate gap attracts foreign capital, boosting foreign exchange reserves and the money supply. However, this scenario can also pose risks, such as rising inflation rates, which might diminish the benefits of higher nominal interest rates and undermine the positive effects of financial reforms.

McKinnon's theory suggests that to mitigate these risks, domestic interest rates should be aligned with international rates. Such alignment ensures that the influx of foreign capital does not negate the advantages of financial liberalization. A recommended approach to achieve this is through gradual currency devaluation. This policy helps balance the gains for investors borrowing abroad at lower rates with the increased costs due to currency depreciation, thereby preserving the benefits of financial liberalization.

2.2.2 Edward Shaw's Analysis

Ronald Shaw expanded upon McKinnon's concepts in his influential 1973 book, Financial Deepening in Economic

Development, by highlighting the vital significance of financial liberalization in fostering economic progress. Shaw proposed that a robust financial sector is a prerequisite for attaining elevated levels of economic growth. He argued that financial liberalization allows real interest rates to be set by market forces, which accurately reflect the scarcity of savings and thereby drive economic growth.

Shaw's research highlights that when real interest rates are kept below their market equilibrium level, investment, and savings are adversely affected. This results in inadequate savings to meet investment demands. In contrast, when nominal interest rates are raised, it leads to increased savings, which in turn boosts both the quantity and quality of investments. Higher interest rates compel banks to finance projects with returns exceeding the real interest rate, thus filtering out less profitable investments and supporting more profitable ones. This process enhances investment quality and accelerates economic growth by aligning investment with the increased level of savings. (Elsayed, 2013, p. 25) .

Shaw further contended that raising interest rates until they reach the equilibrium level—where the savings curve intersects with the investment curve—ensures optimal economic growth. At this equilibrium, investment volume satisfies all demands, and the interest rate reflects the optimal balance for maximizing economic growth, savings, and investment quality (Baptiste, 2004, p. 34).

Additionally, Shaw's analysis introduced a focus on domestic money as vital for financing investments, which differed from McKinnon's perspective. Shaw argued that money should not be viewed merely as an external factor but as an integral liability within the financial system. He emphasized the importance of financial intermediation in mobilizing domestic money for investment purposes, thus underscoring its role in economic development (Baptiste, 2004, p. 3).

Based on this, Shaw derived the demand for money function as follows. (Elsayed, 2013, p. 25):

$$\frac{M}{P} = F(Y, v, d - \pi^*)$$

where the value of v indicates the opportunity cost of retaining money in real terms of economic value.

Shaw anticipated that real economic benefits would derive from all forms of wealth, including money, through enhanced financial intermediation. He argued that financial deregulation and the resulting increase in real interest rates on deposits would boost incentives for saving and investing. This, in turn, would lead to improved investment efficiency and higher rates of economic growth (Serieux, 2008, p. 4).

Nevertheless, the ideas proposed by McKinnon and Shaw provide separate but interrelated perspectives on the correlation between finance and growth in the economy. McKinnon's primary focus was on domestically funded investment and its association with deposit interest rates, with a particular emphasis on the deposit channel impact. This approach considers how self-financed investments interact with interest rates and savings. In contrast, Shaw highlighted the importance of financial depth and external financing, referring to the intermediation effect. Shaw's perspective centers on how financial intermediaries facilitate investment by channeling savings into productive investments.

While McKinnon's theory emphasizes the role of self-financing and internal resources, Shaw's theory focuses on the broader impact of financial depth and intermediation. Both theories are complementary because most investment projects rely on a mix of self-financing and external loans.

The intermediation effect, according to theory, should become evident shortly after the implementation of financial liberalization, as interest rates are liberalized. On the other hand, the deposit channel effect, which relates to the interaction between deposit interest rates and investment, may become more pronounced over the medium to long term (Molho, 1986, p. 111).

