Estimating the Impact of Monetary Policy Instruments on the International Competitiveness of the Food Industry: The Algerian Case Study (1992–2024).

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Abstract: This study examines the impact of monetary policy instruments on the international competitiveness of Algeria's food industry during the period 1992–2024, within the broader framework of the country's shift toward a market-based economy and monetary liberalization. This is done through by assess the influence of key monetary tools namely the real exchange rate, inflation rate, money supply (M2), and real interest rate in enhancing the global competitiveness of the agri-food industry. Using the ARDL model methodology in estimation, the findings revealed a long-run equilibrium relationship, with significant effects from inflation, exchange rate, and money supply, in order of the size of the long-term effect, which amounted to:1,09;0,99;0,42 respectively, while the interest rate proved statistically insignificant. Finally the study recommends maintaining exchange rate stability, improving inflation management, directing liquidity toward productive investment, and reforming interest rate mechanisms to better support export-oriented competitiveness.

Key words: Monetary Policy, International Competitiveness, Food Industry, International competitiveness indicators, ARDL Model.
Jel Classification Codes : E52, L66, Q18.

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Introduction:

Algeria's economy is heavily dependent on oil and gas revenues, rendering it susceptible to fluctuations in global market prices. Despite this reliance, the nation grapples with numerous economic challenges, such as elevated unemployment rates and a lack of economic diversification. The food industry plays a crucial role in Algeria's economy, in this context, the **agri-food industry** has emerged as a strategically significant sector. In 2023 (National Statistical Office, 2025, pp. 43-45), its **value added amounted to 4 243,4 million USD**, accounting for **37,11% of national GDP**, and employing approximately **19.830 workers**. Given the significant economic and social role of the food industry, the periodic assessment of its competitiveness in international markets has become increasingly crucial. Such evaluations provide valuable insights into the industry's global positioning, efficiency, and resilience, helping to inform policy decisions and strategic development. The core competitiveness of industries today should be built on sustainable advantages rather than short-term gains from government support or cheap inputs. This requires sound enterprise-level economic policies that enhance resource quality and resilience. In light of current economic instability, ensuring long-term competitiveness in the agricultural sector is both relevant and essential. (Tranchenko, 2013, p. 7) In this regard, monetary policy instruments, designed to foster economic stability, could serve as a key driver in boosting the competitiveness of Algeria's food industries. This study aims to examine the effects of monetary policy instruments, namely the real interest rate, exchange rate, money supply, and inflation, on the global competitiveness of Algerian's Food industry; Accordingly, the following research question can be formulated:

To what extent do monetary policy instruments, namely the real interest rate, exchange rate, money supply, and inflation, affect the international competitiveness of Algeria's food industries?

To address this main question, several sub-questions have been posed:

-What is the effect of the real interest rate on the international competitiveness of Algeria's food industries?

-How does the exchange rate affect the international competitiveness of Algeria's food industries?

-What is the impact of money supply on the international competitiveness of Algeria's food industries?

-How does inflation influence the international competitiveness of Algeria's food industries?

This study formulates its hypotheses based on established theoretical frameworks and empirical findings from prior research on the impact of macroeconomic policy instruments—such as real interest rates, exchange rates, money supply, and inflation—on international competitiveness, particularly in the context of Algeria's food industry.

H1: High real interest rates negatively affect export competitiveness by increasing capital costs and discouraging investment.

This hypothesis is rooted in neoclassical theory (Chetty, 2007, p. 67), which emphasizes the role of the real interest rate in determining capital costs. An increase in interest rates reduces investment incentives, especially in sectors reliant on financing, which weakens competitiveness. This is confirmed by Veronika and Dagmar (2018), whose findings showed that expansionary policies (including interest rate reductions) enhance industrial firm performance and profitability.

H2: Exchange rate depreciation enhances competitiveness by improving the price advantage in global markets.

This draws on the **theory of comparative advantage** and the **Marshall-Lerner condition** (Abbas Ali, Johari , & Haji, 2014, pp. 2-3), which suggest that **exchange rate depreciation** boosts exports by improving the price competitiveness of domestic goods. This is empirically supported by **Rezoug and Hadjadj (2022)**, who found that depreciation of the Algerian dinar significantly increased food exports, confirming the strategic role of exchange rate policy.

H3: An expansion in the money supply positively contributes to competitiveness when accompanied by productive investments.

This is informed by **Keynesian theory** (Abderrahmane, 2015, pp. 140-141), which links **money supply expansion** to economic activity. An increase in monetary supply can enhance competitiveness when directed toward productive investments. **Veronika and Dagmar (2018)** also found that the positive effects of expansionary monetary policy depend on firm size and the ability to access investment opportunities.

H4: Inflation dynamics influence competitiveness in non-linear ways. While high inflation tends to erode competitiveness by increasing production costs and causing price instability, moderate inflation may enhance sectoral resilience and adaptive capacity. This hypothesis is grounded in both monetarist and Keynesian theoretical perspectives. From a monetarist standpoint, sustained inflation is primarily a monetary phenomenon that disrupts price stability and economic efficiency. Meanwhile, Keynesian theory, through the interaction of aggregate supply and demand curves, highlights the dual role of inflation: excessive inflation hampers growth, but moderate inflation can stimulate output and investment under certain conditions (Kelebogile & Ravinder , 2021, p. 166), Empirical evidence supporting this hypothesis is provided by Yalouli and Bouguerra (2022), who employed an ARDL model on Algerian data from 1984 to 2020, revealing a long-term negative relationship between inflation and the competitiveness of food exports.

These hypotheses aim to evaluate the existence, direction, and magnitude of the relationship between monetary policy instruments and sectoral competitiveness, and to identify which instruments play a more influential role in shaping Algeria's global industrial positioning.

1. Research methodology

This study adopts a quantitative approach to examine the impact of selected monetary policy instruments on the international competitiveness of Algeria's agri-food industry over the period **1992–2024**. This timeframe corresponds to a pivotal phase in Algeria's economic transformation, marked by the gradual transition from a centrally planned system to a market-oriented economy through major structural and institutional reforms, including exchange rate liberalization, increased central bank autonomy, and the adoption of modern monetary policy frameworks aimed at price stability. The period also encompasses significant external shocks, particularly oil price fluctuations, which may have generated structural breaks affecting economic relationships. From a methodological perspective, the selected timeframe provides sufficiently consistent and reliable data for econometric analysis. These characteristics justify the use of the ARDL framework, which is well suited to long time-series data characterized by structural instability and mixed integration orders, and allows for the identification of long-run equilibrium relationships that capture average dynamics rather than short-term fluctuations. The year 2024 is retained as the endpoint, as it represents the most recent year with complete and validated data.

The study integrates both descriptive and analytical approaches to explore the theoretical foundations and empirical dimensions of the subject. The empirical investigation is based on time series data collected from both national and international statistical sources, incorporating key indicators such as the trade coverage ratio, export market share, and the real exchange rate. To capture the dynamic interplay between the variables, the study applies econometric techniques within the Eviews software environment, particularly utilizing the Autoregressive Distributed Lag (ARDL) model and the Error Correction Mechanism (ECM), selected based on the stationarity characteristics of the dataset. This methodological framework facilitates the identification of both short-run dynamics and long-term equilibria, offering robust empirical evidence to either validate or question existing theoretical propositions.

This study adopts a quantitative approach to examine the impact of selected monetary policy instruments on the international competitiveness of Algeria's agri-food industry over the period 1992–2024. This timeframe corresponds to a critical phase in Algeria's economic

transformation, characterized by the gradual shift toward a market-oriented system, exchange rate liberalization, enhanced central bank autonomy, and the adoption of modern monetary policy frameworks. In addition, the period provides sufficiently consistent and reliable data, which is essential for conducting rigorous econometric analysis. The year 2024 marks the endpoint of the study, as it represents the most recent year with complete and validated data.

The empirical analysis combines descriptive and econometric methods based on time-series data from national and international sources. Estimation is conducted using the Autoregressive Distributed Lag (ARDL) model within the EViews environment, which allows for the identification of both short-run dynamics and long-run equilibrium relationships through an error correction mechanism.

Although international competitiveness is inherently multidimensional, the ARDL framework requires the specification of a single dependent variable. Accordingly, the Revealed Comparative Advantage (RCA) index is employed as the primary measure of export-based competitiveness in the agri-food sector. This choice is justified by the widespread use of the RCA index in empirical literature, its strong theoretical grounding, and the availability of consistent trade data over long time horizons. To complement the econometric analysis, additional competitiveness indicators are used descriptively, allowing for a broader interpretation while maintaining methodological consistency.

While existing international and Algerian studies have widely examined the relationship between macroeconomic policies and competitiveness, they differ in analytical focus, scope, and variable selection. Much of the literature relies on firm-level analyses or composite competitiveness indices, whereas Algerian studies often emphasize partial macroeconomic effects or internal competitiveness over limited time horizons. Consequently, international sectoral competitiveness measured through trade-based indicators remains underexplored.

This study contributes by adopting a **macroeconomic and international sectoral perspective** on the competitiveness of Algeria's agri-food industry. International competitiveness is primarily assessed using the **Revealed Comparative Advantage (RCA) index** in the econometric analysis, while complementary indicators—including the **trade coverage ratio**, **export market share**, and **intra-industry trade index**—are employed in the descriptive analysis to reflect the multidimensional nature of competitiveness. Covering a long period (1992–2024) and integrating key monetary policy instruments, the study provides dynamic insights into the short- and long-run determinants of export-based competitiveness in a structurally evolving economy.

2. The theoretical framework of the competitiveness

2.1 Definition : Competitiveness is a multidimensional concept closely related to economic growth, sustainable development, and national economic prosperity. This concept has evolved over the decades, initially being linked to foreign trade performance in the 1970s, then expanding in the 1980s to include industrial policies. In the 1990s, it became associated with national technological policies. With the onset of the 21st century, competitiveness became an indicator of a country's ability to enhance economic well-being and improve living standards. It later evolved into the concept of "responsible competitiveness," which has gained prominence over the past decade, emphasizing the importance of integrating environmental considerations into economic policies. Moreover, economic literature has varied in defining competitiveness, its classifications, measurement indicators, and determining factors.

The concept of competitiveness also varies depending on the level of analysis, whether at the firm, sectoral, or international level. It can be categorized across these three interconnected levels within the economic framework. A high degree of firm-level competitiveness enhances the efficiency and productivity of the sector in which it operates, leading to improved sectoral performance and increased output. Ultimately, this positively impacts a country's overall competitiveness by stimulating economic growth, boosting exports, and attracting foreign direct investment (FDI), thereby strengthening its position in global markets (Al-Khalifa, 2014, p. 77).

the term "competitiveness" is still not well defined. This is because it has origins in a variety of economic theories, including microeconomics, international commerce, and theories of economic development.

