

The Impact of Accessibility of financial services Indicators on economic growth in Algeria: An Analytical Study for the Period 2004-2020

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Received: 06-06-2024 Accepted: 01-12-2024 Published: 15-12-2024

Abstract:

This study aims to examine the impacts of various monetary services accessibility indicators on Algeria's financial expansion from 2004 to 2020. The study utilized indicators such as the density of commercial bank branches and ATMs per 100,000 adults, the number of deposit accounts and borrowers per 1,000 adults, the total credit extended to the private sector, and the GDP growth rate to represent economic development.

The research applied multiple linear regression analysis conducted with EVIEWS 12 software to evaluate various hypotheses. The findings indicated that the number of ATMs had a positive impact on financial expansion. In contrast, the number of deposit accounts and borrowers did not significantly affect economic progress. Additionally, the existence of commercial bank branches and the amount of credit extended to the private sector had a negative impact on financial expansion throughout the period studied.

Keywords: Indicators, Accessibility of monetary services, Financial expansion, Multiple Linear Regression, Algeria.

1. Introduction

Economic expansion is a fundamental goal pursued by countries through their developmental strategies, given its profound impact on multiple dimensions of development. Elevated growth rates offer several advantages, such as generating new opportunities and improving the societal conditions for people, which include enhanced educational prospects, poverty reduction, and lower unemployment rates. Achieving financial expansion requires the collective efforts of all human and institutional capacities, regardless of gender, age, or social standing, and entails the engagement of diverse economic elements that fuel growth. Such cooperation fosters a cohesive relationship essential for guiding the nation's growth path.

Several studies have identified accessibility of monetary services as a primary result of financial expansion. This term refers to the ability of individuals and businesses to access monetary products and services provided by formal institutions that are beneficial, responsible, cost-effective, and accessible, catering to their needs. The effective use and access to these monetary services have a positive influence on various factors including investment rates, poverty levels, unemployment rates, and the values of gross domestic product. Consequently, this enhances a nation's economic development and promotes authentic and sustained growth rates.

1.1 Study Problem

The central issue of this research can be articulated as the following primary question:

What are the effects of accessibility of monetary services indicators on financial expansion in Algeria?

1.2 Study Hypothesis

This research is based on the following primary assumptions:

Accessibility of monetary services indicators have a set of positive and negative effects on financial expansion in Algeria.

1.3 Study importance

The significance of this study stems from its analysis of the accessibility of monetary services and its assessment of their influence on financial expansion, as this subject is a recurring theme that necessitates ongoing investigation and appraisal.

1.4 Study Objective

This study aims to shed light on the reality of accessibility of monetary services in Algeria, focusing on highlighting the extent to which accessibility of monetary services contributes to financial expansion in Algeria.

1.5 Study Limitations

- **Temporal Boundaries:** We have defined the period (2004-2020) based on the availability of statistics on the study variables.
- **Spatial Boundaries:** We focused on the case of Algeria.

1.6 Study Methodology

In this study, we utilized the descriptive-analytical method, which entails collecting and analyzing data to comprehensively investigate the topic from all perspectives.

1.7 Literary review

The following are the most important studies that addressed aspects relevant to our study problem:

1.7.1 Study of Bakbak 2022

The aim of this research was to explore and evaluate the effect of banking accessibility to monetary services Regarding economic expansion, joblessness, and poverty in Algeria between 2004 and 2020. The research made use of the Error Correction Model (ECM) for its analysis. Results showed that elements like the quantity pertaining to branches of retail banks, the count of ATMs, the quantity of bank accounts, and the extensive Currency provision had a positive effect on Monetary progress and at the same time, poverty diminished and unemployment levels.

1.7.2 Study of Rakhrou & Daham 2021

This research concentrated on the significance of improving accessibility of monetary services and examined the progression of its critical indicators in Algeria. It determined that significant efforts are required in Algeria to advance accessibility of monetary services. Additionally, the study discovered that enhancements in accessibility of monetary services facilitate more effective monetary transactions and provide support to economically disadvantaged groups.

1.7.3 Study of Benilles & Rakhrou 2021

This study sought to examine the impact of monetary services accessibility on comprehensive economic progress in Algeria. It Found that the accessibility of monetary amenities plays a role in wider economic advancement and assists households in alleviating poverty. Nonetheless, the measures of monetary services accessibility showed that Algeria lags considerably in this regard, underscoring the necessity for substantial enhancements in monetary services accessibility across the nation.

