EXCHANGE RATE VARIATION, INTERNATIONAL TRADE AND THEIR IMPACTS ON DOMESTIC PRICE LEVEL IN NIGERIA.

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A THESIS WRITTEN IN THE DEPARTMENT OF ECONOMICS, FINANCE AND INVESTMENT, AND SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF POST GRADUATE DIPLOMA IN ECONOMICS OF THE BENSON IDAHOSA UNIVERSITY,
BENIN CITY, NIGERIA.

October, 2025

DECLARATION

I **ENOGHAYIN, James Etin-osa** do hereby declare that this thesis is entirely my own work and composition. The work embodied in this thesis has not been submitted in candidature for any degree and is not concurrently being submitted for any other degree. All references made to the works of other persons have been duly acknowledged.

_____ _____

ENOGHAYIN, James Etin-osa **Date**

CERTIFICATION

The undersigned certify that this thesis was be carried out by **ENOGHAYIN, James Etin-osa** and was approved as adequate in scope and content in partial fulfillment of the requirements for the award of Post Graduate Diploma (PGD) degree in Economics, Benson Idahosa University, Benin City.

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DEDICATION

To God Almighty, the source of my strength and wisdom, whose grace carried me through every challenge.

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ABSTRACT

Persistent instability in the price level of domestic goods and services has remained a major macroeconomic challenge in Nigeria, largely driven by exchange rate volatility and the country's heavy dependence on international trade. Fluctuations in the exchange rate, coupled with rising import dependence and a narrow export base, have intensified inflationary pressures and weakened consumer purchasing power. Against this backdrop, this study examines the impact of exchange rate dynamics and international trade on the price level of domestic products in Nigeria. The study specifically aims to examine the effect of exchange rate movements on domestic prices, assess the impact of export trade on the price level of domestic products, analyze the influence of import trade on domestic prices, and determine the interacting effect of exchange rate and import on domestic price level. Annual time-series data spanning 1990–2023 were sourced from the Central Bank of Nigeria and the National Bureau of Statistics, and analyzed using the Autoregressive Distributed Lag (ARDL) approach. The findings reveal, first, that exchange rate depreciation has a positive and statistically significant effect on the price level of domestic goods and services, confirming the existence of exchange rate pass-through in Nigeria. Second, export trade is found to have an insignificant effect on domestic price levels in both the short and long run, reflecting the narrow and oil-dependent structure of Nigeria's export base. Third, import trade exerts a significant positive effect on domestic prices in the short run, validating the imported inflation hypothesis due to Nigeria's heavy reliance on foreign goods and production inputs. Fourth, the exchange rate is found to significantly moderate the relationship between import trade and domestic price levels, with currency depreciation amplifying the inflationary impact of imports. Based on these findings, the study recommends, first, that monetary authorities should prioritize exchange rate stability through effective foreign exchange management, reserve accumulation, and credible monetary policy coordination to reduce exchange rate pass-through to domestic prices. Second, to improve the price-stabilizing role of exports, the government should aggressively pursue export diversification, particularly in agriculture, manufacturing, and non-oil sectors, to strengthen foreign exchange earnings and reduce vulnerability to external shocks. Third, to mitigate imported inflation, policies aimed at import substitution, domestic industrial development, and increased local production of intermediate and capital goods should be strengthened. Finally, given the amplifying role of exchange rate depreciation on import-induced inflation, coordinated exchange rate and trade policies are required, including improved foreign exchange supply, reduced structural bottlenecks, and enhanced competitiveness of domestic firms, to achieve sustainable price stability in Nigeria. The study concludes that Nigeria's inflationary pressures are largely short-term and externally driven. It recommends reducing import dependence through industrialization, diversifying exports beyond oil, stabilizing the exchange rate, and investing in infrastructure to address supply constraints.

CHAPTER ONE

INTRODUCTION

1.1. Background to the Study

Price dynamics refers to the natural and regular changes in the prices of goods and services over time, which may be driven by seasonal variations, changes in supply and demand, or economic policies. Fluctuations are often part of a predictable cycle and can be influenced by factors like market trends, production cycles, or inflation (Mankiw, 2020); Price volatility, on the other hand, refers to the degree of variation in the price of a good or service over time. High price volatility means that the price experiences sharp, unpredictable swings in a short period. This could be due to external shocks, such as global market disruptions, changes in government policies, or speculative trading (Black, 2018). Volatility is typically used to describe erratic and less predictable price movements. In Nigeria, movements in the price level have been a major macroeconomic concern, with inflation consistently remaining in double digits for most of the past decade (National Bureau of Statistics [NBS], 2024). Structural weaknesses, such as heavy dependence on imports, exchange rate volatility, insecurity in agricultural regions, and energy price shocks, continue to exert upward pressure on prices (Adeniran *et al*., 2023).

One likely effect of export trades is price level in the domestic market. Price levels of domestic goods and services have been troublesome in their destabilizing effects, particularly on economies that are heavily reliant on commodity imports. Such volatility can lead to economic instability, affect government revenues, disrupt investment plans, and impact exchange rates in these nations (Cashin & McDermott, 2002; World Bank, 2009). Recently attention has been drawn to the role of price levels in transmitting inflation and inducing macroeconomic and financial adjustments in developing countries. These economies, are

often particularly vulnerable to price volatility, which affects their exchange rates, inflation rates, fiscal balances, and overall economic stability (Baffes, Kose, Ohnsorge, & Stocker, 2015; World Bank, 2022). Food inflation, in particular, plays a significant role in shaping Nigeria's overall price level, given that food accounts for more than 50% of household expenditure (World Bank, 2022). Additionally, reforms such as the removal of fuel subsidies and exchange rate unification have had strong pass-through effects on consumer prices, contributing to rising costs in transportation, energy, and production (IMF, 2023). Despite policy measures by the Central Bank of Nigeria (CBN) to tighten monetary conditions, the persistence of cost-push factors highlights the structural nature of price instability in the country.

Exchange rate refers to the value of a nation's currency in terms of another nation's currency (Mankiw, 2020). This rate determines how much of one currency can be exchanged for another and serves as a critical factor in international trade, investment and monetary policy. In Nigeria, the exchange rate is particularly critical because the country relies heavily on imports for goods and services that are not locally produced or are in short supply. This dependence makes the economy highly sensitive to exchange rate fluctuations (Ogbuagu and Ewubare, 2019). Nigeria has both official and parallel (black market) exchange rates, which often diverge. The official exchange rate is set by the Central Bank of Nigeria (CBN), while the parallel rate is driven by market forces. As Uchenna, Okonkwo and Chukwuemeka, (2020) explained, the gap between the official and parallel exchange rates in Nigeria often widens during periods of foreign exchange scarcity, leading to market distortions and arbitrage opportunities. The International Monetary Fund (2023) noted that such dual exchange rate systems can create inefficiencies, undermine investor confidence, and contribute to economic instability.

International trade is defined as the exchange of goods and services across international borders or territories, enabling countries to specialize in the production of goods where they have a comparative advantage (Krugman & Obstfeld, 2018). It plays a vital role in economic development by fostering global interdependence, enhancing access to diverse products, and stimulating economic growth. International trade is the purchase and sale of goods and services by companies in different countries (Smith, 2021). Consumer goods, raw materials, food, and machinery all are bought and sold in the international marketplace. International trade allows countries to expand their markets and access goods and services that otherwise may not have been available domestically (Hill, 2021). According to Nwankwo (2018), international trade is a vital component of Nigeria's economy, contributing significantly to foreign exchange earnings and economic growth. However, the country's trade balance is often influenced by its reliance on oil exports, making it vulnerable to fluctuations in global oil prices. As a result of international trade, the market is more competitive. This can ultimately result in more competitive pricing and cheaper products. Nigeria's international trade consists of exports and imports, with oil accounting for the bulk of its export revenue. In 2022, crude oil and natural gas constituted over 80% of the country's total exports, making Nigeria heavily reliant on the global oil market. However, the country also imports various goods, including machinery, refined petroleum products, food, and electronics to meet domestic demand (World Bank, 2023; Ogbuagu & Ewubare, 2019).

Some instances of international trade includes exports such as; In 2024, the United States experienced a significant surge in bulk agricultural exports, marking a 22% increase from the previous year—the largest annual rise in a decade. This growth was particularly evident in exports to countries like Mexico and Colombia, which saw record increases. Conversely, exports to China decreased by 5%, reaching an 11-year low, excluding trade war years. Overall, U.S. agricultural and related product exports grew fractionally in value to $191

billion, maintaining a strong presence in top markets, including Canada, China, and Mexico (Braun, 2025); Russia's Barter Trade amid Sanctions from the West which complicated traditional payment methods, Russian exporters turned to bartering to facilitate trade. For instance, Russian agricultural trader Astarta Agrotrading exchanged chickpeas and lentils for tangerines and potatoes with Pakistani companies. Additionally, Russian customs in Ekaterinburg traded flax seeds for household appliances with Chinese firms. While reminiscent of Soviet-era practices, this approach has reemerged as a practical solution under current geopolitical constraints (Financial Times, 2024);

In June 2024, China achieved a record trade surplus of $99 billion, marking its highest in over two decades. This was driven by an 8.6% increase in export volumes compared to the previous month, particularly in higher-value manufacturing sectors like electric cars and computer chips. Notably, exports to the U.S., Germany, the UK, and the EU saw significant growth, despite ongoing trade protectionism efforts in these regions (The Times, 2024): China has become a significant trading partner for many African nations, exporting a wide range of goods, including textiles, electronics, and machinery. While this trade has provided African consumers with affordable products, it has also posed challenges for local industries unable to compete with the influx of low-priced Chinese goods. For example, in 2014, Benin imported $411 million worth of wigs and fake beards from China, while Nigeria spent over $9 million on Chinese toothbrushes (Wikipedia, 2024): The East African Community (EAC), comprising countries like Kenya, Rwanda, and Tanzania, has engaged in various trade agreements to bolster its international trade. Kenya and Rwanda have signed an Economic Partnership Agreement with the European Union, providing duty-free and quota-free access to the EU market for all EAC exports. Additionally, the United States and the EAC have signed a Trade and Investment Agreement aimed at increasing trade and investments between the two regions (Wikipedia, 2024):

Meanwhile import trade in Nigeria included Agricultural Produce**,** despite being an agricultural economy. Nigeria is a major importer of rice amongst other agricultural commodities, to meet her local consumption needs, with most imports coming from Thailand and India (FMARD, 2021); Many African nations, including Nigeria and Kenya, import second-hand cars from Japan, Belgium and Germany to meet local transportation demands (UNECA, 2022). Nigeria imports large amounts of machinery, including industrial machines and transport equipment such as automobiles and trucks, primarily from China, the United States, and Japan (NBS, 2022); Nigeria despite being a major oil producer, imports refined petroleum products due to limited local refining capacity. The country imports refined oil products primarily from countries like India, the Netherlands, and the United States (CBN, 2022);

Nigeria imports food items such as rice, wheat, and sugar, with countries like Thailand, India, and Brazil being the primary suppliers (FMARD, 2021). On the other hand, Nigeria actively participates in global export trade, Nigeria is one of the world's largest oil exporters, with crude oil being its main export product. In 2023, Nigeria exported around 1.2 million barrels of crude oil per day. The majority of Nigeria's oil exports go to countries such as the United States, India, and China (CBN, 2023); Nigeria exports significant quantities of agricultural products such as cocoa, sesame seeds, and cashew nuts. Cocoa is one of Nigeria's key exports, with the country being the fourth-largest cocoa producer globally (FAO, 2022); Nigeria is a major exporter of liquefied natural gas (LNG), primarily to markets in Europe and Asia. In 2023, Nigeria's LNG exports reached significant volumes, bolstered by international demand **(**NLNG, 2023).