Despite the abundance of definitions and international indicators addressing competitiveness, there remains no universal consensus on a singular definition of the concept. In response to this complexity, the prevailing definitions can generally be classified into three main categories: those based on external trade performance, those combining trade performance with standards of living, and those focused exclusively on living standards. The first category emphasizes the balance of trade as an indicator of a country's competitiveness, where a trade surplus reflects strength and a deficit signals weakness. However, this perspective has been criticized for its limitations, particularly since a trade surplus may coexist with declining competitiveness, and a deficit can sometimes accompany rising living standards—as was the case in the United States during the 1980s. (Krugman, 1994, p. 30)

The second category integrates both trade performance and the capacity to improve citizens' standards of living. This perspective is reflected in definitions adopted by the U.S. Council on Competitiveness and the OECD, which link competitiveness to both market success and societal well-being (Cellini & Soci, 2002, p. 74). However, some economists, notably Paul Krugman, challenge the idea that national prosperity depends primarily on global market performance. In his seminal article "Competitiveness: A Dangerous Obsession," Krugman argues that framing domestic economic issues through the lens of international competition is misleading, and that real solutions lie in enhancing internal productivity and efficiency (Krugman, 1994, p. 34).

The third category defines competitiveness solely through the lens of living standards, highlighting a country's ability to ensure sustained improvements in per capita income through robust and continuous economic growth (Porter M. E., The Competitive Advantage of Nations, 1990, p. 76). This multidimensional nature of competitiveness underscores the importance of defining it precisely, as each definition implies a different set of policy responses.

In the context of Algeria, where the economy faces persistent trade deficits, high unemployment, and weak productivity, a tailored definition is essential. Thus, competitiveness should be understood as the capacity of the Algerian economy to perform effectively in both domestic and international markets, based on high levels of productivity and employment that contribute to improved income and living standards. Achieving this vision requires not only increased exports, but also the fair distribution of gains across production factors, particularly labor. Such an outcome will not occur spontaneously it necessitates a coherent national strategy that integrates employment, investment, infrastructure, and skills development. Economic policy, encompassing fiscal, monetary, and trade measures, along with appropriate legal frameworks, plays a pivotal role in supporting Algeria's competitiveness trajectory. (Porter M. E., The Competitive Advantage of Nations, 1990, p. 92).

The most common trend in competitiveness research is the commercial approach, which traces its origins to classical trade theories (such as Adam Smith's theory of absolute advantage and Ricardo's theory of comparative advantage) and modern theories (such as Vernon's product life cycle theory and Krugman's theory of economies of scale). In this approach, competitiveness is defined as the ability to "achieve and maintain market share, both domestically and internationally." (Juchniewicz & Łukiewska, 2015, p. 01).

Thus, the competitiveness of the food industry can be defined as the relative ability of firms or sectors to maintain or gain market share in domestic and international markets through cost efficiency, product quality, innovation, and adaptability to regulatory environments."

The competitiveness of the Food-industrial sector represents a comprehensive and final measure of the sector's consistent performance. It reflects the ability of enterprises within the sector to generate high levels of income and employment in a specific region on a long-term, sustainable basis. This is achieved by effectively leveraging technological, human, and physical capital,

while operating under both domestic and international competitive pressures. (Tranchenko, 2013, p. 8).

2.2 Literature Review on the Relationship Between Monetary Policy Instruments and Competitiveness

Economic literature provides extensive evidence that macroeconomic policies significantly influence competitiveness at both national and enterprise levels. Classical studies on the role of state policies in enhancing firm competitiveness began with Michael Porter (1980), who developed the "Five Forces" model (Porter M. E., Competitive strategy: Techniques for analyzing industries and competitors, 1980, pp. 3-5), followed by the "Diamond Model" (Porter M. E., The Competitive Advantage of Nations, 1990, pp. 78-82). Porter linked competitiveness to factor conditions, demand conditions, related and supporting industries, and firm strategy, structure, and rivalry while highlighting the pivotal roles of government and chance in enhancing national competitiveness.

In a similar vein, (Lall, 1990, p. 12) introduced the "Competitiveness Triangle," emphasizing that technological capability is central to competitiveness. This capability is shaped by how firms interact with three key markets: the factor market, the incentive market, and the institutional market. The incentive market encompasses macroeconomic policies, trade and industrial regimes, which collectively impact firm competitiveness. Additionally, local demand its size, growth rate, income distribution, and complexity plays a critical role.

(Brinkman, 1987) underscored that competitiveness stems from a mix of domestic and international factors, with public policy measures including monetary, fiscal, and regulatory policies playing a crucial role in shaping industry or product competitiveness.

(Schaling, 2007, p. 1) explored the effect of real exchange rate fluctuations on competitiveness and growth in South Africa from 1994 to 2006. The study concluded that a declining real exchange rate failed to enhance the trade balance or stimulate economic growth, due to pricing-to-market behavior. It identified high domestic inflation relative to trade partners as the main driver of competitiveness loss, recommending that the inflation targeting range be narrowed from 3–6% to 1–3% as a more effective tool for supporting international competitiveness.

(Diana, Adrian , & Florin , 2012, p. 688) highlighted that macroeconomic stability is a decisive factor in improving competitiveness, particularly in developing economies integrated into larger economic blocs, such as Romania within the European Union. The study found that persistent current account deficits, ineffective fiscal policies, and insufficient infrastructure investment hindered competitiveness—despite GDP per capita growth and a shift in export structures toward medium-tech products.

(Paul R. & Giancarlo , 2013, pp. 2-5) developed an open macroeconomic model incorporating external effects from production shifts toward differentiated industries. Their theoretical simulations demonstrated that well-designed and independent monetary policies encourage firm entry and lower export prices, thus improving a country's international trade position. Fixed exchange rate regimes were found to hinder specialization, while international coordination of monetary policies yielded greater welfare and competitiveness gains than unilateral actions.

In another empirical investigation, (Veronika & Dagmar , 2018, p. 43) examined the effects of the Czech National Bank’s accommodative monetary policy on the competitiveness of non-financial firms across agriculture, construction, and industry during 2006–2015. Using firm-level panel data from the Amadeus database and regression models, the study assessed the impact of low interest rates and foreign exchange interventions on financial performance indicators, particularly return on equity (ROE). Results showed that monetary easing improved firm performance, especially ROE, though effects varied by sector and firm size. Notably, exchange rate interventions had a consistently positive impact on competitiveness.

(Nikola , Mijat , & Nikola , 2020, p. 23) analyzed the link between macroeconomic stability and competitiveness in Western Balkan countries using data from the Global Competitiveness Index and the Analytic Hierarchy Process (AHP). Their findings revealed a strong correlation between indicators such as inflation, public debt, and national savings and the countries' competitiveness rankings, with better-performing countries like Montenegro and North Macedonia demonstrating greater stability.

(Mukhamediyev & Zhansaya , 2020, p. 31) studied the influence of macroeconomic indicators—namely inflation, public debt, interest rates, and current account balances—on national competitiveness, using data from the World Economic Forum and other international sources. The study found that low inflation, price stability, and sound debt management were directly linked to stronger performance on the Global Competitiveness Index.

In a time-series study of South Africa, (Kelebogile & Ravinder , 2021, pp. 161-178) analyzed the relationship between inflation targeting and economic growth from 2000 to 2018 using a Vector Error Correction Model (VECM). Their findings revealed both short- and long-term relationships between the two variables. Diagnostic tests (Dickey-Fuller, Phillips-Perron, and KPSS) confirmed the model's robustness. The study concluded that inflation targeting promotes economic growth and recommended innovative monetary policies to maintain exchange rate stability and ensure coordination between fiscal and monetary strategies.

(Liang, Qian , & Chengjiang , 2024) examined the impact of China's "dual credit" policy, implemented in 2017, on the competitiveness of firms in the new energy vehicle sector. Using data from 58 listed companies between 2014 and 2022, the study applied a difference-in-differences (DID) model with radical innovation as a mediating variable. Results indicated that the policy significantly enhanced productivity and competitiveness, particularly among traditional and state-owned enterprises, with stronger effects in the market-oriented eastern and central regions.

On the topic of inflation targeting, (Bambe, Combes, Kaba, & Minea, 2024, pp. 1-4) conducted a quantitative analysis using data from over 31,000 manufacturing firms across 47 countries between 2006 and 2020. Applying entropy balancing to correct for adoption bias, the study found that inflation targeting significantly improved sales growth and productivity, especially in countries with strong fiscal discipline and effective judicial systems. The findings also emphasized that macroeconomic stability—through reduced volatility in inflation, interest rates, and exchange rates—was the key channel for enhancing competitiveness.

An empirical study conducted in the Czech Republic (Kozelský, et al., 2024, pp. 78-79) found that monetary policy plays a critical role in enhancing the competitiveness of agricultural enterprises. Using a multiple regression model, the research revealed a clear negative effect of rising interest rates on agricultural revenues, reflecting the increased financial burden that constrains investment and undermines competitiveness in the sector. Moreover, a positive relationship was identified between inflation and agricultural revenues, suggesting that, despite the rising cost of inputs, inflation may allow for higher output prices, thus supporting income growth. In contrast, the study found no statistically significant impact of exchange rate fluctuations on agricultural performance, indicating that this variable may require further investigation. Based on these findings, the study advocates for the adoption of flexible monetary policies tailored to the characteristics of the agricultural sector, emphasizing the importance of maintaining low interest rates to stimulate investment, technological innovation, and improved competitiveness in this vital area of the economy.

Focusing on Algeria, (Boukarana, Bensaci, & Zaid Khair , 2013, pp. 41-52) investigated the determinants of competitiveness in food industries in southeastern Algeria, particularly among small and medium-sized enterprises. Results showed that while government support had a positive effect, it remained weak. The study recommended increasing investment in training, improving product quality, and strengthening the role of government and supporting institutions.

Similarly, (yalouli & bouguerra, 2022) assessed the impact of macroeconomic variables on the competitiveness of food industry exports between 1984 and 2020 using an ARDL model. The findings indicated that inflation had a negative impact on competitiveness, whereas GDP, exchange rate, and terms of trade had positive effects. The bounds testing approach confirmed the existence of a long-run equilibrium relationship, underscoring the importance of macroeconomic stability in supporting this strategic sector.

Finally, (Rezzoug & hadjadj, Measuring the impact of currency devaluation on the competitiveness of Algerian food industry exports during the period 2001-2019, 2022, pp. 122-130-131). They found a weak positive correlation, where a 1% devaluation of the dinar led to a 2.35% increase in exports. However, this explained only 25% of export variation, with the remaining 75% attributed to structural factors such as production flexibility and product quality. The study concluded that currency devaluation was more a response to internal and external pressures than a deliberate strategy to boost exports.

