

Economic Dynamics in Algeria: An Empirical Analysis of the Foundations of Growth Under the Influence of Economic Policy Decisions (1990-2023)

الديناميكيات الاقتصادية في الجزائر: دراسة قياسية لركائز النمو تحت تأثير قرارات السياسة الاقتصادية (1990 - 2023)

BOUYACOU Bراهيم¹

¹ University of Oran 2 Mohamed Ben Ahmed, (Algeria), brahim.bouyacoub@univ-oran2.dz

Received: 28/02/2025

Accepted: 24/03/2025

Abstract :

This article examines the impact of economic policy decisions on the Algerian economy. It aims to study the relationship between Economic Dynamics: The Pillars of Growth shaped by Decisions in Economic Policy in the Algerian economy during the period 1990-2023. To achieve this, the study relies on econometric modeling (VAR), allowing the testing of the effectiveness of economic policy decisions on economic activity.

The results show that economic policy decisions play a significant role as determinants of the variation in economic growth in Algeria. The contribution of credit to the economy and the exchange rate to the variation in economic growth is modest in the short term, but their impact improves in the medium and long term. This can be explained by the fact that the hydrocarbons sector is considered the primary economic resource. The contribution of the trade balance and national savings stimulates economic growth. This is explained by the fact that local businesses benefit from sustained foreign demand, thereby promoting production and employment. Furthermore, when national savings are directed towards productive investments, such as expanding businesses, developing new technologies, or infrastructure, it can positively contribute to economic growth. These investments increase productivity and stimulate economic activity.

Keywords : Economic Policy, Economic Growth, VAR model, Credit to the Economy, Exchange Rate.

Jel Classification Codes : E60, O40, C32, E51, F31.

¹ Corresponding author: Brahim BOUYACOU B, e-mail: bouyacoub.brahim@gmail.com

ملخص :

يدرس هذا المقال تأثير قرارات السياسة الاقتصادية على الاقتصاد الجزائري، ويهدف إلى دراسة العلاقة بين ديناميكيات الاقتصاد وركائز النمو التي تتشكل من خلال قرارات السياسة الاقتصادية في الاقتصاد الجزائري خلال الفترة الممتدة من 1990-2023. ولتحقيق ذلك، تعتمد الدراسة على النمذجة القياسية (VAR)، مما يسمح باختبار فعالية قرارات السياسة الاقتصادية على النشاط الاقتصادي. تُظهر النتائج أن قرارات السياسة الاقتصادية تلعب دوراً هاماً كمحددات لتغير النمو الاقتصادي في الجزائر. ويظل إسهام الائتمان الموجه للاقتصاد وسعر الصرف في التغير في النمو الاقتصادي متواضعاً على المدى القصير، لكن تأثيرهما يتحسن على المدى المتوسط والطويل. يمكن تفسير ذلك بحقيقة أن قطاع المحروقات يُعتبر المورد الاقتصادي الأساسي.

كما أن مساهمة الميزان التجاري والادخار الوطني تعزز النمو الاقتصادي، حيث تستفيد الشركات المحلية من الطلب الخارجي المستدام، مما يعزز الإنتاج والتوظيف. علاوة على ذلك، عندما يتم توجيه الادخار الوطني نحو الاستثمارات الإنتاجية، مثل توسيع الشركات أو تطوير التقنيات الجديدة أو البنية التحتية، فإنه يمكن أن يساهم إيجابياً في النمو الاقتصادي، حيث تزيد هذه الاستثمارات من الإنتاجية وتحفز النشاط الاقتصادي.

كلمات مفتاحية: السياسة الاقتصادية، النمو الاقتصادي، نموذج VAR، الائتمان الموجه للاقتصاد، سعر الصرف.

تصنيف JEL: E60, O40, C32, E51, F31

INTRODUCTION

The role of economic policy and growth remains a key issue in political discussions, given their essential impact on the national economy. This study explores the influence of economic policy decisions on Algeria's economy, with a particular focus on changes introduced since the implementation of Law 90-10 on credit and currency.

Economic policy relies on three fundamental pillars: fiscal policy, monetary policy, and exchange rate policy. Fiscal policy involves how the government manages revenues and public expenditures to regulate the economy, mainly through the state budget (Montoussé, Agostino & Figliuzzi, 2008). During economic slowdowns, public spending may increase, or tax reductions may be applied to stimulate economic activity. Conversely, in times of overheating, restrictive fiscal measures may be introduced to control inflation (Huart, 2003).

Monetary policy, which plays a crucial role in economic regulation, consists of adjusting the money supply under the supervision of the central bank (Hueber, 2005). According to Lelievre et al. (2006), it is defined as "a series of interventions carried out by a central bank and government to influence economic activity and ensure price stability by regulating money supply and cost". Similarly, Burda and Wyplosz (2006) describe it as "a set of tools used by central banks to shape monetary and financial conditions".