1.2. Statement of the Research Problem

Price level of domestic goods and services is a significant economic challenge, particularly in developing economies like Nigeria. Nigeria's heavy reliance on international trade for the importation of essential raw materials, finished goods, and capital equipment has made its economy vulnerable to external shocks, including exchange rate volatility and global trade dynamics. These external influences have exacerbated domestic price instability, contributing to an inflation rate of 34.80% in December 2024, up from 34.60% in November 2024. This persistent inflationary trend, which reached a 28-year high of 34.19% in June 2024, undermines economic growth, increases inflationary pressures, and reduces consumer welfare, further exacerbating the hardships faced by the population. This volatility has led to rising living costs, with over 33 million people projected to be food insecure by the next year. This increase in food insecurity highlights the severe economic challenges brought on by domestic price levels (Akinlo & Lawal, 2015; Okoye, Nwakoby, Modebe, & Okorie, 2019).

The exchange rate, especially the value of the Naira relative to major currencies like the US Dollar, plays a crucial role in price determination. In 2024, the exchange rate for the Naira fell sharply, with the Naira trading at approximately 1,000 Naira to 1 US Dollar in the parallel market, contributing to higher costs for imported goods and production inputs. When the Naira depreciates, the cost of imported goods and production inputs rises, increasing the cost of production for domestic industries. These higher costs are often passed on to consumers, leading to inflationary trends and price volatility in domestic markets (CBN, 2023). For example, the sharp depreciation of the Naira in recent years has significantly increased the cost of essential imports such as petroleum products, food items, and machinery, further driving up prices in the domestic economy (National Bureau of Statistics [NBS], 2022). Furthermore, international trade exposes Nigeria to global price shocks and disruptions. For instance, fluctuations in global oil prices—a major source of foreign

exchange for Nigeria—have significant spillover effects on the exchange rate and, subsequently, on the prices of goods and services in the domestic market.

In 2024, global oil prices experienced volatility, with Brent crude fluctuating between $70 and $90 per barrel, impacting Nigeria's oil revenue (Emefiele, 2020). Similarly, disruptions in global supply chains, trade tariffs, and rising transportation costs contribute to the instability of domestic prices; for example Nigeria has effective duty of 50% or more on over 80 tariff lines, and transportation sub-index of the Consumer Price Index (CPI) increased from 672.10 points in September 2024 to 692.20 points in October 2024 (Okoye *et al*., 2019). Small and medium-sized enterprises (SMEs), which form a significant part of Nigeria's economy (accounting for approximately 48.5% of Nigeria's GDP and 76% of total employment), are disproportionately affected by exchange rate volatility and trade-related price changes due to their limited ability to hedge against these risks. The result is unpredictable pricing, increased production costs, reduced competitiveness, and lower consumer purchasing power (Adebiyi, 2017).

Despite the recognized role of international trade and exchange rate management in price stability, there remains a lack of comprehensive studies examining their combined impact on domestic price levels in Nigeria. Existing studies tend to focus either on the effects of exchange rate volatility on price stability (Adepoju, 2016; Oji, Ayodele & Olatunde, 2020) or on the impacts of trade dynamics and openness on inflation (Ojo & Fashola, 2018). This limited approach leaves a gap in understanding how these two factors interact in the Nigerian context to affect domestic price levels. Addressing this problem is critical for understanding the drivers of price levels and formulating effective policies to stabilize prices, reduce inflation, and foster sustainable economic growth. This study, therefore, seeks to examine the impact of international trade and exchange rate dynamics on price levels of domestic goods

and services in Nigeria, providing insights to assist policymakers in developing strategies to mitigate price instability.

1.3. Research Questions

The study seeks to answer the following questions:

i) What is the impact of exchange rate on domestic price level in Nigeria?

ii) What is the impact of export on domestic price level in Nigeria?

iii) How has import affected domestic price level in Nigeria?

iv) Is there an interactive effect of exchange rate on import – price level in Nigeria?

1.4. Objectives of the Study

The primary aim of this research is to examine the dynamic interaction among exchange rate, international trade and price level of domestic products in Nigeria. The specific objectives include to;

1. determine the effect of exchange rate on domestic price level in Nigeria?
2. evaluate the impact of export on domestic price level in Nigeria?
3. assess the effect of import on domestic price level in Nigeria?
4. examine if there is an interacting effect of exchange rate and import on domestic price level in Nigeria?

1.5. Research Hypotheses

Based on the research questions stated above, the hypothesis to be tested in the course of this study are as follows;

$H_{0\,1}$: Exchange rate has no significant impact on domestic price level in Nigeria.

$H_{0\,2}$: Export trade has no significant impact on domestic price level in Nigeria.

$H_{0\,3}$: Import trade has no significant impact on domestic price level in Nigeria.

$H_{0\,4}$: There is no significant interactive effect of exchange rate and import on domestic price level in Nigeria.

1.6. Scope of the Study

The purpose of the research is to determine the interrelationship and the effect of exchange rate and international trade on price level of local goods and services in Nigeria with empirical analysis spanning the period of 1990 to 2023. The nature of this study necessitated the use of secondary data in line with the objectives of this study. Relevant and recent empirical and theoretical literature was reviewed.

1.7 Significance of the Research

The study on the impact of international trade and exchange rate dynamics on price level of domestic goods and services is significant for multiple stakeholders, including policymakers, businesses, and the academic community. This research provides insights into the intricate relationship between international economic factors and domestic price stability, which is critical for economic planning and sustainable growth. Firstly this research will provide policymakers like the Central Bank of Nigeria (CBN) and government agencies with a comprehensive understanding of how exchange rate fluctuations and trade dynamics drive domestic price instability. In an import-dependent economy like Nigeria, exchange rate depreciation increases the cost of production inputs, leading to inflation (Okoye *et al*., 2019).

Secondly the study highlights how fluctuations in the exchange rate and global trade conditions impact the cost structure of domestic businesses. By identifying these challenges, businesses—particularly small and medium enterprises (SMEs)—can strategize to mitigate

risks such as rising production costs, reduced profit margins, and loss of competitiveness thereby supporting the capacity for production (Adebiyi, 2017). Thirdly this study will help in understanding the key factors driving price instability, enabling the government to address rising inflation and safeguard consumer purchasing power (NBS, 2022). Stable prices are essential for improving living standards and reducing poverty. Fourthly this research will contribute to the existing body of knowledge by examining the combined effects of international trade and exchange rate fluctuations on price instability. Previous studies often focus on either trade or exchange rate volatility in isolation (Akinlo & Lawal, 2015). By addressing this research gap, the study provides a more holistic understanding of the economic forces that drive domestic price levels. It will serve as a valuable resource for future researchers and scholars exploring related topics.

Fifthly the findings from this research can support trade and financial regulators in evaluating the effectiveness of existing policies aimed at stabilizing the exchange rate and managing international trade promote economic diversification, reduce import dependency, and enhance the country's foreign exchange reserves (Emefiele, 2020). Finally the research offer actionable insights for businesses, investors, and entrepreneurs seeking to understand the risks and opportunities associated with exchange rate volatility and international trade. Such insights can inform strategic decisions related to sourcing inputs, pricing, and managing foreign exchange exposure, thereby improving business resilience and competitiveness.

1.8. Limitations of the Study

The primary limitation to research like this is the issue of accuracy of data collected as most secondary data are being filled with estimation errors. Thus if there are errors in collection, collation and computation of data it is a common practice to have estimation results, which tends to cast doubt on the validity and reliability of the econometric results generated. I plan

to address this issue by primarily utilizing data from the Central Bank of Nigeria and the National Bureau of Statistics for data collection. Another limitation of this study is the exclusion of other important macroeconomic variables that could influence the relationship between exchange rates, international trade, and price levels of domestic goods and services in the data analysis method. Additionally, incorporating other variables would fall outside the scope of this study.

1.9. Organization of the Study

This study is organized into five chapters: The first chapter provides the background information of the interrelationship among exchange rate, international trade and price levels, statement of the research problem, research questions, research hypothesis, significance of the research and limitations of the study. Chapter two deals with the literature review, while chapter three focuses on the theoretical framework and method of data analysis. The fourth chapter reveals the empirical analysis and interpretation of the research findings. Finally the fifth and final chapter talked about the summary of the findings, recommendation and conclusion.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Concept of Exchange Rate Dynamics

In their definition of an exchange rate, Krugman and Obstfeld (2018) established that it represents the price of one currency in relation to another; it serves as the relative price of two currencies, indicating the value of one currency in terms of the other. Additionally, they characterized the exchange rate as a ratio that specifies how much one currency can be traded for another within the global financial market, thereby highlighting the importance of exchange rates in international trade, investments, and economic policies, as they affect the pricing of goods, services, and financial transactions across countries. Mankiw (2020) states that the exchange rate is the rate at which one currency is exchanged for another in the foreign exchange market. This economic concept is vital as it denotes the price of one currency in terms of another. It significantly influences global trade, investment, and monetary policy. A primary type of exchange rate is the nominal exchange rate, which indicates the relative value of one currency against another. This rate is applicable in daily transactions, such as purchasing goods or services from foreign markets.

For instance, if the nominal exchange rate between the U.S. dollar and the euro is 1 USD = 0.85 EUR, it shows how much one dollar can be converted into euros. Although the nominal exchange rate offers a straightforward measure of currency value, it fails to consider price variations between countries, which is where the real exchange rate becomes relevant. The real exchange rate modifies the nominal exchange rate to account for differences in price levels across countries. It provides a more precise representation of a nation's competitiveness by comparing the relative costs of goods between countries. A decline in the real exchange

rate renders domestic goods more affordable in the international market, thereby enhancing exports, while an increase typically results in higher export prices (Mishkin, 2019). The notion of exchange rates is further complicated by the selection of exchange rate regimes, which can be either fixed or flexible. In a flexible or floating exchange rate system, the currency's value is determined by market forces, where supply and demand dictate the price of the currency. This enables the currency to fluctuate in response to changes in economic conditions such as inflation, trade balances, or interest rates. A significant advantage of this system is its ability to respond to economic changes, allowing the currency to adjust without government intervention.

In contrast, a fixed or pegged exchange rate system entails a government or central bank maintaining the value of its currency at a predetermined rate relative to another currency, such as the U.S. dollar. This system offers stability and predictability in trade and investment, as businesses can depend on a consistent exchange rate. However, it necessitates substantial reserves of foreign currency to uphold the peg, and if the domestic economy is misaligned with the fixed rate, it can result in economic imbalances (Krugman & Obstfeld, 2018). Furthermore, exchange rates can become misaligned, resulting in the overvaluation or undervaluation of a currency. An overvalued currency is one that is priced higher than its market equilibrium, which can adversely affect a country's export competitiveness by making its goods and services more expensive for foreign buyers. Conversely, an undervalued currency renders a country's exports cheaper, potentially increasing demand but also raising the cost of imports, which can lead to inflationary pressures. In either scenario, governments may intervene to stabilize the currency to avert undesirable economic outcomes (Blanchard, 2019).

Depreciation occurs when a country's currency diminishes in value against a foreign currency, indicating that more units of the domestic currency are needed to acquire one unit of the foreign currency. The notion of exchange rates is further complicated by the selection of exchange rate regimes, which can be either fixed or flexible. In a flexible or floating exchange rate system, the currency's value is determined by market forces, where supply and demand dictate the price of the currency. This enables the currency to fluctuate in response to changes in economic conditions such as inflation, trade balances, or interest rates. A significant advantage of this system is its ability to respond to economic changes, allowing the currency to adjust without government intervention.