3. Empirical Studies on the Impact of Financial Liberalisation on Economic Growth: A Comprehensive Review

3.1 Supporting Evidence

a. **(Selvarajan & al, 2018)**: This study analyzed financial liberalization in ASEAN-6 countries from 1990 to 2015 using the Pooled Mean Group (PMG) estimation technique. The findings indicated that an increase in private-sector credit enhances economic growth. Loosening restrictions on non-private securities and lending terms also promoted private sector growth and bolstered economic performance, supporting a positive relationship between financial liberalization and economic growth.

b. **(Haruna & Abu Bakar, 2021)**: Focusing on five Sub-Saharan African countries, this research used the Pooled Ordinary Least Squares (OLS) model with Driscoll and Kraay standard errors. The study found that domestic financial deregulation spurred economic growth, with both private-sector bank credit and foreign direct investment (FDI) contributing positively. However, the impact of capital and labor was found to be detrimental, and the interaction between financial liberalization and corruption was noted to reduce growth.

c. **(Brada & Iwasaki, 2024)** The study, through an analysis of 54 studies and 906 estimates, shows that financial liberalization boosts economic growth, especially when applied comprehensively to the stock market and financial markets.

Although it may increase financial sector volatility, its economic benefits remain clear.

d. **(Igbinovia & Igbinovia, 2023)**: in his study applied panel data analysis using the Generalized Method of Moments (GMM) to investigate the effects of financial liberalization within the Economic Community of West African States (ECOWAS). Statistical analysis revealed that financial liberalization and economic openness have a substantial impact on economic growth, nevertheless, inflation and exchange rates have adverse consequences. The observed impact of interest rates was determined to be positive, but insignificant in statistical terms.

3.2 Contrary Evidence

a. **(Peter & Temidayo, 2017)**: This study assessed the McKinnon-Shaw hypothesis in Nigeria from 1981 to 2014 using an Autoregressive Distributed Lag (ARDL) model. The analysis revealed minimal or statistically insignificant effects of interest rates on real money demand, GDP growth, and investment rates, suggesting that the McKinnon-Shaw theory might be less applicable in Nigeria due to financial system inefficiencies.

b. **(Shaharuddin & al, 2020)**: Examining eight emerging Asian countries, this study used measures such as the Lin and Milessi-Ferretti (LMF), Edison-Warnock (EW) ratio, and Foreign Equity Liability (FEL). The research found that, except for South Korea, financial liberalization did not directly contribute to GDP growth in other countries, indicating that the benefits of financial liberalization are not uniformly applicable across emerging Asian economies.

c. **(SANTANA, 2021)**: The present research examined the complex interaction between financial development and

economic growth, focusing on the Latin American region over the period of 1973 to 2005. The findings of this study provide valuable insights into the interplay. Utilizing a dynamic panel methodology with the Generalized Method of Moments (GMM), the study examined sixteen nations in the area to clarify the intricate mechanisms by which recurring banking crises might impede economic development despite efforts to liberalize the financial sector. Significantly, these results challenge commonly accepted theories that often propose a direct and positive relationship between financial development and economic growth.

d. **(Boussadia, 2022)**: Applying the ARDL limits testing approach, this research evaluated the impact of banking sector liberalization on Algeria's economic growth from 1980 to 2021. The study found that both internal (banking sector reforms) and external (capital account liberalization) financial liberalization measures negatively impacted economic growth, contradicting the McKinnon-Shaw theory.

These research efforts illuminate the intricate nature of the influence of financial liberalization on economic development, with varying results depending on regional, contextual, and methodological factors.

It is clear from earlier research that financial liberalization's effects on economic growth are not constant or universal across nations or eras. These effects vary significantly based on several factors, including:

- **Development of Financial Systems**: Countries with advanced financial systems are often better positioned to benefit from financial liberalization policies. Conversely, countries lacking strong financial infrastructure may struggle to achieve positive growth effects.

- **Presence of Efficient Markets**: The optimization of the advantages of financial liberalization relies on the presence of efficient financial and banking markets capable of accurately allocating resources. Lacking such markets, and insufficient funding for productive industries may hinder the anticipated economic development.

- **Political and Economic Stability**: Political and economic stability plays a significant role in enhancing or undermining the effects of financial liberalization. Countries experiencing political or economic instability often face difficulties in reaping the benefits of liberalization policies, as instability increases risks and reduces investor confidence.

- **Financial Crises:** Recurrent or sudden financial crises can diminish the potential benefits of financial liberalization, especially if these crises result from the liberalization policies themselves. The risk of a banking crisis may rise if the financial industry is liberalized without adequate regulation and oversight.