1.8 Study Structure

This research is structured into:

- The Conceptual Framework of Accessibility of monetary services and Economic Development;

Assessing the Influence of Accessibility of monetary services Metrics on Financial expansion in Algeria from 2004 to 2020.

2. The Theoretical Framework of Accessibility of monetary services and Financial expansion

Through this section, we will attempt to present the theoretical foundations that researchers have addressed in the field of accessibility of monetary services and provide a concise overview of the key aspects of this concept.

2.1 Emergence of Accessibility of monetary services

The idea of "accessibility of monetary services" first emerged in 1993 through the work of Leyshon and Thrift, who studied banking in Southeast England and examined how the closure of bank branches affected people's access to monetary services. By 1999, the definition had expanded to include the various elements that affect an individual's ability to utilize existing monetary services (Husseini, 2020, p. 99).

Global attention to accessibility of monetary services surged following the 2008 Worldwide economic turmoil. The Group of Twenty (G20) subsequently prioritized accessibility of monetary services in their economic and monetary development agenda. The World Bank underscored the importance of widespread access to monetary services as a key strategy for eradicating extreme poverty and fostering shared prosperity (Azawi & Rafa, 2021, p. 107).

During 2013, the World Bank Consortium initiated the Universal Initiative to Promote Innovation in Monetary Services Accessibility. Similarly, organizations like the Consultative Group to Assist the Poor and the

International Finance Corporation initiated projects focused on improving access to monetary services(Husseini, 2020, p. 99).

Several governments have adopted policies and laws to reduce the risks linked to innovative monetary services, with the goal of increasing inclusivity within their regulatory structures. These measures involve the introduction of equitable and clear regulations to protect consumers of monetary services, ensuring price transparency, setting up systems for customer grievance redressal, and appointing regulatory bodies to defend consumer rights. In 2003, the United Kingdom and Malaysia led the way by developing national strategies for accessibility of monetary services, and now many countries, both developing and developed, are crafting their own national accessibility of monetary services plans. (Abdullah, 2016, p. 16).

2.2 Definition of Accessibility of monetary services

Multiple explanations exist of accessibility of monetary services, including the following:

The Association for Economic Collaboration and Development (OECD) characterizes the accessibility of monetary services as: "The procedure of offering prompt and affordable entry to an extensive array of official and regulated financial amenities and items, and broadening their utilization across different social groups through creative strategies, such as monetary literacy and education, intended to improve monetary well-being and foster Community and financial integration (Yasmina & Tawfiq, 2022, pp. 597-608)."

Atkinson and Messy define accessibility of monetary services as: "The endeavor to supply cost-effective, prompt, and ample access to a diverse selection of regulated monetary products and services, and to augment their usage throughout all social segments by applying both conventional and novel methods designed specifically for this objective, incorporating monetary literacy and education, targeted at enhancing monetary results." (Yoshino & Morgan, 2016, p. 04)."

The Bank of Algeria characterizes the availability of monetary services as: "The distribution and utilization of an extensive array of monetary offerings by diverse social segments, encompassing entities and particularly disadvantaged persons, via formal routes. This encompasses facilities such as transaction and deposit accounts, methods for payments and transfers, coverage options, funding, loans, and advanced monetary offerings that are affordably costed and appropriately customized. Moreover, this strategy includes protecting the rights of consumers by providing assistance to

promote efficient monetary handling and savings accumulation, thus preventing reliance on unofficial networks and tools."

These channels often impose relatively high costs, resulting in the failure to satisfy monetary and banking service requirements through these means. (Rakhrou, 2021, p. 301)."

From the discussion, it is evident that accessibility of monetary services refers to the capacity to access and utilize a range of monetary services offered by formal entities to all parties, including individuals and institutions, and to derive benefits from these services to fulfill their needs.

2.3 The Importance of Accessibility of monetary services

Access to monetary services has moved from a peripheral issue to a major focus for many governments and monetary regulators. It now occupies a significant position in economic development discussions. As a result, ensuring access to monetary services is a crucial component of economic development, achieving the following (Nar, 2019):

- Accessibility of monetary services acts as a catalyst for financial expansion and promotes monetary and social stability.
- It assists small and medium-sized businesses that add to the gross domestic product (GDP) and endeavors to integrate them into the official financial structure.
- It facilitates monetary intermediation, thus bettering income allocation and improving the living standards of impoverished households through its role in generating new employment opportunities. It becomes an essential instrument for fighting poverty and fostering economic development.
- It boosts competition among monetary institutions by broadening their range of services and products and improving their quality to appeal to a wider clientele.

