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The Impact of the Inflation Rate on the Algerian Dinar–US Dollar Exchange Rate in Algeria: An Empirical ARDL Study over the Period 1986–2023

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Abstract:
This study aims to measure the impact of the inflation rate on the exchange rate of the Algerian dinar against the US dollar over the period 1986–2023, using annual data from the World Bank's World Development Indicators. An autoregressive distributed lag (ARDL) model and the bounds testing approach to cointegration are employed after verifying that both the exchange rate and inflation variables are integrated of order one, I(1).The results indicate the existence of a longrun equilibrium relationship between the two variables, whereby a 1% increase in inflation leads to a depreciation of the dinar by approximately 0.79%. The run equilibrium relationship between the two variables, whereby a 1% increase in inflation leads to a depreciation of the dinar by approximately 0.79%. The errorcorrection model shows that the speed at which the exchange rate adjusts back to its correction model shows that the speed at which the exchange rate adjusts back to its longrun equilibrium is relatively lowrun equilibrium is relatively low, reflecting the role of monetary policy and the prevailing exchange rate regime. The study concludes that controlling inflation is a key prerequisite for achieving greater exchange rate stability in Algeria.

Keywords: exchange rate, inflation, Algerian dinar, ARDL model, error - correction model, cointegration.
JEL Classification: E31 ،F41

1. Introduction:

The exchange rate constitutes a fundamental linkage between the national economy and the global economy. It reflects the "price" of the domestic currency in terms of foreign currencies and, at the same time, embodies the degree of competitiveness of the economy and its ability to withstand external shocks. In the case of Algeria, where hydrocarbon revenues denominated in US dollars represent the primary source of foreign exchange, the path of the Algerian dinar–US dollar exchange rate becomes a central indicator of the state of the macroeconomy and the effectiveness of the economic policies pursued.

Inflation, in turn, is among the most sensitive economic phenomena in terms of its direct repercussions on the purchasing power of households, the distribution of income and wealth, and savings and investment decisions. Persistently high inflation erodes the real value of wages and savings, distorts the incentive structure for longterm investment, and pushes individuals and firms to seek alternative stores of value in foreign currencies or real assets. This, in turn, reshapes the demand for foreign exchange and thus affects the exchange rate.

From the mid1980s (1986) to 2023, the Algerian economy has undergone deep transformations: a sharp collapse in oil prices in 1986 and the subsequent debt and recession crisis the implementation of structural adjustment programs in the 1990s, accompanied by a gradual liberalization of the exchange rate and the opening of the economy to trade and foreign investment a period of financial abundance in the 2000s fueled by high oil prices and finally the oil price shock after 2014 and the economic fallout of the COVID19 pandemic. During this period, inflation followed a volatile path, oscillating between episodes of relative overshooting and others of relative stability, while the dinar's exchange rate displayed a broadly 19 pandemic. During this period, inflation followed a volatile path, oscillating between episodes of relative overshooting and others of relative stability, while the dinar's exchange rate displayed a broadly onedirectional trend of depreciation against the dollar, albeit with phases of relative stability or slow correction.

These developments raise legitimate questions regarding the nature of the relationship between inflation and the exchange rate in Algeria: to what extent does domestic inflation explain the depreciation of the dinar? Does the exchange rate path reflect price differentials between the domestic and foreign economies as suggested by purchasing power parity (PPP)? Or do other factors – such as oil prices and changes in the balance of payments – play a greater role in shaping that relationship?

Accordingly, the main research question of this study is:

- What is the impact of the inflation rate on the Algerian dinar–US dollar exchange rate in Algeria over the period 1986–2023? And does a longrun equilibrium relationship exist between the two variables that can be characterized econometrically using an ARDL model?