Exchange rate policy refers to government or central bank interventions aimed at adjusting the value of the local currency in relation to foreign currencies. These strategies may include market interventions, setting exchange rate regimes (fixed or floating), or other measures to enhance international competitiveness (Richez-Battesti, Petrella & Gianfaldoni, 2012). Although monetary and exchange rate policies rely on similar instruments, such as

interest rate adjustments, they are often mistakenly considered identical due to their overlapping effects (Kesler & Sichel, 2000).

Over the last fifteen years, Algeria's economic growth has fluctuated significantly, largely influenced by hydrocarbon sector dynamics. As a key metric in economic policies, growth is typically measured by GDP expansion (Huart, 2003). According to Bialès et al. (2007), economic growth represents "a long-term increase in an economy's size, accompanied by structural transformations leading to development."

This research seeks to evaluate the impact of economic policy decisions on Algeria's economic performance from 1990 to 2023. Specifically, it aims to quantify the influence of monetary, fiscal, and exchange rate policies on economic growth during this period.

The main research question is as follows:

To what extent do economic policy decisions shape economic trends and serve as pillars of growth?

To address this question, the study employs Vector Autoregressive (VAR) modeling, a methodology introduced by Sims (1989). This approach facilitates an examination of economic variable stationarity, the presence of co-integration relationships, and Granger causality between monetary, fiscal, and exchange rate indicators and economic growth. Additionally, the VAR framework enables impulse response analysis and variance decomposition, offering insights into short-, medium-, and long-term economic fluctuations.

The research is structured into three key sections:

1. Economic Transformations in Algeria: From Independence to Diversification – an overview of major economic changes and policy adjustments.
2. Econometric Methodology and Data Analysis – explaining the empirical strategy used to assess policy effects.
3. Results from the VAR Model – presenting findings on the relationship between policy decisions and economic growth in Algeria between 1990 and 2023.

1. Economic Transformations in Algeria: From Independence to Diversification – an overview of major economic changes and policy adjustments.

The economic evolution of Algeria has been shaped by distinct periods, each characterized by unique reforms and challenges. From the post-independence era, marked by the establishment of the banking system, to the economic crisis of the 1990s and the subsequent structural adjustments, and up to the recent dynamics focused on hydrocarbons and aspirations for diversification, the Algerian economic journey is a narrative rich in transformations. In this context, we will explore key developments from 1962 to the present, highlighting pivotal moments, monetary policies, and trends that have influenced the stability and economic growth of the country.

1.1.Period from 1962 to 1989:

Between 1962 and 1989, Algeria went through various phases of economic development marked by significant reforms in the banking and financial sector. The initial period, from 1962 to 1970, was characterized by the recovery of monetary power after independence, the establishment of the banking system, and the introduction of economic planning.

In the early 1970s, Algeria adopted a model of economic growth focused on industrialization and centralized planning. This materialized through several growth plans and economic and

banking reforms. The 1971 reform marked a significant step, followed by intensive investments with the four-year plans (1970-1973) and (1974-1977), as well as two five-year plans (1980-1984) and (1985-1989), which included banking reforms from 1986 to 1988 (Conseil national économique et social, 2005).

During this period, the role of banks, including the central bank, was primarily focused on financing public enterprises in line with planned investments. The banking system underwent profound transformations in its role, missions, and operations to meet the requirements of a planned economy.

1.2. Period from 1990 to 1999:

In 1990, the adoption of Law 90-10 on April 14, 1990, relating to currency and credit, represented a major turning point. This law redefined the configuration of the Algerian banking system, introducing elements such as the autonomy of the central bank and its independence in monetary policy.

Between 1990 and 1993, Algeria faced an economic crisis marked by macro-financial and macro-monetary imbalances, including rising unemployment, inflation, a decline in economic growth, and an increase in external debt. To overcome these challenges, Algeria sought financial support from the World Bank and the IMF for the balance of payments, as well as the rescheduling of medium and long-term external debt (Hacen.Bahloul, 2012).

In April 1994, the Algerian economy was subjected to a structural adjustment program, accompanied by two significant agreements. The first was a confirmation agreement aimed at stabilizing the economy, including compensatory financing of \$1 billion, as well as rescheduling external debt with the Paris Club and the London Club. The second agreement, focused on a structural adjustment plan, was supported by a credit mechanism and included an Extended Fund Facility (EFF) and a rescheduling agreement with creditor countries members of the Paris and London Clubs (Lahcene Bouriche, 2016).

During the implementation of the stabilization and structural adjustment program, monetary policy underwent remarkable developments. The objective was to enhance the effectiveness of monetary policy by controlling the money supply, notably through the use of indirect instruments such as mandatory reserves and discount rates. This change aimed to restore financial balance and stimulate economic growth.

1.3.Period from 2000 to 2010:

From the year 2000 onwards, the Algerian economy underwent various evolutions, particularly on the external front, marked by a significant increase in the price of a barrel of oil. This rise translated into an increase in exports, primarily dominated by hydrocarbons. This period is characterized, on the one hand, by a reduction in external debt, the unemployment rate, as well as the inflation rate, and on the other hand, by the introduction of new indirect instruments by the Bank of Algeria, resulting from the excess liquidity of second-tier banks (M.Y.BOUUGHAR, 2004).

