MAPAN-JOURNAL ,
Publisher: METROLOGY SOC INDIA , NPL PREMISES,
Address: DR K S KRISHNAN MARG, NEW DELHI, INDIA,
ISSN / eISSN:0970-3950 / 0974-9853
Volume 25-isue 1-(2025)
https://doi-001.org/1025/17628870322601

OPEN ACCESS

The Effect of Global Inflation on Economic Growth in Algeria During the Period 1990–2024: An Approach Using MIDAS Models

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Received: 17/06/2025 ; Accepted: 28/10/2025

Abstract:
This study aims to analyze the impact of global inflation on economic growth in Algeria during the period (1990–2024) using the MIDAS model, which allows for the integration of monthly and annual data without loss of information. The results indicate that global inflation, particularly that driven by rising food and energy prices, has a negative short-term effect on Algerian economic growth through channels such as exchange rate fluctuations and declining purchasing power. However, this adverse effect is temporarily mitigated by increased oil revenues and government spending. The findings also reveal that the Algerian economy suffers from structural fragility that makes it highly vulnerable to external shocks, and that periods of economic growth are predominantly tied to fluctuations in oil prices. The study recommends diversifying the productive base and enhancing coordination between monetary and fiscal policies to mitigate the effects of global inflation and ensure more sustainable growth.

Keywords: Global Inflation – Economic Growth – Algeria – MIDAS Model – Food Prices –External Shocks .

JEL Classification: E31, O40, C51, F41, Q11, H50

Introduction

Global inflation has emerged as one of the most pressing challenges facing both advanced and developing economies. Recent shocks in food and energy prices, coupled with disruptions in global value chains, have highlighted the vulnerability of open economies to external inflationary pressures. This vulnerability is further exacerbated in rentier economies that rely heavily on oil and gas revenues

on the one hand, and food imports to meet domestic demand on the other, placing them in a dual confrontation with global market volatility.

Algeria represents a paradigmatic case of this situation, as more than 90% of its exports and nearly half of its public revenues depend on hydrocarbon rents, while imports account for a significant share of its basic food needs. This duality renders the impact of global inflation complex and nonlinear: rising global food prices directly increase import costs and erode household purchasing power, while oil price booms temporarily offset these effects by boosting public revenues and expanding government spending. Nevertheless, the net effect on economic growth remains unstable and fluctuates over the long term.

Moreover, understanding the relationship between global inflation and economic growth in Algeria requires a rigorous analytical approach that takes into account the unique structure of a rent-dependent economy and its deep integration with global markets. This underscores the importance of employing MIDAS (Mixed Data Sampling) models, which allow for the integration of data with different temporal frequencies, offering a more dynamic and precise perspective on the impact of global inflation on national economic performance. Such models facilitate an in-depth analysis of the interaction between external shocks and domestic factors within a flexible and extendable time framework.

1-Research Problem

The core research problem addressed in this study is as follows:

To what extent does global inflation affect economic growth in Algeria during the period 1990–2024, and how can MIDAS models help uncover the nature of this impact?

2-Research Hypotheses

Based on the research problem, it becomes essential to formulate a set of hypotheses that provide preliminary answers to the main research question:

- The impact of global inflation on economic growth in Algeria is characterized by a dynamic nature, making the growth trajectory more susceptible to external fluctuations.
- The effect of global inflation on Algeria's economic growth appears to be both delayed and cumulative over time. This is a feature that the MIDAS approach can help uncover by integrating data of varying frequencies.

3-Research Importance

- **Theoretical Importance:**This study enriches economic literature on the relationship between global inflation and economic growth in developing economies by introducing a novel quantitative approach using MIDAS models.

- **Practical Importance:**The research provides actionable insights for policymakers in Algeria by highlighting the nature and magnitude of the global inflation effect, contributing to the design of more flexible economic policies against external shocks.
- **Methodological Importance:**The study employs an advanced statistical model that enables the integration of mixed-frequency data (monthly and quarterly), thereby overcoming the limitations of traditional econometric models**.**

4-Research Objectives

This study aims to achieve a set of scientific and practical objectives by examining the impact of global inflation on economic growth in Algeria using Mixed Data Sampling (MIDAS) regression models. The key objectives of the research are as follows:

- To analyze the relationship between global inflation and economic growth in Algeria, by examining the short- and long-term correlations between the two variables and identifying the nature of this impact (positive, negative, or neutral) based on empirical data.
- To evaluate the dynamic effects of global inflation on the Algerian economy through the application of MIDAS models, which allow the identification of cumulative and lagged effects of global inflation on growth, reflecting the complex temporal structure of the relationship.
- To develop an appropriate econometric framework for integrating mixed-frequency data by employing the MIDAS approach, thereby overcoming the limitations of conventional models that require uniform data frequency.
- To derive policy-relevant insights and recommendations for Algerian decision-makers by presenting quantitative results that can guide economic policy towards enhancing the resilience of the national economy to external inflationary shocks.

5- Research Methodology

This study employs an applied quantitative econometric approach to examine the dynamic effects of global inflation on economic growth in Algeria. The analysis is based on monthly data of the global food price index, used as a proxy for global inflation, sourced from the Food and Agriculture Organization (FAO) for the period 1990–2024. Additionally, annual data on Algerian economic growth—measured by the growth rate of GDP per capita—and explanatory variables such as government expenditure and the exchange rate are obtained from the World Bank database for the same period.

To capture the relationship between these mixed-frequency variables, the study employs Mixed Data Sampling Regression Models (MIDAS), which enable a more precise and realistic analysis of the cumulative and time-lagged effects of global inflation on economic performance**.**

Accordingly, the methodological elements can be summarized in the following table.

Table(1): ResearchMethodologyElements

ResearchMethodologyElements	
Type of Study	**AppliedEconometric Quantitative Analysis**
Data	**Global Inflation (Global Food Prices) – Monthly Data (1990–2024) sourced from the Food and Agriculture Organization (FAO)**
	Algerian Economic Growth (Per Capita GDP Growth), Government Expenditure Growth, and Exchange Rate – Annual Data (1990–2024) sourced from the World Bank
Method	**Adoption of MIDAS Regression Models to Measure the Dynamic Impact of Global Inflation on Algerian Economic Growth**

Source: Compiled by the researchers.