4 . An examination of how financial liberalization has affected Algeria's economic growth

4.1. The Research Variables and the Methodological Approach

A dynamic macroeconomic model was precisely designed to assess the McKinnon-Shaw hypothesis in the context of Algeria from 2000 to 2022, taking into account the specific chronology and characteristics of the Algerian economy. This model integrates a set of factors derived from theoretical frameworks and prior empirical research on the relationship between financial liberalization and economic development. Included in the model are the following variables:

 GDP: The rate of growth of the Gross Domestic Product, which is a unit of measurement for the expansion of the economy.

 Financial Liberalization Indicators:

- **Internal Financial Liberalization Indicators:**
    - **IR:** Interest Rate.
    - **CSP:** Credit to the Private Sector as a percentage of GDP. This variable represents the process of financial intermediation and the function of financial institutions in supplying capital to various sectors of the economy.
- **External Financial Liberalization Indicator:**
    - **FDI:** Net inflows of Foreign Direct Investment as a percentage of GDP. This indicator serves as a measure of capital account liberalization.
- **Conditions of Financial Liberalization:**
    - **M:** Money Supply as a percentage of GDP. McKinnon defines this statistic as a representation of financial depth, at the same time as it shows the size of the formal financial sector in comparison to the entire economy.
    - **INF:** Inflation Rate.
- **Control Variables:**
    - **OPEN:** Trade Openness.
    - **GFCF:** Gross Fixed Capital Formation as a percentage of GDP.
    - **SAV:** Total Savings as a percentage of GDP.

Considering the relationship described below:

$$GDP = \alpha + \beta_0 IR + \beta_1 GFCF + \beta_2 M + \beta_3 SAV + \beta_4 FDI + \beta_5 CSP + \beta_6 OPEN + \beta_7 INF + \varepsilon_t$$

Where:

- α،β_0،β_1،β_2،β_3،β_4،β_5،β_6،β_7: Model parameters.
- ε_t : Random error.

It is worth noting that this period was chosen due to its significance in the development of the Algerian economy, marked by security stability and financial reforms concurrent with economic reforms under growth support programs, the Five-Year Plan, and the Economic Recovery Program.

In order to optimize the quality of the estimated standard model while preserving the statistical characteristics of the original time series, the statistics were resampled from yearly to quarterly data. This transformation was performed using statistical techniques included in EViews 12.

4.2. Presentation and Analysis of Standard Model Results

4.2.1. Testing for Variable Stationarity

For this purpose, time series data stationarity was checked by applying the Augmented Dickey-Fuller test to study variables.

Table 1. Testing for Variable Stationarity

variables	level			1st difference			Decision
	Intercept	Trend and Intercep	None	Intercept	Trend and Intercep	None	
GDP	0.0899	0.1402	0.1101	0.0028	0.0157	0.0001	I(1)
IR	0.0506	0.2625	0.0053				I(0)
CSP	0.4182	0.7866	0.8513	0.1150	0.2336	0.0118	I(1)
GFCF	0.2406	0.9766	0.7447	0.0611	0.1255	0.0046	I(1)
M	0.0681	0.0543	0.9067	0.0116	0.0482	0.0006	I(1)
SAV	0.5770	0.7425	0.6047	0.0336	0.1254	0.0024	I(1)
FDI	0.2832	0.0834	0.2496	0.0020	0.0125	0.0001	I(1)
OPEN	0.6445	0.7404	0.3990	0.0124	0.0544	0.0006	I(1)
INF	0.0449	0.2759	0.0321				I(0)

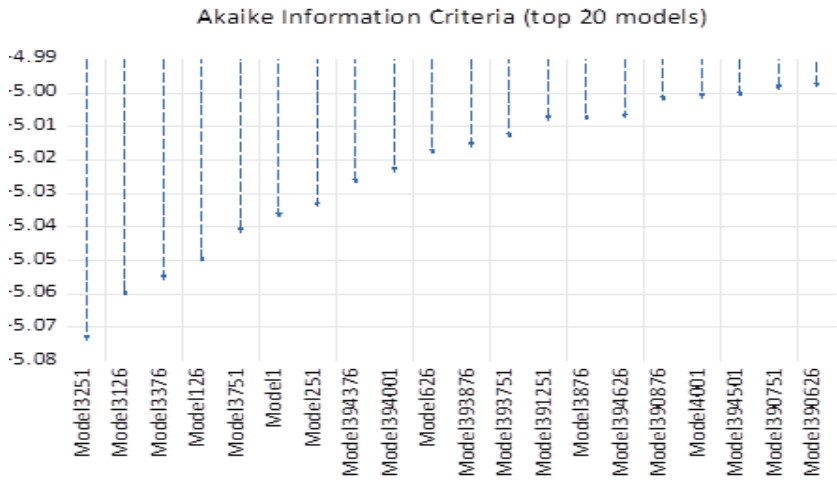
Source: Eviews 12 outputs.