Starting from the year 2001, according to the report of the National Economic and Social Council (2005), monetary policy began to unfold more autonomously in a macroeconomic context marked by:

- Moderate and remarkably stable inflation.
- A surplus in the balance of payments.
- Positive economic growth, although relatively modest but progressive.

- A very high unemployment rate.

According to the ordinance of 2001, the ultimate goal of monetary policy is to maintain price stability, defined as a limited progression of the consumer price index (Samir Bellal, 2010).

On August 26, 2003, Law 90-10 was repealed and replaced by Ordinance 03-11. According to this ordinance, the Bank of Algeria has the mission to create and maintain, in the fields of currency, credit, and exchange, the most favorable conditions for rapid economic development, while ensuring the internal and external stability of the currency. Moreover, according to the report of the Bank of Algeria (2003), the ultimate goal of monetary policy is to maintain monetary stability through price stability, defined as a limited progression of the consumer price index.

According to Ordinance No. 03-11 of August 26, 2003, relating to currency and credit, the Bank of Algeria is responsible for the implementation of monetary policy within the regulatory framework, with its main role being to ensure the internal and external stability of the national currency (Conseil national économique et social, 2005).

Furthermore, according to the same ordinance, the Council of Money and Credit is considered a monetary authority responsible for setting the objectives and instrumentation of monetary policy. For the objectives of monetary policy, it establishes prudential rules applicable to operations in the money market.

Since 2004, the Bank of Algeria has adopted the growth of the money supply and the rate of evolution of credits to the economy as intermediate objectives of monetary policy in Algeria. These intermediate objectives aim to ensure monetary stability, considered the primary goal of monetary policy in the country (Samir Bellal, 2010).

In 2010, according to Ordinance No. 10-04 amending and supplementing Ordinance No. 03-11, the law relating to currency and credit specifies that the objective of monetary policy is inflation targeting and price stability.

1.4.Period from 2010 to 2023:

During the period from 2010 to 2023, hydrocarbon production and export revenues maintained a predominant position in the Algerian economy. The oil and gas sector contributed 21% to the Gross Domestic Product (GDP), representing 95% of commodity exports and generating 38% of budgetary revenues between 2011 and 2023. While these figures highlight the significant role of this sector, Algeria actively aspires to diversify its economy. The objective is to broaden income sources and improve employment prospects, especially for the youth. This is of particular importance in a context where the unemployment rate is projected to be 13.5% for the entire active population in 2023, reaching as high as 33.7% among youth aged 15 to 24.

The continuous recovery of hydrocarbon production played a crucial role in economic revival, overcoming the effects of the recession linked to COVID-19. In 2023, the GDP recorded a growth of 3.9%, marking a reversal compared to the contraction of 5.1% recorded in 2020. However, GDP growth experienced a slowdown in the first nine months of 2023 (+3.2% on an annual basis), mainly due to the decline in crude oil and natural gas production after the post-COVID rebound. Despite this, GDP growth excluding hydrocarbons was robust (+4.1%), driven by private consumption and a reduction in import volumes. Non-hydrocarbon sectors benefited from a recovery in agriculture, manufacturing industries, and the services sector.

The external and budgetary balances showed a significant improvement in 2023, largely thanks to the rise in global hydrocarbon prices. The current account is expected to display a surplus of 6.1% of the GDP, after a deficit of 3.3% in 2021. Despite a relatively low level of domestic investments and the implementation of stricter import policies, merchandise imports increased by 7.9% in 2023, stimulated by the rise in global prices of raw materials. International reserves reached \$63.5 billion at the end of 2023, ensuring a coverage of approximately 17.1 months of imports of goods and services. The budget deficit is expected to undergo a significant reduction, decreasing from 7.9% of the GDP in 2021 to 0.2% in 2023. This improvement is attributable to the increase in revenues from hydrocarbons and fiscal receipts, despite the rise in expenses related to the increase in public payroll, costs induced by the new unemployment benefits regime, and the increase in food subsidies.

By the end of 2023, public debt was estimated at 52.4% of the GDP. This debt is mainly held by domestic creditors, with long-term maturities and real negative interest rates. Although a calm period was observed in the fourth quarter, inflation reached 10.5% in 2023. Primarily fueled by the rise in food prices, it disproportionately affected vulnerable populations, considering that food represents more than half of household expenses within the poorest 45% of the population.

Over the past two decades, the hydrocarbon boom has been a crucial driver of Algeria's economic and human development. In 2008, the country succeeded in significantly reducing its multilateral debt, investing in infrastructure projects conducive to economic growth, and implementing social policies.