6-Previous Studies

This section reviews prior studies related to the variables under investigation. The studies are categorized into national/local studies and international/foreign studies and are arranged chronologically from the earliest to the most recent, as follows:

6-1-National/Local Studies

- **Moulay Boualem &Sefir Mohamed (2019):** This study aimed to construct an econometric model analyzing the relationship between inflation and economic growth in Algeria. The results indicated a positive relationship between the inflation rate and economic growth, suggesting that, in a favorable economic environment, higher inflation could positively impact growth. The study also highlighted that reliance on the hydrocarbons sector contributes to higher wages and investment in other sectors; however, it often coincides with increased imports to meet rising domestic demand. (Moulay &Sefir, 2019)
- **Ben Masoud, N., & Mesbah, S. (2024):** This study analyzed the relationship between global inflation and economic growth in Algeria over the period 2000–2023 using MIDAS models, which allow the integration of data with different frequencies to capture short- and long-term effects more accurately. The authors relied on data from the World Bank, IMF, and the Bank of Algeria, where economic growth was represented by real GDP per capita growth and global inflation by the international consumer price index. The results showed a significant negative short-term impact of global inflation on Algerian economic growth due to higher import costs and reduced purchasing power, while the long-term effect was less severe due to reliance on oil revenues and public spending. The MIDAS model results also indicated an asymmetric relationship between the variables, with the impact of global price increases being stronger than that of price decreases. (Ben Masoud&Mesbah, 2024(

6-2-International/Foreign Studies

- **Parker, M. I. (2017):** This paper examined the role of global factors in causing common movements in consumer price inflation, with a particular focus on sub-indices for food,

housing, and energy. The study utilized a comprehensive dataset covering 223 countries and territories, collected from national and international sources. The results indicated that global factors explain a large portion of the variance in national inflation rates in developed countries—typically those with high GDP per capita, advanced financial systems, and greater central bank transparency—but not for middle- and low-income countries. The study also found that common factors account for a significant portion of the variance in food and energy prices. (Parker, 2017)

- **Musa OguAkwe et al. (2020):** This study examined the relationship between inflation and economic growth in several developing countries, highlighting that the impact varies according to the nature and structure of the economy. The findings suggested that moderate inflation could stimulate growth, whereas high inflation negatively affects economic activity, particularly in structurally fragile economies.
- **Ahmed, R., et al. (2023):** This research investigated the relationship between inflation and macroeconomic indicators, including GDP, trade balance, and unemployment, with a focus on the influence of crude oil prices. Using monthly data from the UK covering January 2010 to June 2022, the authors employed three analytical methodologies: vector autoregression (VAR), time-varying VAR, and panel time-varying models with robustness checks. The results revealed that inflation shocks initially reduce other economic indicators, but Brent crude oil price shocks respond more rapidly to rising inflation compared to other indicators, returning to positive levels within a month. Furthermore, the impact of inflation shocks is strongest in the first quarter and diminishes over the long term. (Ahmed et al., 2023)
- **Aguilar et al. (2024):** This study analyzed the effect of global inflation on inflation expectations of analysts in emerging economies and the role of central banks in mitigating this effect. The research used quarterly data covering 22 emerging economies from 2000 to 2023, focusing on the mean and dispersion of future inflation expectations. Three main findings emerged: first, global inflation affects the average inflation expectation and, to a lesser extent, its dispersion, particularly for short-term expectations, with a marked increase in late 2021. Second, while global inflation primarily influences short-term expectations, the local component has a stronger effect on long-term expectations. Third, monetary policy can help reduce the transmission of global inflation to expectations and decrease analysts' forecast dispersion, highlighting the ability of central banks in emerging economies to guide inflation expectations even when driven largely by global factors. (Aguilar et al., 2024)
- **Ha, J., & So, I. (2024):** This study examined the effects of inflation uncertainty on both inflation and economic activity. Results indicated a sharp rise in global inflation uncertainty since the COVID-19 pandemic, reaching historical levels comparable to those in the 1970s and 1980s. Empirical findings revealed that increased inflation uncertainty was followed by significant declines in economic growth, particularly in investment. The relationship between inflation uncertainty and inflation itself was not stable and varied across countries and periods. Simulations using a DSGE model showed that the transmission of uncertainty shocks, via demand or supply channels, can lead to a negative economic cycle with differential impacts on inflation. (Ha & So, 2024)
- **Habib, A. O., et al. (2025):** This study analyzed the interaction between income (measured by per capita GDP), food price inflation, and human capital (measured by school enrollment rates and life expectancy at birth) in Nigeria. Findings revealed that income positively affects

life expectancy but not school enrollment rates. Food price inflation had a significant positive effect on school enrollment but not on life expectancy. However, the interaction between income and food inflation negatively impacted both indicators. The study identified four key dimensions: financial constraints, perceived importance of education, trade-offs in education and health, and coping strategies. Despite significant financial challenges, households prioritized education, often at the expense of education quality, nutrition, and healthcare spending. The study concluded that while rising income and food prices individually enhance human capital, their interaction—particularly amid continuous food price increases—can hinder overall progress, recommending government intervention to stabilize food prices to strengthen the positive effect of income on human capital in Nigeria. (Habib et al., 2025)

- **Alvarez, J. A., & Kroen, T. (2025):** This paper examined the relationship between energy prices and inflation dynamics amid the global inflation surge during the COVID-19 pandemic. Results indicated that, despite notable energy shocks during 2021–2022, the transmission of these shocks to inflation remained relatively stable over time. The study showed that energy price shocks significantly affect inflation through fixed sectoral channels, with structural characteristics, such as energy dependency and price flexibility, playing a pivotal role in the transmission mechanism. These findings highlight the need for a sectoral perspective to understand inflationary pressures and emphasize the importance of detailed data on pricing mechanisms and inter-sectoral linkages to grasp how energy price shocks propagate to inflation. (Alvarez &Kroen, 2025)

Despite the abundance of studies examining the relationship between inflation and economic growth, both nationally and internationally, none have explicitly analyzed the impact of **global inflation on Algerian economic growth using MIDAS models** in a way that integrates the following dimensions:

- **Use of mixed-frequency data:** Most previous local studies employed traditional models (VECM, VAR, or simple regression models) and did not exploit the advantages of MIDAS models, which allow combining monthly global inflation data with annual or quarterly economic growth data. For example, the local study by **Ben Masoud & Mesbah (2024)** applied MIDAS but was limited to the period 2000–2023 and did not focus on sectoral relationships or the role of structural factors in the Algerian economy, particularly under major global shocks such as the COVID-19 pandemic.
- **Integration of global inflation with Algeria's structural economic context:** Algeria is a rentier economy highly dependent on energy exports, making it extremely sensitive to imported inflation and global energy price fluctuations. International studies, such as **Parker (2017)** and **Aguilar et al. (2024)**, focused on other countries without providing in-depth insights into Algeria's context or rentier economies specifically, limiting the applicability of their results.
- **Insufficient coverage of major global crises:** The time periods in most previous studies did not fully encompass the impacts of major global events, such as the 2008 financial crisis, the 2022 Ukraine war, or the COVID-19 pandemic on global inflation and local economic growth. In contrast, this study covers the period **1990–2024**, providing a long-term historical and dynamic perspective on structural changes in the Algerian economy.