This main question can be broken down into the following sub-questions:

* What are the main theoretical frameworks that explain the relationship between inflation and the exchange rate in an open economy, particularly in oil exporting, exporting, resource dependent economies dependent economies?
* What are the time-series properties of exchange rate and inflation series in Algeria over the study period in terms of stationarity and series properties of exchange rate and inflation series in Algeria over the study period in terms of stationarity and nonstationarity?
* Is there statistical evidence of a cointegrating relationship between the two variables that reflects a longrun equilibrium pathrun equilibrium path?
* What is the nature of the effect (direction and magnitude) that inflation exerts on the exchange rate in the short and long run, and what does the speed of adjustment imply?

The study seeks to achieve the following objectives:

1. To analyze the relationship between inflation and the Algerian dinar–US dollar exchange rate in light of classical and contemporary theories of open-economy macroeconomics
2. To construct an ARDLtype econometric model to measure the impact of inflation on the exchange rate in the short and long run, and to test for the existence of cointegration between the two variables
3. To relate the empirical results to the trajectory of the Algerian economy and to the transformations that have affected the foreign exchange market and monetary policy over 1986–2023
4. To provide practical recommendations for policymakers on how to use inflation control as an instrument for exchange rate stabilization, while highlighting the limitations of the model used and avenues for future research.

The importance of this study stems from:

- A temporal perspective: it covers a relatively long period, allowing the impact of major shocks (oil price collapses, reform programs, global crises) on the inflation–exchange rate nexus to be observed
- A methodological perspective: it relies on the ARDL–bounds testing framework, which is suitable for medium sized samples and variables integrated of orders I(0) and I(1), while allowing a distinction between sized samples and variables integrated of orders I(0) and I(1), while allowing a distinction between shortrun dynamics and run dynamics and longrun relationships
- An applied perspective: the results contribute to the policy debate on the causes of the dinar’s depreciation and on the effectiveness of monetary and fiscal policies in containing inflation and stabilizing the exchange rate.

The study adopts a dual approach: a descriptiveanalyticalanalytical approach to set out the theoretical framework and briefly review relevant empirical studies, and an econometric approach in the applied part through the construction of an ARDL model and application of the bounds test for cointegration, using EViews software and World Bank data.

2. Theoretical Framework and Brief Literature Review

2.1. Exchange Rate: Concept and Role in Macroeconomics

The exchange rate is defined as the number of units of one currency that must be paid to obtain one unit of another currency. In this study, the nominal exchange rate of the Algerian dinar against the US dollar represents the number of dinars per US dollar. An increase in this number indicates a depreciation of the dinar, whereas a decrease signals an appreciation of its external value.

The literature distinguishes between:

- Nominal exchange rate: the rate observed in the foreign exchange market without adjustment for inflation
- Real exchange rate: the nominal rate adjusted for relative price levels between domestic and foreign economies, used for assessing international competitiveness
- Effective exchange rate (nominal and real): a trade weighted average of the bilateral exchange rate against a basket of currencies, reflecting the importance of each trading partner.

Exchange rate regimes range from fixed pegs to other currencies or baskets, to free floating, to managed floating. Historically, Algeria moved from a quasifixed system in the 1980s to a regime closer to managed float from the 1990s onward, with active intervention by the Bank of Algeria in guiding the official exchange rate in light offixed system in the 1980s to a regime closer to managed float from the 1990s onward, with active intervention by the Bank of Algeria in guiding the official exchange rate in light of developments in reserves and the balance of payments.

Maintaining a relatively stable exchange rate, within reasonable bounds, contributes to:

- Reducing the risks associated with external trade
- Improving the investment climate, particularly for foreign direct investment
- Curbing currency substitution (“dollarization”) and supporting the role of the domestic currency
- Enhancing the credibility of monetary policy in targeting inflation.

2.2. Inflation: Concept, Measurement, and Algerian Specificities

Inflation is defined as a sustained increase in the general price level, rather than a temporary rise in the prices of specific goods. It is commonly measured by the Consumer Price Index (CPI) or the Wholesale Price Index, with the annual inflation rate derived as the percentage change in the index between two consecutive years.

The sources of inflation are manifold and include:

1. Demandpull inflation: when aggregate demand exceeds the productive capacity of the economy

2. Costpush inflation: due to rising wages, higher prices of raw materials and energy, and other cost factors

3. Structural inflation: stemming from structural imbalances such as weak domestic supply, market power and monopolies, and distribution bottlenecks.