Extensive economic literature affirms that instruments of monetary policy—namely interest rates, inflation, and exchange rates—have a substantial influence on competitiveness at both national and sectoral levels. Numerous empirical findings demonstrate that lower interest rates support firm competitiveness by reducing financing costs and facilitating investment, whereas higher rates restrict capital access and hinder performance, particularly in sectors like agriculture and food processing that are highly sensitive to credit conditions (Veronika & Dagmar, 2018; Kozelský et al., 2024). Inflation, meanwhile, exhibits a more complex and dual effect: while it may elevate production costs, it can simultaneously drive revenue growth by enabling firms to increase prices, as observed in both agricultural and industrial contexts. The role of exchange rates is less conclusive; although some studies suggest that currency depreciation can enhance export performance, such effects are often limited by structural weaknesses such as low product quality and insufficient production flexibility (Rezzoug & Hadjadj, 2022). In Algeria's case, research on food industry competitiveness has underscored the positive but insufficient impact of government support and macroeconomic factors (Boukarana et al., 2013; Yalouli & Bouguerra, 2022), while highlighting the need for targeted reforms.

3. Empirical Study on The impact of monetary policy instruments on the Global competitiveness of Algerian food industry.

3.1 Presentation of Study Data

3.1.1. Sample and Study Period

This analytical section aims to examine the evolution of the study's core variables over the period 1990–2024, focusing on key monetary policy instruments namely the real interest rate, real exchange rate, money supply, and inflation rate, alongside indicators of international competitiveness in the agri-food industry. The analysis seeks to highlight long-term trends and identify major shifts shaped by both domestic and global economic dynamics. Additionally, it explores the trajectory of Algeria's food industry exports and imports and compares their performance to global exports in the same sector. This comparison allows for a clearer assessment of Algeria's competitive standing and helps identify structural challenges limiting its integration into the international Food industry trade.

The study relied on the Bank of Algeria, the UN Comtrade Database and National Bureau of Statistics, from which data for all the variables used in the study were obtained.

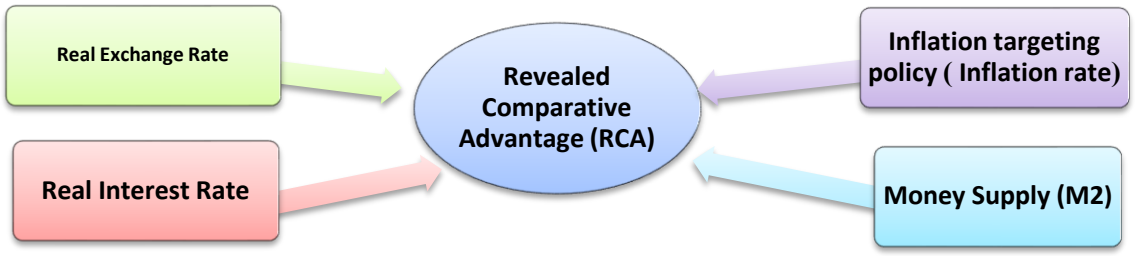
3.1.2. Data Sources:

The study relied on the Bank of Algeria, the UN Comtrade Database and National Bureau of Statistics, from which data for all the variables used in the study were obtained.

3.2. Study Variables:

This study applies an empirical, business performance-oriented approach to studying the impact of monetary policy instruments-represented by the real interest rate, exchange rate, money supply and Inflation targeting policy on the international competitiveness of the agri-food industry in Algeria. Between 1992 and 2024.

Figure (01): View study variables.



source : created by the authors.

3.2.1. The independent variables used in this study represent key monetary policy instruments. These include the real interest rate, real exchange rate, money supply (M2), and inflation rate.

These variables are selected based on their theoretical and empirical relevance to the analysis of international competitiveness in Algeria's food industries.

3.2.2. The dependent variable: While five different indicators of international competitiveness were explored in the economic analysis, the empirical study relied on the Balassa Revealed Comparative Advantage (RCA) index as the dependent variable as the primary measure of Algeria's industrial competitiveness in the food sector. This index was chosen for its strong explanatory power in assessing a country's ability to specialize in specific exports relative to the global average. It is also favored for its computational simplicity, interpretability, and reliance on consistent trade data, making it a suitable tool for evaluating the sector's relative export performance over the study period. Moreover, the Balassa index remains one of the most widely used tools for measuring revealed comparative advantage, particularly in studies that examine competitiveness from the perspective of external trade performance.

Export market share (EMS) (Juchniewicz & Łukiewska, 2015, p. 64) is an indicator that measures the proportion of a specific entity's (e.g., a country or a group of countries) exports of a particular product relative to the total world exports of that product. It reflects the entity's competitiveness and its relative position in international markets, it is calculated using the following formula $\mathbf{E}\boldsymbol{MS} = \mathbf{E_{Fi}/E_{FW}}$, where: E_{Fi}: Export of food products of the entity I; E_{FW}: world export of food products.

The logical values of the Export Market Share (EMS) indicator range between 0 and 1, or can be expressed as a percentage. A value of 0 indicates no exports in the sector, while values between 0 and 1 reflect a relative contribution to the global market—stronger as the value approaches 1, and weaker as it nears 0.

Trade coverage (TC) is used to examine the relationship between exports and imports within a specific sector and is defined as follows [Verdoorn, 1960]:**TC = EFi / IFi** where: **EFi** – exports of food products by entity *i*, **IFi** – imports of food products by entity *i*.

A ratio greater than **1** indicates that the country generates a trade surplus and holds a relative advantage over its trading partners. Conversely, a ratio below **1** reflects a **trade deficit** and the absence of such an advantage.

Intra-industry trade index: evaluates how specialized a country's industry is by examining the extent to which it exports and imports goods within the same product category. A value close to one indicates a high level of specialization and strong competitiveness in both domestic and international markets (Rezzoug, Evaluating the competitiveness of the food industries in Algeria, 2022, p. 214), while a value near zero reflects limited specialization and weak market positioning. The IIT is calculated using the following formula (G. GRUBEL & LLOYD, 1975): **IIT = 1 - |Xi - Mi| / (Xi + Mi)** Where: - X_i: exports of industry i - M_i: imports of the same industry- IIT: intra-industry trade percentage for industry i relative to the total trade of that industry.

Net Export Index: The Net Export Index reflects a country's revealed comparative advantage through its net exports in a specific sector. It is calculated as the ratio of net international trade (exports minus imports) to the country's total international trade (exports plus imports) in the same sector. A positive index value indicates that the industry possesses a revealed comparative advantage in international markets, while a negative value suggests the absence of such an advantage. In the following section, the index values will be calculated for the various branches of the food processing industries for which data are available, by using the following formula: **N.E.I = (X-M)/(X+M) (**ABDOUS, 2013, p. 86) Where: X **:** exports, M **:** imports.

Revealed Comparative Advantage (RCA) index, introduced by **Balassa (1965)**, is a widely accepted metric used to assess a country's export specialization in a particular product relative to the global average. This index compares a country's share of exports in a specific product to that product's share in world exports. A value greater than one indicates that the country holds a comparative advantage in that product, whereas a value below one suggests otherwise. The RCA

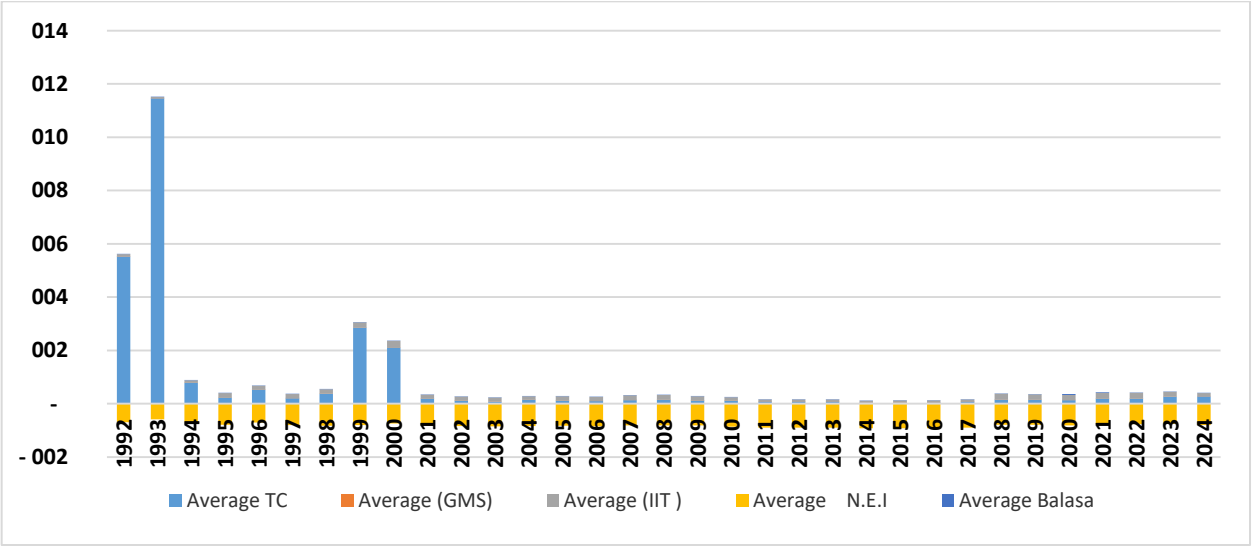
is calculated using the following formula (FERTŐ & HUBBARD, 2002, p. 5): $\mathbf{B = (x_{ij} / x_{it}) / (xw_j / xw_t)}$. Where: $\mathbf{x_{ij}}$: Exports of product j by country i $\mathbf{x_{it}}$: Total exports of country i. $\mathbf{xw_j}$: World exports of product j.$\mathbf{xw_t}$: Total world exports.

3.3. Data Analysis of the Empirical Study

3.3.1.Evolution of the Average Competitiveness Indicators of the Algerian Agri-food Industries during the Period 1992–2024.

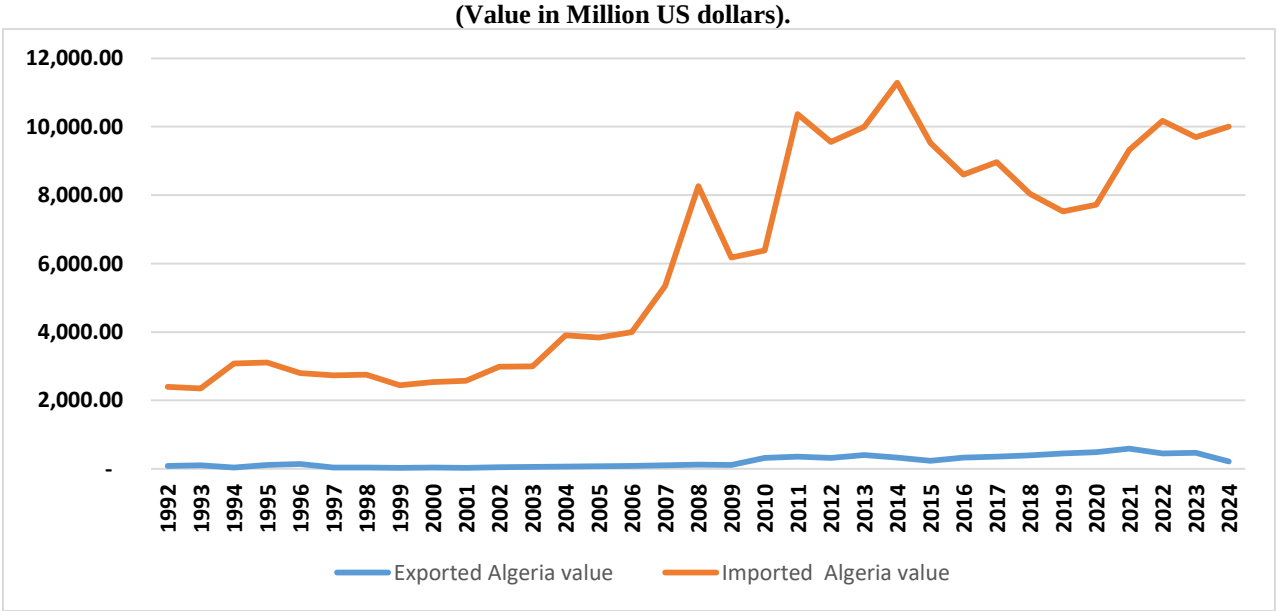
The following graph Figure (2), illustrates the evolution of key competitiveness indicators of the Algerian agri-food industry over the 33-year period from 1992 to 2024. It provides a comprehensive overview of long-term trends in various performance metrics, highlighting fluctuations and structural patterns that have shaped the international competitiveness of the sector.