It ensures that various societal segments can access, utilize, and receive official monetary products and services at fair and transparent prices, rather than relying on informal monetary channels.

2.4 Dimensions of Accessibility of monetary services and its Indicators

In the last ten years, the notion of monetary service accessibility has expanded to encompass various important aspects, quantified by a range of metrics formulated by multiple global bodies including the World Bank, the

Alliance for Monetary Services Accessibility, the G20, the Arab Monetary Fund, and the Global Partnership for Monetary Services Accessibility. These metrics are typically categorized into groups: monetary access, monetary usage, monetary depth, and the quality of monetary services. Based on information from the International Monetary Fund about the Algerian economy, the most vital metrics for assessing banking accessibility of monetary services can be outlined as follows ([Bakbak, 2022, p. 165](#)):

2.4.1 Monetary Access

This relates to the capacity to utilize monetary services offered by formal institutions, encompassing the assessment of access levels to pinpoint and examine possible obstacles to opening and sustaining a bank account. These obstacles could consist of expenses and the distance to service points for banking, branches, and ATMs. Data concerning access to monetary services can be acquired from information supplied by monetary institutions. ([Behnass, Rasoul, & Bessissa, 2019, p. 215](#)). Among the indicators measuring monetary access, we find ([Bakbak, 2022, p. 165](#)):

- Cumulative count of retail bank branches.
- Cumulative count of automated teller machines (ATMs).
- Concentration of retail bank branches per 1,000 square kilometers.
- Concentration of ATMs per 1,000 square kilometers.
- Quantity of ATMs per 100,000 adults.
- Quantity of retail bank branches per 100,000 adults.

2.4.2 Monetary Usage

This relates to the extent to which clients engage with monetary services, requiring the gathering of data on the consistency and frequency of use within a given timeframe ([Shenbli & Lakhdar, 2019, p. 109](#)).

Indicators of this dimension include ([Bakbak, 2022, p. 165](#)):

- Total number of deposit accounts at commercial banks
- Number of deposit accounts at commercial banks per 1,000 adults
- Total number of loan accounts at commercial banks
- Number of loan accounts at commercial banks per 1,000 adults

- Total number of borrowers from commercial banks
- Number of borrowers from commercial banks per 1,000 adults
- Total number of ATM cards

2.4.3 Monetary Depth

Monetary depth involves a complex process aimed at expanding the magnitude and functioning of middleman financial organizations by enhancing the diversity of monetary amenities and tools they provide.. (Tarchi, Terkou, & Bouflih, 2018, p. 114). Monetary depth is measured by a set of indicators as follows (Bakbak, 2022, p. 165):

- Overall bank assets relative to gross domestic product (GDP)
- Overall deposits relative to GDP
- Overall loans relative to GDP
- Loan extended to the private sector compared to GDP
- Monetary supply relative to GDP

2.5 The Effect of the Connection Between Availability of financial services and Economic Expansion

Economic expansion is described as a increase in the production of goods and services within a specific nation over a certain time frame. This expansion relies on an increase in the average actual income per person.(Dinaoui & Zrouat, 2022, p. 15). Financial expansion is measured by a set of indicators, including (Mansour, 2022, p. 264):

2.5.1 Gross Domestic Product (GDP) representing the rate of financial expansion

This indicates the complete value contributed by all manufacturers in the economy, incorporating any taxes on items while omitting any subsidies not factored into the value of the products. It is determined without subtracting for the wear and tear of produced assets or the exhaustion and deterioration of natural resources.

2.5.2 Accessibility of monetary services Index

Based on the analysis of the previously discussed components.

2.5.3 Investment or Capital Stock:

Based on the World Bank database, it includes total spending on improving fixed assets within the economy and net adjustments in inventory amounts. Fixed assets cover enhancements to land, purchases of machinery and equipment, and the building of facilities like roads, railways, schools, offices, and hospitals. Inventories are the reserves of goods held by companies to manage short-term or unforeseen changes in production or sales, all quantified as a proportion of Gross Domestic Product (GDP).