- **Lack of sensitivity analysis of Algerian economic growth to global inflation shocks across time and sectors:** Previous research did not deeply investigate the variability of Algeria's economic growth response to different shocks (e.g., food, energy, manufactured goods). MIDAS models combined with sectoral analysis can provide such insights.

From this perspective, the present study aims to fill this gap by applying a MIDAS (Mixed Data Sampling) framework, which allows for the integration of data at different frequencies without information loss, enabling the detection of dynamic effects between external shocks and local variables. By applying this framework to Algeria over the period 1990–2023, the study seeks to offer an in-depth understanding of how global inflation, government spending, and exchange rates influence economic growth, highlighting the adaptive limits of a rentier economy facing rapid fluctuations in the global economic environment.

I- Theoretical Framework of the Study Variables: Global Inflation and Economic Growth

In this section, we aim to explore the concepts of inflation and economic growth, as well as the causal relationship between inflation and growth. The discussion will be structured as follows:

1. A Multidimensional Perspective on the Concept of Inflation: From Local to Global

Inflation is a complex and multidimensional economic phenomenon that ranges from domestic dynamics to global influences, encompassing monetary, structural, and fiscal factors. Understanding inflation today requires an examination of diverse economic theories—from the Quantity Theory of Money to endogenous growth models that integrate technology and global markets. This section also calls for a deeper look into the various types of inflation.

1.1. Economic Theories Explaining Inflation: From the Quantity Theory of Money to Endogenous Growth

Numerous schools of thought have sought to link inflation to factors believed to affect aggregate supply and demand, leading to persistent increases in the prices of goods and services. In this context, various economic theories have approached the study of inflation from different perspectives, including the Quantity Theory of Money, Keynesian Theory, Monetarist Theory, Structuralist Theory of Inflation, Rational Expectations Theory, Radical Theory, New Classical Synthesis, and the New Political Macroeconomy of Inflation.

In this part, we will examine the main economic theories that explain inflation. These are summarized in the following table:

Table(2) : The Economic Theory Interpreting Inflation

Theories	TheirExplanations of Inflation"
Quantity Theory of	**According to Totonchi (2011), the Quantity Theory of Money is the oldest surviving economic doctrine. It links the general price level to changes in the quantity of money in circulation.**

Money	**This implies that the level of money supply determines whether an economy is inflationary or not. Totonchi (2011) explains that monetarists apply Fisher's equation of exchange, which is expressed as follows: MV = PT** **Where:M = money supply / V = velocity of circulation /P = price level / T = transactions (often replaced with Y, national income, as a measure of output)** **The equation suggests that the total expenditure (MV) must equal the value of output (PY). Monetarists argue that inflation occurs when there is an excessive increase in the money supply.**
Keynesian Theory of Inflation	**John Maynard Keynes (1883–1946) and his followers believed that inflation results from increases in aggregate demand—referred to as demand-pull inflation. This type of inflation occurs when total demand for goods and services exceeds aggregate supply in the economy. Aggregate demand consists of consumption, investment, and government expenditure. According to Totonchi (2011), policies that decrease any of these components—such as reducing government spending, raising taxes, or controlling the money supply—can help reduce inflationary pressure.**
Endogenous Growth Theory	**Endogenous growth theories explain economic growth as being driven by internal factors within the production process, such as economies of scale, increasing returns, or technological innovation—unlike exogenous theories that attribute growth to external factors like population increases. When these models are applied within a monetary exchange framework, such as those developed by Fucas (1988), Lucas and Stokey (1987), and McCallum and Goodfriend (1987), inflation (treated as a tax) reduces both the rate of return on capital and overall economic growth. According to Gokal and Hanif (2004), a rise in inflation lowers the marginal value of current consumption relative to the marginal product of the last unit of labor.**

Source: Authors based on data from Ogu, M., et al. (2020). *Impact of inflation on economic growth in Nigeria (1999–2017). UMYU Journal of Counselling and Educational Foundations, 1*(1), 1–10, pp. 4–5. Retrieved from

Based on the content discussed in the table above, we can derive a comprehensive definition of inflation as the gap between the increase in the quantity of money in circulation and the actual quantity of goods and services available in the markets. An excess in the money supply leads to heightened demand that is not matched by a corresponding increase in production, creating an imbalance between the monetary mass and real output. This imbalance manifests as a general and sustained rise in prices, which is the primary indicator of inflation.

Accordingly, inflation arises from a combination of factors, most notably:

- **Expansion of the money supply without a corresponding increase in output**, as explained by the Quantity Theory of Money, which posits that inflation occurs when monetary growth outpaces real economic growth.
- **Excess aggregate demand over the productive capacity of the economy**, referred to as demand-pull inflation in Keynesian theory, where excessive demand drives prices upward.
- **Internal effects of economic growth**, as proposed by endogenous growth theory, where inflation functions as a "tax" that reduces the real return on capital and dampens long-term growth, particularly when technological or productive progress fails to keep pace with monetary expansion.

This definition thus attempts to synthesize monetary, demand-based, and structural dimensions of inflation, reflecting a multidimensional perspective on its nature and evolution in contemporary economies.

1.2. Types of Inflation

In this part, inflation is classified based on the scope of its impact and the source of inflationary pressures into **domestic** and **global inflation**, each of which is further divided into subcategories:

A. Types of Domestic Inflation

- **Demand-Pull Inflation**: This type of inflation occurs when the general level of demand (aggregate spending) increases while production remains constant. This imbalance between supply and demand leads to a disequilibrium in the overall economy, which results in upward pressure on prices as the production sector becomes unable to meet the surge in aggregate demand.
- **Cost-Push Inflation**: This form of inflation arises from an increase in production costs, particularly wages (Wage-Push Inflation). It typically occurs when workers negotiate higher wages, especially through strong trade unions. When employers comply with these wage demands, they pass on the increased costs to consumers through higher prices, thereby adding inflationary pressure to the economy while seeking to preserve profit margins.
- **Galloping (Hyper) Inflation**: This is the most severe and damaging form of inflation for the national economy, marked by a rapid and continuous rise in prices over a short period. Economist Philip D. Cagan (1956) defined hyperinflation as a condition in which the monthly price increase exceeds 50% (Al-Amiri, 2014, p. 30). This phenomenon typically occurs after wars or during severe social crises that undermine government control. It causes a sharp decline in the purchasing power of money, erodes its basic functions—especially its role as a store of value—and leads to dramatic increases in both prices and wages (Al-Hajjar, 2006, p. 282).