In Algeria, inflation is influenced by:

- Volatility in oil prices and its impact on public expenditure
- The structure of foreign trade and the economy's reliance on imports of consumer and intermediate goods
- Subsidy schemes and administered pricing
- Monetary policy decisions, including episodes of direct monetary financing of fiscal deficits
- Political and social conditions that shape expectations of economic agents.

These factors render inflation in Algeria a phenomenon with intertwined monetary, fiscal, and structural dimensions.

2.3. Theories Explaining the Inflation–Exchange Rate Relationship

2.3.1. Purchasing Power Parity (PPP)

The PPP doctrine posits that the exchange rate between two currencies should reflect the ratio of price levels between the two countries. In its relative form, PPP can be presented as:

$$\Delta \ln Et \approx \pi d,t - \pi_{f,}t$$

where Et is the nominal exchange rate, $\pi d,t$is the domestic inflation rate, and $\pi_{f,}t$ is the foreign inflation rate. This formulation suggests that changes in the exchange rate over the long run approximately mirror inflation differentials between the economies.

Numerous studies (e.g. Rogoff, 1996 Taylor & Taylor, 2004) indicate that PPP does not hold exactly in the short run, but tends to hold approximately in the long run, once factors such as transportation costs, tariffs, and trade barriers are accounted for.

In this study, we focus on domestic inflation in Algeria as a key determinant of the dinar's exchange rate, under the simplifying assumption that US inflation is relatively more stable and less volatile than Algerian inflation over the long run. This assumption allows foreign inflation to be approximated as constant and absorbed into the intercept, but it remains a simplification and is explicitly acknowledged as a limitation.

2.3.2. The Monetary Approach to Exchange Rate Determination

According to the monetary approach (Frenkel, 1976), the exchange rate is determined by the equilibrium conditions of the money markets in the domestic and foreign economies. When money supply in a country grows faster than real output, domestic price pressures emerge. Under a regime of capital mobility and asset substitutability, part of this monetary disequilibrium is reflected in a depreciation of the domestic currency. Inflation, in this perspective, is essentially the visible manifestation of an underlying monetary imbalance, and the exchange rate acts as a mirror reflecting that imbalance.

2.3.3. Open Economy Macroeconomic Models: Mundell–Fleming and Dornbusch's Overshooting Model

The Mundell–Fleming model shows that expansionary monetary policy under a flexible exchange rate regime leads to a fall in domestic interest rates, capital outflows, and a depreciation of the domestic currency, which in turn feeds into domestic inflation via higher import prices. Dornbusch's (1976) overshooting model further emphasizes that asset markets (including foreign exchange markets) adjust faster than goods markets, causing the exchange rate to overshoot its new longrun equilibrium level in response to monetary shocks before gradually converging.

2.3.4. Summary and Channels of Mutual Influence

The main channels through which inflation affects the exchange rate can be summarized as:

- Competitiveness channel: higher domestic prices weaken export competitiveness and increase import dependence
- Interest rate and portfolio allocation channel: if nominal interest rates do not keep pace with inflation, real interest rates fall, encouraging shifts from domestic assets to foreign currencies as stores of value
- Expectations channel: expectations of high inflation prompt economic agents to hedge by holding foreign currency, which exerts downward pressure on the domestic currency.

Conversely, the exchange rate can affect inflation through imported inflation and expectations. However, the present study focuses on the single direction running from domestic inflation to the nominal exchange rate, while recognizing that the relationship is inherently interactive and leaving a full bidirectional causality analysis to future research.

2.4. Brief Overview of Selected Empirical Studies

Empirical studies on developing and emerging economies have examined the inflation–exchange rate nexus from various angles: testing PPP in the long run estimating the impact of monetary and fiscal shocks and commodity prices on exchange rate dynamics and modeling real exchange rates in commodity exporting economies within the "Dutch disease" framework.