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Depreciation occurs when a country's currency diminishes in value against a foreign currency, indicating that more units of the domestic currency are needed to acquire one unit of the

foreign currency. For instance, if the exchange rate changes from 1 USD = 0.75 GBP to 1 USD = 0.70 GBP, it indicates that the pound has strengthened against the dollar. This appreciation can arise from a variety of economic factors, such as robust economic growth, low inflation rates, and elevated interest rates. Nations with stable and expanding economies tend to attract foreign investments, which boosts the demand for their currency and leads to appreciation (Blanchard, 2021). In a similar vein, when a country maintains a trade surplus by exporting more than it imports, foreign purchasers are required to obtain more of its currency to settle payments for goods and services, thus increasing its value. Although currency appreciation offers advantages, such as reducing the cost of imports and aiding in inflation control, it also presents certain disadvantages. A stronger currency renders a country's exports pricier for foreign consumers, which can diminish international competitiveness and potentially harm export-dependent industries.

Moreover, tourism may suffer as international travelers find it more costly to visit and spend in the appreciating currency. Countries experiencing prolonged appreciation may face challenges related to trade imbalances, as local consumers might increasingly prefer less expensive imported goods over domestically produced options, adversely affecting local industries and employment (Mankiw, 2019). To address fluctuations in exchange rates, central banks and governments may take action through monetary policy measures. A prevalent strategy involves modifying interest rates; increasing interest rates can draw foreign investors in search of higher returns, resulting in currency appreciation, while decreasing interest rates may produce the opposite outcome. Additionally, central banks might directly engage in foreign exchange markets by buying or selling their own currency to sway its value (Dornbusch, Fischer, & Startz, 2018). Some nations implement a managed exchange rate system, where authorities intervene to mitigate extreme volatility while permitting market forces to exert some influence over exchange rates.

Several notable instances of exchange rate depreciation have occurred in recent history. During the Asian Financial Crisis of 1997–1998, countries such as Thailand, Indonesia, and South Korea saw their currencies collapse due to speculative attacks, high external debt, and weak financial systems. Thailand's baht, for example, lost over half its value after the government abandoned its fixed exchange rate (Krugman, 1998). Between 2014 and 2016, the Russian ruble depreciated by around 50% amid falling oil prices and international sanctions over the Ukraine conflict, which undermined investor confidence and led to capital outflows (IMF, 2016). Following the Brexit referendum in 2016, the British pound dropped approximately 10%, hitting a 31-year low due to widespread uncertainty about the UK's future economic and trade relations (Baker *et al*., 2017). In the 2010s, Venezuela's bolívar experienced one of the most extreme depreciations in history—losing about 99% of its value—due to economic mismanagement, hyperinflation, and collapsing oil revenues (Hernández, 2018). Similarly, the Japanese yen depreciated by about 20% between 2011 and 2012 as the Bank of Japan implemented aggressive monetary easing in response to the economic impact of the 2011 earthquake and persistent deflation (Ito, 2014).

Nigeria has experienced several significant episodes of exchange rate depreciation driven by a combination of oil dependency, macroeconomic instability, and foreign exchange market challenges. One major period was between 2014 and 2017, when the global oil price crash led to a sharp decline in Nigeria's oil revenues, which are a key source of foreign exchange and government income. The Central Bank of Nigeria (CBN) initially tried to maintain an artificially high naira value by restricting access to foreign currency and imposing import controls. However, this led to a widening gap between the official and parallel market exchange rates. By 2017, the naira had depreciated by more than 50%, falling from around 160–170 naira per U.S. dollar to over 500 on the parallel market (IMF, 2017). These policies failed to stabilize the currency, and the government eventually adopted a more flexible

exchange rate regime, though this came with rising inflation and a decline in purchasing power (Adepoju, 2017).

Another significant depreciation occurred in 2016, when the continued slump in oil prices depleted Nigeria's foreign exchange reserves. The CBN was forced to abandon its fixed exchange rate policy, moving from 197–199 to over 280 naira per dollar in the official market, while the parallel market exceeded 400. The move aimed to reduce the large gap between market rates and official rates and to restore some balance to the foreign exchange market. However, the devaluation triggered further inflation, particularly in the cost of imported goods, worsening living conditions for many Nigerians (Adeniran, 2017). In 2020, Nigeria again faced exchange rate pressure, this time due to the global economic fallout from the COVID-19 pandemic. The collapse in oil prices and disruptions in global supply chains reduced foreign exchange inflows significantly. In response, the CBN officially devalued the naira from 306 to 360 per dollar, but market pressures pushed the rate to 470–500 per dollar on the parallel market (CBN, 2020). The depreciation, combined with the pandemic's economic impact, further accelerated inflation, especially in food prices.

More recently, in 2023, the naira faced renewed depreciation pressure due to the removal of fuel subsidies, persistent inflation, and ongoing dependence on oil exports. In a major policy shift, the CBN unified the official and parallel market exchange rates, resulting in immediate devaluation. The naira traded above 700 per dollar by mid-2023, with further depreciation into 2024 (CBN, 2024). This continuing currency weakness reflects deep structural issues in Nigeria's economy, such as low foreign investment, fiscal deficits, and vulnerability to oil price fluctuations.

2.1.2 International Trade

International trade is the exchange of goods, services, and capital across national borders or territories. It has long been a central feature of global economies, offering numerous benefits and driving economic growth, but also presenting a series of challenges that governments must manage (Krugman *et al.*, 2018). One of the key principles of international trade is the idea of comparative advantage, introduced by the economist David Ricardo in the 19th century. Ricardo argued that even if a country is not the most efficient producer of any good in absolute terms, it can still benefit from trade by specializing in the goods and services where it has the lowest opportunity cost. This specialization leads to a more efficient allocation of global resources and benefits all participating nations (Ricardo, 1817). Adam Smith, earlier in the 18th century, had developed the concept of absolute advantage, which suggested that countries should produce goods they can make most efficiently and trade for those they cannot. The combination of these theories helps explain why nations engage in trade and the mutual advantages that arise from it (Smith, 1776).

International trade also encourages the reduction of barriers to trade, such as tariffs, quotas, and subsidies, which can impede the flow of goods between countries. Free trade advocates argue that removing these barriers leads to greater economic efficiency, with goods being produced where they are most cost-effective, and consumers gaining access to a wider variety of products at lower prices (Krugman *et al*., 2018). Trade agreements like the North American Free Trade Agreement (NAFTA), now updated as the United States-Mexico-Canada Agreement (USMCA), and the European Union's single market, illustrate how countries seek to create more efficient trade environments by reducing or eliminating trade barriers (Felbermayr *et al*., 2020). These agreements help countries access larger markets for their products, encourage foreign direct investment, and promote the sharing of technology and knowledge.

However, trade is not without its complications. One significant criticism is that trade can exacerbate income inequality. While certain industries or regions benefit from increased export opportunities, others may be adversely affected by competition from abroad. For example, workers in industries that face competition from countries with lower labor costs may experience job losses or stagnant wages. This uneven distribution of benefits from trade can lead to social and economic divides within countries, especially if the workforce is not adequately retrained or supported. The rise of populist movements and protectionist policies in several countries in recent years has been, in part, a response to these concerns, with some governments opting to impose tariffs and other barriers to shield domestic industries from foreign competition (Autor *et al*., 2013). Additionally, trade can create dependence on foreign markets, which may expose countries to vulnerabilities. For example, if a country relies heavily on exports to a specific trading partner, a disruption in that partner's economy—due to a recession, a natural disaster, or geopolitical tensions—can severely impact the exporting nation's economy. This was clearly demonstrated during the 2008 global financial crisis, when a sharp reduction in global demand led to declines in trade volumes and economic output worldwide (Baldwin & Lopez-Gonzalez, 2015).

Despite these challenges, international trade has also been a powerful engine for economic growth. Countries that embrace trade tend to experience higher levels of innovation, efficiency, and economic development (Krugman & Obstfeld, 2018). Global value chains (GVCs), in which production is spread across multiple countries, have transformed industries by allowing nations to specialize in specific stages of production. For instance, a smartphone may be designed in the United States, have components manufactured in China, South Korea, and Japan, and be assembled in Vietnam. This globalized production process increases efficiency and allows for cheaper production, ultimately benefiting consumers worldwide (Gereffi & Fernandez-Stark, 2016). Moreover, trade fosters cultural exchange, as the

movement of goods, people, and ideas between countries enables societies to experience and learn from one another. This cultural exchange enriches societies and strengthens diplomatic and economic ties between nations. As countries become more integrated through trade, they also become more interconnected politically, which can promote peace and cooperation (Frieden, 2017).

Imports and exports are two core components of international trade, each playing a vital role in the global economy. Both are fundamental to the exchange of goods, services, and capital across borders, contributing to the economic interdependence of nations. Through the process of importing and exporting, countries can access a wider variety of products and services, gain from specialized production capabilities, and tap into global markets (Krugman *et al.*, 2018). Exports refer to the goods or services that a country produces domestically and sells to foreign markets. By exporting, countries can access larger markets, which allows businesses to scale their production and achieve economies of scale. This process helps drive economic growth and job creation, as industries that cater to export markets often experience higher levels of productivity. Exporting also enables nations to specialize in the production of goods and services where they hold a comparative advantage.

According to the principle of comparative advantage, as proposed by David Ricardo, countries can benefit from trade by focusing on producing goods they can make more efficiently than others, and then exchanging these goods for items they cannot produce as efficiently (Ricardo, 1817). This specialization leads to a more efficient allocation of global resources and allows countries to access products that they may not be able to produce domestically due to factors like geography, climate, or technology. Exports can also promote innovation and the adoption of new technologies. For instance, nations with strong export sectors often experience technological advancements as they compete in international

markets, driving industries to innovate to remain competitive (Krugman & Obstfeld, 2018). Countries like Japan and South Korea, which have highly export-oriented economies, are prime examples of how exports can stimulate industrial and technological development.

Imports refer to goods and services brought into a country from foreign markets. By importing, countries gain access to products that they cannot produce as efficiently or cheaply as other nations, whether due to limitations in domestic resources, technology, or cost structures. Imports allow consumers and businesses to access a wider range of goods and services, often at lower prices than if they were to produce them domestically (Krugman and Obstfeld, 2018). For example, countries with limited natural resources may import raw materials, while others may import high-tech goods or specialized products. This enables nations to enjoy a standard of living higher than they could achieve through domestic production alone. Additionally, importing goods that are produced more efficiently in other countries can lead to greater consumer choice and lower prices, contributing to economic welfare (Baldwin & Lopez-Gonzalez, 2015). Imports also play a critical role in supporting domestic industries. Many industries rely on imported intermediate goods—raw materials, components, and parts—to produce finished goods.

For example, the electronics industry often depends on imported microchips, which are then used in the production of smartphones, computers, and other electronic devices. These imports allow domestic manufacturers to focus on value-added processes like assembly, design, and branding, while benefiting from the specialized skills and technologies available in other countries (Baldwin & Lopez-Gonzalez, 2015). The interplay between imports and exports is central to a country's trade balance, which is a key indicator of its economic health. A country's trade balance is calculated as the difference between the value of its exports and imports. When a nation exports more than it imports, it is said to have a trade surplus. Conversely, when a country imports more than it exports, it experiences a trade deficit. Both

trade surpluses and deficits have significant implications for a country's economy, affecting factors such as employment, currency valuation, and overall economic stability (Krugman and Obstfeld, 2018; Baldwin & Lopez-Gonzalez, 2015).

A trade surplus can be seen as an indicator of a country's economic strength, as it suggests that the nation is producing goods and services that are in high demand in the global market. This leads to higher revenues for domestic producers and can contribute to economic growth. Countries with persistent trade surpluses often experience a boost in employment in export-oriented industries, such as manufacturing, agriculture, or technology, as these sectors expand to meet demand from foreign markets (Krugman & Obstfeld, 2018). Furthermore, a trade surplus can help strengthen the country's currency. When foreign buyers purchase goods from a country, they must often convert their currency into the domestic currency to complete transactions. This increased demand for the domestic currency can lead to currency appreciation, making imports cheaper for consumers and businesses (Baldwin & Lopez-Gonzalez, 2015). However, a consistently strong currency could hurt a country's exports in the long term, as it makes their goods more expensive for foreign buyers, which could lead to a reduction in demand.