B. Types of Global Inflation

- **Monetary (External) Inflation**: This type of inflation refers to the rise in domestic price levels resulting from an increase in central bank reserves held in U.S. dollars, a situation often attributed to what is known as the **"dollar payment principle."**
- **Imported Inflation**: This form of inflation is driven by external factors, specifically the transmission of inflationary pressures from global markets through imports—a phenomenon particularly evident in oil-exporting Arab countries. Inflation is transmitted among capitalist economies through international business cycles and is exported from developed capitalist countries to developing nations via international trade (Awadallah, 1998, pp. 228–229). Developing countries are especially vulnerable to this type of inflation owing to their economic dependence on external markets and their high degree of openness. This dependency translates into rising domestic prices for imported final goods and services as global inflation flows into local markets

2- Interpreting Global Inflation Movements Through Major Historical Events

In this part, we examine the contribution of shocks to the changes in inflation levels using historical decomposition

Table (3):The role of shocks in explaining global inflation during the five global recessions since 1970: 1975, 1982, 1991, 2009, and 2020.

Periods	Explanation of Global Inflation Movements
1975	**Before the 1975 recession, global inflation was primarily driven by oil price shocks, which accounted for approximately 80% of the increase in inflation between August 1973 and January 1974. Global demand shocks explained the remaining share (around 20%). The Arab oil embargo caused a fourfold rise in oil prices, curbing aggregate demand through its impact on the transportation and industrial sectors. The subsequent decline in inflation after the recession was largely attributed to the fading effects of earlier oil price shocks (over 60%) and demand shocks (about 40%) during the period from February 1974 to July 1976.**
1982	**The sharp rise in global inflation in the late 1970s, which preceded the 1982 recession, was primarily driven by oil price shocks (around 60%) following the sharp increase in oil prices after the Iranian Revolution in 1979. Although the impact of oil price shocks dissipated within a year, demand shocks continued to fuel inflation, accounting for about 40% of the increase between February 1978 and the end of 1980. As monetary policy tightened to curb inflation, the influence of these shocks began to diminish. The prolonged decline in inflation after 1981 was driven by a combination of fading oil price shocks (around 50%) and demand shocks (approximately 45%) between 1981 and early 1986. Consistent with historical accounts, this period coincided with a tightening of monetary policy and a deterioration in global risk sentiment during the 1982 recession.**
1991	**In the period leading up to the 1991 recession, the rise in global inflation in the late 1980s and early 1990s was primarily driven by oil price shocks (around 65%) associated with the Gulf War of 1990–1991, particularly between April and September 1990. The subsequent decline in inflation after the recession was attributed to oil price shocks (more than 40%) and demand shocks (around 60%). This period of falling inflation coincided with financial crises in several advanced economies.**
2009	**After a prolonged period of low and stable inflation, oil price shocks once again caused a temporary surge in inflation during 2007–2008, with global monthly inflation rising by 0.5 percentage points (equivalent to about 6 percentage points annually) between late 2006 and June 2008. These shocks accounted for three-quarters of the increase in inflation during that time. The subsequent decline in inflation at the height of the 2009 recession was driven by the reversal of oil price shocks as oil prices collapsed, global demand shocks as the world economy entered one of the deepest recessions since World War II, and interest rate shocks as risk premia rose amid banking crises in the United States and Europe.**
2020	**In the early stages of the pandemic, approximately 60% of the decline in global inflation was attributed to global demand shocks, as consumer and investment demand collapsed between March and May amid lockdowns and heightened uncertainty surrounding policies and growth prospects. Global supply shocks, however, contributed to upward pressure on inflation during this period due to disruptions in production processes and global value chains. Unlike previous recessions, the sharp drop in inflation at the beginning of the pandemic was followed by a swift rebound. Global demand shocks accounted for the largest share (around 45%) of the rise in inflation between May 2020 and October 2022, reflecting the rapid adjustment in economic behavior. Oil price shocks and global interest rate shocks—linked to the effects of the expansionary monetary policies of 2020 and the stabilization of risk premia—explained the remainder of the increase in inflation, particularly in 2021 and early 2022. With the onset of the Russian invasion of Ukraine, oil price shocks and global supply shocks led to further increases in inflation.**

Source: Authors based on data from Ha et al (2023). *What Explains Global Inflation* (Policy Research Working Paper No. 10648). Washington, DC: The World Bank, p.15-16.Retrieved from https://openknowledge.worldbank.org/handle/10986/4079

The table above indicates that the historical decomposition of inflation reveals that both oil price shocks and demand shocks have played a significant role in explaining changes in global inflation. The global inflation factor experienced considerable and persistent fluctuations until the 1990s, after which it stabilized during the 1990s and early 2000s. However, it became more volatile again during the global financial crisis of 2007–2009 and the subsequent recovery in 2010. Following a period of relative stability, it returned to noticeable volatility with the onset of the COVID-19 pandemic in early 2020.

The global inflation factor frequently declined around turning points in the global business cycle. For example, it fell sharply before or during global recessions, especially those associated with the 2007–2009 financial crisis and the COVID-19 pandemic, as well as during the recessions of 1975 and 1982.(According to Kose and Terrones, 2015. A global recession is defined as a contraction in real global GDP per capita) (Ha et al., 2023, p. 8).

3. Inflation and Economic Growth: Impact and Transmission Channels

Economic growth refers to the expansion of a country's potential output or national product. In other words, economic growth occurs when the production possibility frontier of a country shifts outward. The following table summarizes the main methods used to measure economic growth:

Table(4): Methods of Measuring Economic Growth (Al-Heiti, 2019)

Indicator	Definition
GDP Growth Rate	Represents the annual percentage change in the market value of all final goods and services produced within a country's borders. It indicates the overall pace of economic expansion or contraction.
GDP per Capita Growth Rate	Measures the rate of change in real output per person, adjusted for inflation and population growth, indicating changes in living standards and individual productivity.
Gross National Product (GNP)	The total market value of final goods and services produced by the residents (nationals) of a country, regardless of where the production occurs.

Total Factor Productivity (TFP)	Reflects the efficiency with which capital and labor are used in production; it measures the portion of output growth not explained by input growth, often linked to technology and innovation.