Figure (02): Evolution of the Average Competitiveness Indicators of the Algerian Food Industries during the Period 1992–2024.



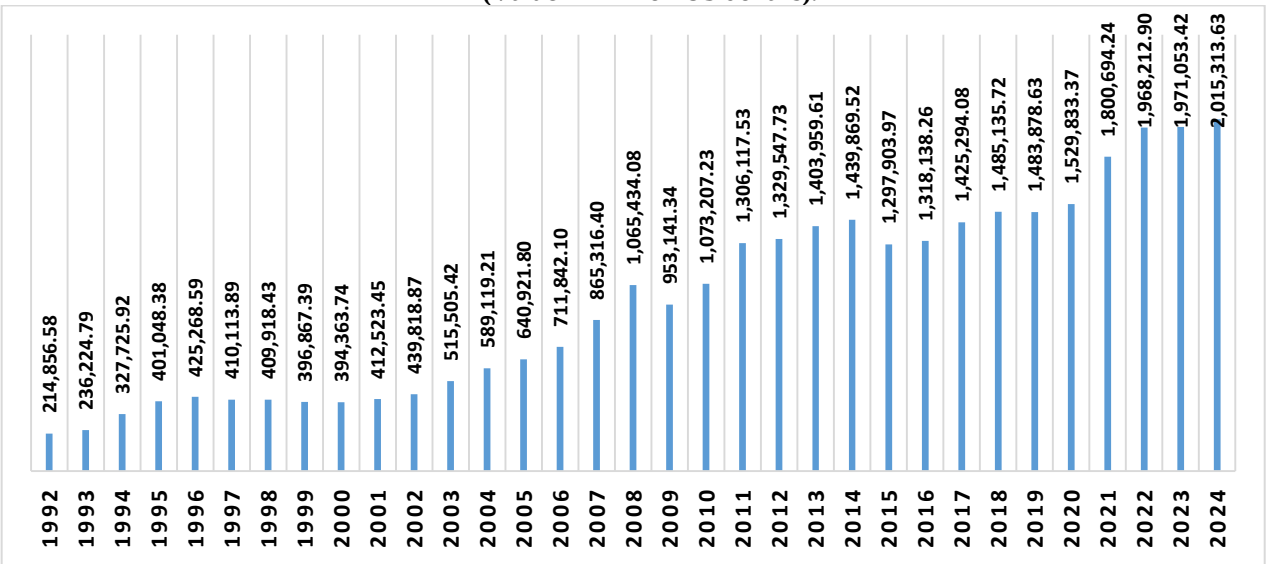
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Figure (03): Evolution of Algeria's food exports and imports during the period 1992–2024. (Value in Million US dollars).



source : created by the authors, based on the data of the ONS https://www.ons.dz/ and the UN Comtrade Database, https://comtradeplus.un.org/ .

Figure (04): Evolution of Exported World's Food Industries value during the period 1992–2024. (Value in Million US dollars).



source : created by the authors, based on the data of the UN Comtrade Database, https://comtradeplus.un.org/

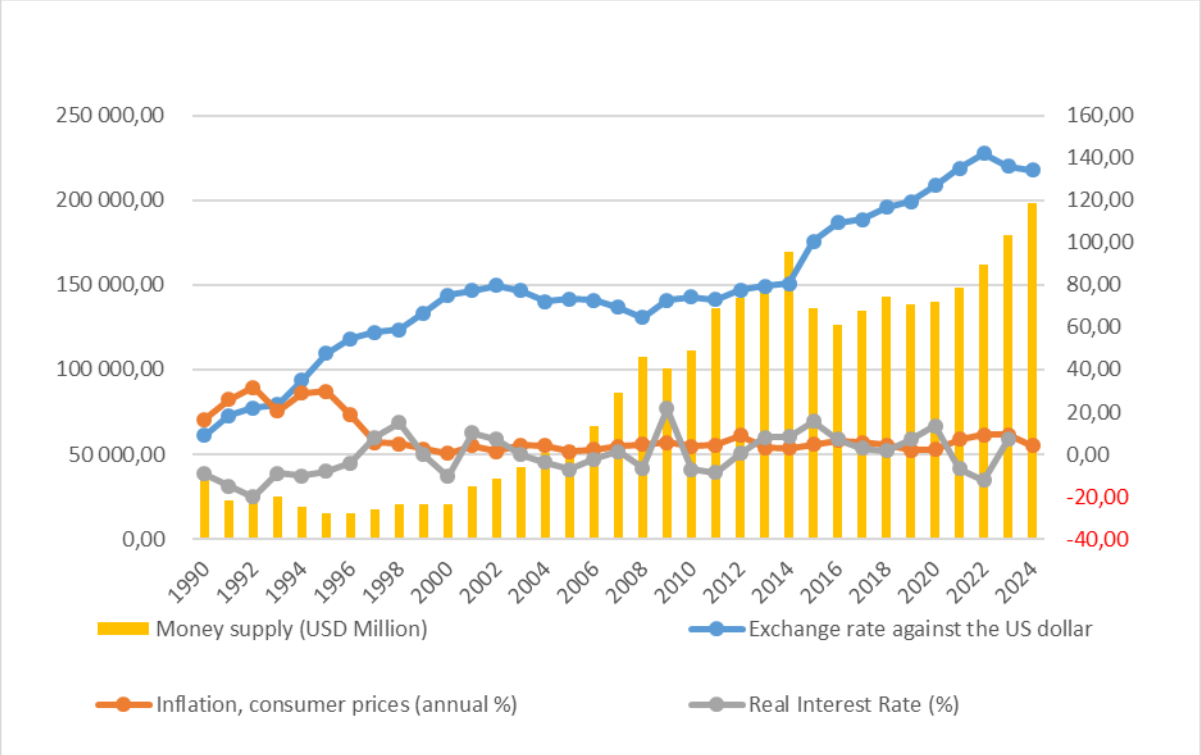
Based on the data presented in Figures 02, 03, and 04, as well as Table 01 in the appendices, it was found that during the study period between 1992 and 2024, Algeria's food sector demonstrated persistently low competitiveness, as reflected in both trade data and standard competitiveness indicators. The trade coverage ratio (TC) remained under 1 in most years, aside from an early peak in 1993 (11.47), indicating a structural trade deficit. Exports rarely exceeded $600 million and remained volatile, while imports consistently surpassed $2 billion, reaching over $11 billion in some years. This gap reflects a sustained reliance on foreign markets to meet domestic food demand.

At the global level, Algeria's export market share (EMS) remained at or near zero, highlighting the country's marginal presence in international agri-food trade despite a global export boom exceeding $2 trillion by 2024. The intra-industry trade index (IIT) reached its highest point at 0.26 but remained generally weak, confirming the limited integration of Algeria's agri-food products into global supply chains. Similarly, the net export index (NEI) recorded consistently negative values from -0.70 to -0.93 underscoring the chronic trade imbalance. The revealed comparative advantage (RCA), measured via the Balassa index, also remained low throughout, rarely exceeding 0.03, suggesting the absence of any strong or specialized export niche in this sector.

Taken together, these indicators point to a structurally fragile agri-food economy with limited capacity to compete, integrate, or scale internationally. Addressing this challenge requires more than production and quality enhancements it necessitates a strategic reduction in import dependence and the implementation of corrective actions through a coordinated set of macroeconomic policy tools, including monetary, fiscal, trade, and investment measures aimed at fostering long-term competitiveness.

3.3.2 Evolution of Algeria's Monetary Policy Indicators During the Period 1990–2024.

Figure (05): Evolution of Algeria's Monetary Policy Indicators During the Period 1990–2024. (Value in Million US dollars).



source : created by the authors, based on the data of the ONS https://www.ons.dz/ , Bank Of Algeria https://www.bank-of-algeria.dz , Accessed 30/06/2025

Based on the data presented in Figures 05, it was found that during the study period between 1992 and 2024, Algeria's monetary indicators evolved within a framework shaped by successive waves of economic reform, largely driven by both internal structural constraints and external financial pressures. In the early 1990s, the country entered a phase of deep restructuring under the guidance of international financial institutions, adopting market-oriented reforms including exchange rate liberalization, fiscal discipline, and the removal of generalized subsidies. These changes prompted a sharp decline in the value of the national currency, with the exchange rate deteriorating steadily from single to triple digits over the three-decade period.

This shift was accompanied by inflationary volatility, particularly acute during the initial years of transition, with consumer price inflation surpassing 30% in some years. The mismatch between rapid monetary adjustments and a stagnant production base created sustained inflationary pressures. At the same time, real interest rates remained in negative territory for much of the period, discouraging private saving and limiting domestic capital formation, particularly in productive sectors.

In the 2000s, Algeria capitalized on a favorable oil market by launching large-scale public investment programs, which significantly expanded the money supply. However, this monetary growth occurred in a context where structural weaknesses persisted, especially regarding the diversification of economic output. As a result, the liquidity injected into the economy failed to translate into lasting improvements in real sector performance.

The oil price collapse in 2014 triggered a renewed period of macro-financial instability. In response, the Algerian authorities implemented unconventional monetary measures, including direct monetary financing of budget deficits. While these steps helped to temporarily sustain public spending, they also increased inflationary risks and placed additional downward pressure on the national currency. By 2024, despite a growing money supply exceeding 198 billion USD, the country continued to struggle with currency depreciation, inflation acceleration, and insufficient real economic expansion.

Overall, Algeria's monetary trajectory reflects a policy environment where short-term adjustments often took precedence over structural reform. The interplay between exchange rate management, inflation dynamics, interest rate distortions, and uncontrolled liquidity expansion contributed to a fragile macroeconomic equilibrium. Without a robust framework for productive diversification and institutional reform, the effectiveness of monetary policy in promoting competitiveness remained limited.