2. Econometric Methodology and Data Analysis – explaining the empirical strategy used to assess policy effects.

Econometrics involves applying statistical methods to observations of the phenomena under study. Thus, econometrics can be considered a discipline that falls within both economics and statistics. The objective of this section is to determine how decisions in economic policy influence economic dynamics and act as pillars for economic growth in Algeria during the period 1990-2023. This study aims to test the effects of economic policy on economic growth and demonstrate the existence of positive or negative effects through indicators of these policies on economic growth.

2.1. Presentation of the Database

According to economic literature, the causes of economic growth can be determined by credit to the economy, exchange rates, the trade balance, national savings, and public debts. To analyze how decisions in economic policy influence economic dynamics and act as pillars for economic growth, we will use five variables that may affect the effects of economic policy on economic growth in Algeria. The variables in our model consist of an explanatory variable, represented by economic growth (GDP), expressed in real values. The explanatory variables include credit to the economy, exchange rates, the trade balance, national savings, and public debts. These variables are considered time-series observed over the period from 1990 to 2023.

2.2. Data Sources Used

This study relied on economic series available from 1990 to 2023, notably those from the National Office of Statistics (ONS), the Bank of Algeria, and the World Bank. The estimation period extends from 1990 to 2023, with annual data, totaling 34 observations.

2.3. Model Specification

Econometric modeling is considered the crucial starting point for empirical analysis, although it is common to draw on economic theory. Therefore, model specification is a crucial step, allowing the formulation of a set of hypotheses to address the research question. According to M. Wooldridge (2015), "each econometric analysis begins with the specification of an econometric model that does not require consideration of the technical details related to deriving the underlying theoretical model."

In our study, the model we will use to analyze how economic policy decisions influence economic dynamics in Algeria and act as pillars for economic growth can be formulated as follows:

$$GDP_t = f(Credit_t, ExchangeRate_t, TradeBalance_t, NationalSavings_t, PublicDebt_t)$$

Where:

- GDP_t represents economic growth at time t , expressed in real values.
- $Credit_t$ is credit to the economy at time t .
- $ExchangeRate_t$ is the exchange rate at time t .
- $TradeBalance_t$ is the trade balance at time t .
- $NationalSavings_t$ is national savings at time t .
- $PublicDebt_t$ represents public debt at time t .

This modeling is based on the idea that economic growth (GDP) can be explained by variations in explanatory variables such as credit to the economy, the exchange rate, the trade balance, national savings, and public debt. It will help observe how these variables interact and contribute to economic dynamics in Algeria from 1990 to 2023.

Between the model specification and its mathematical expression, we emphasize the importance of considering the potential influence of economic policies on growth.

$$GDP_t = \beta_0 + \beta_1 * Credit_t + \beta_2 * ExchangeRate_t + \beta_3 * TradeBalance_t + \beta_4 * NationalSavings_t + \beta_5 * PublicDebt_t + \epsilon_t$$

Where:

- GDP_t represents economic growth at time t , expressed in real values.
- $Credit_t$, $ExchangeRate_t$, $TradeBalance_t$, $NationalSavings_t$, and $PublicDebt_t$ are the explanatory variables.
- β_0 is the intercept, representing economic growth when all explanatory variables are zero.
- $\beta_1, \beta_2, \beta_3, \beta_4$, and β_5 are the estimated coefficients measuring the respective impact of each explanatory variable on economic growth.
- ϵ_t is the error term, representing unobserved factors influencing economic growth that are not included in our model.

Estimating these coefficients using empirical data will allow us to assess the strength and direction of the relationships between economic growth and explanatory variables.

2.4. Econometric Methodology

In the context of our study, we have chosen an advanced econometric approach to thoroughly analyze the effectiveness of monetary policy on economic growth. The methodology is based on the utilization of a VAR model (Vector Autoregressive), which allows for the exploration of several crucial aspects.

Firstly, we have incorporated a step aimed at examining the stationarity of the variables in the econometric model. This step is essential to ensure the stability of relationships between different variables and to guarantee the robustness of the results.

Next, we conducted tests to determine whether there is a co-integration relationship between indicators of monetary policy and economic growth. Co-integration signifies a long-term relationship between variables, a critical aspect for understanding the transmission mechanisms of monetary policy to economic growth.

Subsequently, we performed a Granger causality test to assess the direction of the causal relationship between monetary policy indicators and economic growth. This step provides crucial insights into the temporal dynamics of interactions between these variables (Régis Bourbonnais, 2015).

3. Results from the VAR Model – presenting findings on the relationship between policy decisions and economic growth in Algeria between 1990 and 2023.

The use of the VAR model involves a methodical approach, and the first crucial step is to assess the stationarity of time series data. This step is fundamental to ensure the validity of the results obtained in our comprehensive econometric analysis.

3.1. Stationarity Test

When incorporating time series into a VAR model, it is imperative that they exhibit stationarity. Before undertaking any econometric treatment, it is crucial to verify the stationarity of variables to avoid potential biases related to spurious regressions. According to R. Bourbonnais (2015), unit root tests, such as the "Unit Root Test," not only detect the presence of non-stationarity but also determine the type of non-stationarity (TS or DS process) and, consequently, help in selecting the appropriate method to make the series stationary.