Although a trade surplus can support economic growth, it can also lead to international tensions. Countries with large trade surpluses, particularly with major economic powers like the United States or the European Union, may face criticism for creating trade imbalances. The concern is that persistent surpluses in one country may be indicative of trade practices that distort fair competition, such as subsidies or currency manipulation. As a result, trade surpluses can sometimes prompt retaliatory measures or the imposition of tariffs, which can disrupt the global trade system (Baldwin & Lopez-Gonzalez, 2015). A trade deficit, on the other hand, occurs when a country imports more than it exports. While this situation may initially seem negative, it does not necessarily indicate economic decline. In some cases,

trade deficits can be a reflection of a country's robust demand for foreign goods, which may suggest that consumers are prosperous and able to afford imported products (Krugman & Obstfeld, 2018). Additionally, deficits may occur when a country invests heavily in foreign markets, borrowing capital from abroad to fund domestic development or infrastructure projects. This can spur future economic growth, as the investments made during periods of trade deficit may yield returns in the future.

However, sustained trade deficits can raise concerns, particularly when they are financed by borrowing. If a country relies on foreign debt to cover its trade deficit, it may face challenges when it comes to repaying that debt. A rising debt burden can lead to higher interest payments and a greater reliance on foreign investors, which increases the country's vulnerability to external economic shocks. For example, a sudden loss of confidence by foreign investors could lead to a sharp depreciation of the domestic currency, which would make imported goods more expensive and drive inflation (Baldwin & Lopez-Gonzalez, 2015). Trade deficits can also signal a loss of competitiveness in the domestic economy. If a country imports significantly more than it exports over a long period, it may indicate that domestic industries are unable to compete effectively on the global stage. This could be due to a variety of factors, such as higher labor costs, outdated technology, or inadequate infrastructure, which make domestic products less attractive compared to cheaper foreign alternatives. A persistent trade deficit could lead to job losses in certain sectors, particularly those that face heavy competition from imports, such as manufacturing (Krugman & Obstfeld, 2018).

Governments play a significant role in shaping the dynamics of imports and exports. Through trade policies, such as tariffs, quotas, and trade agreements, governments influence the flow of goods and services across borders. Tariffs, for example, can make imported goods more expensive, encouraging consumers to purchase domestically produced alternatives. Trade

agreements, on the other hand, aim to reduce trade barriers and increase market access for exports, creating a more favorable environment for international trade (Krugman *et al*., 2018). Governments often take actions to manage the effects of trade surpluses and deficits. A country experiencing a trade deficit might implement protectionist policies, such as tariffs, quotas, or subsidies for domestic industries, to reduce imports and promote exports. These policies are intended to support local industries by making foreign products more expensive, thus encouraging consumers to purchase domestically produced goods. However, protectionist measures can lead to trade tensions and may ultimately harm the economy by reducing overall efficiency, as countries may be less able to benefit from the comparative advantage of other nations (Krugman & Obstfeld, 2018).

On the other hand, trade surplus countries may face pressure to stimulate domestic consumption and reduce the reliance on exports. Some countries with large trade surpluses, like China, have been encouraged to adopt policies that increase domestic demand, thus reducing their dependence on external markets. In this way, trade policies and exchange rate management can influence the sustainability of trade imbalances and their broader economic effects (Baldwin & Lopez-Gonzalez, 2015). The globalization of supply chains has increased the significance of imports and exports, as countries depend on sourcing intermediate goods from multiple regions, assembling them into finished products, and re-exporting them globally. This interdependence has blurred the distinction between imports and exports, with nations acting as both producers and consumers. Historically, trade has been central to human development, from the early exchanges between Mesopotamia and the Indus Valley around 3000 BCE, through the Phoenician maritime trade, the Indian Ocean Trade Network, and the Silk Road, which facilitated not only commerce but also cultural and technological exchanges. The Trans-Saharan trade linked sub-Saharan Africa to Europe, while the Age of Exploration established global trade routes, resulting in the Columbian Exchange. In the modern era,

globalization and institutions like the WTO have accelerated trade liberalization and integration.

In Nigeria, imports play a crucial role in the economy, including refined petroleum products due to limited local refining capacity, agricultural products like wheat and maize to stabilize food prices, and manufactured goods and machinery to support industrial development. The country also imports processed foods and beverages under strict regulatory oversight and maintains a list of prohibited and restricted items to protect local industries. Recently, fuel importation has been affected by financial constraints and subsidy policy changes, leading to shortages and inflationary pressures. On the export side, Nigeria remains a major crude oil exporter, though production faces challenges from vandalism, theft, and declining investment. Efforts to diversify exports have led to growth in agricultural products such as cocoa, sesame, and cashews, with the Nigerian Export Promotion Council expanding market access. The launch of the Dangote Refinery in 2024 marks a shift toward exporting refined petroleum products, potentially reducing reliance on imports. Cocoa remains a key non-oil export, with Nigeria among the top global exporters, particularly to European markets. Under the AfCFTA agreement, Nigeria has increased exports of cassava, yams, and beans to African markets, supporting regional trade growth and economic diversification.

2.1.3 Price Level of Domestic Goods/Services

Price level refers to the changes in the prices of goods and services that are produced within a country over time. These fluctuations can have significant implications for both consumers and producers, influencing inflation, purchasing power, and overall economic stability. Price volatility is driven by various economic factors, including shifts in supply and demand, production costs, government policies, and external events such as natural disasters or global economic crises (Mankiw, 2021; Blanchard, 2017; Gawande & Krishna, 2003). Price level refers to the phenomenon of prices rising and falling over a period of time, influenced by

factors such as supply and demand, market conditions, and external events (Cambridge Dictionary, n.d.). Price levels of domestic goods and services have been paramount undermining economies that are heavily reliant on commodity imports. Such volatility can lead to economic instability, affect government revenues, disrupt investment plans, and impact exchange rates in these nations (Cashin & McDermott, 2002; World Bank, 2009).

Supply-Demand - One of the primary drivers of price levels is the basic economic principle of supply and demand. When demand for a good or service rises and supply remains constant or struggles to keep pace, prices tend to increase. Conversely, when supply exceeds demand, prices generally decrease. For instance, if there is a surge in demand for agricultural products due to population growth or changes in consumer preferences, prices may rise, particularly if supply is constrained. On the other hand, external factors such as a poor harvest or supply chain disruptions can reduce the availability of goods, resulting in price hikes (Mankiw, 2021).

Production Cost - Production costs also play a crucial role in the fluctuation of prices. Changes in the costs of labor, raw materials, and energy can directly influence the price of goods. For example, when the price of oil increases, transportation and manufacturing costs rise, which can lead to higher prices for goods that rely on these inputs. Similarly, wage increases or shortages of raw materials can increase production costs, which are often passed on to consumers in the form of higher prices. Conversely, technological advancements or efficiencies that lower production costs can lead to price reductions for consumers (Blanchard, 2017).

Exchange Rate Movements - Exchange rates can also have a significant impact on the prices of domestic goods, particularly for countries that depend on imported raw materials or intermediate goods. When a country's currency depreciates against other currencies, the cost

of imported goods rises, which can increase the cost of domestic goods that rely on these imports. For example, if a country's currency weakens relative to the U.S. dollar, the price of imported goods such as electronics or fuel will rise, which may lead to an increase in the price of domestically produced goods that use these inputs (Obstfeld & Rogoff, 2005).

Government policies and regulations can either exacerbate or mitigate price levels. Policies such as price controls, tariffs, and subsidies can all influence the prices of domestic goods. For example, price controls, intended to keep prices affordable, may lead to shortages if they are set too low. Tariffs on imported goods can protect local industries but also increase the price of imports, which may lead to higher prices for substitute domestic goods. Subsidies, on the other hand, can lower the production costs for certain industries and reduce price levels for consumers (Baldwin, 2017).

External shocks, such as natural disasters or geopolitical events, can also contribute to significant price levels. For instance, a natural disaster like Hurricane Katrina in the U.S. disrupted oil production, causing oil prices to spike and leading to higher prices for goods dependent on energy inputs. Similarly, the COVID-19 pandemic caused widespread disruptions in supply chains, leading to shortages and price increases across a range of goods globally (Gawande & Krishna, 2003). These types of external shocks often create short-term volatility in prices, as the economy adjusts to new supply and demand conditions.

Price levels, especially when they are persistent or extreme, can have significant economic and social implications. For consumers, fluctuating prices, particularly for essential goods like food and fuel, can reduce purchasing power and increase the cost of living. Inflationary pressures, resulting from rising prices, often affect lower-income households the most, as they spend a larger proportion of their income on these basic necessities. On the business side, price levels can create uncertainty, making it more difficult for firms to plan for the future

and invest in growth. Uncertainty over future costs may lead businesses to delay investments or pass on price increases to consumers, which further exacerbates inflation.

Some cases of price levels of local goods and services that occur due to shifts in supply and demand, production costs, changes in government policies, and external influences such as natural disasters or global economic events are as follows: Food Price Volatility in Developing Economies - In many developing countries, food prices are highly volatile. For example, in Nigeria, the prices of food staples such as rice, wheat, and maize have fluctuated due to factors like fluctuating agricultural productivity, exchange rate depreciation, and global commodity price movements. In 2020, food prices in Nigeria experienced sharp increases, largely due to supply chain disruptions caused by the COVID-19 pandemic, changes in the exchange rate, and transportation challenges (Akinmoladun *et al*., 2021). This price volatility has a direct impact on consumer welfare, as food constitutes a large portion of household expenditure in many developing economies; Fuel Price Changes - Fuel prices are highly susceptible to fluctuations in global oil prices and local government policies. In many countries, including Nigeria, changes in global crude oil prices often lead to corresponding changes in domestic fuel prices. For instance, in 2016, Nigeria experienced significant price hikes in petroleum products after the government removed fuel subsidies, which had kept fuel prices artificially low for several years (Omole, 2016).

The removal of subsidies resulted in a dramatic increase in fuel prices, causing widespread inflation and affecting the cost of transportation and other goods and services across the country; Exchange Rate Impact on Imported Goods - Fluctuations in exchange rates can directly affect the prices of domestically produced goods that rely on imported inputs. In Nigeria, for example, the depreciation of the Naira against the U.S. dollar in recent years has led to higher costs for imported goods and services, such as electronics and construction

materials, driving up their domestic prices. The rise in prices for imported goods often leads to increased prices for locally produced substitutes, exacerbating inflationary pressures on local consumers (Obstfeld & Rogoff, 2005); Seasonal Price levels in Agricultural Goods - In many countries, seasonal variations in production lead to periodic price levels in agricultural goods. For example, in India, the prices of fruits and vegetables often rise during off-season periods due to reduced supply. Similarly, the price of rice in Thailand and India fluctuates due to seasonal harvesting cycles and the impact of weather conditions on crop yields.

These seasonal fluctuations can affect the cost of living for consumers and lead to short-term inflationary pressures in local economies (Wright & Clegg, 2019); Price levels Due to Government Policy Changes - Local goods and services can experience price levels due to changes in government policies. For example, in Nigeria, the introduction of tariffs on imported goods has affected local markets, leading to higher prices for some goods. In 2019, the Nigerian government closed its borders to certain goods to promote domestic production. While this policy aimed to support local agriculture, it also caused the prices of goods such as rice and poultry to increase due to reduced imports and higher local demand (Baldwin, 2017). Such price changes can disrupt local markets and affect household consumption patterns.