2.5.4 Population Density or Demographic Growth

Represents the poverty and unemployment rates in the study.

2.5.5 Official Exchange Rate

Represents the value of the currency against foreign and leading currencies.

In a recent analysis conducted by Sethi and Acharya (2018), which analyzed the changing nature impacts of monetary services accessibility on financial expansion across various developed and developing nations, the empirical results showed a sustained positive correlation between monetary services accessibility and financial expansion in 31 countries worldwide. Additionally, the causality test indicated a two-way relationship between monetary services accessibility and financial expansion, confirming that access to monetary services is a crucial catalyst for economic development.. ([Rakhrou & Daham, 2021, p. 481](#)).

2.5.6 Impact of Monetary Access Dimension on Financial expansion:

The study Inoue and Hamori (2016) conducted a study analyzing data from 37 Sub-Saharan African countries between 2004 and 2012 to determine if enhanced access to monetary services contributed to financial expansion in the region. The empirical findings clearly demonstrated that improved access to monetary services had a significant and statistically robust impact on boosting financial expansion in Sub-Saharan Africa. ([Rakhrou & Daham, 2021, p. 481](#)).

It's significant to emphasize that the World Bank has set a global objective to achieve universal access to monetary services by 2020, aiming to include citizens without bank accounts who lack formal monetary access. The goal of these monetary services is twofold: to ensure that every adult has an account for basic monetary transactions and to enhance access to investment-generating monetary services. This initiative aims to reduce monetary exclusion, which hinders financial expansion and exacerbates poverty. Completely eradicating poverty is unfeasible when a significant

portion of the population operates in an informal monetary environment that fails to provide affordable and suitable monetary tools to help them build wealth and secure sustainable monetary stability for themselves and their families. (Mansour, 2022, p. 263).

2.5.7 Impact of Monetary Usage Dimension on Financial expansion:

Research findings suggest enhancing the caliber of financial services and broadening their use by individuals and institutions fosters equal opportunities and optimizes economic potential. The adoption of innovative monetary services empowers the poor, women, and youth by enabling them to make small, productive investments, thereby increasing productivity and income. This income growth can lead to higher consumption and stimulate economic activity. Moreover, opening a current account can provide access to a broader range of suitable monetary services, supporting investment in various sectors and contributing to higher growth rates. (Shenbli & Lakhdar, 2019, p. 113).

2.5.8 Impact of Monetary Depth Dimension on Financial expansion

The relationship between monetary depth and financial expansion is generally emphasized through three main insights, as identified by Aliu and Abazi, which are as follows (Tarchi, Terkou, & Bouflih, 2018, p. 117): (1)Monetary depth positively influences financial expansion, as evidenced by cross-sectional data and time-series regression analysis from both developed and developing countries, (2)Monetary depth negatively affects financial expansion, as indicated by panel time-series data from developing nations over the last three decades (1980s, 1990s, and early 2000s), (3)The relationship between financial expansion and monetary depth is complex: monetary depth positively affects financial expansion up to a certain level of development, beyond which its impact turns negative.

3. Evaluating the Effect of Monetary Services Accessibility Indicators on Financial expansion in Algeria Over the Period (2004-2020)

In this section, we estimated the parameters of the multiple linear regression model using the least squares method. We will then proceed to analyze the results from economic, statistical, and quantitative perspectives.

3.1 Determining the Model Variables

The first phase in evaluating how the indicators of monetary services accessibility influence Algeria's economic development from 2004 to 2020 with the multiple linear regression model involves determining the variables

involved. We used yearly data sourced from the World Bank and the International Monetary Fund.

3.1.1 Dependent Variable

This is the variable whose behavior we seek to elucidate, represented by the Gross Domestic Product (GDP) growth rate, denoted as (GDP).

3.1.2 Independent Variables

These include accessibility of monetary services indicators:

A. Access Indicators, including:

- Number of branches of commercial banks per 100,000 adults, symbolized by (BB).
- Number of ATMs per 100,000 adults, symbolized by (NAT).

B. Usage Indicators, including:

- Number of deposit accounts at commercial banks per 1,000 adults, represented by (DA).
- Number of borrowers from commercial banks per 1,000 adults, represented by (NB).