In the Arab and Maghreb region, most studies find that exchange rates do not fully and immediately reflect inflation differentials in the short run, although there is often evidence of cointegrated relationships between price levels and exchange rates in the long run. They also emphasize the roles of oil prices, external balances, and foreign reserves as important determinants of the domestic currency.

Within this literature, the present study adds a focused contribution on the Algerian case using a parsimonious bivariate ARDL model over a relatively long sample period. It is intended as a first step, to be followed by richer multivariate models duly incorporating key external and domestic factors.

3. Methodology and Data

3.1. Data and Sample Period

The study uses annual data for Algeria over the period 1986–2023, primarily drawn from the World Bank's World Development Indicators (WDI) database. The starting year, 1986, is a pivotal point marked by a sharp plunge in oil prices and the onset of a prolonged phase of economic and financial adjustment. The sample extends to the latest year for which reliable data were available at the time of the study.

The use of annual data is consistent with the objective of analyzing medium to longrun trends, even though it comes at the cost of losing some shortrun dynamics that might be captured using quarterly or monthly data.

3.2. Variable Definitions and Transformations

The dataset comprises two main variables:

1. Nominal exchange rate of the dinar against the dollar (EX):

The dependent variable in the model, measured as the number of Algerian dinars per US dollar, computed as an annual average of the official exchange rate announced by the Bank of Algeria.

2. Domestic inflation rate (INF):

The independent variable, measured as the annual percentage change in the Consumer Price Index (CPI).

To improve the statistical properties of the series and facilitate interpretation of the estimated coefficients, the following logtransformations are used:

- $LEX_t = In\ (EX_t)$
- $\mathrm{LINF}t = \mathrm{IN}\left(1 + \frac{\mathrm{INF}t}{100}\right.$

The latter transformation allows us to handle years with low or even negative inflation rates, while preserving an approximate elasticity interpretation for the coefficients. Hence, LINF can be viewed as a logarithmic measure of the cumulative change in the price level rather than a log of the raw inflation rate.

In this version of the model, the dataset does not include foreign inflation (US), oil prices, or external balance variables. This is a deliberate choice to maintain a simple twovariable framework focused on the inflation–exchange rate link, with an explicit acknowledgement that excluding these variables is a limitation and a natural direction for future extensions.

3.3. Econometric Model and Estimation Strategy

The study starts from a simple longrun linear specification:

$LEXt=\alpha+\beta LINFt+\varepsilon t$

where βcaptures the longrun effect of inflation on the exchange rate. Given that macroeconomic time series commonly exhibit nonstationarity in levels, we adopt the ARDL modelling approach as developed by Pesaran et al. (2001), which offers flexibility in handling variables integrated of orders I(0) and I(1), and allows joint modelling of shortrun dynamics and longrun equilibrium.

A general two variable ARDL model can be written as:

$$\Delta LEXt = \gamma_0 + \sum_{i=1}^{p} \gamma_1i\Delta LEXt - i + \sum_{j=0}^{q} \gamma_{2j}\, \Delta LEXt - j\text{Ø}1LEXt - 1\text{Ø}2\text{LINFt} - 1 + \upsilon t$$

The empirical procedure follows these steps:

1. Testing for stationarity:

Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) tests are applied to LEX and LINF in levels and first differences to ensure that none of the variables is integrated of order two, I(2).

2. Lag selection:

Several ARDL models with different lag structures are estimated, and the optimal model is selected on the basis of the Akaike Information Criterion (AIC), with a reasonable maximum lag length given annual data and sample size.

3. Bounds testing for cointegration:

The ARDL bounds test is used to determine whether a longrun equilibrium relationship exists between the variables. If the computed Fstatistic exceeds the upper bound critical value (I(1)), cointegration is inferred.

4. Estimation of longrun relationship and errorcorrection model (ECM):

Upon confirming cointegration, the longrun coefficients are obtained from the ARDL model and the associated ECM is derived to capture shortrun adjustment and the speed of convergence to equilibrium.