The table indicates that, aside from interest rates and inflation rates, which were constant at their levels, the time series for the variables under investigation were not stationary at their levels. The need to apply the first difference to the remaining variables implies that they include integration of order one. The obtained results provide evidence in favor of using the Autoregressive Distributed Lag (ARDL) model for further study.

4.2.2 Testing Bounds for Cointegration

Before verifying the long-run connection estimation among the variables under investigation, it is imperative to ascertain the best lag duration or the time frame during which the selection criteria produce the lowest value. Findings revealed the following ideal lags : (4, 4, 4, 3, 4, 3, 4, 4, 4).

Fig.1. Determining the Optimal Lag Length for the Model



Source: Eviews 12 Outputs.

By calculating the F-statistic and comparing it with the Pearson tabulated statistic, the Bounds Test will be used to establish the presence of a long-term equilibrium link between the variables. The results of the Bounds Test are shown in the table below.

Table2. Bounds Test Results Between Model Variables

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	23.68152	10%	1.85	2.85
k	8	5%	2.11	3.15
		2.5%	2.33	3.42
		1%	2.62	3.77

Source: Eviews 12 Outputs.

As seen in the table below, the calculated Fisher F-statistic, estimated at 23.68, exceeds the upper critical values (I1Bound) at all levels. Therefore, the alternative hypothesis is confirmed, indicating a persistent cointegration trend between the variables, whereas the null hypothesis is rejected.

4.2.3 Estimating the Long- and Short-Term Equilibrium Relationship

The model's validity is confirmed only after conducting several economic and econometric tests to ensure that it aligns with theoretical frameworks and is free from econometric issues.

A. Summary of Results from Utilising the ARDL Model for Estimating Long-Term and Error Correction Models

- **Estimation of Short-Term Relationship and Error Correction Model**

As can be seen from the top half of the ECM estimate, the majority of the variables are statistically significant at the 5% level. This is the case for the majority of the variables. A long-term equilibrium relationship is confirmed by the statistically significant negative (-0.26) value of the error correction term (CointEq(-1)). The speed at which economic growth adjusts from short-term to long-term deviations from its long-term equilibrium is around 26.18%, as shown by the statistical measure of the error correction coefficient. These findings suggest that about 26.18% of the deviation in economic growth from its long-term equilibrium that occurs in period t-1 is corrected in period t.

- **Determination of the Long-Term Relationship**:

The long-term parameter table findings indicate that all financial liberalization variables, except foreign investment and the money supply, are statistically significant at the 5% level. This suggests that, based on the relationship below, these factors have a major long-term influence on economic growth.

*GDP =-1.3749*IR + 0.0731*GFCF + 0.0927*M2 - 0.5885*SAV -0.2300*FDI-0.2463*CSP + 0.3598*OPEN - 0.8846*INF + 11.4946*

B. Economic Tests

From the estimated model, particularly the long-term relationship, the following observations are produced:

- **Negative and Statistically Significant Impact of Domestic Credit extended to the Private Sector on Economic Growth** : Specifically, each 1% increase in the ratio of domestic credit to the private sector relative to total GDP leads to a 24.6% decrease in economic growth. This is attributed to the high percentage of non-performing loans, which can be seen as a logical result of the government's regular and repeated recapitalization of public banks and the provision of subsidized loans to the private sector, especially to young entrepreneurs, through government programs. These programs are not aligned with basic lending principles (e.g., subsidized loans to young people and farmers carry higher risks compared to other types of loans). Additionally, the inefficiency in allocating credit to the private sector is due to the Algerian banking system's struggle with external interference, which deprives the Algerian economy of financial resources that could be optimally directed to support productive investments. Furthermore, bank loans for financing investment projects have primarily been short-term, which are not suitable for covering the medium-term financing needs of individuals and businesses. Moreover, the monopoly of lending activities by public banks, which hold over 90% of total assets and loans, prevents the Algerian economy from benefiting from effective private sector participation in achieving economic growth.
- There is a negative and considerable influence that interest rates have on the growth of the economy. A 1% increase in the real interest rate causes the growth rate to drop by 137.49%. This suggests that, for the Algerian economy during the research period, the McKinnon-Shaw model is not long-term viable. Increased borrowing costs for investments due to