C. Depth Indicators, including:

Credit extended to the private sector (as a percentage of Gross Domestic Product), denoted by (NB).

3.2 Determining the Functional Form of the Model

The equation of the study model takes the following form:

$$(1) \quad GDP = F(BB, NAT, DA, NB, CP)$$

Alternatively, it can be written according to the general formula as follows:

$$(2) \quad GDP = \beta_0 + \beta_1 BB + \beta_2 NAT + \beta_3 DA + \beta_4 NB + \beta_5 CP + \mu_T$$

Where:

- β_i : are the parameters of the model to be estimated.
- μ_T : is the random variable that includes model errors.

3.3 Estimation of the Multiple Linear Regression Model

In order to interpret the nature of the relationship between financial expansion and the study variables, we used the Ordinary Least Squares (OLS) method as presented as shown in the table below:

Table 1. Results of Estimating the Model Parameters

Dependent Variable: GDP			Method: Least Squares	
Sample:2004 2020			Included	
Observations:17				
Variable	Coefficient	Std.Error	t-statistic	Prob
NAT	2.014	0.537	3.749	0.003
NB	-0.043	0.099	-0.433	0.673
DA	0.008	0.005	1.525	0.155
CP	-0.744	0.140	-5.304	0.0003
BB	-14.256	3.947	-3.614	0.004
C	72.334	19.105	3.838	0.002
R-Squared		0.8027		
Adjusted R –Squared		0.7130		
f-statistic		8.9534		
prob(F-statistic)		0.0013		
Durbin-Watson stat		1.7068		

Source: Compiled by the researcher based on results from EVIEWS 12.

From the previous table, we can write the estimated Gross Domestic Product (GDP) equation as follows:

$$GDP = 72.334 - 14.269BB + 2.014NAT + 0.008DA - 0.043NB - 0.744CP + \mu_T$$

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3.4 Diagnosing the Estimated Model

The diagnosed model is as follows:

3.4.1 Economic Study of the Estimated Model

- The presence of a positive constant aligns with economic theory, representing the initial value of financial expansion in the absence of the variables included in the equation.
- There is a negative correlation between the number of commercial bank branches, the number of bank borrowers, and the credit extended to the private sector with financial expansion, which is contrary to economic theory.
- There is a positive correlation between the number of ATMs and the number of bank deposit accounts with financial expansion, which is consistent with economic theory.

These findings align with previous empirical studies, such as the research conducted by ([Bakbak, 2022](#)).

3.4.2 Statistical Study of the Estimated Model

The statistical significance of the model coefficients is tested using the t-test, while the overall significance of the model is assessed through the determination coefficient and the F-test.

A. Test for Coefficients

a. For the coefficients of NAT, CP, and BB

We observe that the probability of the t-test for these coefficients is statistically significant at a significance level of less than 5%. This indicates that these variables are statistically significant in the model during the period (2004-2020).

b. For the coefficients of NB and DA

We notice that the probability of the t-test for these coefficients is not statistically significant at a significance level greater than 5%. This means

that these variables are not statistically significant in the model during the period (2004-2020).

- c. The constant coefficient is statistically significant (0.002) at a significance level of less than 5%.

B. Overall Significance Test for the Model

a. Determination Coefficient (R^2)

The value of the determination coefficient is 80.27%, indicating the model's goodness-of-fit. This means that 80.27% of the variations in financial expansion are explained by the independent variables, while 19.73% are explained by other factors not included in the model, including the margin of error.

b. Fisher's F-Test

The probability of Fisher's F-test is statistically significant (0.001) at a significance level of less than 5%, indicating that the model as a whole is significant.

From the above, it is evident that despite the insignificance of some explanatory variable coefficients and their lack of influence on the dependent variable, the overall model is considered significant.

3.4.3 Standard Study of the Estimated Model

Tests will be conducted to ensure the good description of the model and its absence of statistical problems:

A. Ramsey Test for Model Description

Table 2. Results of Ramsey Test for Model Description

Ramsey REST Test			
Specification: GDP NAT NB DA CP BB C			
	Value	Df	Probability
T-Statistic	1.822	10	0.098
F-Statistic	3.320	(1,10)	0.098

Source: Compiled by the researcher based on results from EVIEWS 12.

Based on the test results, the Fisher test probability (0.098) exceeds the 5% significance level. Consequently, we accept the null hypothesis, indicating that the model is well-described.