4. Econometric Analysis.

In light of the foregoing review of the impact of monetary policy instruments on the industrial competitiveness of agri-food sectors in previous studies and following several iterations that incorporated most of the relevant monetary variables the following set of variables has been selected as explanatory factors to estimate the core model for the monetary determinants of industrial competitiveness.

$$COMP_t = f\left(RIR_t, EXR_t, M2_t, INF_t\right) \text{ Where:}$$

$COMP_t$: The dependent variable, representing industrial competitiveness; RIR_t :Real interest rate. EXR_t: Real exchange rate. $M2_t$:Broad money supply; INF_t :Inflation rate.

In this econometric study, the Autoregressive Distributed Lag (ARDL) model is employed to analyze the relationship between the study variables. This approach is particularly suitable due to its flexibility in handling time series that are stationary at level or at first difference. The ARDL methodology involves testing the stationarity of the variables, applying the bounds test to examine long-run cointegration, estimating both short-run and long-run relationships, and finally conducting diagnostic tests to ensure the robustness and validity of the model.

4.1. Testing the Stationarity of the Model Variables:

The stationarity of the study's variables is assessed using both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. The results for all variables are generated simultaneously through the built-in functionality of the EViews 12.0 software (see table N° 05 in Appendix), and are summarized in the following table:

Table (01): Stationarity Levels of the Econometric Study Variables.

Of order I(1)	Of order I(0)
COMP،EXR ،INF ،M2	RIR

Source: Prepared by the researchers based on EViews 12.0 software.

It is evident from the table in appendix No. 2 that the RIR variable is stationary at level (i.e., integrated of order zero) based on the results of both the ADF and PP tests, as the absolute values of the calculated test statistics $\tau_{\hat{\phi}_1}$ exceed the critical values in all three models at the 5% significance level. Moreover, the trend component in the third model is not statistically significant (see table N° 05 in Appendix). For the remaining variables, the absolute values of the calculated statistics $\tau_{\hat{\phi}_1}$ for both the ADF and PP tests are smaller than the critical values $\tau_{tabulè}$ in the three models at the 5% level. Therefore, we accept the hypotheses $\left(H_0 : \lambda = 0\right)$ and $\left(H_0 : \phi_1 = 1\right)$, and the trend component in the third model is also found to be statistically insignificant for all series. This indicates that these series are non-stationary of the DS (difference stationarity) type. However, the calculated test statistics $\tau_{\hat{\phi}_1}$ for the first-differenced series exceed the critical values in all three model at the 5% significance level, indicating that these series are stationary at the first difference, i.e., integrated of order one (I(1)).

4.2. Cointegration Testing (Bounds Test)

At this stage, the existence of a cointegrating relationship among the variables is examined using the Bounds Testing approach, which is based on the Wald test for detecting long-run equilibrium relationships. To conduct this test, the previously specified general model must be

reformulated into an Unrestricted Error Correction Model (UECM), which takes the following form: $\Delta COMP_t = a_0 + \sum_{i=1}^{p} b_i \cdot \Delta COMP_{t-i} + \sum_{i=0}^{p} c_i \cdot \Delta EXR_{t-i} + \sum_{i=0}^{p} d_i \cdot \Delta INF_t + \sum_{i=0}^{p} e_i \cdot \Delta M2_t + \sum_{i=0}^{p} g_i \cdot \Delta RIR_t +$

$\delta_1 \cdot COMP_{t-1} + \delta_2 \cdot EXR_{t-1} + \delta_3 \cdot INF_{t-1} + \delta_4 \cdot M2_{t-1} + \delta_5 \cdot RIR_{t-1} + \varepsilon_t$ .....(01)

The cointegration among the variables in Equation (1) is tested through the following hypotheses:

Null Hypothesis: $H_0 : \delta_1 = \delta_2 = ...\delta_5 = 0$ There is no cointegration among the variables.

Alternative Hypothesis $H_1 : \delta_1 \neq \delta_2 \neq ....\delta_5 \neq 0$ There is cointegration among the variables.

This test follows a non-standard Fisher distribution (F); therefore, the rejection or acceptance of the null hypothesis depends on comparing the calculated F-statistic—which takes the following form (Alaa Abdul-Zahra Hassan & Abdul Latif Hassan Shoman, 2013, p. 179): $F = \frac{(SSER - SSEU)/m}{SSEU/(n-k)}$.....(2) , The term SSEU refers to the sum of squared residuals from the unrestricted model (representing the original or alternative hypothesis), while SSER denotes the sum of squared residuals from the restricted model (reflecting the null hypothesis). Here, k represents the number of parameters in the restricted model, q indicates the number of variables, and n stands for the total number of observations. The calculated F-statistic is then compared against the critical values tabulated by Pesaran et al. (2001) at a given significance level. The table includes two bounds: the Lower Critical Bound, which assumes that the variables are stationary at level I(0), and the Upper Critical Bound, which assumes that the variables are integrated of order one, I(1);and the upper critical bound, which assumes that the variables are integrated of order one (I(1)). If $F_{cal} \rangle F_{upper\ critical}$ In this case, the null hypothesis is rejected, and the alternative hypothesis is accepted, indicating the presence of a cointegrating relationship. However, if: $F_{cal} \langle F_{lower\ critical}$ the null hypothesis is accepted(i.e., no cointegration). However, if it is found that: $F_{lower\ critical} \langle F_{cal} \langle F_{upper\ critical}$,In this case, the result of the test is considered inconclusive and falls within the region of uncertainty. To examine the existence of a long-run equilibrium relationship (i.e., cointegration) between industrial competitiveness and the explanatory variables, the F-statistic was calculated using the bounds testing approach (see Table N° 06 in Appendix), The results are presented in the following table.

Table (02): Results of the Cointegration Test Using the Bounds Testing Approach (Bounds Test) for the UECM–ARDL Model.

Bounds Test for the Existence of Cointegration							
Tabulated Fisher Values)				**Significance Level**	**Degrees of Freedom**	Calculated Fisher Value F_{cal}	Decision
$F^{**}_{critical}$		$F^{*}_{critical}$					
$I(1)$	$I(0)$	$I(1)$	$I(0)$				
6,61	5,14	4, 92	3,81	%1	4	3,67	Acceptance of the Alternative Hypothesis of the Existence of Cointegration
4,66	3,57	3,97	3,05	%5			
3,99	3,05	3,53	2,68	%10			
-It is observed from the figure that the calculated F-values are significantly higher than the upper bound critical values at various significance levels, indicating the rejection of the null hypothesis and the acceptance of the alternative hypothesis. This confirms the existence of a cointegration relationship between the competitiveness of the food industry and the explanatory variables at Level of significance 10%.							
Source of Critical Values: *Critical Fisher Fisher values Pesaran et al. (2001), and **Critical Fisher values Narayan (2005).							

Source: Prepared by the researchers based on EViews 12.0 software.

It is observed from Table (02) above that the calculated F-statistic, amounting to 3.67, falls between the lower and upper bounds of the tabulated Fisher critical values at the 5% significance level, according to the distributions of Pesaran et al. and Narayan. This places the result within the zone of uncertainty. However, the significance and negativity of the error

correction term, as will be demonstrated later, confirm the existence of cointegration thus leading to the acceptance of the alternative hypothesis $H_1 : \delta_1 \neq \delta_2 \neq ....\delta_5 \neq 0$ and rejection of the null hypothesis $H_0 : \delta_1 = \delta_2 = ...\delta_5 = 0$; This indicates the presence of a long-run equilibrium relationship between industrial competitiveness and the explanatory variables, thereby confirming the existence of cointegration among the variables of the research model.

4.3. Estimation of the Model Parameters in the Long and Short Run:

After confirming the existence of a long-run equilibrium relationship between competitiveness and its explanatory variables (i.e., the presence of cointegration among the variables), the third step involves estimating the ARDL model parameters for both the long and short run. However, before adopting this model to estimate the short- and long-term effects, it is necessary to verify the adequacy of its performance by conducting the following diagnostic tests:

1. Normality Test of the Residuals: Jarque-Bera test;
2. Serial Correlation Test for Residuals: Breusch-Godfrey Serial Correlation LM Test,
3. Heteroskedasticity Test: ARCH test;
4. Model Specification Test: Ramsey RESET test, which examines the appropriateness of the model's functional form;
5. Structural Stability Test: CUSUM and CUSUMSQ tests over the entire study period;
6. Predictive Performance Test: Evaluation of the model's forecasting ability;

Given that the ARDL model requires the inclusion of lagged variables as explanatory regressors, the optimal ARDL specification in terms of lag lengths for the included variables is ARDL (3,3,3,4,0). This choice is based on the Schwarz Information Criterion, as shown in (Table N° 10 in Appendix**)**. The results of the long-run parameter estimation for the ARDL model can be directly obtained using the EViews 12 software. These results are summarized in the table below. The chosen model specification includes both a constant and a trend term, as they were found to be statistically significant. Moreover, this model displayed the lowest values for the statistical criteria AIC, SC, and HQ, indicating the best fit.

Table (03): Estimation Results of Long-Run Coefficients of the ARDL Model

Estimation Results of the Long-Run Equation of the ARDL Model as Follows:

$$COMP_t = \sum_{i=1}^{p} a_i \cdot COMP_{t-i} + \sum_{i=0}^{p} b_i \cdot EXR_{t-i} + \sum_{i=0}^{p} c_i \cdot INF_{t-i} + \sum_{i=0}^{p} e_i \cdot M2_{t-i} + \sum_{i=0}^{p} k_i \cdot RIR_{t-i} + \varepsilon_t$$

Dependent Variable: LIMP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR	0.99	0.42	*2.33*	0.01
INF	1.09	0.33	3.28***	0.02
M2	0.42	0.23	1.85*	0.08
RIR	0.09	0.12	0.75	0.46
TREND	-4.59	2.73	-1.68	0.12

Diagnostic tests	JB	LM	ARCH	RESET
statistic	$\chi^2 = 0,77$	$F_{(2,8)} = 1,004$	$F_{(1,26)} = 0,42$	$F_{(4,5)} = 1,93$
probability	670.	410.	520.	240.

Notes**:** * Significant at 10%, ** Significant at 5%, *** Significant at 1%

Source: Prepared by the researchers based on EViews 12.0 software.