2.2 Theoretical Literature Review

Basically, there are three major schools of thought on price level namely the classical-Monetarist, the Keynesians and the neo-Keynesians.

2.2.1 The Monetarists Theory

The monetarists, following the Quantity Theory of Money (QTM), have propounded that the quantity of money is the main determinant of the price level, or the value of money, such that any change in the quantity of money produces an exactly direct and proportionate change in the price level (Fisher, 1911). The QTM is traceable to Irving Fisher's famous equation of

exchange: MV ≡ PQ, where M stands for the stock of money; V for the velocity of money in circulation; Q is the volume of transactions which take place within the given period; while P stands for the general price level in the economy. Transforming the equation by substituting Y (total amount of goods and services exchanged for money) for Q, the equation of exchange becomes: MV ≡ PY. The introduction of Y provides the linkage between the monetary and the real side of the economy. In this framework, however, P, V, and Y are endogenously determined within the system. The variable M is the policy variable, which is exogenously determined by the monetary authorities. The monetarists emphasized that any change in the quantity of money affects only the price level or the monetary side of the economy, with the real sector of the economy totally insulated. This indicates that changes in the supply of money do not affect the real output of goods and services, but their values or the prices at which they are exchanged only. An essential feature of the monetarist model is that it focused on the long-run supply-side properties of the economy as opposed to the short-run dynamics (Dornbush, Fisher & Kearney, 1996).

The Keynesian opposed the monetarist's view of direct and proportional relationship between the quantity of money and prices. According to this school, the relationship between changes in the quantity of money and prices is non-proportional and indirect, through the rate of interest.

2.2.2 Keynesian Theory on Price Level

The Keynesian theory of the price level is rooted in the ideas of John Maynard Keynes, particularly from his work The General Theory of Employment, Interest and Money (1936). It focuses on how aggregate demand (AD) and aggregate supply (AS) determine output and prices in an economy. He advanced that in the short run, prices are relatively sticky or rigid, especially wages. Changes in aggregate demand (government spending, investment, consumption, net exports) influence output and employment more than prices and if AD

increases, firms increase output first, not prices. Price level rises only after full employment, once the economy reaches full employment (Y*), further increases in AD cause the price level to rise, since supply is inelastic.

Imports and exports in the context of price level and aggregate demand**,** are components of aggregate demand. In Keynesian theory, the total demand for goods and services (Aggregate Demand or AD) is:

$$AD = C + I + G + (X – M)$$

Where C is Consumption, I is Investment, G is Government spending, X is Exports and M is Imports.

Net exports (X - M) are crucial in determining the overall level of demand in the economy. Increased imports (M) reduce aggregate demand, since more money is spent on foreign goods. While lower AD leads to lower output and employment**,** not necessarily lower prices, especially when below full employment. So, in the Keynesian short run**,** higher imports may not reduce price level significantly, but may reduce domestic production. Conversely, higher exports (X) increase AD which leads to higher output and employment**,** not prices. If the economy is at or near full employment**,** more exports can cause demand-pull inflation—a rise in the price level.

The monetarist criticized Keynesian theory of price level because it ignored the role of money supply as a determinant of inflation, and opined that inflation is always and everywhere a monetary phenomenon. Furthermore the Keynesian could not explain the reasons for “stagflation”. New classical theory also opposed the Keynesian claims, that the theory ignored rational expectations of people, not just reactive behavior, for example if people anticipate government policies (like stimulus), they adjust their behavior, neutralizing the effects.

2.2.3 Purchasing Power Parity (PPP) Theory

The Purchasing Power Parity (PPP) Theory, propounded by Gustav Cassel in 1918. Cassel suggested that exchange rates should reflect the relative price levels between two countries. According to PPP, the exchange rate between two currencies should equal the ratio of the price levels of a basket of goods in each country. If this theory holds true, identical goods should cost the same in both countries when expressed in a common currency. Deviations from this parity often indicate that a currency is either overvalued or undervalued, depending on whether the exchange rate is above or below the level predicted by PPP (Rogoff, 2018). Thus, suggesting that exchange rates adjust so that identical goods cost the same across different countries when expressed in a common currency. When a currency depreciates, the price of imported goods increases, leading to inflation in domestic markets. If domestic producers rely on imported raw materials, production costs rise, leading to price levels in goods and services (Dornbusch & Krugman, 1976).

One of the criticisms of this assertion is that PPP assumes prices adjust quickly, but in reality, prices (especially in services and labor) are sticky and markets are imperfect. Wages, contracts, and regulations for example, can delay adjustments, especially in the short run. It was also argued that PPP is only relevant for tradable goods, many goods and services (like housing, electricity, haircuts) cannot be traded internationally, yet overall price indices include both.

2.2.4 The Exchange Rate Pass-Through Effect

The Exchange Rate Pass-Through Effect, it explains how exchange rate changes affect domestic prices. When a country's currency depreciates, import costs rise, and businesses may pass these additional costs to consumers. However, the extent of pass-through depends on market structure, trade openness, and monetary policy (Taylor, 2000). The exchange rate

pass-through effect explains how exchange rate fluctuations, influenced by export trade, affect domestic price levels. When exports increase, demand for the local currency rises, leading to appreciation. A stronger currency can reduce the cost of imports, stabilizing domestic prices. However, in cases where exports rely on imported inputs, currency appreciation may not offset inflationary pressures (Taylor, 2000). The concept of ERPT did not originate from a single economist or a specific date like many classical theories. Instead, it evolved gradually through empirical research in the fields of international trade and macroeconomics, particularly from the 1970s onward. Early academic discussions can be traced to economists analyzing the effects of exchange rate changes on import prices during periods of floating exchange rates, especially after the collapse of the Bretton Woods system in 1971. Researchers like Dornbusch (1973) and Krugman later contributed significantly to the understanding of pricing behavior in open economies, particularly through models of pricing-to-market and sticky prices. However, ERPT as a formal concept gained more attention in the 1980s and 1990s, especially in IMF and World Bank studies focused on inflation and exchange rate management in developing and emerging economies.

Despite its importance, ERPT has faced various criticisms. One major criticism is that it assumes a direct and linear relationship between exchange rate changes and prices, whereas in reality, the transmission can be non-linear and context-dependent. For instance, a small depreciation may have no noticeable effect on prices, but a large one might trigger significant inflation. Another critique is that it ignores the role of firm behavior and market structure. In competitive markets, firms may absorb costs to maintain market share, which weakens the pass-through effect. Also, ERPT often overlooks the impact of currency invoicing. If imports are priced in a dominant foreign currency like the US dollar, the local exchange rate might have a delayed or muted effect on final prices. Moreover, critics argue that ERPT models tend to oversimplify global value chains, where inputs cross multiple borders before reaching

consumers, making it difficult to isolate the pure effect of exchange rates on end-prices. Lastly, the theory has been challenged for its weaker empirical validity in the short run, as many studies find inconsistent or delayed price responses to exchange rate changes, especially in economies with stable inflation and strong monetary frameworks.

2.3 Empirical Literature Review

Here are some notable empirical works that investigated the impact of exchange rate, imports, and exports on the price level in Nigeria. These studies were arranged into two sub-headings namely exchange rate depreciation and price level in Nigeria and international trade and price level in Nigeria.

2.3.1 Exchange Rate Depreciation and Price level in Nigeria

Alege and Osabohien (2019) used the Autoregressive Distributed Lag ARDL approach in their paper, Exchange Rate and Inflation Nexus in Nigeria covering 1981-2017 periods. The study found a strong positive link between depreciation and inflation and recommended economic diversification to reduce dependence on imports. Nwachukwu and Egwaikhide (2019), using Structural Vector Autoregression SVAR, studied Exchange Rate Dynamics and Inflationary Pressures in Nigeria with data from 1980-2015. The research identified import prices as the main transmission channel of depreciation-induced inflation and recommended boosting domestic production.

Balogun (2020) examined The Impact of Exchange Rate Fluctuation on Inflation in Nigeria with data from 1986-2018, using the Autoregression Distributed Lag ARDL method. The study found that depreciation significantly influences inflation and suggested maintaining a managed floating exchange regime. Okonkwo (2021) in Exchange Rate Policy and Inflation in Nigeria: An Empirical Investigation spanning the period 1986-2019, applied Autoregression Distributed Lag ARDL to demonstrate that exchange rate depreciation is a

significant inflation driver. The recommendation was to combine fiscal discipline with monetary tightening.

Yusuf (2021), in Exchange Rate and Inflation in Nigeria: Evidence from 1981–2020, used Error Correction Model ECM analysis and found a long-run relationship between exchange rate depreciation and inflation. The study recommended macroeconomic stability measures. Emeka and Omojolaibi (2022), in their disaggregated analysis titled Exchange Rate Pass-Through to Inflation in Nigeria, the data span was for a 40-year period of 1980 to 2020. They employed panel regression and discovered that the exchange rate's effect on inflation varies by sector. They advised sector-specific inflation management strategies.

Adegbite and Adebayo (2022) applied VAR in their study Monetary Policy, Exchange Rate Depreciation, and Price Stability in Nigeria. Data span was for 1986 to 2020 period. The results showed that effective monetary policy can mitigate inflation caused by depreciation. They recommended timely use of contractionary policy tools. Lawal (2020), in Exchange Rate Depreciation and Food Price Inflation in Nigeria, used the Generalized Auto-regressive Conditional Heteroskedasticity GARCH model to analyze data spanning a period of 1990-2018. The study found out that food prices are highly sensitive to exchange rate depreciation. He recommended input subsidies and support for domestic agriculture.

Onifade and Apanisile (2023) conducted a threshold regression in their study, Exchange Rate Instability and Inflation in Nigeria: A Threshold Analysis. The study period covered 1981 to 2021. They found inflation increases significantly once depreciation exceeds a certain threshold. The recommendation was to implement capital flow controls. Bello and Aluko (2021) used Vector Auto-regression VAR and Impulse Response Functions IRFs in their study Exchange Rate Depreciation and Core versus Headline Inflation in Nigeria. The

study covered the period 1986 to 2019. The findings revealed different lag effects on core and headline inflation. They recommended better inflation forecasting models.

Study by Okechukwu, Nwokoye, Okoye, Nwokocha, Eze, Onwuka, and Ekwugha (2023) explored the relationship between Nigeria's exchange rate and inflation, utilizing the Autoregressive Distributed Lag (ARDL) model, spanning a period of 1990 to 2021. Findings revealed a positive relationship between exchange rate fluctuations and inflation. This means that as the exchange rate increases (depreciates), inflation tends to rise. However, despite this positive relationship, the impact of exchange rate on inflation was found to be statistically insignificant in their analysis. This implies that, although exchange rate movements and inflation might be correlated, this correlation does not hold enough statistical weight to conclude that exchange rate changes directly and reliably drive inflation in the Nigerian context. The statistical insignificance of this relationship suggests that the impact of exchange rate fluctuations on inflation may not be as strong as anticipated. This highlights the importance of considering a broader set of factors when analyzing inflationary trends in emerging economies like Nigeria.

Eze and Ezeani (2019), using a Vector Autoregressive (VAR) model, explored the impact of exchange rate depreciation on consumer prices in Nigeria, analyzing data from 1990 to 2017. They found that depreciation led to sharp increases in consumer prices, especially in the food and transportation sectors. Their recommendation centers on reducing exchange rate volatility and strengthening local production to cushion the effects of depreciation. Onwumere and Okoroafor (2020) analyzed the effect of exchange rate depreciation on Nigeria’s manufacturing sector performance, using time series data from 2000 to 2019. Their study showed that depreciation made imported raw materials more expensive, thus hindering

productivity in the manufacturing sector. They suggest that increased investment in local manufacturing and policies supporting export-oriented industries could alleviate these effects.