higher interest rates result in lesser investment and lower production, which hurt economic growth. Furthermore, the availability of favorable home loans with subsidized interest rates from the Treasury is what is responsible for the notable growth in savings, not interest rates. Furthermore, because there aren't any other options, deposits from Sonatrach, the biggest oil company in Algeria, are made in state banks without taking real interest rates into account.

- Non-important Effect of Indirect Foreign Investment: Over the long run, a 1% increase in indirect foreign investment results in a 23% decline in economic growth, suggesting that this investment type is not important. This is because the majority of these investments are unproductive and service-oriented. In addition, capital flight brought on by the failing financial sector has hampered economic expansion.
- The long-term impact of trade openness on economic development is both positive and substantial. Specifically, a 1% increase in trade openness results in a substantial 35.9% rise in economic growth. Therefore, to achieve faster economic growth, the Algerian government should loosen import restrictions and diversify exports beyond the oil sector.
- Negative Impact of Inflation on Economic Growth: Economic theory suggests that a 1% rise in the inflation rate leads to a statistically significant decline of 88.45% in economic development.
- Gross Fixed Capital Formation Has a Positive and Significant Effect: A 1% rise in GCF causes an increase in economic growth of 7.31%. This relatively small effect can be explained by the large disparity in the accumulation of human capital brought about by the low GDP-to-education and training spending, as well as by the unfavorable institutional and legal environments. These factors are critical for optimizing the returns on investments made in both physical and human capital

- The Influence of Savings on Economic Growth Is Negative and Considerable: For every 1% increase in the savings-to-GDP ratio, economic growth declines by 58.85%. This can be explained by the initial period's large government investments in infrastructure, which supported growth, and the COVID-19 crisis, which led to substantial government spending amidst declining revenues from oil taxation. Additionally, the low level of social savings as a percentage of total savings, due to many individuals and institutions avoiding placing their savings in commercial banks or holding productive financial assets like stocks and bonds, contributes to this negative effect. Instead, there is a tendency to seek assets outside the formal banking sector, such as speculative investments in real estate, land, and goods, with significant activity occurring in informal markets due to underdeveloped official real estate markets in Algeria. Public distrust in banks, exacerbated by scandals like those involving Khalifa Bank and the Algerian Industrial and Commercial Bank, also plays a role.

C. Econometric Tests :

To evaluate the quality of the model and the validity of its parameters, several econometric tests were carried out, including the following measures:

• **Residuals Normality Test**: Appendix 3's Jarque-Bera test findings reveal a p-value of 0.79, above the significance level of 0.05. As a result, it is not possible to reject the regularly distributed residuals null hypothesis.

• **Autocorrelation Test**: A p-value of 0.11, above the 0.05 significance level, is obtained using the Breusch-Godfrey test in Appendix 3. As a result, the residuals show no signs of autocorrelation.

• **Heteroskedasticity Test**: Appendix 3's ARCH test findings yield a p-value of 0.9832, above the 0.05 significance level. Therefore, the residuals do not significantly show any signs of heteroskedasticity.

• **Stability Test**: The findings, shown in Appendix 3, provide evidence of the model's long-term stability and appropriateness for representing the underlying variable connections. These results indicate that the cumulative sums of residuals and squared residuals are within the 5% confidence range. Based on the 5% significance threshold, it may be inferred that the model's short-run adjustments effectively stabilize long-run equilibrium.