It is evident from the table above that all the explanatory variables for industrial competitiveness had positive signs and significant, except for the interest rate. This outcome supports the theoretical expectations and will be further analyzed in the following sections. Based on the estimation results, the Error Correction Term (ECT) equation can be expressed as follows:

$$CoinEq = COMP - (0,99 \cdot EXR + 1,09 \cdot INF + 0,42 \cdot M2 + 0,09 \cdot RIR - 4,59 \cdot @trend) .....(03)$$

As for the estimated short-run coefficients (i.e., the results of the error correction model derived from the ARDL approach), they are as follows:

The estimation results of the short-run equation of the following ARDL model:

$$d(COMP_t) = \sum_{i=1}^{p} a_i \cdot d(COMP_{t-i}) + \sum_{i=0}^{p} b_i \cdot d(EXR_{t-i}) + \sum_{i=0}^{p} c_i \cdot d(INF_{t-i}) + \sum_{i=0}^{p} e_i \cdot d(M2_{t-i}) + \sum_{i=0}^{p} f_i \cdot d(RIR_{t-i}) - \lambda \cdot ECT_{t-1} + \varepsilon_t$$

$$d(COMP_t) = \underset{}{50,59} - \underset{(6,04)^{***}}{0,81} \cdot d(COMP_{t-1}) - \underset{(-5,79)^{***}}{1,3} \cdot d(COMP_{t-2}) - \underset{(-2,3)^{**}}{0,46} \cdot d(EXR) + \underset{(0,87)}{0,18} \cdot d(EXR_{t-1}) + \underset{(4,69)^{***}}{1,53} \cdot d(EXR_{t-2}) - \underset{(-1,74)}{0,33} \cdot d(INF)$$
$$- \underset{(1,09)}{0,16} \cdot d(INF_{t-1}) + \underset{(3,09)^{**}}{0,5} \cdot d(INF_{t-2}) - \underset{(-4,86)^{***}}{4,86} \cdot d(M2_t) - \underset{(-0,1)}{0.01} \cdot d(M2_{t-1}) + \underset{(4,48)^{***}}{0.56} \cdot d(M2_{t-2}) - \underset{(-1,94)^{*}}{0.11} \cdot d(M2_{t-3}) - \underset{(-5,11)^{***}}{0,41} \cdot ECT_{t-1}$$

$R^2 = 0,82 \quad Loglikelihood = -60,08 \quad DW = 2,09 \quad n = 29$

Note: The Indicator d attached to each variable denotes the first-order difference. ECT_{t-1} **:** Error Correction Term $(\hat{\varepsilon}_{t-1})$ (ECT).*,**,*** Statistical significance is indicated at the 10%, 5%, and 1% levels, respectively. The values in parentheses represent the Student's t-statistics. Since the variable ECT_{t-1} is statistically significant and negative , this confirms the existence of a cointegrating relationship among the variables and supports the use of the ARDL model for estimation.

Source: Prepared by the researchers based on EViews 12.0 software.

4.4. Diagnostic Checking and Evaluation of Estimation Results.

In light of the estimation results of the short-run and long-run equations of the ARDL model, it is observed that the coefficient of the error correction term ECT_{t-1} is statistically significant at the 1% level, with the expected negative sign. This result supports the existence of a long-run equilibrium relationship among the variables. The coefficient also reflects the model's speed of adjustment from short-run disequilibrium toward long-run equilibrium. Specifically, the estimated value of the error correction term, which is -0.41, indicates that industrial competitiveness adjusts toward its equilibrium level by correcting approximately 41% of the deviation from the previous period (t–1) in each time period (t). In other words, when industrial competitiveness deviates from its long-run equilibrium value in the short term, 41% of that deviation is corrected in the following period. This implies that the adjustment process takes approximately $\frac{1}{0,41} = 2,44$ years for industrial competitiveness to return to its equilibrium level following a shock in the model resulting from changes in the explanatory variables.

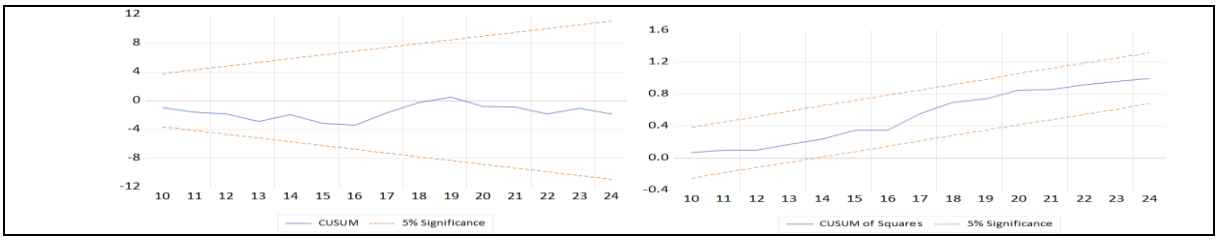
The estimation results also reveal that most of the estimated coefficients are statistically significant at various significance levels, except for the real interest rate variable in the long run, which was found to be statistically insignificant.

Furthermore, the table N° 10 in Appendix shows that the coefficient of determination (R^2) reached 0.82, indicating a good fit of the model and its strong explanatory power, as the independent variables explain over 82% of the variations in industrial competitiveness. Additionally, the Durbin-Watson statistic suggests no evidence of first-order autocorrelation in the residuals.

It is evident from Tables 07, 08, and 09 in the appendices, as well as from Figure 06 in the appendices, that:

1. The Jarque-Bera (JB) test statistic supports the null hypothesis that the residuals are normally distributed.
2. The Breusch-Godfrey test indicates no presence of higher-order serial correlation in the model's residuals.
3. The ARCH test supports the null hypothesis of homoscedasticity, confirming that the variance of the error term remains constant across observations.
4. The RESET test suggests that the functional form of the estimated model is correctly specified.
5. The model also passed the structural stability test over the sample period.

Figure (06): Graphical Representations of the CUSUM and CUSUMSQ Statistics.



Source: Prepared by the researchers based on EViews 12.0 software.

Finally, (Rezzoug & hadjadj, Measuring the impact of currency devaluation on the competitiveness of Algerian food industry exports during the period 2001-2019, 2022, pp. 122-130-131). They found a weak positive correlation, where a 1% devaluation of the dinar led to a 2.35% increase in exports. However, this explained only 25% of export variation, with the remaining 75% attributed to structural factors such as production flexibility and product quality. The study concluded that currency devaluation was more a response to internal and external pressures than a deliberate strategy to boost exports.

Extensive economic literature affirms that instruments of monetary policy—namely interest rates, inflation, and exchange rates—have a substantial influence on competitiveness at both national and sectoral levels. Numerous empirical findings demonstrate that lower interest rates support firm competitiveness by reducing financing costs and facilitating investment, whereas higher rates restrict capital access and hinder performance, particularly in sectors like agriculture and food processing that are highly sensitive to credit conditions (Veronika & Dagmar, 2018; Kozelský et al., 2024). Inflation, meanwhile, exhibits a more complex and dual effect: while it may elevate production costs, it can simultaneously drive revenue growth by enabling firms to increase prices, as observed in both agricultural and industrial contexts. The role of exchange rates is less conclusive; although some studies suggest that currency depreciation can enhance export performance, such effects are often limited by structural weaknesses such as low product quality and insufficient production flexibility (Rezzoug & Hadjadj, 2022). In Algeria's case, research on food industry competitiveness has underscored the positive but insufficient impact of government support and macroeconomic factors (Boukarana et al., 2013; Yalouli & Bouguerra, 2022), while highlighting the need for targeted reforms.

effect of the current (two-period lagged) real exchange rate on industrial competitiveness in the short run, with an estimated impact of –0.46 (1.52). This suggests that a one-unit increase in the current (or lagged with two years) real exchange rate leads to a decline (improvement) in competitiveness by –0.46 (1.52) units. In the long run, the relationship becomes significantly positive with an impact of 0.99. This indicates that exchange rate adjustments—particularly real depreciation—may enhance the competitiveness of domestic food industries. This finding is consistent with the conventional economic theory which posits that a depreciation in the local currency boosts the relative price advantage of domestic goods, thus improving their positioning in international markets. In Algeria, the overvaluation of the dinar for many years may have hindered export performance, and recent exchange rate corrections could explain the positive long-term gains observed in competitiveness.

Inflation Rate (INF): The analysis indicates a statistically significant positive in short-run impact of Two-year lagged inflation on industrial competitiveness, with coefficient of 0.49 . In the long term, the effect Is also significantly positive, with a magnitude of 1.09. This suggests that a moderate increase in inflation can support competitiveness by improving relative export prices, particularly in a context of fixed production costs or price rigidity. These results are aligned with the structuralist and Keynesian perspectives, which suggest that moderate inflation can stimulate economic activity and correct real exchange rate misalignments. In Algeria's case, where production costs are often rigid and exchange rate interventions are common, a mild

inflationary environment may have contributed to improved cost-competitiveness of industrial products over time.

Money Supply (M2): The results show a statistically significant negative (positive) for current and three-year lagged (two-year lagged) money supply on industrial competitiveness in short-run , the size of the impact reached -0.46, -0.11 (0.56) respectively. and a positive and significant between money supply and industrial competitiveness in long-run relationship , with impacts of 0.42 . These findings suggest that increasing the money supply eventually leads to an improvement in competitiveness. This is in line with Keynesian theory, which emphasizes the role of monetary expansion in stimulating investment and production, particularly in productive sectors such as the food industry. In the Algerian context, where access to credit has historically been constrained, expansions in money supply—when channeled effectively—may have supported industrial upgrading and export-oriented production, thereby enhancing competitiveness.

Real Interest Rate (RIR): The relationship between the real interest rate and industrial competitiveness is found statistically insignificant in both the short and long run . This implies that changes in the real interest rate have not had a meaningful impact on competitiveness during the study period. One possible explanation lies in the underdeveloped nature of Algeria's financial sector and the weak transmission mechanism of monetary policy, especially in the industrial sector. Additionally, industrial investments, particularly in the food processing sector, may not be highly sensitive to interest rate fluctuations due to structural and institutional constraints, such as limited financial deepening, regulatory bottlenecks, and dominance of public enterprises.

Time Trend (TREND): The trend variable, which captures the evolution of industrial competitiveness over time, is negative but statistically is insignificant (–4.59). This result reflects a persistent downward trend in the competitiveness of the food industry, despite holding other variables constant. It likely reflects structural weaknesses in the sector, such as outdated production technologies, lack of innovation, and limited integration into global value chains. This decline signals the need for comprehensive industrial policy reforms and long-term strategies to strengthen the sector's productivity and market positioning.

Collectively, these findings underscore the crucial role of monetary policy in shaping the competitiveness of Algeria's food industry. They highlight the need for a coherent macroeconomic policy framework that supports sustainable competitiveness, both in the short and long term. Tailored monetary strategies, coupled with structural reforms, could help unlock the full potential of Algeria's industrial base in global markets.

6.Conclusion

The econometric results obtained using the ARDL model reveal a differentiated impact of monetary policy instruments on the international competitiveness of Algeria's food industry over the period 1992–2024. Specifically, the real exchange rate, inflation rate, and money supply (M2) exhibit statistically significant effects in both the short and long run, while the real interest rate shows a weak and statistically insignificant relationship. In the long run, the estimated coefficients indicate that inflation has the strongest effect on competitiveness (1.09), followed by the real exchange rate (0.99) and money supply (0.42), reflecting the relative importance of price-related and liquidity-related channels in shaping international competitiveness.