5. Diagnostic checking:

The estimated ECM is subjected to standard diagnostic tests: serial correlation (Breusch–Godfrey), heteroskedasticity (ARCH), normality of residuals (Jarque–Bera), and parameter stability (CUSUM and CUSUMSQ).

6. Consideration of structural changes:

Given the major shocks and regime shifts (1986, 1994, 2014, COVID19), structural breaks are discussed at an interpretive level. However, no formal cointegration tests allowing for structural breaks (e.g. Gregory–Hansen) are implemented in this study, which is recognized as a methodological limitation.

4. Empirical Results and Analysis

4.1. Stationarity of the Time Series

Results from ADF and PP tests indicate that both LEX and LINF fail to reject the null hypothesis of a unit root in levels, implying nonstationarity at level. However, when the tests are applied to the first differences ΔLEX $\Delta LINF$the computed statistics become more negative than the critical values at the 1%, 5%, and 10% significance levels, allowing rejection of the unit root hypothesis and establishing stationarity in first differences.

Thus, both series are integrated of order one, I(1), and there is no evidence of I(2) behavior. This satisfies a key requirement for the validity of the ARDL–bounds testing framework.

4.2. Selection of the Optimal ARDL Model

Using an appropriate maximum lag structure for annual data, a range of ARDL(p, q) models were estimated for LEX and LINF. These models were then ranked according to the AIC. The optimal specification was found to be ARDL(1,0), i.e.:

- one lag for the exchange rate LEX_{T-1}
- no lags for inflation in the shortrun part of the model, though inflation enters the longrun relationship.

This implies that changes in the exchange rate in the short run depend mainly on its own lagged changes and on the errorcorrection term, while the effect of inflation is primarily captured through the longrun channel.

4.3. Bounds Test for Cointegration

Applying the bounds test following Pesaran et al. (2001), the computed Fstatistic is approximately 14.76, which is significantly higher than the upper bound critical values (I(1)) at the 10%, 5%, and 1% levels. Accordingly, the null hypothesis of no level relationship between LEX and LINF is rejected in favor of the alternative of cointegration.

In other words, a longrun equilibrium relationship exists between inflation and the Algerian dinar–US dollar exchange rate. The two variables cannot drift apart indefinitely in the long run without adjustment mechanisms being activated to restore equilibrium.

4.4. LongRun Relationship

From the ARDL(1,0) specification, the longrun equation can be expressed as:

$$LEXt=\alpha+\beta LINFt+\varepsilon t$$

The key estimated coefficients (presented here without detailed tables) are:

- The intercept α: positive and statistically significant, capturing structural and quasiconstant factors affecting the level of the exchange rate, such as productivity differentials, relative income levels, and institutional factors.
- The longrun inflation coefficient which is: $\beta 0.79\backslash)$
  - Positive: indicating that higher domestic inflation is associated with a depreciation of the dinar (an increase in LEX)
  - Statistically significant: confirming that the relationship is not a statistical artefact
  - Less than one: suggesting that the passthrough from inflation to the exchange rate is partial rather than complete, and that other factors (such as policy interventions, oil prices, and openness) dampen or modify this passthrough.

Economically, the estimate implies that a 10% increase in Algeria's inflation rate tends, in the long run, to be associated with an approximately 7.9% depreciation of the nominal exchange rate, ceteris paribus. This is broadly consistent with PPP and the monetary approach, while also revealing that policy and structural features of the Algerian economy absorb part of the inflationary impact on the exchange rate.

4.5. ShortRun Dynamics and the ErrorCorrection Model

The errorcorrection model (ECM) derived from the ARDL(1,0) specification captures shortrun dynamics and the process by which deviations from longrun equilibrium are corrected. The main result is:

- The errorcorrection coefficient \(\lambda\) is negative, statistically significant, and has a magnitude of about –0.063.

This indicates that approximately 6.36% of any deviation from the longrun equilibrium exchange rate is corrected each year, implying a relatively slow speed of adjustment. In practical terms, it may take a considerable number of years for large disequilibria to be fully eliminated if other conditions remain unchanged.