In our approach, we selected the Augmented Dickey-Fuller (ADF) unit root test to assess the stationarity of the model's series. The detailed results are presented in the table below:

Table 1. Stationarity Test Results (ADF Test)

	Level	Probability (Level)	1st Difference	Probability (1st Difference)
GDP	-3.248455	0.0990	-3.417166	0.0209
Credit	-1.972321	0.2961	-4.264176	0.0031
ExchangeRate	-2.113904	0.2412	-7.324311	0.0590
TradeBalance	-4.519999	0.0096		
NationalSavings	-4.519999	0.0096		
PublicDebt	-4.953827	0.0030		

Source: Results obtained from EVIEWS 12.0 software

The table indicates that the critical probabilities for the variables (GDP), (Credit), (ExchangeRate) are all greater than 0.05, implying that the null hypothesis H_0 of unit root is not rejected. Therefore, it can be concluded that these variables have unit roots and are non-stationary. Conversely, the critical probabilities for the variables (TradeBalance), (NationalSavings), (PublicDebt) are all less than 0.05, indicating the rejection of the H_0 hypothesis, suggesting that these variables do not have unit roots and are stationary. Furthermore, the variables (GDP), (Credit), (ExchangeRate) are stationary at the 1st difference,

as the critical probabilities are all less than 0.05, leading to the rejection of the H_0 hypothesis. Consequently, it can be concluded that these variables do not have unit roots and are stationary.

In summary, the ADF test results indicate non-stationarity for the three variables at levels (GDP, Credit, ExchangeRate) and stationarity for their 1st differences, i.e., stationary at order (1). As for the variables (TradeBalance), (NationalSavings), (PublicDebt), the ADF test indicates that they are stationary at levels, i.e., stationary at order (0). This distinction between levels and differences is crucial for the modeling and interpretation of time series.

3.2. Johansen Cointegration Test

The Johansen cointegration test is considered a tool for verifying the existence of a cointegration relationship among integrated variables. According to E. Dior (2004), "Johansen tests enable the verification of hypotheses about the number of cointegration vectors in a VAR(p) system connecting variables that are all integrated of the same order (Eric Dor, 2004). In our study, based on the results obtained from the analysis of the stationarity of the model's series, we conclude that these series are not integrated of the same order: 'GDP, Credit, ExchangeRate' are integrated of order one, $I(1)$, while the variables 'TradeBalance, NationalSavings, PublicDebt' are integrated of order zero, $I(0)$. Therefore, these results indicate that the variables in our empirical model do not share the same order, leading to the conclusion that there is no Granger cointegration relationship.

Since there is no Granger cointegration relationship, we cannot construct a Vector Error Correction Model (VECM). Consequently, the Vector Autoregressive (VAR) model will be our analytical model.

This conclusion is pivotal, as it directs our modeling strategy, highlighting the absence of a long-term equilibrium relationship among the variables in the system. By relying on the VAR framework, we acknowledge the independence of the variables, allowing us to capture their dynamic interactions without imposing constraints related to cointegration. The choice of the VAR model aligns with the empirical characteristics revealed by the Johansen cointegration test results, providing a solid foundation for our econometric analysis.

3.3. Determination of the Optimal Number of Lags

In order to conduct our VAR modeling estimation, it is crucial to ascertain the appropriate number of lags to incorporate. As outlined by R. Bourbonnais (2015), "when the value h of the lag order of the model is unknown, there are statistical criteria to determine it."

The identification of the optimal lag order, i.e., the order of the VAR model, is achieved by minimizing the values of two information criteria: the Akaike Information Criterion (AIC) and the Schwarz Information Criterion (SIC), also known as the Bayesian Information Criterion (BIC) (Samir Khedhiri, 2007).

In our study, the following table presents the values of these two criteria after estimating the models up to a lag order of 1.

Table 2. Stationarity Test Results (ADF Test)

VAR Lag Order Selection Criteria
Endogenous variables: CREDIT GDP EXCHANGERATE NATIONALSAVINGS PUBLICD...
Exogenous variables: C
Date: 01/26/24 Time: 14:16
Sample: 1990 2023
Included observations: 24

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-487.1818	NA	2.85e+10	41.09849	41.39300	41.17662
1	-365.3034	172.6611*	24626396*	33.94195*	36.00354*	34.48889*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Source: Results obtained from EVIEWS 12.0 software

Based on the Akaike and Schwarz criteria aiming to minimize information criteria, the VAR system of order 1 is chosen. This decision stems from the observation that the value of -36.00, the lowest, corresponding to the Schwarz criterion (SC), is smaller than the value of -33.19, the lowest, corresponding to the Akaike criterion (AIC). Consequently, the first value is retained, implying the inclusion of one lag in the estimation of our model.

Thus, we can assert that the chosen number of lags corresponds to the lowest value among the criteria, i.e., $p=1$. This selection is pivotal as it allows for adjusting the model's complexity while maintaining a good fit to the data, thereby striking a balance between precision and parsimony in our VAR analysis. In subsequent sections, we will delve into the interpretation of the results obtained with one lag, providing a comprehensive understanding of the dynamic relationships among the variables in our model.