Finally, Bello and Akintoye (2021) used the Granger Causality test to investigate the relationship between exchange rate changes and price instability, analyzing data from 1986 to 2020. They found a bidirectional causality, where exchange rate depreciation and price instability influenced each other. Their recommendation is to adopt flexible exchange rate policies coupled with targeted inflation control measures to break this cycle. The study of Valogo, Olayemi and Ibrahim (2023) examined the dynamics of exchange rate pass-through (ERPT) to domestic prices in Nigeria, employing a non-linear threshold regression model to assess the relationship between exchange rate movements and domestic prices. This research analyzed quarterly data from 2000 and 2023 focusing on exchange rate depreciation on various price indices in Nigeria. The analysis revealed a 5% depreciation threshold of the Nigerian naira, beyond which the pass-through effect to consumer prices becomes statistically significant. It was suggested that policymakers should monitor exchange rate movements closely and implement measures to prevent sharp depreciations that exceed the identified threshold, thereby mitigating inflationary pressures.

Atuma, Bright, Nwibo, Nkwagu, Udenta, Njim, Ogbonna and Uwaeke (2024) investigated the impact of exchange rate depreciation on Nigeria's import demand from 1986 to 2021. Employing an ex-post facto research design, the authors utilized the Auto-Regressive Distributed Lag (ARDL) model to analyze both short-run and long-run relationships among the variables. The study found that in the short run, exchange rate depreciation negatively affected import demand, but the effect was not statistically significant. However, in the long run, exchange rate depreciation had a statistically significant negative impact on import demand. The error correction mechanism indicated a significant adjustment towards long-run

equilibrium. Additionally, causality tests revealed a unidirectional relationship from import demand to exchange rate depreciation. Based on these findings, the study recommends that the Nigerian government should strengthen import substitution policies to enhance domestic production and reduce reliance on imports.

2.3.2 International Trade and Price level In Nigeria

Aigheyisi and Isikhuemen (2019) did a study on trade and financial openness, and output growth volatility: Evidence from Nigeria utilizing the Autoregressive Distributed Lag (ARDL) Bounds Testing Approach to Cointegration and Generalized Autoregressive Conditional Heteroskedasticity (GARCH) models. Analyzing data from 1970 to 2015 it was found that trade openness and financial openness exacerbate output growth volatility in the long run. The study recommends cautious liberalization and development of the financial system to stabilize output growth. Sakanko and David (2019) investigated trade openness and inflation: empirical explanation of the nexus in Nigeria. They utilized the Autoregressive Distribution Lag (ARDL). Findings showed both short-run and long-run analyses were significant positive relationship in Nigeria. The study recommended that policies that mitigate the inflationary effects of trade openness should be implemented, such as strengthening domestic production capacities.

Ajayi and Oguntomi (2022) Impact of International Trade on Nigeria Economic Growth: Evidence on Trade Cost. Methodology employed was the Ordinary Least Squares (OLS) technique to analyze data from 1960 to 2021. The study found that trade costs, measured via consumer price index and inflation, have a significant negative effect on GDP in the long run. This underscores the adverse impact of high trade costs on Nigeria's economic growth. Commodity Price Shock and Economic Performance: An Empirical Evidence for Nigeria according to Abdullahi, Duru, Umar, and Maikudi (2023) utilized a Multivariate Generalized

Autoregressive Conditional Heteroscedasticity (MGARCH) model to analyze data from 1980 to 2021. The study revealed that commodity price shocks have significant effects on Nigeria's economic performance, with past innovations causing positive volatility shocks. It recommends diversification towards agricultural production to stabilize the real exchange rate and mitigate the impact of global commodity price levels.

Oil price shock and macroeconomic aggregates: Empirical evidence from Nigeria was conducted by Adesete and Bankole (2020) using the Structural Vector Autoregressive (SVAR) Approach. Findings showed that oil price shocks negatively impact economic growth, import, investment, inflation, and exchange rate, except export in the long term. It was recommended that Nigeria should reduce over-reliance on crude oil earnings by developing other key sectors such as agriculture and mining. Atoyebi, Oseni, Ogede, and Adegboyega (2023) did a study on unraveling the relationship between trade openness, economic growth, and financial development in Nigeria. The methodology was Autoregressive Distributed Lag (ARDL) model analyzing data from 1990 to 2021. The Findings indicated positive long-term relationship between trade openness and financial development, while economic growth has a negative short-term impact on financial expansion. The study recommends that Nigerian should implement trade liberalization policies that promote financial development. This includes enhancing financial intermediation and ensuring that trade openness strategies are aligned with financial sector reforms to foster sustainable economic growth.

According to Afolabi (2020) study, Financial Development, Trade Openness, and Economic Growth in Nigeria using time series data from 1981 to 2018 and employing econometric techniques such as cointegration analysis and vector error correction models (VECM), Afolabi examines both the short-run and long-run relationships among the variables. The

analysis confirms that both financial development and trade openness have a positive and statistically significant impact on Nigeria's economic growth, particularly in the long run. The key recommendation from the study is that Nigeria should pursue policies that enhance financial sector efficiency and reduce trade barriers. This includes strengthening the regulatory framework for financial institutions and promoting export diversification to maximize the growth benefits of openness.

Impact of Trade Openness on Economic Development in Nigeria, a study by Bala, Ambi, Hadith, and Baba (2021) investigated the relationship between Nigeria's trade liberalization policies and its broader economic development outcomes. Using annual time series data and employing an autoregressive distributed lag (ARDL) model. The dataset spans multiple decades from 1986 to 2019, capturing shifts in trade policy and economic reforms in Nigeria. The authors find that trade openness has a mixed effect: while it contributes positively to economic development in the long run, its short-run impact is volatile and sometimes negative due to external shocks and the country's overdependence on imports. The key recommendation is that trade openness should be complemented with sound industrial policies, investment in export-driven sectors, and improved trade infrastructure.

The study titled "Trade Openness and Economic Development in Nigeria" by Abubakar, Bala, and Elijah (2022) provides an insightful examination of how Nigeria's engagement with international trade has influenced its broader economic development outcomes. Using annual time series data from 1981 to 2020, the study employed the Autoregressive Distributed Lag (ARDL) model to estimate both short-run and long-run relationships between trade openness and economic development indicators. Their analysis shows that trade openness positively influences economic development in the long run, primarily by encouraging foreign investment, increasing access to technology, and stimulating competition in domestic markets.

It was recommended that Nigeria should leverage trade openness strategically by developing its domestic production base, especially in manufacturing and agriculture, and by investing in trade-related infrastructure.

Ari, Jibir, and Hassan (2022) worked on the Impact of Trade Openness and FDI on Nigeria's Economic Growth, using the combined effects of trade openness and Foreign Direct Investment (FDI) on Nigeria's economic growth, revisiting the ongoing debate on their relationship. The study provided updated insights, affirming that both trade openness and FDI have a positive influence on Nigeria's economic growth. The authors recommend a more targeted approach to attracting FDI and facilitating trade liberalization, emphasizing the need for structural reforms to improve the business environment. Nwadike, Johnmary and Alamba (2020) authored a paper, Impact of Trade Openness on Nigerian Economic Growth: An Empirical Investigation, using econometric techniques, focusing on a time series analysis to assess the impact of trade openness on Nigeria's economic growth over a period from 1970 to 2011. The authors employed the cointegration and error correction model (ECM) to analyze long-term and short-term dynamics. The study concludes that trade openness has a positive significant impact on Nigeria's economic growth. The findings suggest that GDP responds positively to shocks in trade openness, particularly in the long run. Trade liberalization has contributed to enhanced economic growth by increasing access to foreign markets and foreign capital. Promoting trade openness as a key strategy for stimulating economic growth was recommended.

Tule, Salisu and Ebuh (2019) utilized the Nonlinear Autoregressive Distributed Lag (NARDL) model to investigate the asymmetric effects of positive and negative changes in inflation on Nigeria's trade balance. The NARDL approach allows for the examination of both short-run and long-run asymmetric relationships. The study likely used time series data

for Nigeria. Findings revealed that positive and negative changes in inflation have different impacts on the trade balance. For instance, high inflation might worsen the trade balance more significantly than the improvement caused by low inflation. The study recommended that policymakers should aim for stable and low inflation to foster a favorable trade balance. Exchange Rate Fluctuations and Trade Balance in Nigeria, an empirical work by Godfrey and Agwu (2019), used cointegration and error correction model (ECM) techniques, the study analyzed time series between 1980 to 2018 data to determine both the long-run equilibrium relationship and the short-run dynamics between the variables. The cointegration results suggest a significant long-term relationship, while the ECM reveals how quickly deviations from equilibrium are corrected over time. These findings underscore the importance of exchange rate stability in maintaining a favorable trade balance and suggest that effective exchange rate policies are essential for long-term trade performance in Nigeria.

The study "Export Growth and Inflation: Evidence from Sub-Saharan Africa" by Adewuyi and Olufemi (2020), explored the relationship between export performance and inflation across twelve Sub-Saharan African countries, including Nigeria. Using panel data analysis covering the period from 2000 to 2018, the authors examine how different categories of exports influence domestic price levels. The results reveal that export growth—particularly in non-oil sectors—has a deflationary impact on inflation, suggesting that increased export activities help to stabilize prices by boosting foreign exchange earnings and easing supply constraints. Based on these findings, the authors recommend that policymakers prioritize export diversification strategies as a tool to control inflation and promote long-term economic stability. Similarly, Akinlo and Igbatayo (2019) investigated the effects of trade openness and imports on inflation in Nigeria using data from 1980 to 2017. Applying the Granger causality test and co-integration analysis, their findings indicated that both trade openness and rising imports contributed significantly to inflationary pressures. They recommended that the

government implement policies to limit excessive importation by supporting domestic industries and improving the trade balance.

Ijomah and Odunsi (2020), focusing on developing economies including Nigeria, assessed how export activity influences price stability. Drawing on data from 2005 to 2019 and employing the Generalized Method of Moments (GMM), their study revealed that increased exports contribute to price stability by easing supply-side constraints and boosting foreign exchange inflows. They urged policymakers in developing countries to promote export diversification as a means of controlling inflation and achieving macroeconomic stability. Finally, Omojolaibi and Adebayo (2021) explored the inflationary impact of trade liberalization in Nigeria from 1990 to 2019, using an Error Correction Model (ECM). Their results showed that liberalization had led to increased imports and subsequent inflationary pressures, although rising exports helped to moderate some of these effects. They recommended a gradual liberalization approach, ensuring that local industries are adequately protected while encouraging export growth to stabilize prices over the long term.

2.5 Gaps in the Literature

Although several studies have examined the relationship between exchange rates, international trade, and price levels, significant gaps remain, particularly in the Nigerian context. First, much of the existing literature focuses on the direct impact of exchange rate fluctuations on inflation but does not sufficiently capture the combined interaction among exchange rate, import trade, and export trade on domestic price levels. This narrow approach fails to provide a holistic understanding of how these variables interact simultaneously to influence price dynamics. Second, while studies have assessed the effect of export trade on economic growth and foreign exchange earnings, relatively few have analyzed its direct influence on the price level of domestic products. This creates a gap in understanding how

rising or falling exports affect domestic inflationary pressures, particularly in an economy heavily dependent on both imported and exported goods.

Third, the literature is limited in its treatment of import trade as a determinant of price levels beyond simple cost-push inflation arguments. Few studies have examined how the structure, composition, and regulatory environment of imports (e.g., government policies on import tariffs, restrictions, and subsidies) affect domestic prices over time. Finally, there is insufficient empirical work investigating whether exchange rate movements moderate the relationship between import trade and price levels. Understanding this moderating effect is crucial in economies like Nigeria, where exchange rate volatility directly affects the cost of imports and, consequently, domestic prices. This gap highlights the need for studies that integrate exchange rate dynamics into the analysis of import-price relationships to provide evidence-based policy recommendations.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The chapter is categorized into theoretical framework, model specification, estimation process and techniques.