The low speed of adjustment can be attributed to factors such as:

- The nature of the exchange rate regime (managed float with official intervention)
- The authorities' aversion to sharp and sudden exchange rate movements
- Structural and price rigidities in the economy.

In the shortrun ECM, the coefficient of determination (R^2) is about 39.85%, which means that inflation and the adjustment process explain roughly 40% of the yeartoyear variation in the exchange rate, while the rest is driven by other omitted factors.

4.6. Diagnostic Tests and Model Stability

A battery of diagnostic tests was performed on the ECM:

1. Serial correlation (Breusch–Godfrey test):

The test results indicate no significant serial correlation in the residuals at conventional significance levels, supporting the assumption of error independence.

2. Heteroskedasticity (ARCH test):

There is no strong evidence of ARCHtype conditional heteroskedasticity, as the p-values are above 0.05, which supports the homoskedasticity assumption.

3. Normality (Jarque–Bera test):

The residuals appear to be approximately normally distributed, enhancing confidence in the statistical inference drawn from the model.

4. Parameter stability (CUSUM and CUSUMSQ tests):

The CUSUM and CUSUMSQ plots remain within the 5% significance bands for most of the sample period, although some fluctuations reflect temporary shocks that do not amount to major structural breaks. Overall, the results suggest that the estimated relationship is structurally stable over the study period.

While these diagnostics are encouraging, they do not preclude the possibility of deeper structural changes in the Algerian economy during the sample period. Addressing such changes formally would require cointegration tests that explicitly allow for structural breaks, which are beyond the scope of this study.

5. Discussion of Results in Light of Theory and the Algerian Context

The empirical findings align with several theoretical expectations and observed features of the Algerian economy:

1. Evidence of a longrun equilibrium relationship between inflation and the exchange rate:

The existence of cointegration between \(LEX\) and \(LINF\) is in line with the core idea of PPP: when domestic prices rise faster than foreign prices (which are approximated as relatively stable here), the domestic currency tends to depreciate in the long run.

2. Positive impact of inflation on dinar depreciation:

The positive coefficient (0.79) confirms that inflation is a key driver of the dinar's longrun depreciation. This is consistent with episodes of marked inflation (e.g. early 1990s, post2014 years), during which domestic price pressures coincided with exchange rate adjustments or accelerations in the depreciation trend.

3. Partial passthrough of inflation to the exchange rate:

The fact that the coefficient is less than one indicates that the exchange rate does not fully mirror inflation differentials. Part of these differentials is absorbed by subsidy and pricecontrol mechanisms, administrative intervention in the foreign exchange market, and various frictions in the transmission of prices between domestic and external markets. This is characteristic of an economy with a significant degree of state regulation in both product and currency markets.

4. Slow adjustment towards longrun equilibrium:

The low magnitude of the errorcorrection coefficient (\(-0.063\)) suggests that the exchange rate does not adjust quickly to eliminate disequilibria, and that inflation–exchange rate misalignments can persist for long periods. While such gradualism may help avoid abrupt and socially costly exchange rate corrections, it can also lead to the buildup of imbalances that will ultimately require more drastic and more expensive adjustments.

5. The importance of omitted variables:

The moderate R^2 in the shortrun ECM underscores that inflation alone cannot explain the full dynamics of the exchange rate. Oil prices, external reserves, the current account balance, political and security conditions, and international financial conditions are all crucial determinants. Their exclusion in this simplified model creates the risk of omitted variable bias, which is explicitly acknowledged as a limitation.

6. Positioning within the broader empirical literature:

The results of this study broadly match the empirical evidence for other developing and commodity exporting economies, where exchange rates tend to reflect inflation differentials in the long run, but are also heavily influenced by terms of trade and commodity price shocks. Within this context, the present study can be viewed as an initial step in building richer models for Algeria that explicitly incorporate oil prices, external accounts, and interestrate policy.

6. Conclusion and Recommendations

6.1. Main Findings

This study set out to analyze the impact of the inflation rate on the Algerian dinar–US dollar exchange rate over 1986–2023, using the ARDL modelling approach and the bounds test for cointegration, with data from the World Bank and appropriate logarithmic transformations of the variables.