Source: Authors based on data from

After reviewing the concept and methods of measuring economic growth, it is now essential to address the relationship between inflation and economic growth—a topic that remains one of the most debated issues in economics. Despite extensive research, there is still no consensus among economists on whether inflation stimulates or hinders economic growth. In this regard, three main theoretical propositions can be identified:

- **Inflation as a Stimulus:** Some economists argue that inflation can stimulate economic growth. They believe that rising price levels can encourage spending and investment, leading to higher production and growth.
- **Inflation as a Constraint:** Others maintain that inflation is detrimental to economic growth. According to this view, inflation increases uncertainty, discouraging investment and savings. Moreover, inflation erodes the real value of money, diminishing purchasing power and lowering living standards.
- **No Relationship:** A third position suggests that there is no direct relationship between inflation and economic growth. Proponents of this view see inflation merely as a reflection of economic activity, rather than a driving force behind it.

For the purposes of this study, the focus is on the proposition that inflation exerts an impact on economic growth, particularly in terms of its negative effects transmitted through several key channels:

- **Investment Channel:** Investment is a primary driver of economic growth, yet high inflation poses a significant barrier. Elevated inflation increases uncertainty about future prices and the real returns on investment, leading investors to adopt a more cautious approach. Additionally, inflation erodes the real value of financial resources, limiting firms' ability to self-finance projects while also increasing borrowing costs due to higher interest rates.

  In the Algerian context, this dynamic has been evident during periods of high inflation, where price instability has slowed industrial investment and diverted capital toward short-term commercial activities or the informal sector, both of which offer quicker returns but contribute less to productive economic growth (Shloufi et al., 2020, p 24.)

- **Consumption Channel:** Consumption is a major component of aggregate demand and therefore a critical determinant of economic growth. High inflation erodes household purchasing power, especially for those on fixed incomes, thereby reducing real consumption

levels. When prices rise faster than nominal incomes, individuals' ability to purchase goods and services declines, weakening aggregate demand and slowing economic activity.

In Algeria, household consumption of basic goods declined during periods of high inflation, particularly for imported food products, due to rising prices denominated in dinars. This decline negatively affected the growth rate in the trade and services sectors.

- **Exchange Rate Channel:** The exchange rate is a key mechanism through which inflation affects economic growth. Rising inflation reduces the competitiveness of national exports by raising domestic production costs relative to foreign goods, thereby worsening the trade balance. In response, monetary authorities often resort to currency devaluation to restore external balance. However, this approach raises import costs—especially for intermediate and essential goods—further intensifying internal inflationarypressures.

  In Algeria, whose economy relies primarily on oil revenues, rising inflation levels are accompanied by significant fluctuations in the dinar's exchange rate. This situation leads to disruptions in overall economic stability, as the depreciation of the dinar increases import costs and erodes purchasing power, without sufficiently contributing to export growth due to the limited diversification of economic sectors.

II- Empirical Study: Methods and Tools

This study attempts and seeks to investigate and determine the extent of the impact of global inflation on economic growth in Algeria, and how MIDAS models can reveal the nature of this effect over the last 34 years of the 21st century, covering the period from 1990 up to 2024. This will be accomplished by identifying the chosen econometric model based on previous studies, defining the study variables and their calculation methods, and specifying the data sources from international bodies and organizations working in this field, which are as follows**.**

1- Definition of Model Variables and Data Sources

The first methodological step involved specifying the variables that constitute the model: Economic Growth is the Dependent Variable, while Global Inflation, the Exchange Rate, and Government Expenditure are the selected Independent Variables. The study will proceed by utilizing a defined econometric model and gathering data from relevant international organizations.

- **The Dependent Variable is the Growth of GDP per capita, symbolized as (GDPPC)**. This indicator has been adopted as the representative measure for economic growth because it reflects the change in the average real income per individual after accounting for population size. Unlike the aggregate Gross Domestic Product (GDP), which can be significantly influenced by population size, the per capita figure provides a more accurate depiction of the level of economic welfare. Consequently, given that the study's objective is to quantify the aggregate impact of international inflation on economic performance, this variable is deemed the most suitable proxy for representing economic growth in Algeria

- **The independent variables are as follows:**

✓ **The first independent variable is Global Food Prices (INFM).** This variable wasadopted as the representative proxy for global inflation. Global food prices are considered a direct channel through which international inflation transmits to the Algerian economy, primarily due to Algeria's significant reliance on food imports to meet domestic demand. Any rise in global prices is rapidly reflected in import costs and household purchasing power, thereby affecting consumption rates and overall growth. Consequently, this index was chosen as the primary variable representing international inflation.

✓ **The second independent variable is the Exchange Rate**, denoted by the symbol (EXR). This variable wasselected as an explanatory variable because the exchange rate serves as a key channelthatdetermines the transmission of global inflation to the domesticeconomy. If global food prices rise globally and this coincides with the depreciation of the local currency's value, the impact of external inflation is magnified and becomes more acute. Conversely, the stability or appreciation of the exchange rate may mitigate the severity of this effect. Furthermore, the exchange rate indirectly influences economicgrowth by affecting the competitiveness of exports and imports

✓ **Government Final Consumption Expenditure Growth**, denoted by the symbol **(GFCEG)**. This variable was selected as an **explanatory variable** because final government expenditure constitutes a crucial component of **aggregate demand** and represents a mechanism through which the government can mitigate the effects of external inflation on economic activity.

Specifically, increasing public spending during periods of rising global prices can support growth by bolstering public consumption and public investment. However, this expenditure could also place **pressure on fiscal and economic balances** if it is not efficiently targeted. Thus, this variable is introduced as an **internal channel** that mediates the relationship between international inflation and economic growth.