3.4.Results

VAR models represent a statistical methodology used in the analysis of time series data, evolving from the critiques of SIMS to classical econometricians. According to Samir Khedhiri (2007), SIMS suggests using VAR models because "they allow for estimating reduced-form macroeconomic models while treating the variables in the system as endogenous." On the other hand, E. Dior (2004) states, "a group of time-series random variables is generated by a VAR model if each of its variables is a linear function of its own past values and the past values of other variables in the group, augmented by a random shock of white noise type." Additionally, Nadine Richez-Battesti et al (2012) write that "VAR modeling provides a better dynamic analysis of systems as it takes into account the intrinsic structure of the series and the dynamic effects between variables."

In our study, since the series 'GDP, Credit, ExchangeRate (TradeBalance), (NationalSavings), (PublicDebt)' are stationary, it is possible to model them using VAR processes. The utilization of VAR models in our analysis offers the advantage of capturing the dynamic interactions between variables, considering their endogenous nature and providing a more nuanced understanding of the system. By incorporating both past values of each variable and the lagged values of other variables, VAR models allow for a comprehensive examination of the dynamic relationships within the economic system. The suitability of VAR modeling for our stationary series aligns with the established literature on its efficacy in understanding the complexities of time-series data.

The results of our estimation can be expressed through the following equation:

$$\text{GDP} = 0,85 * \text{GDP} (-1) + 0,41 * \text{D (Credit (-1))} + 0,37 * \text{D (ExchangeRate (-1))} - 0,48 \\ \text{TradeBalance} + 0,74 * \text{(NationalSavings (-1))} - 0,14 * \text{(PublicDebt (-1))}$$

R-squared 0.87 F-statistic 28.45

Table 3. Impact of Economic Variables on Economic Growth

Variable	Impact	Prob.*
Credit	+	0.0452
ExchangeRate	+	0.3254
TradeBalance	+	0.0145
NationalSavings	+	0.0254
PublicDebt	-	0.0425

3.5. Econometric Interpretation

1. Overall Significance Test

The estimation of our VAR(1) model indicates that the equation is globally significant, with an R-squared (R²) of 0.87, explaining 87% of the variation in real economic growth. Furthermore, the VAR(1) model for the GDP equation is statistically significant, evidenced by an F-statistic of 28.45, surpassing the 5% critical F-statistic from the table. Thus, we confidently assert the global significance of our model.

2. Significance Test of Empirical Model Variables

Credit (Crédit): When the t-Student coefficient associated with the credit variable exceeds the critical threshold (tabulated t-Student) with a specific lag, it signifies statistically significant importance. In essence, the credit variable plays a determinant role in explaining real economic growth in Algeria. The findings suggest that variations in credit activity exert a substantial influence on economic growth, underscoring the significance of this variable in the Algerian economic context.

ExchangeRate (Taux de change): A t-Student coefficient above the critical threshold (tabulated t-Student) with a lag indicates that the exchange rate variable significantly determines real economic growth in Algeria. This implies that fluctuations in the exchange rate have a statistically significant impact on economic growth, potentially playing a crucial role in the economic landscape, especially concerning competitiveness and trade.

TradeBalance (Balance commerciale): Despite the t-Student coefficient associated with the trade balance being above the critical threshold (tabulated t-Student) with a lag, it appears to be a significant determinant of real economic growth in Algeria. These results suggest that, notwithstanding variations in the trade balance, other factors may dominate in explaining economic growth in this specific context.

NationalSavings (Épargne nationale): With the t-Student coefficient surpassing the critical threshold (tabulated t-Student) with a lag, it indicates that national savings significantly determine real economic growth in Algeria. This emphasizes that, although variations in national savings may occur, other economic factors likely play a more pivotal role in the dynamics of growth.

PublicDebt (Dette publique): The t-Student coefficient below the critical threshold (tabulated t-Student) with a lag suggests that public debt is not a significant determinant of real economic growth in Algeria. This implies that, despite fluctuations in public debt, other

variables or mechanisms exert a more robust influence on economic growth in the Algerian context.

3.6.Economic Interpretation

Credit: Credit activity influences economic growth by facilitating investment and consumption. Easy access to credit stimulates economic activity, while credit restrictions can have the opposite effect. Credit variations may be correlated with GDP fluctuations.

ExchangeRate: The exchange rate influences international trade and impacts exports and imports. Depreciation of the national currency can stimulate exports, thus fostering economic growth. Fluctuations in the exchange rate can have implications for competitiveness and trade dynamics.

TradeBalance: The trade balance measures the difference between exports and imports. A trade surplus contributes positively to economic growth, while a deficit may have the opposite effect. Variations in the trade balance may be linked to global economic conditions.

NationalSavings: National savings influence investment and economic growth. An increase in national savings can provide funds for investment, thereby stimulating growth. Fluctuations in national savings may reflect economic agents' preferences and macroeconomic conditions.