The positive and significant coefficient of the **real exchange rate (0.99)** underscores its central role in international competition by influencing the relative prices of Algerian food exports vis-à-vis foreign competitors. A depreciation of the domestic currency enhances price competitiveness in global markets, particularly in food products where competition is largely price-driven. However, this effect remains largely contingent on the structural characteristics of the Algerian food industry, which is marked by limited diversification and weak non-price competitiveness. Consequently, improvements in competitiveness driven by exchange rate

movements tend to reflect temporary price advantages rather than sustained gains in productivity or product differentiation.

Inflation emerges as the **most influential determinant of international competitiveness**, with a long-run coefficient of **1.09**, a result that requires interpretation beyond conventional theoretical expectations. In the Algerian context, inflation is largely structural and partly imported, operating within an institutional environment characterized by administered prices, subsidies, and limited domestic competition. Under these conditions, moderate inflation does not necessarily undermine international competitiveness. Instead, it may improve export performance by increasing nominal export values and reinforcing price-based competitiveness, particularly in essential goods sectors such as food processing. Moreover, the relatively high degree of price pass-through allows exporting firms to adjust export prices more rapidly than production costs, thereby mitigating the adverse impact of inflation on profit margins. As a result, the observed positive relationship between inflation and competitiveness reflects a context-specific interaction between inflation dynamics, exchange rate adjustments, and cost structures, rather than a general inflation-led competitiveness mechanism.

The **positive but smaller coefficient of money supply (0.42)** indicates that monetary expansion contributes to international competitiveness primarily through indirect channels. Increased liquidity can ease financing constraints, facilitate working capital requirements, and support export activities in an environment where access to private credit remains limited. Nevertheless, the relatively modest magnitude of this effect suggests that a substantial share of monetary expansion is absorbed by non-productive uses or domestic markets, rather than being channeled toward export-oriented productive investment. This finding highlights the limited efficiency of monetary transmission mechanisms in enhancing international competitiveness in the absence of complementary structural reforms.

In contrast, the **real interest rate displays a weak and statistically insignificant effect**, confirming the limited role of this instrument in shaping international competitiveness in Algeria. This outcome reflects structural features of the Algerian economy, including the dominance of public financing, underdeveloped financial markets, and the reliance of firms on non-market-based funding mechanisms. Within the context of international competition, investment and export decisions in the food industry are more strongly influenced by exchange rate policy, cost structures, state support, and access to subsidized inputs than by conventional borrowing costs. The insignificance of the real interest rate thus underscores the weakness of the interest rate channel in Algeria's monetary policy transmission process.

Overall, the results indicate that the international competitiveness of Algeria's food industry is primarily driven by **macroeconomic price-related factors**, particularly inflation and exchange rate dynamics, while liquidity conditions play a secondary role and traditional interest rate instruments remain largely ineffective. This pattern reflects the nature of international competition faced by Algerian food exports, where price-based competitiveness dominates in the absence of strong non-price advantages such as innovation, quality upgrading, and product differentiation. These findings highlight the importance of interpreting monetary policy effects on competitiveness through a context-specific lens that accounts for the institutional and structural characteristics of the Algerian economy.

The findings of this study indicate that enhancing the international competitiveness of Algeria's food industry requires an integrated monetary and structural approach. In this regard, greater exchange rate flexibility is recommended to preserve export price competitiveness without generating excessive inflationary pressures. At the same time, inflation should be maintained within moderate levels that ensure price stability and support long-term competitiveness, alongside improved coordination between monetary and fiscal policies.

The results also highlight the need to redirect monetary expansion toward export-oriented productive investment, rather than allowing liquidity to be absorbed by non-productive activities. In contrast, the limited impact of the real interest rate reflects weak monetary

transmission mechanisms, suggesting a greater emphasis on alternative instruments such as targeted credit policies and improved access to finance. Finally, sustaining international competitiveness requires strengthening non-price factors through quality upgrading, innovation, and improved logistical infrastructure within a coherent institutional policy framework.

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Appendices.

Appendix No. 1: Evolution of the Average Competitiveness Indicators of the Algerian Food Industries during the Period 1992–2024.

PERIOD	Average TC	Average (GMS)	Average (IIT)	Average N.E.I	Average Balasa
1992	5,527050	0,000325	0,087616	-0,699569	0,007001
1993	11,466591	0,000401	0,045867	-0,582652	0,008637
1994	0,781097	0,000103	0,100519	-0,687381	0,002210
1995	0,222009	0,000250	0,176451	-0,786985	0,005388
1996	0,512867	0,000306	0,160600	-0,705280	0,006594
1997	0,208752	0,000078	0,152149	-0,806697	0,001674
1998	0,374235	0,000067	0,171442	-0,828558	0,001446
1999	2,858465	0,000054	0,191049	-0,808951	0,001173
2000	2,092181	0,000067	0,258461	-0,741539	0,001446
2001	0,184160	0,000061	0,158836	-0,809921	0,001314
2002	0,115056	0,000085	0,154977	-0,845023	0,001992
2003	0,091255	0,000088	0,142380	-0,857620	0,001834

2004	0,141200	0,000101	0,135296	-0,841786	0,001863
2005	0,110072	0,000114	0,167053	-0,832947	0,001595
2006	0,098200	0,000116	0,153293	-0,846707	0,001512
2007	0,132638	0,000109	0,181372	-0,818628	0,001571
2008	0,142989	0,000124	0,178156	-0,816106	0,001661
2009	0,115397	0,000125	0,158834	-0,809923	0,002644
2010	0,111065	0,000355	0,125844	-0,864037	0,006660
2011	0,063188	0,000333	0,097494	-0,902506	0,005922
2012	0,057656	0,000293	0,094364	-0,905636	0,005427
2013	0,057694	0,000381	0,095262	-0,904738	0,008105
2014	0,041228	0,000332	0,072329	-0,927671	0,007926
2015	0,042076	0,000267	0,075519	-0,924481	0,009965
2016	0,044192	0,000351	0,078252	-0,921748	0,015434
2017	0,058696	0,000334	0,099756	-0,900244	0,013520
2018	0,161286	0,000370	0,207890	-0,792110	0,012752
2019	0,141779	0,000436	0,203544	-0,796456	0,017473
2020	0,138045	0,000457	0,188700	-0,811300	0,030848
2021	0,178686	0,000475	0,232804	-0,767196	0,021867
2022	0,190015	0,000287	0,218458	-0,767266	0,008536
2023	0,264586	0,000291	0,184369	-0,758634	0,010038
2024	0,273350	0,000088	0,129019	-0,809657	0,003750

source : created by the authors, based on the data of the ONS https://www.ons.dz/ and the UN Comtrade Database, https://comtradeplus.un.org/ .

Appendix No. 2: UNIT ROOT TEST TABLE (PP) and (ADF).

UNIT ROOT TEST TABLE (PP)

		COMP	EXR	INF	M2	RIR
At Level						
With Cons...	t-Statistic	-1.9581	-1.0440	-6.3165	0.4129	-5.1097
	Prob.	*0.3029*	*0.7252*	*0.0000*	*0.9804*	*0.0002*
		n0	n0	***	n0	***
With Cons...	t-Statistic	-2.4087	-1.8165	-3.9887	-2.1543	-6.7624
	Prob.	*0.3684*	*0.6731*	*0.0194*	*0.4975*	*0.0000*
		n0	n0	**	n0	***
Without C...	t-Statistic	-1.3870	2.1789	-3.5618	2.1666	-4.7794
	Prob.	*0.1505*	*0.9915*	*0.0008*	*0.9912*	*0.0000*
		n0	n0	***	n0	***
At First Difference		d(COMP)	d(EXR)	d(INF)	d(M2)	d(RIR)
With Cons...	t-Statistic	-5.2146	-3.8838	-5.8419	-4.2169	-16.0133
	Prob.	*0.0002*	*0.0058*	*0.0000*	*0.0025*	*0.0000*
		***	***	***	***	***
With Cons...	t-Statistic	-5.1033	-3.8594	-6.5282	-4.3210	-15.7304
	Prob.	*0.0014*	*0.0264*	*0.0000*	*0.0092*	*0.0000*
		***	**	***	***	***
Without C...	t-Statistic	-5.3195	-3.0181	-5.7701	-3.6145	-13.3513
	Prob.	*0.0000*	*0.0038*	*0.0000*	*0.0007*	*0.0000*
		***	***	***	***	***

UNIT ROOT TEST TABLE (ADF)

		COMP	EXR	INF	M2	RIR
At Level						
With Cons...	t-Statistic	-1.8860	-1.0294	-3.2496	0.5267	-4.7996
	Prob.	*0.3344*	*0.7306*	*0.0261*	*0.9851*	*0.0005*
		n0	n0	**	n0	***
With Cons...	t-Statistic	-2.3011	-4.5219	-2.0024	-2.0302	-4.8873
	Prob.	*0.4214*	*0.0072*	*0.5772*	*0.5632*	*0.0022*
		n0	***	n0	n0	***
Without C...	t-Statistic	-1.3870	2.7288	-3.1731	2.5498	-4.7783
	Prob.	*0.1505*	*0.9977*	*0.0025*	*0.9965*	*0.0000*
		n0	n0	***	n0	***
At First Difference		d(COMP)	d(EXR)	d(INF)	d(M2)	d(RIR)
With Cons...	t-Statistic	-5.2354	-3.8328	-3.8853	-4.2894	-6.4556
	Prob.	*0.0002*	*0.0066*	*0.0064*	*0.0021*	*0.0000*
		***	***	***	***	***
With Cons...	t-Statistic	-5.1377	-3.8049	-2.9913	-4.3777	-6.4370
	Prob.	*0.0012*	*0.0298*	*0.0926*	*0.0080*	*0.0000*
		***	**	*	***	***
Without C...	t-Statistic	-5.3273	-3.1136	-2.6151	-3.5917	-6.5325
	Prob.	*0.0000*	*0.0029*	*0.0109*	*0.0008*	*0.0000*
		***	***	**	***	***

Notes: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1%. and (no) Not Significant
*MacKinnon (1996) one-sided p-values.

Appendix No. 3: ARDL LONG Run Form and Bounds Test.