Table (5): Definition of Study Variables and Data Source

The Variables	Symbol	Source
Economic Growth	GDPPD	**The World Bank**
International Inflation	INFM	**Food and Agriculture Organization (FAO)**
Exchange Rate	EXR	**The World Bank**
Government Expenditure	GFCEG	**The World Bank**

Source: Compiled by the Researchers

2-Study Period and Study Model

To investigate the impact of the global inflation rate on economic growth in Algeria between 1990 and 2024, this study utilizes Mixed Data Sampling (MIDAS) regression, necessitated by the use of mixed-frequency data: annual observations for GDP per capita growth, the exchange rate, and

government expenditure, alongside monthly data for global food prices as a proxy for international inflation. The MIDAS model is chosen for its ability to integrate these varying frequencies into a single framework without the loss of information incurred by traditional aggregation; it employs weighting functions (like polynomial distributed lags) to efficiently capture the dynamic and lagged effects of the high-frequency global price shocks on the lower-frequency domestic economic growth, making it the most appropriate methodology for accurately estimating this precise temporal relationship.

$$GDPPG = \beta_0 + \sum W_{t-k}(k;\theta)INFM + \beta_1 EXR + \beta_2 GFCEG + \varepsilon_t$$

Where:

- **GDPPD:** Growth Rate of GDP Per Capita (Dependent Variable)
- **INFM:** The monthly change in global food prices (the international inflation index), with time lags up to **K**
- **w(k;θ):** A weighting function (typically polynomial, such as the Almon lag or Beta function) is used to aggregate the effect of monthly data on the annual/quarterly data
- **EXR:** The Rate of Change of the Exchange Rate (Nominal or Real)
- **GFCEG :** Growth Rate of Government Final Consumption Expenditure

3- Estimation Results of the Mixed Data Sampling (MIDAS) Model for the Impact of Global Inflation on Economic Growth in Algeria

In the Mixed Data Sampling (MIDAS) models, several methods exist for the weighting function—which determines how the effect of high-frequency variables (like monthly data) is transmitted to low-frequency variables (like annual data)—including the Polynomial Lag/Almon, the Exponential Almon Model, the Beta distribution-based model (Beta), the Unrestricted MIDAS Model (U-MIDAS), and Automatic Selection Models (Auto/Gets). Given that each model has unique characteristics regarding its flexibility, the number of parameters required, and the assumed shape of the weighting function, the optimal model to represent the impact of global inflation on Algerian economic growth will be chosen by comparing and evaluating the multiple models based on a set of standard econometric statistical criteria, with the results presented in the following table.

Table (6): Selection Criteria for Comparing MIDAS Models

	AIC	BIC	HQ	R^2	RMSE
PDL/ALMON	4.3486	4.6628	4.4558	0.4255	**1.7323**
ExponentialAlmon	4.7458	5.0151	4.8376	0.0936	**2.176**
Beta	4.8046	5.1189	4.9118	0.0936	**2.176**
U-MIDAS	4.7614	5.3448	4.9011	0.5044	**1.7609**
Auto/Gets	4.4626	4.732	4.5545	0.3171	**1.8887**

Source: Compiled by the Researchers

Based on the analysis, the PDL/Almon model is determined to be the most suitable for studying the relationship, as it achieved the lowest values across the key information criteria (AIC}=4.3486, BIC=4.6628, HQ=4.4558) compared to all other MIDAS models, while also recording the smallest estimation errors (RMSE=1.7323). Although the U-MIDAS model had a slightly higher explanatory power (R^2=0.4255), the PDL/Almon model's overall superior performance across the majority of criteria means it is adopted as the most efficient model, successfully balancing accuracy with estimation parsimony.

Table (7): Estimation Results of the PDL/Almon Model.

	coefficient	t-statistic	Prob
C	**19.322**	**-3.656104**	**0.0002**
EXR	**-0.105**	**-1.835134**	**0.0011**
GFCEG	**0.066**	**4.244917**	**0.0775**
PDL01	**-2.346**	**-4.242567**	**0.0002**
PDL02	**2.244**	**4.325128**	**0.0002**
PDL03	**-0.558**	**-4.382159**	**0.0002**
PDL04	**0.040**	**4.409212**	**0.0001**
Lag(0)	**-0.6206**		
Lag(1)	**0.228**		
Lag(2)	**0.4399**		
Lag(3)	**0.2548**		
Lag(4)	**-0.0871**		
Lag(5)	**-0.3459**		
Lag(6)	**-002816**		
Lag(7)	**0.3458**		

Source: Compiled by the Researchers

The results from the table above indicate a negative and significant impact of the exchange rate (EXR) on economic growth in Algeria, where a 0.105 increase in the exchange rate (i.e., a depreciation of the Algerian Dinar) leads to a corresponding decrease in economic growth. This finding is consistent with Algeria's import-dependent economy, as a depreciated Dinar immediately raises the local cost of imports, weakening purchasing power, accelerating domestic inflation, and subsequently causing a decline in consumption and domestic production; furthermore, the currency's weakness erodes investment confidence and increases financing costs, reflecting the observed sharp slowdown in growth after past Dinar depreciations (such as the 2014 oil price collapse), underscoring that exchange rate stability is essential for achieving sustained growth.

Furthermore, the result highlights the fragility of the Algerian economy when faced with exchange rate shocks, and confirms the limitations of managed float policies in the absence of a robust productive base capable of offsetting the pressure on imports.

The results demonstrate that an increase in government expenditure (GFCEG) leads to a rise in economic growth by 0.0668, a relatively weak effect that aligns with the Algerian reality, where the government relies on expansionary public spending—especially in infrastructure, housing, and social support—to stimulate economic activity and achieve positive growth rates. However, the effect remains unsustainable due to inefficient resource allocation and a lack of economic diversification, meaning public spending functions more as a "shock absorber" than a true growth engine; it primarily mitigates the short-term negative impact of inflationary shocks but fails to

transition the economy towards a structural and sustainable growth trajectory due to the dominance of rentier and consumption-oriented allocations.

The results reveal that the Polynomial Distributed Lag (PDL01–PDL04) coefficients are statistically significant, confirming a dynamic and non-linear effect from global food price inflation shocks on Algerian economic growth. An increase of one unit in the global food price index has an immediate, negative effect on per capita GDP growth, which declines by approximately 0.62 units; this reflects the Algerian economy's heavy reliance on imports of basic foodstuffs (like wheat, sugar, and oils), where an immediate global price shock is instantly translated into higher import bills and reduced household purchasing power, negatively impacting growth. This initial negative impact is quickly followed by a positive effect as sustained global food price inflation often coincides with a rise in global energy prices, boosting Algeria's revenue as a rentier economy highly dependent on hydrocarbon exports; this increase allows the government to fund food imports and expand public spending, resulting in a positive growth effect of 0.22 units in the second month (reaching 0.43 in the second and 0.25 in the third month) through the oil revenue channel. However, this temporary positive gain rapidly fades, and the effect of continued global inflation turns negative again, leading to subsequent decreases in economic growth by -0.08, -0.34, and -0.28 units in the following months, as the prolonged shock increases the food import bill, raises the burden of government subsidies, erodes household purchasing power, and compounds budgetary pressures.