5. Conclusion

This research paper tests the McKinnon-Shaw theory in Algeria, using long-run parameters between financial liberalization and the growth rate of an economy. Using an ARDL model for analysis, quarterly data was considered from 2000 to 2022 with variables from the theory and earlier research. Key variables included GDP growth rate, trade openness, gross fixed capital formation, savings as a percentage of GDP, foreign direct investment (FDI), interest rates, private sector credit, financial depth, and inflation. Key findings include:

• Cointegration: The limits test provides evidence of the long-term cointegration between financial liberalization and economic growth, suggesting that eventually, these variables can attain their equilibrium.

• Negative Effects of Internal Financial Liberalization: Interest rates and private sector lending were two indicators of internal financial liberalization that, in contrast to the positive effect theory, had long-term negative effects on economic growth. This situation indicates that the liberalization of the Algerian banking sector is too weak to equilibrate savings and investment adequately.

• The limited impact of external financial liberalization: The impact of FDI had been non-significantly positive for growth due to the focus on oil and telecommunication. Thus, this reinvigorates rentier economy functions, implying that the current policies of external financial liberalization are unlikely to improve long-term economic growth.

• Trade Openness as a Greater Determinant: While the trade openness factor indeed posed a more significant positive influence on growth compared with that of the policies about financial liberalization. The threshold approach provided credence to the idea that minimal requirements for financial liberalization must exist.

• The lack of adequate conditions for financial liberalization is evident from the adverse effects of inflation and financial depth on GDP, which contradict the economic trajectory. Therefore, it is imperative to implement structural changes for the progression of financial liberalization.

Hence, the article affirms that the process of financial liberalization in Algeria is both partial and imperfect. The study thus concludes with some recommendations for the purpose of financially supporting the sustainable economic growth of Algeria:

- **Pre-Liberalization Preparations** :

- Manage Inflation and ensure Policy Stability: Institute supportive monetary and fiscal policies to build investor confidence.
- Improve Institutional and Regulatory Quality: Have an independent regulatory body established and increase legal quality.

- **Promote Financial Sector Development**:

- Increase the level and diversity of financial infrastructure, services provided, and development of specialized banks for long-term investment.

- Development of insurance for increased diversification of financial risks and improvement in the quality of human resources.

- **Financial Market Development:**

- Efficient mobilization of capital from the public and private sectors, diversification of investments, and market infrastructure improvement.
- Enhancement of market capacity and growth of players.

- **Increased Financial Inclusion**:
  To augment the savings rate, advance the development of Islamic financial products, and enhance financial literacy to achieve greater accessibility and use of the financial system.

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7. Appendices

Appendix 01: Short-Run Relationship Testing

ARDL Error Correction Regression
Dependent Variable: D(GDP)
Selected Model: ARDL(4, 4, 4, 4, 3, 3, 4, 4, 4)
Case 2: Restricted Constant and No Trend
Date: 09/04/24 Time: 17:44
Sample: 2000Q1 2022Q4
Included observations: 85

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	1.211933	0.062706	19.32731	0.0000
D(GDP(-2))	-0.437355	0.100023	-4.372531	0.0001
D(GDP(-3))	0.253451	0.048548	5.220654	0.0000
D(IR)	-1.714117	0.177419	-9.661395	0.0000
D(IR(-1))	3.197498	0.465522	6.868626	0.0000
D(IR(-2))	-2.385744	0.504497	-4.728956	0.0000
D(IR(-3))	1.900160	0.237733	7.992843	0.0000
D(SAV)	0.092000	0.107378	0.856792	0.3964
D(SAV(-1))	0.518976	0.287290	1.806450	0.0780
D(SAV(-2))	-0.265667	0.302306	-0.878802	0.3845
D(SAV(-3))	0.515699	0.132392	3.895258	0.0003
D(GFCF)	0.552302	0.056407	9.791436	0.0000
D(GFCF(-1))	-0.361675	0.154978	-2.333724	0.0245
D(GFCF(-2))	-0.114267	0.171951	-0.664535	0.5100
D(GFCF(-3))	0.503726	0.085147	5.915983	0.0000
D(M2)	-0.312311	0.024308	-12.84804	0.0000
D(M2(-1))	0.339529	0.036074	9.412126	0.0000
D(M2(-2))	-0.226125	0.022719	-9.953313	0.0000
D(FDI)	-1.054111	0.097417	-10.82062	0.0000
D(FDI(-1))	0.621569	0.160939	3.862141	0.0004
D(FDI(-2))	-0.278342	0.093937	-2.963073	0.0050
D(CSP)	0.080086	0.100150	0.799664	0.4284
D(CSP(-1))	0.731981	0.223838	3.270140	0.0022
D(CSP(-2))	-0.504814	0.230483	-2.190239	0.0341
D(CSP(-3))	1.074401	0.122044	8.803364	0.0000
D(INF)	-1.623162	0.169386	-9.582597	0.0000
D(INF(-1))	3.129494	0.437208	7.157908	0.0000
D(INF(-2))	-2.525011	0.473942	-5.327682	0.0000
D(INF(-3))	2.008629	0.230897	8.699260	0.0000
D(OPEN)	0.400539	0.044843	8.932124	0.0000
D(OPEN(-1))	-0.858985	0.107066	-8.022944	0.0000
D(OPEN(-2))	0.448332	0.117761	3.807129	0.0005
D(OPEN(-3))	-0.492565	0.057397	-8.581664	0.0000
CointEq(-1)*	-0.262062	0.015454	-16.95763	0.0000