LONG Run modele

ARDL Long Run Form and Bounds Test
Dependent Variable: D(COMP)
Selected Model: ARDL(3, 3, 3, 4, 0)
Case 4: Unrestricted Constant and Restricted Trend
Date: 01/01/80 Time: 00:09
Sample: 1992 2024
Included observations: 29

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	45.19356	13.38887	3.375458	0.0071
@TREND	5.404838	1.705761	3.168578	0.0100
COMP(-1)*	-0.411765	0.173437	-2.374153	0.0267
EXR(-1)	-1.175830	0.299405	-3.927222	0.0028
INF(-1)	-1.288026	0.469560	-2.743048	0.0207
M2(-1)	-0.495973	0.169485	-2.926359	0.0151
RIR**	-0.110225	0.147024	-0.749709	0.4707
D(COMP(-1))	-0.813280	0.423489	-1.920427	0.0837
D(COMP(-2))	-1.300141	0.393398	-3.304900	0.0079
D(EXR)	-0.461728	0.292825	-1.576802	0.1459
D(EXR(-1))	0.181782	0.308652	0.588954	0.5690
D(EXR(-2))	1.527513	0.540617	2.825497	0.0180
D(INF)	-0.329577	0.342354	-0.962680	0.3584
D(INF(-1))	0.165192	0.264028	0.625660	0.5456
D(INF(-2))	0.499729	0.257672	1.939397	0.0812
D(M2)	-0.465127	0.161423	-2.881423	0.0163
D(M2(-1))	-0.010160	0.163099	-0.062290	0.9516
D(M2(-2))	0.561591	0.215487	2.606141	0.0262
D(M2(-3))	-0.114527	0.081043	-1.413165	0.1880

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 4: Unrestricted Constant and Restricted Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR	0.999711	0.429027	2.330184	0.0420
INF	1.095102	0.333339	3.285252	0.0082
M2	0.421685	0.224808	1.875756	0.0889
RIR	0.093716	0.124468	0.752927	0.4688
@TREND	-4.595287	2.729725	-1.683425	0.1232

EC = COMP - (0.9997*EXR + 1.0951*INF + 0.4217*M2 + 0.0937*RIR -4.5953 *@TREND)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	3.675359	10%	2.68	3.53
k	4	5%	3.05	3.97
		2.5%	3.4	4.36
		1%	3.81	4.92
Actual Sample Size	29	Finite Sample: n=35		
		10%	3.035	3.997
		5%	3.578	4.668
		1%	5.147	6.617
		Finite Sample: n=30		
		10%	3.097	4.118
		5%	3.715	4.878
		1%	5.205	6.64

ARDL Error Correction modele

ARDL Error Correction Regression
Dependent Variable: D(COMP)
Selected Model: ARDL(3, 3, 3, 4, 0)
Case 4: Unrestricted Constant and Restricted Trend
Date: 01/01/80 Time: 00:10
Sample: 1992 2024
Included observations: 29

ECM Regression
Case 4: Unrestricted Constant and Restricted Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	50.59840	8.366673	6.047613	0.0001
D(COMP(-1))	-0.813280	0.214405	-3.793192	0.0035
D(COMP(-2))	-1.300141	0.224429	-5.793116	0.0002
D(EXR)	-0.461728	0.200084	-2.307668	0.0437
D(EXR(-1))	0.181782	0.208368	0.872408	0.4034
D(EXR(-2))	1.527513	0.325213	4.696957	0.0008
D(INF)	-0.329577	0.189178	-1.742150	0.1121
D(INF(-1))	0.165192	0.151296	1.091849	0.3005
D(INF(-2))	0.499729	0.161721	3.090072	0.0114
D(M2)	-0.465127	0.095705	-4.860014	0.0007
D(M2(-1))	-0.010160	0.100270	-0.101322	0.9213
D(M2(-2))	0.561591	0.125402	4.478328	0.0012
D(M2(-3))	-0.114527	0.058901	-1.944391	0.0805
CointEq(-1)*	-0.411765	0.080484	-5.116140	0.0000

R-squared	0.818934	Mean dependent var	-0.056483
Adjusted R-squared	0.662009	S.D. dependent var	4.594727
S.E. of regression	2.671235	Akaike info criterion	5.109230
Sum squared resid	107.0324	Schwarz criterion	5.769304
Log likelihood	-60.08384	Hannan-Quinn criter.	5.315957
F-statistic	5.218654	Durbin-Watson stat	2.090531
Prob(F-statistic)	0.001617		

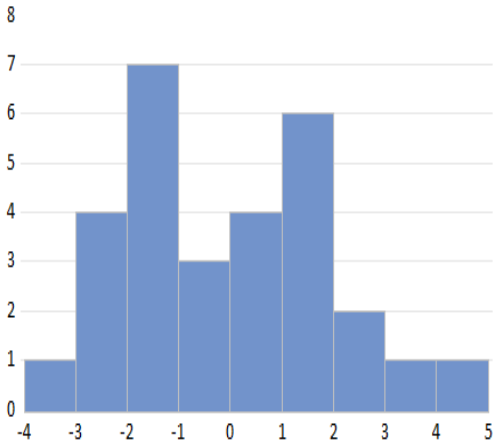
* p-value incompatible with t-Bounds distribution.

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	3.675359	10%	2.68	3.53
k	4	5%	3.05	3.97
		2.5%	3.4	4.36
		1%	3.81	4.92

Appendix No. 4: Results of the Diagnostic Tests:

Jarque-Bera (JB) Test



Series: Residuals	
Sample 1996 2024	
Observations 29	
Mean	1.59e-1
Median	-0.1941
Maximum	4.94488
Minimum	-3.5890
Std. Dev.	1.95514
Skewness	0.39353
Kurtosis	2.84349
Jarque-Bera	0.77812
Probability	0.67769

ARCH Test

Heteroskedasticity Test: ARCH

F-statistic	0.417427	Prob. F(1,26)	0.5239
Obs*R-squared	0.442434	Prob. Chi-Square(1)	0.5060

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 01/01/80 Time: 00:09
Sample (adjusted): 1997 2024
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.125564	1.232064	3.348497	0.0025
RESID^2(-1)	-0.125885	0.194842	-0.646086	0.5239

R-squared	0.015801	Mean dependent var	3.652980
Adjusted R-squared	-0.022053	S.D. dependent var	5.189304
S.E. of regression	5.246211	Akaike info criterion	6.221638
Sum squared resid	715.5909	Schwarz criterion	6.316796
Log likelihood	-85.10294	Hannan-Quinn criter.	6.250729
F-statistic	0.417427	Durbin-Watson stat	2.030313
Prob(F-statistic)	0.523886		

Breusch-Godfrey Serial Correlation LM Test:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	1.004876	Prob. F(2,8)	0.4080
Obs*R-squared	5.822604	Prob. Chi-Square(2)	0.0544

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 01/01/80 Time: 00:07
Sample: 1996 2024
Included observations: 29
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COMP(-1)	0.323089	0.408488	0.790940	0.4518
COMP(-2)	-0.170595	0.313847	-0.543560	0.6016
COMP(-3)	0.190885	0.420858	0.453561	0.6622
EXR	-0.113996	0.317168	-0.359419	0.7286
EXR(-1)	0.068360	0.454955	0.150257	0.8843
EXR(-2)	0.113342	0.621742	0.182297	0.8599
EXR(-3)	-0.117487	0.547899	-0.214432	0.8356
INF	-0.086108	0.352493	-0.244284	0.8132
INF(-1)	-0.081041	0.394144	-0.205611	0.8422
INF(-2)	0.005025	0.313998	0.016002	0.9876
INF(-3)	-0.072426	0.264368	-0.273959	0.7911
M2	-0.039061	0.166720	-0.234290	0.8206
M2(-1)	0.074609	0.210818	0.353902	0.7326
M2(-2)	0.045589	0.241794	0.188544	0.8551
M2(-3)	-0.091190	0.243413	-0.374630	0.7177
M2(-4)	0.028146	0.086067	0.327018	0.7520
RIR	-0.029238	0.149471	-0.195610	0.8498
C	5.323240	13.90338	0.382874	0.7118
@TREND	-0.216909	1.861393	-0.116530	0.9101
RESID(-1)	-0.534746	0.495980	-1.078161	0.3124
RESID(-2)	0.120161	0.488881	0.245787	0.8120

R-squared	0.200779	Mean dependent var	1.59E-14
Adjusted R-squared	-1.797272	S.D. dependent var	1.955144
S.E. of regression	3.269987	Akaike info criterion	5.367871
Sum squared resid	85.54253	Schwarz criterion	6.357982
Log likelihood	-56.83413	Hannan-Quinn criter.	5.677961
F-statistic	0.100488	Durbin-Watson stat	1.983572
Prob(F-statistic)	0.999983		

Ramsey RESET Test

Ramsey RESET Test
Equation: UNTITLED
Omitted Variables: Powers of fitted values from 2 to 5
Specification: COMP COMP(-1) COMP(-2) COMP(-3) EXR EXR(-1) EXR(-2) EXR(-3) INF INF(-1) INF(-2) INF(-3) M2 M2(-1) M2(-2) M2(-3) RIR RIR(-1) RIR(-2) RIR(-3) C @TREND

	Value	df	Probability
F-statistic	1.936474	(4, 5)	0.2428
Likelihood ratio	28.07315	4	0.0000

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	122.7371	4	30.68426
Restricted SSR	201.9642	9	22.44047
Unrestricted SSR	79.22713	5	15.84543

LR test summary:

	Value
Restricted LogL	-71.17155
Unrestricted LogL	-57.13498

Unrestricted Test Equation:
Dependent Variable: COMP
Method: Least Squares
Date: 01/01/80 Time: 00:14
Sample: 1995 2024
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COMP(-1)	-1.605772	2.848225	-0.563780	0.5973
COMP(-2)	0.340543	0.822737	0.413914	0.6961
COMP(-3)	-0.848983	2.643165	-0.321200	0.7611
EXR	0.434702	0.646073	0.672837	0.5309
EXR(-1)	-0.120162	2.103923	-0.057113	0.9567
EXR(-2)	-0.240094	2.512209	-0.095571	0.9276
EXR(-3)	0.548692	2.536160	0.216348	0.8373
INF	-0.295561	0.662446	-0.446166	0.6741
INF(-1)	0.560010	1.418923	0.394673	0.7094
INF(-2)	0.149112	0.402914	0.370085	0.7265
INF(-3)	0.225841	0.675167	0.334496	0.7516
M2	0.552339	1.132959	0.487519	0.6465
M2(-1)	-0.285148	0.664051	-0.429407	0.6855
M2(-2)	-0.034008	1.315128	-0.025859	0.9804
M2(-3)	0.155523	0.820826	0.189471	0.8572
RIR	0.054445	0.260838	0.208730	0.8429
RIR(-1)	-0.014423	0.199188	-0.072411	0.9451
RIR(-2)	0.118863	0.320412	0.370969	0.7259
RIR(-3)	0.116530	0.165363	0.704691	0.5125
C	-20.98698	86.42398	-0.242837	0.8178
@TREND	-3.471921	13.07697	-0.265499	0.8012
FITTED^2	-0.376867	1.346683	-0.279848	0.7908
FITTED^3	0.132118	0.183345	0.720596	0.5034
FITTED^4	-0.009654	0.010176	-0.948627	0.3864
FITTED^5	0.000208	0.000193	1.079171	0.3298

R-squared	0.945599	Mean dependent var	7.064289
Adjusted R-squared	0.684477	S.D. dependent var	7.086576
S.E. of regression	3.980631	Akaike info criterion	5.475665
Sum squared resid	79.22713	Schwarz criterion	6.643330
Log likelihood	-57.13498	Hannan-Quinn criter.	5.849211
F-statistic	3.621286	Durbin-Watson stat	1.488806
Prob(F-statistic)	0.078337		