Finally, the effect turns positive again in the seventh month, with a one-unit rise in global inflation leading to a 0.3459 unit increase in economic growth; this final swing may be attributed to sustained government intervention through additional subsidies and increased hydrocarbon-funded imports, which alleviates pressure on purchasing power and facilitates a recovery in economic activity, alongside the role of internal adjustment mechanisms by households and the state in gradually absorbing the shock.

These results confirm that the Algerian economy operates within a "rentier volatility cycle," where its response to external shocks is dictated more by the trajectory of oil prices than by independent economic policies. This means that growth oscillates between consumption-led contraction and temporary rentier-driven recovery, without the ability to generate a self-sustaining growth cycle.

It can be concluded that the relationship between global inflation and Algerian economic growth is characterized by three fundamental properties:

- **Structural Fragility: The heavy reliance on food imports renders the economy highly vulnerable to global price shocks.**
- **Temporary Rentier Compensation: Rising oil prices provide a short-term reprieve (or breather) but do not resolve the structural issue**
- **Lack of Sustainability:** In the medium to long term, the negative effect reasserts itself, overpowering the positive effect unless the state intervenes with exceptional measures (additional subsidies, resource reallocation).

Conclusion and Recommendations

The findings of this study, derived from the MIDAS model (which allows for the integration of mixed-frequency data), demonstrate that global inflation is a clearly influential external factor impacting the dynamic of economic growth in Algeria throughout the period under review. Specifically, the statistical estimations of the model, particularly using the PDL/Almon specification, showed that the relationship between the studied variables is characterized by a non-linear and time-varying nature. Furthermore, the standard econometric indicators (AIC, BIC, R^2)

confirmed an acceptable goodness-of-fit and the model's ability to explain the recorded fluctuations in the growth rate.

Statistically, the results concluded that global inflation, especially that stemming from rising food and energy prices, has a negative and significant impact on economic growth in the short run, leading to a decline in purchasing power and increased import costs. However, this effect is temporarily mitigated by improved oil revenues resulting from rising oil prices, thereby creating a volatile economic cycle marked by contradictory short-term effects. The results also revealed that the exchange rate acts as a primary channel for the transmission of external inflation, as the depreciation of the Dinar contributes to magnifying external shocks, while government expenditure remains a positive yet limited factor due to its largely unproductive nature

Economically, these results reflect the fragility of the Algerian economy's production structure and its excessive reliance on oil revenues in the face of global inflationary pressures. The findings indicate that the Algerian economy reacts to inflationary shocks in an immediate and unsustainable manner, ultimately rendering their long-term impact negative on real growth.

Consequently, the study recommends the necessity of:

- **Strengthening economic diversification.**
- **Rationalizing fiscal policy** toward productive investment.
- **Adopting a flexible and stable monetary policy** capable of absorbing the effect of imported inflation and mitigating growth volatility.

The study also calls for deepening future **econometric modeling** by utilizing high-frequency data to better estimate the effectiveness of economic policy tools in responding to external shocks.

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Annexes

Annex (1): PDL/ALMON Model

Dependent Variable: GDPPG
Method: MIDAS
Date: 09/03/25 Time: 18:02
Sample (adjusted): 1991 2024
Included observations: 34 after adjustments
Method: PDL/Almon (polynomial degree: 4)
Automatic lag selection, max lags: 12
Chosen selection: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR	-0.105107	0.032261	-3.258074	0.0030
GFCEG	0.066837	0.040870	1.635348	0.1136
C	19.32237	5.107976	3.782784	0.0008
Page: FAO Series: INFM(-12) Lags: 8				
PDL01	-2.346331	0.620609	-3.780690	0.0008
PDL02	2.244165	0.582255	3.854263	0.0006
PDL03	-0.558482	0.143014	-3.905086	0.0006
PDL04	0.040003	0.010181	3.929194	0.0005

R-squared	0.425554	Mean dependent var	2.649023
Adjusted R-squared	0.297899	S.D. dependent var	2.320066
S.E. of regression	1.944018	Akaike info criterion	4.348632
Sum squared resid	102.0385	Schwarz criterion	4.662883
Log likelihood	-66.92674	Hannan-Quinn criter.	4.455800
Durbin-Watson stat	1.416354		

FAO\INFM(-12)	Lag	Coefficient	Distribution
	0	-0.620644	
	1	0.228098	
	2	0.439918	
	3	0.254836	
	4	-0.087128	
	5	-0.345953	
	6	-0.281619	
	7	0.345896	

Annex (2): Exponential Almon Model

Dependent Variable: GDPPG
Method: MIDAS
Date: 11/06/25 Time: 17:40
Sample (adjusted): 1991 2024
Included observations: 34 after adjustments
Method: Exp-Almon
Optimization method: initial OPG iterations followed by BFGS
Coefficient covariance computed using observed Hessian
Convergence not achieved after 1000 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR	-0.051447	0.036742	-1.400199	0.1724
GFCEG	0.006067	0.049412	0.122787	0.9032
C	10.66509	5.708094	1.868415	0.0722
Page: FAO Series: INFM(-12) Lags: 12				
SLOPE	-0.026696	0.029484	-0.905449	0.3730
EXPPDL01	-10.12343	32.19698	-0.314422	0.7555
EXPPDL02	0.781281	2.476543	0.315473	0.7547

R-squared	0.093646	Mean dependent var	2.649023
Adjusted R-squared	-0.068203	S.D. dependent var	2.320066
S.E. of regression	2.397880	Akaike info criterion	4.745832
Sum squared resid	160.9952	Schwarz criterion	5.015190
Log likelihood	-74.67914	Hannan-Quinn criter.	4.837691
Durbin-Watson stat	1.351395		

FAO\INFM(-12)	Lag	Coefficient	Distribution
	0	-0.010931	
	1	-4.57E-06	
	2	-9.12E-09	
	3	-8.68E-11	
	4	-3.94E-12	
	5	-8.54E-13	
	6	-8.83E-13	
	7	-4.36E-12	
	8	-1.03E-10	
	9	-1.15E-08	
	10	-6.16E-06	
	11	-0.015754	

Annex (3): Beta Model

Dependent Variable: GDPPG
Method: MIDAS
Date: 11/06/25 Time: 17:42
Sample (adjusted): 1991 2024
Included observations: 34 after adjustments
Method: Beta
Optimization method: initial OPG iterations followed by BFGS
Coefficient covariance computed using observed Hessian
Failure to improve objective (non-zero gradients) after 7 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR	-0.051060	0.037418	-1.364588	0.1836
GFCEG	0.005531	0.050311	0.109930	0.9133
C	10.58590	5.859482	1.806627	0.0820
Page: FAO Series: INFM(-12) Lags: 12				
SLOPE	-0.026170	0.030806	-0.849502	0.4031
BETA01	0.999957	NA	NA	NA
BETA02	0.999939	5.38E-05	18582.59	0.0000
BETA03	-0.083297	NA	NA	NA