3.2 Theoretical Framework

The theoretical framework in this study seeks to explain the relationship between exchange rate, import and export trades on price levels in Nigeria. This chapter examines the relevant theory that provides insights into the effect of import, export and exchange rate dynamics on price level in Nigeria and the applicable model of study.

3.2.1 The Monetarists Theory

The theory guiding this study is the famous quantity theory of money (QTM) propounded by Fisher (1911). The monetarists used the quantity theory of money as the framework for explaining the relationship between money supply and the price level. However, this relationship will also be modified to include output. In its simplest form, the quantity theory of money says that changes in money supply are followed by equal changes in the inflation rate and, through the force of the Fisher effect, in the nominal interest rate. The quantity theory of money is a measure of the extent to which inflation movements can be explained by purely monetary forces.

The starting point of the quantity theory of money is the popular identity:

$$MV \equiv PY \quad \text{.....(3.0)}$$

Where M is money supply, V is the velocity of money, Y is real output (GDP), and P is price level. If we move to price fluctuation rates, we can express this equation as:

In an open economy context, the QTM implies that changes in the money supply influence the price level and, through relative price changes, affect international competitiveness, exports, and imports. An increase in the money supply, assuming velocity is constant and output changes slowly, leads to higher domestic price levels. This results in a real exchange rate depreciation, making domestic goods cheaper for foreigners and thus potentially boosting exports. In contrast, a contractionary monetary policy (reduced money supply) tends to lower domestic price levels, leading to real appreciation and a reduction in exports, as domestic goods become more expensive relative to foreign goods. Therefore, exchange rate fluctuations and monetary expansion/contraction directly affect net exports through their impact on relative prices.

3.3 Model Specification

Following this theoretical framework, the study estimates the relationship and adopts a time series econometric approach to analyze the effects of import (IMP), export (EXP), and exchange rate depreciation (EXRT) on the price level (proxied by Inflation - INF) in Nigeria, under the theoretical lens of the Quantity Theory of Money (QTM). The functional model assumes that inflation or changes in the price level are fundamentally driven by changes in money supply (MS), velocity of money (V), and the real output (Y), thus:

$$INF = f(EXRT, IMP, EXP, EXRT*IMP, IR, GFCF) \quad \ldots\ldots(3.1)$$

Therefore, the linear model would look thus:

$$INF = \beta_0 + \beta_1 EXRT_t + \beta_2 EXP_t + \beta_3 IMP_t + \beta_4 (EXRT*IMP)_t + \beta_5 IR_t + \beta_6 GFCF + \mu_t, \quad \ldots\ldots(3.2)$$

Where:

- INF = Inflation rate
- $EXRT_t$ = Exchange rate (Naira/USD) at time *t*

- IMP_t = Total value of imports of goods and services to GDP ratio at time *t*
- EXP_t = Total value of export of goods and services to GDP ratio at time *t*
- IR = Lending interest rate
- GFCF = Gross fixed capital formation (proxy for domestic investment)
- μ_t = Error term
- β_i : Parameters to be estimated

3.4.1 Definition of the Variables

S/N	Label	Description	Sources
i.	INF	Price level (proxied as inflation)	Central Bank of Nigeria, Statistical Bulletin (2025)
ii.	EXRT	Exchange rate (Naira/USD) is the nominal exchange rate of the Naira against the U.S. dollar**,** typically taken from the parallel market rate.	Central Bank of Nigeria, Statistical Bulletin (2025)
iii.	IMP	Total value of goods and services bought from other countries.	
iv.	EXP	Total value of goods and services sold to other countries.	
iii.	IMP*EXP	Total value of goods and services imported/exported to GDP ratio.	Central Bank of Nigeria, Statistical Bulletin (2025)
	IR	Lending interest rate is a control variable to signify the monetary policy stance on investment.	Central Bank of Nigeria, Statistical Bulletin (2025)
	GFCF	Gross fixed capital formation is the measure of the net increase in capital within an economy. This is used here as a control variable proxy for domestic investment.	Central Bank of Nigeria, Statistical Bulletin (2025)

Source: Author's compilation (2025)

A-priori Expectations

1. **Exchange rate (EXRT): $\beta > 0$** – Depreciation raises import costs, fueling inflation.
2. **Exports/GDP (EXP): $\gamma \leq 0$** – Stronger exports ease balance-of-payments and supply constraints, reducing inflation (though demand booms may cause mild inflation).
3. **Imports/GDP (IMP): $\delta \leq 0$** – More imports increase supply and ease prices; can be inflationary if dominated by costly inputs.

4. **Gap (EXRT − IMP): η > 0 or ambiguous** – Depreciation without offsetting imports raises inflation; effect depends on relative size.
5. **Interest rate (IR): φ < 0** – Higher rates dampen demand, easing inflation; effect may be weak in Nigeria.
6. **Gross Fixed Capital Formation (GFCF): χ ≤ 0** – Investment expands capacity (disinflationary long run), but may raise demand (inflationary short run).
7. **Error-correction term (ρ): ρ < 0** – Negative and significant, ensuring stable adjustment to equilibrium.

Note: Short-run effects may differ (e.g., GFCF can raise inflation initially). Structural factors like subsidies, price controls, and exchange restrictions may also alter expected signs.

3.4.2 Autoregressive Distributed Lag (ARDL) Model Specification

Accordingly, the combined ARDL model for examining the impact of exchange rate variation, imports, exports, and other control variables on inflation in Nigeria is specified as follows:

$$\Delta INF_t = \alpha_0 + \sum\alpha_1\Delta INF_{t-I} + \sum\alpha_2\Delta EXRT_{t-I} + \sum\alpha_3\Delta EXP_{t-I} + \sum\alpha_4\Delta IMP_{t-I} + \sum\alpha_5\Delta(EXRT*IMP)_{t-I} + \sum\alpha_6\Delta IR_{t-I} + \sum\alpha_7\Delta GFCF_{t-I} + \lambda_1 INF_{t-1} + \lambda_2 EXRT_{t-1} + \lambda_3 EXP_{t-1} + \lambda_4 IMP_{t-1} + \lambda_5(EXRT*IMP)_{t-1} + \lambda_6 IR_{t-1} + \lambda_7 GFCF_{t-1} + \varepsilon t \qquad (3.3)$$

Error Correction Mechanism (ECM) or restricted version of ARDL model in equation 3.3

$$\Delta INF_t = \alpha_0 + \sum\alpha_1\Delta INF_{t-I} + \sum\alpha_2\Delta EXRT_{t-I} + \sum\alpha_3\Delta EXP_{t-I} + \sum\alpha_4\Delta IMP_{t-I} + \sum\alpha_5\Delta(EXRT*IMP)_{t-I} + \sum\alpha_6\Delta IR_{t-I} + \sum\alpha_7\Delta GFCF_{t-I} + \lambda_1 INF_{t-1} + \lambda_2 EXRT_{t-1} + \lambda_3 EXP_{t-1} + \lambda_4 IMP_{t-1} + \lambda_5(EXRT*IMP)_{t-1} + \lambda_6 IR_{t-1} + \lambda_7 GFCF_{t-1} + \varepsilon t \qquad (3.4)$$

Where:

- Δ denotes the first difference operator,
- α_0 is the intercept,
- α_i captures the short-run dynamic effects,
- λ_i represents the long-run coefficients, and
- ε_t is the white-noise error term.

3.5 Methods of Data Analysis

The empirical analysis emphasizes the monetary dynamics affecting real output and external trade, assuming a relatively stable velocity of money and the endogenous response of prices and output to monetary shocks.

3.5.1 Descriptive Statistics

The data for this study consist of variables such as Inflation INF, Exchange Rate EXRT, Imports IMP, Exports EXP and Gross Fixed Capital Formation GFCF. Exemplified with their statistical tools like mean, standard deviation, skewness, kurtosis, and Jarque-Bera test. With the purpose of understanding distribution and basic characteristics of data.

3.5.2 Correlation Analysis

Pearson correlation coefficient statistical tool would be utilized, using the Quantity Theory of Money (QTM) as your theoretical foundation. Correlation coefficient (r) analysis will help to examine the strength and direction of the linear relationship between inflation INF (proxy for price level), exchange rate EXRT, imports IMP, exports EXP, interest rate IR, and Gross Fixed Capital Formation GFCF (proxy for domestic investment). It is expected that INF and GFCF are positively correlated, negative correlation between EXP and INF.

3.5.3 Unit Root Test (Stationarity Test)

Prior to estimation, the time series properties of the variables are assessed using the Augmented Dickey-Fuller (ADF) unit root test to ensure stationarity. This is necessary because non-stationary data can lead to spurious regression results. If the variables are integrated of other one, the first differences are used, and Johansen co-integration tests are conducted to identify any long-run equilibrium relationship among the variables.

3.5.4 Co-integration Test

The Johansen co-integration technique, Johansen (1988, 1995) was utilized in the study given the fact that the study adopted a multivariable model. The fact that the variables are co-integrated implies that there is an adjustment process, which prevents errors in the long-run relationship from becoming larger and larger. Co-integration analysis helps to identify long-run economic relationships between two or more variables. It is important to test for co-integration because if two non- stationary variables are co-integrated, a vector autoregressive model in first difference may lead to misspecification and invalid inferences of the model (Masih & Masih, 1996). Such a time series is modeled using generalized method of moments (GMM). The Johansen trace test and the maximum eigenvalue test are used. Time series diagnostic tests are employed such as Ramsey RESET test for the entire structural stability of the model in line with underlining classical assumptions; residual diagnostic tests like Histogram normality test, Breusch Godfrey serial correlation LM test, Breusch-Pagan-Godfrey (BPG) and ARCH Heteroskedasticity tests. The software for the analysis is the E-VIEWS econometric software.

3.5.5 Auto-Regression Distributed Lag (ARDL)

In this study, the ARDL approach was adopted to examine the dynamic relationship between exchange rate, international trade (exports and imports), and domestic price fluctuations in

Nigeria. The mixed integration order of the variables, as revealed by the Augmented Dickey-Fuller (ADF) unit root tests, justified the use of ARDL. The bounds testing procedure was employed to confirm the existence of a long-run relationship, while the short-run error correction model provided insights into the immediate drivers of price instability. This methodological choice ensures robustness, reliability, and policy relevance of the results, especially in addressing Nigeria's structural inflationary challenges.

3.6 Sources of Data

The data for this study covers the period 1990 to 2023. The nature of this study necessitated the use of secondary data from various sources; Central Bank of Nigeria (CBN) for data on exchange rates, and inflation; National Bureau of Statistics (NBS) for data on inflation, GDP, imports and exports and World Bank and International Monetary Fund (IMF) for macroeconomic data on Nigeria.

CHAPTER FOUR

DATA PRESENTATIONS, DATA ANALYSIS AND DISCUSSION OF RESULTS

4.0 Presentation and Interpretation of Regression Results

This chapter presents the data, results of the empirical analysis, and their interpretation in line with the objectives of the study. It begins with a description of the sources and characteristics of the data, followed by preliminary analyses such as descriptive statistics and correlation tests. The chapter then reports the outcomes of econometric tests including unit root, co-integration, and model estimation. The results are discussed in relation to the research questions and hypotheses, highlighting both short-run and long-run dynamics. Finally, the findings are compared with existing literature to provide a robust discussion.

4.1 Descriptive Statistics

The descriptive statistics of the variables used in the study are reported in Table 4.1.