B. LM Autocorrelation Test (LM Test)

Table 3. Results of Breusch-Godfrey Test for First-Order Autocorrelation

Broush-Godfrey Serial Correlation LM Test			
	Value	Df	Probability
F-Statistic	0.236	(1,10)	0.637
Obs*R-squared	0.392	1	0.531

Source: Compiled by the researcher based on results from EVIEWS 12.

The test results indicate that the probability of the Fisher test (0.637) exceeds the 5% significance level. Therefore, we accept the null hypothesis, which states that there is no first-order autocorrelation.

C. ARCH Stability Test

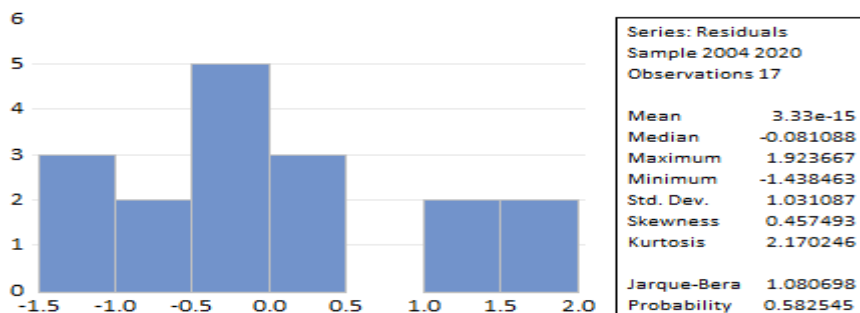
Table 4. Results of ARCH Test

Heteroskedasticity Test ARCH			
	Value	Df	Probability
F-Statistic	0.024	(1,14)	0.878
Obs*R-square	0.027	1	0.867

Source: Compiled by the researcher based on results from EVIEWS 12.

The test results reveal that the probability of the Fisher test (0.878) is above the 5% significance level. Thus, we accept the null hypothesis, indicating that there is no heteroskedasticity issue.

D. Jarque-Bera Normality Test for Model Residuals

Fig 1. Results of Jarque-Bera Test

Source: Compiled by the researcher based on results from EVIEWS 12.

The test results show that the probability of the Jarque-Bera test (0.582) exceeds the 5% significance level. Thus, we accept the null hypothesis, which indicates that the residuals follow a normal distribution.

Based on the diagnostic tests performed on the estimated model, it is clear that the overall model is significant and has strong explanatory power. Furthermore, the functional form used in the model formulation is well-described, and there are no statistical issues present in the model.

4. CONCLUSION

This study aimed to evaluate the role of accessibility of monetary services indicators in boosting financial expansion in Algeria from 2004 to 2020. We have derived a series of results that can be summarized as follows:

- The number of ATMs has a significant positive impact on financial expansion. Among the study's variables, this is the sole indicator that contributes to enhancing financial expansion in Algeria during the period 2004-2020.
- The number of commercial bank branches has a significant negative impact on financial expansion. This is attributed to the inefficiency of commercial banks and the decline in their capacity for innovation, which adversely affects financial expansion in Algeria.
- Neither the number of deposit accounts nor the number of borrowers from banks significantly impact financial expansion. This is due to the low quality of monetary services in Algeria and their limited utilization by individuals and institutions.
- Credit provided to the private sector negatively impacts financial expansion. This is attributed to the weakness of Algeria's monetary sector and its inability to balance loans and deposits effectively.
- The influence of monetary services accessibility on financial expansion was negligible, attributed to the minimal monetary literacy and insufficient initiatives to improve access to monetary services in Algeria.

Recommendations:

The key suggestions for improving access to monetary services in Algeria and boosting financial expansion rates can be outlined as follows:

- Encourage modern monetary technology companies to expand in providing monetary services, reducing their costs, ensuring their diversity to meet the needs of various users.
- Implement efficient systems to improve access to financing and banking services for individuals and business owners, ensuring these services are accessible to all segments of society.
- Activate and develop the monetary market (stock exchange) to enable monetary and banking institutions to support private sector growth.
- Improve access to monetary services, especially microfinance, by transforming the Algerian postal service into a credit institution.
- Create a conducive environment for accessing monetary services by developing the infrastructure of the monetary system, expanding bank branches especially in rural areas.
- Promote monetary awareness through increasing monetary education and awareness programs.

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