R-squared	0.999765	Mean dependent var	0.008066
Adjusted R-squared	0.999613	S.D. dependent var	0.757297
S.E. of regression	0.014907	Akaike info criterion	-5.284768
Sum squared resid	0.011333	Schwarz criterion	-4.307708
Log likelihood	258.6026	Hannan-Quinn criter.	-4.891767
Durbin-Watson stat	3.228098		

* p-value incompatible with t-Bounds distribution.

Source: Eviews 12 Outputs.

Appendix 02: Long-Run Relationship Testing

Levels Equation
Case 2: Restricted Constant and No Trend

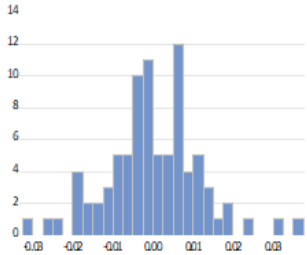
Variable	Coefficient	Std. Error	t-Statistic	Prob.
IR	-1.374916	0.451703	-3.043847	0.0040
SAV	-0.588514	0.158723	-3.707813	0.0006
GFCF	0.073100	0.035815	2.041037	0.0476
M2	0.092681	0.094468	0.981080	0.3322
FDI	-0.230040	0.136917	-1.680140	0.1004
CSP	-0.246270	0.041317	-5.960439	0.0000
INF	-0.884560	0.334943	-2.640927	0.0116
OPEN	0.359816	0.138755	2.593164	0.0130
C	11.49456	4.164882	2.759876	0.0085

EC = GDP - (-1.3749*IR -0.5885*SAV + 0.0731*GFCF + 0.0927*M2 -0.2300 *FDI -0.2463*CSP -0.8846*INF + 0.3598*OPEN + 11.4946)

Source: Eviews 12 Outputs.

Appendix 03: Econometric Tests

A : Normality Test



B: Autocorrelation Test

Breusch-Godfrey Serial Correlation LM Test:

Null hypothesis: No serial correlation at up to 2 lags

F-statistic	2.237123	Prob. F(2,40)	0.1467
Obs*R-squared	2.456320	Prob. Chi-Square(2)	0.1170

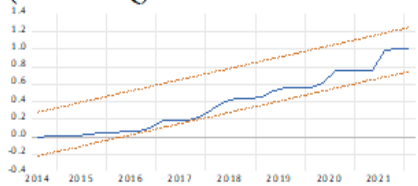
C: Heteroskedasticity Test (ARCH Test)

Heteroskedasticity Test: ARCH

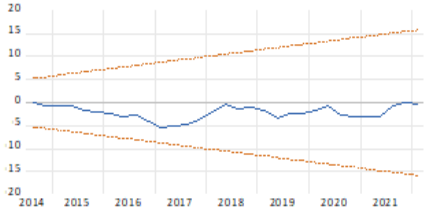
F-statistic	0.000418	Prob. F(2,80)	0.9838
Obs*R-squared	0.000447	Prob. Chi-Square(2)	0.9832

D: Stability Test

Cumulative Sum of Squared Residuals (CUSUMSQ)



Cumulative Sum of Residuals (CUSUM)



Source: Eviews 12 Outputs.