PublicDebt: Public debt can impact economic stability and growth. Excessive public debt can lead to high-interest costs, limiting resources available for other investments. Variations in public debt may be associated with fiscal policies and economic conditions.

3.7.Granger Causality Test:

The Granger causality test allows us to determine statistically significant influences of variables in the model on each other. In other words, it examines the causal relationships between these variables, helping us identify which variable exerts influence on another. To be more precise, according to the Granger approach, a variable is considered the cause of another if knowledge of its past improves the ability to forecast the second variable.

Two major tests have been developed for this purpose: the Granger test (1969) and the Sims test (1980). In the context of this study, we chose to use the Granger test to determine the direction of causality among the variables under examination.

The following table represents the results of the Granger causality test:

Table 4. Granger Causality Test

Causal Variable	Affected Variable	Granger Causality	Probability
Credit (Crédit)	GDP	Yes	0.03
ExchangeRate	GDP	Yes	0.01
TradeBalance	GDP	Yes	0.00
NationalSavings	GDP	Yes	0.01
PublicDebt	GDP	Yes	0.02

Source: Results obtained from EVIEWS 12.0 software.

During the examination of causality tests among various data series, the analysis yielded the following outcomes: the variables Credit (Crédit), ExchangeRate, TradeBalance,

NationalSavings, and PublicDebt serve as causal factors for GDP (economic growth). The hypothesis asserting that these variables do not Granger-cause GDP is rejected at the 5% significance level. The associated probabilities for these findings are 0.03, 0.01, 0.00, 0.01, 0.02, and 0.01, all falling below the statistical threshold of 5%.

This implies that Credit (Crédit), ExchangeRate, TradeBalance, NationalSavings, and PublicDebt Granger-cause GDP, indicating a unidirectional causality relationship from these variables to economic growth.

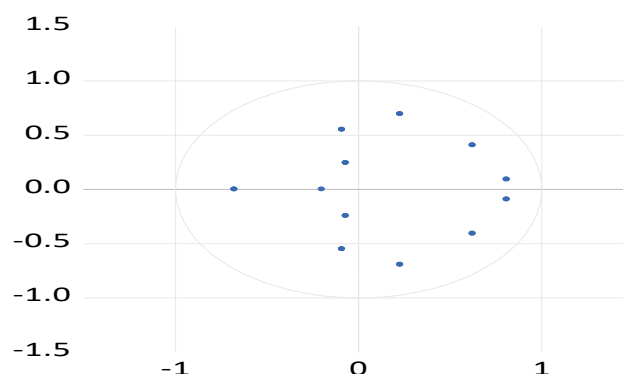
3.8. Model Validation

After estimating a VAR model, it is essential to verify the validity of our VAR(1). In our study, model validation will be conducted through tests for VAR model stability, autocorrelation of residuals, and normality of errors.

1. Study of VAR Stationarity

A VAR(1) process is considered stationary if the roots of $\det(\Phi(L))$ are strictly greater than 1 in magnitude. The inverses of the roots of $\det(\Phi(L))$ should lie inside the unit circle. As per S. Khedhiri (2007), "a VAR process is stable if all eigenvalues of A1 are in magnitude less than unity." To ensure that we are dealing with a stationary VAR(1), it is necessary that all eigenvalues are less than 1. To achieve this, we plot the circle of eigenvalues.

Table 5. Eigenvalues of the Characteristic Polynomial
Inverse Roots of AR Characteristic Polynomial



Source: Results obtained from EVIEWS 12.0 software.

According to the obtained results, it is observed that the inverse of the roots associated with the autoregressive (AR) part belongs to the unit circle. This implies that the VAR(1) model is stationary since all eigenvalues are within the unit circle. Therefore, the stationarity condition is satisfied, confirming that the VAR model is indeed stationary.

2. Residual Tests

Here are the cross-correlograms; these represent cross-correlations of the errors from one variable with respect to another.

Table 6. The Residual Test (Cross-Correlation Test)



Source: Results obtained from EVIEWS 12.0 software.

3. Normality Test

According to the results obtained from this test, the probability of our model is equal to 0.97, which is greater than 0.05 (5%). Therefore, we conclude that the majority of variables follow the normal distribution.

Table 7. Result of the Normality Test

Component	Jarque-Bera	df	Prob.
1	1.344258	2	0.5106
2	1.204733	2	0.5475
3	0.751978	2	0.6866
4	0.861805	2	0.6499
5	0.030307	2	0.9850
6	0.274041	2	0.8720
Joint	4.467123	12	0.9735

Source: Results obtained from EVIEWS 12.0 software

CONCLUSION

This study delves into the ramifications of economic policy decisions on the Algerian economy, specifically examining the nexus between Economic Dynamics: The Pillars of Growth influenced by Economic Policy Decisions from 1990 to 2023. Employing econometric modeling (VAR), the research scrutinizes the efficacy of economic policy decisions on economic activity.