The main findings can be summarized as follows:

1. ADF and PP tests indicate that the exchange rate and inflation (in their transformed logarithmic forms) are integrated of order one, I(1), with no evidence of I(2) behavior, thus justifying the use of the ARDL approach.

2. The bounds test confirms the existence of a cointegrating relationship between (LEX) and (LINF), as the Fstatistic exceeds the upper critical value at standard significance levels, indicating a longrun equilibrium link between inflation and the exchange rate.
3. In the long run, a 1% increase in domestic inflation is associated with an approximate 0.79% depreciation of the dinar against the dollar, with a statistically significant and positive coefficient, confirming inflation as a key determinant of the exchange rate path.
4. The errorcorrection model shows that the speed of adjustment towards the longrun equilibrium is relatively slow only about 6.36% of deviations from equilibrium are corrected annually.
5. Diagnostic checks support the adequacy of the model: no significant serial correlation, evidence of homoskedasticity, approximate normality of residuals, and broadly stable parameters over the sample period.

6.2. Policy Recommendations

Based on these results, the following recommendations may be put forward:
1. Using inflation control as a lever for exchange rate stability:
- Adopt a clear and gradual inflation argeting framework, alongside greater operational independence for the Bank of Algeria in the use of monetary policy instruments
- Avoid heavy reliance on monetary financing of fiscal deficits during periods of low oil prices, given its direct impact on inflation and, consequently, on the exchange rate
- Develop inflation forecasting tools and integrate them systematically into interestrate and liquidity management decisions.

2. Strengthening coordination between monetary and fiscal policy:
- Reduce the budget deficit through tax base broadening and rationalization of current expenditures
- Redirect public spending towards productive investment and infrastructure that enhance productivity and competitiveness, thereby easing inflationary pressures over the medium term.

3. Diversifying the productive base and reducing import dependence:
- Encourage sectors capable of import substitution, especially in foodstuffs and key industrial inputs
- Support activities with high value added and export potential, thereby lowering structural demand for foreign exchange.

4. Enhancing transparency and credibility in exchange rate policy:
- Clarify the framework for managing the exchange rate (e.g. managed float with indicative bands), allowing market participants to form more accurate expectations
- Narrow the gap between the official and parallel market exchange rates by reforming access to foreign currency and simplifying regulatory procedures
- Use foreign reserves judiciously to smooth excessive volatility without committing to unsustainable exchange rate levels.

6.3. Limitations and Directions for Future Research

Despite providing clear empirical evidence of a longrun link between inflation and the exchange rate in Algeria, the present study has several methodological limitations:

1. Bivariate model:

- Excluding foreign inflation (US), oil prices, external reserves, and the current account balance may bias the estimates due to omitted variables
- Future research should construct multivariate models (e.g. Multivariate ARDL or VECM) that incorporate the main known determinants of the exchange rate in an oil dependent economy.

2. Annual data only:

- While suitable for longrun analysis, annual data miss finer shortrun dynamics that could be revealed by quarterly or monthly series
- Future work would benefit from higher frequency data where available.

3. No formal testing for structural breaks:

- Although parameter stability was checked via CUSUM and CUSUMSQ, the study did not employ cointegration tests that explicitly allow for structural breaks
- Subsequent research could rely on tests such as Gregory–Hansen or Johansen cointegration with breaks to assess changes in the relationship across different economic regimes (e.g. pre and postadjustment, pre and post2014).

4. Onedirectional analysis of causality:

- The focus was on the impact of inflation on the exchange rate, even though the literature emphasizes bidirectional interactions
- Future studies could use Granger causality tests within a multivariate ECM framework to analyse causal links in both directions, possibly including mediating variables such as public sector wages or import prices.

In light of these limitations, this study can be regarded as a first step in a broader research agenda on exchange rate dynamics in Algeria and their relationship with key macroeconomic indicators, especially inflation and oil prices, in support of the design of more effective macroeconomic and financial policies.

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