R-squared	0.093658	Mean dependent var	2.649023
Adjusted R-squared	-0.107752	S.D. dependent var	2.320066
S.E. of regression	2.441865	Akaike info criterion	4.804642
Sum squared resid	160.9930	Schwarz criterion	5.118893
Log likelihood	-74.67892	Hannan-Quinn criter.	4.911811
Durbin-Watson stat	1.344698		

FAO\INFM(-12)	Lag	Coefficient	Distribution
	0	-0.007994	
	1	-0.000766	
	2	-0.000649	
	3	-0.000598	
	4	-0.000577	
	5	-0.000576	
	6	-0.000593	
	7	-0.000629	
	8	-0.000688	
	9	-0.000788	
	10	-0.000979	
	11	-0.011334	

Annex (4): U-MIDAS Model

Dependent Variable: GDPPG
Method: MIDAS
Date: 11/06/25 Time: 17:43
Sample (adjusted): 1991 2024
Included observations: 34 after adjustments
Method: U-MIDAS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR	-0.124944	0.042151	-2.964215	0.0080
GFCEG	0.078473	0.049573	1.582983	0.1299
C	20.21567	6.594854	3.065370	0.0064
Page: FAO Series: INFM(-12) Lags: 12				
LAG1	-0.870727	0.355009	-2.452687	0.0240
LAG2	0.756221	0.573974	1.317517	0.2033
LAG3	-0.060712	0.494675	-0.122732	0.9036
LAG4	0.606968	0.563798	1.076569	0.2952
LAG5	-0.455607	0.619136	-0.735875	0.4708
LAG6	0.139999	0.402201	0.348081	0.7316
LAG7	-0.496403	0.381605	-1.300827	0.2089
LAG8	0.326476	0.449420	0.726440	0.4764
LAG9	0.087183	0.459793	0.189614	0.8516
LAG10	0.223200	0.358151	0.623201	0.5406
LAG11	-0.846285	0.552261	-1.532400	0.1419
LAG12	0.534780	0.367898	1.453610	0.1624

R-squared	0.504463	Mean dependent var	2.649023
Adjusted R-squared	0.139331	S.D. dependent var	2.320066
S.E. of regression	2.152378	Akaike info criterion	4.671455
Sum squared resid	88.02189	Schwarz criterion	5.344849
Log likelihood	-64.41474	Hannan-Quinn criter.	4.901102
Durbin-Watson stat	1.635400		

Annex (5): Auto/Gets Model

Dependent Variable: GDPPG
Method: MIDAS
Date: 11/06/25 Time: 17:45
Sample (adjusted): 1991 2024
Included observations: 34 after adjustments
Method: Auto/Gets
3 MIDAS terms selected

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR	-0.102715	0.035465	-2.896196	0.0073
GFCEG	0.064383	0.044891	1.434206	0.1626
C	17.72410	5.428441	3.265045	0.0029
Page: FAO Series: INFM(-12)				
LAG1	-0.895765	0.302339	-2.962786	0.0062
LAG2	1.029264	0.342494	3.005204	0.0055
LAG5	-0.188819	0.071445	-2.642874	0.0133

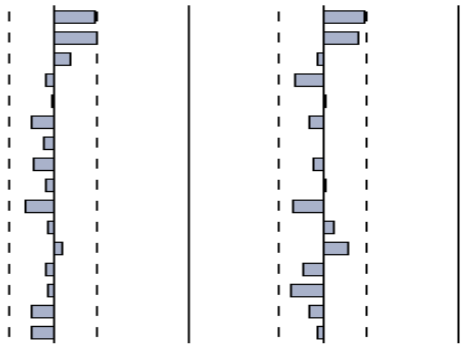
R-squared	0.317165	Mean dependent var	2.649023
Adjusted R-squared	0.195230	S.D. dependent var	2.320066
S.E. of regression	2.081308	Akaike info criterion	4.462655
Sum squared resid	121.2916	Schwarz criterion	4.732013
Log likelihood	-69.86514	Hannan-Quinn criter.	4.554514
Durbin-Watson stat	1.223516		

Annex (6): Diagnostic Tests for the Selected Model (PDL/Almon Model

Annex (6-1): Test for Autocorrelation of Errors

Correlogram of Residuals

Date: 11/06/25 Time: 17:46
Sample (adjusted): 1991 2024
Included observations: 34 after adjustments



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
		1	0.314	0.314	3.6539	0.056
		2	0.344	0.273	8.1868	0.017
		3	0.130	-0.041	8.8568	0.031
		4	-0.060	-0.210	9.0015	0.061
		5	-0.010	0.027	9.0060	0.109
		6	-0.170	-0.102	10.271	0.114
		7	-0.080	0.002	10.563	0.159
		8	-0.143	-0.066	11.520	0.174
		9	-0.065	0.027	11.727	0.229
		10	-0.215	-0.226	14.090	0.169
		11	-0.048	0.085	14.211	0.222
		12	0.069	0.202	14.479	0.271
		13	-0.057	-0.140	14.668	0.329
		14	-0.047	-0.242	14.802	0.392
		15	-0.168	-0.099	16.629	0.342
		16	-0.162	-0.040	18.404	0.301

*Probabilities may not be valid for this equation specification.

Annex (6-2):Test for Homogeneity of Variance

Correlogram of Residuals Squared

Date: 11/06/25 Time: 17:48
Sample (adjusted): 1991 2024
Included observations: 34 after adjustments

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
		1	-0.035	-0.035	0.0453	0.832
		2	0.012	0.011	0.0506	0.975
		3	-0.070	-0.069	0.2442	0.970
		4	-0.094	-0.100	0.6068	0.962
		5	-0.110	-0.117	1.1151	0.953
		6	-0.132	-0.150	1.8769	0.931
		7	-0.024	-0.056	1.9026	0.965
		8	0.102	0.072	2.3949	0.966
		9	-0.105	-0.147	2.9364	0.967
		10	0.196	0.145	4.8966	0.898
		11	-0.049	-0.066	5.0227	0.930
		12	-0.000	-0.034	5.0227	0.957
		13	-0.088	-0.085	5.4768	0.963
		14	-0.064	-0.060	5.7244	0.973
		15	0.017	0.005	5.7435	0.984
		16	-0.006	-0.005	5.7456	0.991

*Probabilities may not be valid for this equation specification.

: Normality Test (6-3)Annex