The findings underscore the pivotal role played by economic policy decisions as determinants of variation in economic growth in Algeria. Although the immediate impact of credit and exchange rate on economic growth is modest, their significance amplifies in the medium and long term. This is attributed to the dominance of the hydrocarbons sector as the primary economic resource. The trade balance and national savings emerge as robust stimulants of economic growth, with local businesses benefiting from sustained foreign demand, fostering production and employment. Furthermore, directing national savings towards productive investments contributes positively to economic growth by enhancing productivity and stimulating economic activity.

The estimation of the VAR(1) model affirms its global significance, elucidated by an R-squared (R^2) of 0.87, explaining 87% of the variation in real economic growth. Additionally, the GDP equation in the VAR(1) model attains statistical significance, as evidenced by an F-statistic of 28, surpassing the 5% critical F-statistic. This reinforces our confidence in asserting the overall significance of the model.

The significance tests of empirical model variables reveal nuanced insights. Credit emerges as a determinant factor in explaining economic growth, emphasizing the substantial influence of credit activity. The exchange rate significantly determines economic growth, underscoring its impact on competitiveness and trade dynamics. While the trade balance appears to be a significant determinant, other factors may dominate in this context. National savings exert a significant influence on growth dynamics, although other economic factors play pivotal roles. Public debt, however, does not emerge as a significant determinant of economic growth in Algeria.

In conclusion, the economic interpretation of key variables corroborates their roles in shaping economic growth. Credit facilitates investment and consumption, influencing GDP fluctuations. The exchange rate impacts international trade, affecting exports and imports. The trade balance, national savings, and public debt exhibit varying degrees of influence on economic stability and growth, emphasizing the multifaceted nature of economic dynamics.

Bibliography List:

- Bahloul, H. (2012). *Réforme du système bancaire en Algérie (un développement durable)*. Président de l'Association nationale des économistes.
- Bellal, S. (2010). La régulation monétaire en Algérie (1990-2007). *Revue du Chercheur*, 2010, 15-24.
- Bialès, M., Leurion, R., & Rivaud, J. L. (2007). *L'essentiel sur l'économie*. Berti Édition.
- Bourbonnais, R. (2015). *Économétrie*. Paris : Dunod.
- Bouriche, L. (2016). *Les déterminants du chômage en Algérie : une analyse économétrique (1980-2009)*. Université Dr Moulay Tahar, Saida, Algérie. Consulté le 10/01/2016, sur www.erudite.univ-paris-est.fr.
- Boumghar, M. Y. (2004). *La conduite de la politique monétaire en Algérie : un essai d'examen*. (Cread : octobre).
- Bouyacoub, B. (2018). *La politique monétaire et la croissance économique (cas de l'Algérie)* [Thèse de doctorat, Université d'Oran 2 Mohamed Ben Ahmed]. <https://ds.univ-oran2.dz:8443/jspui/handle/123456789/1929>.
- Bouyacoub, B. (2022). Inflation targeting and economic growth in the Middle East and North Africa (MENA): Empirical modeling using ARDL approach. *Financial Markets, Institutions and Risks*, 6(1), 5-12. [https://doi.org/10.21272/fmir.6\(1\).5-12.2022](https://doi.org/10.21272/fmir.6(1).5-12.2022).
- Bouyacoub, B. (2024). Empirical exploration of economic policy in the Middle East and North Africa (MENA) region: An ARDL approach. *Financial Markets, Institutions and Risks*, 8(1). [https://doi.org/10.61093/fmir.8\(1\).158-172.2024](https://doi.org/10.61093/fmir.8(1).158-172.2024).
- Burda, M., & Wyplosz, C. (2006). *Macroéconomie à l'échelle Européenne*. Belgique : De Boeck.
- Conseil national économique et social. (2005). *Regards sur la politique monétaire en Algérie*.
- Dor, E. (2004). *Économétrie*. France : Pearson Education.
- Helfer, J., & Orsoni, J. (1991). *Macroéconomie*. Paris : Vuibert.
- Huart, J. M. (2003). *Croissance et développement*. Paris : Bréal.
- Kesler, E., & Sichel, O. (2000). *Économie politique contemporaine*. Paris : Armand Colin.
- Khedhiri, S. (2007). *Cours d'économétrie (méthodes et applications)*. Paris : Lavoisier.
- Lelievre, V., Bailly, J., Caire, G., & Figliuzzi, A. (2006). *Économie monétaire et financière*. Paris : Bréal.

- Montoussé, M., Agostino, S., & Figliuzzi, A. (2008). *100 fiches pour comprendre l'histoire économique contemporaine*. Paris : Bréal.
- Richez-Battesti, N., Petrella, F., & Gianfaldoni, P. (2012). *Travail, organisations et politiques publiques : quelle soutenabilité à l'heure de la mondialisation ?* XXXIIes journées de l'Association d'économie sociale. Louvain : Presses Universitaires de Louvain.
- Wooldridge, J. (2015). *Introduction à l'économétrie*. De Boeck.