Table 4.1: Descriptive Statistics of the Variables

	INF	EXR	EXPT	IMP	IR	GFCF
Mean	18.49486	115.2871	23.72241	31.36897	3.078962	28.23107
Maximum	72.83550	306.0837	41.70000	45.40000	18.18000	53.12219
Minimum	5.388008	8.038285	9.220000	20.50000	-31.4526	14.16873
Std. Dev.	17.14224	83.09229	8.115221	7.135980	10.8149	11.91809
Skewness	2.019549	0.576691	0.302508	0.485549	-1.29467	0.399545
Kurtosis	5.907345	2.996246	2.528034	2.082965	4.922643	1.908131
Jarque-Bera	29.92675	1.607452	0.711463	2.155645	12.56828	2.212124
Probability	0.000000	0.447658	0.700661	0.340336	0.001866	0.330859

Source: Authors' compilation (2025) using output from E-views 10.0

In Table 4.1, Price level as proxied by inflation rate (INF) has a mean of 18.49 for the period under study, revealing a generally high inflationary environment over the study period. and it has a standard deviation of 17.82, showing a minimal deviation from the mean. The maximum and minimum values of INF for the period are 72.83 and 5.38, respectively. The

value of skewness for INF is 2.019. This implies that the distribution of INF is slightly skewed to the right. Its kurtosis value of 5.90, which is above 3, indicates that the distribution of INF is not around the normal peak. The Jarque-Bera value of 29.92 with a probability less than 5 percent indicates that inflation data is not normally distributed.

The real effective exchange rate (EXR) has an average value of 115 naira with a standard deviation of 83.09. The maximum and minimum official exchange rates for the period under consideration are 306 and 8 naira, respectively. Its skewness value is 0.57, indicating that the distribution of the exchange rate is positively skewed. Its Kurtosis (2.99) indicates that the distribution is mesokurtic. The Jarque-Bera value of 1.60 with a probability value greater than 5 percent suggests that the variable is normally distributed. The export trade proxied by the percentage of total export of goods and services to GDP for uniformity of magnitude for variables (EXPT) has an average value of 23.72 percent with a standard deviation of 8.11. The maximum and minimum export to GDP ratio for the period under consideration are 41.70%, and 9.22% respectively. Its skewness value stood at 0.30 indicating that the distribution of export is positively skewed. Its Kurtosis (2.52) indicates that the distribution close to the normal range of 3 and it is mesokurtic. The Jarque-Bera value of 0.71 with probability value of 0.7006 which is greater than 5 percent suggests that the variable is normally distributed.

The import trade proxied by the percentage of total import of goods and services to GDP for uniformity of magnitude for variables (IMP) has an average value of 31.36 percent with a standard deviation of 7.13. The maximum and minimum import to GDP ratio for the period under consideration are 45.40%, and 20.50% respectively. The average, maximum and minimum values of both the export and import values revealed that Nigeria's import outweighs its export. Import skewness value stood at 0.48 indicating that the distribution of export is positively skewed. Its Kurtosis (2.08) indicates that the distribution close to the

normal range of 3 and it is mesokurtic. The Jarque-Bera value of 2.15 with probability value of 0.3402 which is greater than 5 percent suggests that the import is normally distributed.

The average value of the first control variable, interest rate (IR) for the period under review is 3.07 percent. The maximum and minimum values are 18.18% and -31.45% respectively. The skewness value (-1.29) shows that the interest rate is negatively skewed. Its Kurtosis (4.92) indicates that the distribution is highly peaked. The Jarque-Bera value of 2.56 with a probability value of 0.0018 suggests that the variable is not normally distributed.

The gross fixed capital formation, being a control variable and a proxy for domestic investment (GFCF) has an average value of 28.23 percent with a standard deviation of 11.91. The maximum and minimum GFCF for the period under consideration are 53.12% and 14.16% respectively. Its skewness value stood at 0.39, indicating that the distribution of GFCF is positively skewed. Its Kurtosis (1.90). The Jarque-Bera value of 2.21 with a probability value of 0.3308, which is greater than 5 percent, suggests that the domestic investment is normally distributed.

4.2 Correlation Coefficient Result

The correlation matrix for all the variables in the model of the study is reported in Table 4.2

Table 4.2: Correlation Matrix

	INF	EXR	EXPT	IMP	IR	GFCF
INF	1.000000					
EXR	-0.423552	1.000000				
EXPT	-0.070575	-0.517930	1.000000			
IMP	-0.171988	0.826809	-0.616072	1.000000		
IR	-0.828341	0.363049	-0.118972	0.210737	1.000000	
GFCF	0.416623	-0.847801	0.462322	-0.836251	-0.340518	1.000000

*Source**:** Authors' compilation (2025) using output from E-views 10.0*

From Table 4.2, the correlation statistics show that all the explanatory variables have a negative correlation with price level (INF) except for gross fixed capital formation (GFCF),

which is moderately and positively correlated with INF going with a correlation coefficient value of 0.4166. The correlation coefficient between the independent variables was found to be less than 0.90. Based on the weak and moderate association between the independent variables, it therefore implies that there is no possibility of the presence of a multicollinearity problem in the model.

4.3 Unit Root Tests

In this section, the summary of the unit root results using Augmented Dickey-Fuller tests at levels and first differences are presented and discussed as follows:

Table 4.3: Unit Root Tests at Levels and First Difference

Variables	Levels			Remarks	First Difference			Remarks
	ADF Stats	5% Crit. Value	Prob		ADF Stats	5% Crit. Value	Prob.	
INF	-2.1706	-2.9540	0.2202	Non-Stationary	-4.6296	-2.9571	0.0008	Stationary
EXR	0.7508	-1.9524	0.8711	Non-Stationary	-4.6014	-1.9524	0.0000	Stationary
EXPT	-1.6935	-1.9520	0.0851	Non-Stationary	-5.4900	-1.9520	0.0000	Stationary
IMP	1.7895	-2.9604	0.9996	Non-Stationary	-5.0558	-2.9604	0.0003	Stationary
IR	-0.1140	-2.9639	0.9396	Noon-Stationary	-4.1426	-2.9639	0.0031	Stationary
GFCF	-3.3875	-1.9533	0.0015	Stationary	--------	---------	-------	--------

Source: Authors' compilation (2025) Results Extract from E-Views 10.0

The unit root test results in Table 4.3 reveal that the variables used in this study exhibit a mixed order of integration, meaning some are stationary at levels while others become stationary only after first differencing. Specifically, inflation (INF) is non-stationary at levels as absolute value of the ADF statistic (–2.1706) is greater than the 5% critical value (–2.9540) with a probability of 0.2202, but it attains stationarity at first difference with a significant

ADF statistic (–4.6296, p = 0.0008). This implies that inflation follows an I(1) process, showing persistent trends over time that require differencing for stability. Similarly, the exchange rate (EXR) is non-stationary at levels (ADF = 0.7508, p = 0.8711), indicating a random walk behavior in its raw form. However, it becomes stationary at first difference (ADF = –4.6014, p = 0.0000), suggesting that shocks to the exchange rate have permanent effects, but differencing ensures mean reversion. Export (EXPT) and import (IMP) variables follow the same pattern, being non-stationary at levels but attaining stationarity after first differencing, confirming that they are also integrated of order one, I(1). This reflects that Nigeria's trade flows are prone to fluctuations that persist unless adjusted through differencing.

In contrast, gross fixed capital formation (GFCF) is stationary at levels, with its ADF statistic (absolute value) (–3.3875) being higher than the 5% critical value (–1.9533) and a probability of 0.0015. This indicates it is integrated of order zero, I(0), implying that capital formation data is relatively stable around a constant mean and shocks are temporary. The interest rate (IR) is initially non-stationary (ADF = –0.1140, p = 0.9396) but becomes stationary at first difference (ADF = –4.1426, p = 0.0031), suggesting that monetary policy rates are also subject to persistent shocks but eventually stabilize after differencing. Overall, the results confirm that most of the variables, including inflation, exchange rate, imports, exports, and interest rate, are I(1), while GFCF is I(0). The mixed integration order justifies the application of the Autoregressive Distributed Lag (ARDL) technique for the estimation.

4.4 Lag Selection Criterion

The lag selection results from the Vector error correction model were employed to determine the appropriate lag criterion. It is as presented in Table 4.4.

Table 4.4: Lag Selection Criterion Result

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-767.6395	NA	1.96e+16	57.38070	57.71666	57.48060
1	-603.2831	231.3164	4.34e+12	48.83579	51.52345	49.63497
2	-481.3761	108.3618*	4.65e+10*	43.43527*	48.47464*	44.93374*

Source: Author's compilation (2025), using output from Eviews 10.

The optimal lag length for this model is 2. This is decided based on the recommendation of the Akaike information criterion.

4.5 Bounds Test for Cointegration

Table 4.5 Bounds Test for Cointegration

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic:n=1000	
F-statistic	4.773720	10%	1.99	2.94
k	6	5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99

Source: Author's compilation (2025), using output from Eviews 10.

From Table 4.5 above, the F-statistic of 4.773 is greater than the critical values of 2.27 and 3.28 which represent the 5% significance level for the upper and lower bound, respectively. Therefore, we reject the null hypothesis of no levels of co-integrating relationship, hence, there is a long-run relationship between the endogenous and the exogenous variables in the model. The ARDL estimation of this model (see appendix) recommends a ARDL (3, 0, 1, 1,1, 2, 2) model. The short-run error correction estimation is presented in Table 4.6 below.

4.5.1 The Short Run Error Correction Result

Table 4.5.1 Short Run Error Correction Result

Dependent Variable		**AGP**		
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(INF(-1))	-0.775394*	0.112491	-6.89293	0.0001
D(INF(-2))	-0.464232*	0.107793	-4.306682	0.0020
D(EXPT)	0.000961	0.206251	0.004661	0.9964
D(IMP)	15.56779*	2.108333	7.383935	0.0000
D(EXR_IMP)	-0.007869*	0.001336	-5.890707	0.0002
D(IR)	-0.248614	0.185274	-1.341872	0.2125
D(IR(-1))	-0.375028**	0.124884	-3.003006	0.0149
D(GFCF)	0.531712	0.329902	1.611728	0.1415
D(GFCF(-1))	-2.044432*	0.470609	-4.344221	0.0019
CointEq(-1)*	-0.244029*	0.029616	-8.239715	0.0000
R-Squared	0.9654	**Means Dependent Var**		18.130
Adjusted R Squared	0.9040	**S.D dependent Var**		17.192
F-Statistics	15.71			
Prob(F Statistics)	0.0001			

Source: Author's compilation (2025), using output from Eviews 10.*, **,* signifies statistical significance at 1%, 5% and 10%.**

The short-run dynamic results in Table 4.5.1 show the responsiveness of the aggregate price level (INF) to changes in the explanatory variables. Starting with inflation, both its first and second lags are negative and highly significant at 1% (coefficients –0.7753 and –0.4642, respectively). This suggests that all things being equal, past inflation exerts a dampening effect on current aggregate prices, indicating a form of mean reversion where previous inflationary pressures correct themselves over time. The strong significance implies that inflationary dynamics play a crucial short-term role in shaping domestic price behavior in Nigeria.

Exports (EXPT), however, appear statistically insignificant ($p = 0.9964$), suggesting that in the short run, export performance does not exert any direct influence on domestic price levels. This result is plausible given Nigeria's export structure, which is dominated by crude oil commodity whose price transmission into local inflation is largely indirect through foreign exchange earnings rather than immediate price-setting mechanisms. In contrast, imports (IMP) have a large positive and significant coefficient (15.5677, $p < 0.01$), showing that increases in imports substantially raise domestic prices in the short run. This highlights Nigeria's heavy dependence on imported goods and inputs, where rising imports amplify inflationary tendencies due to exchange rate pass-through.

The interaction term between exchange rate and imports (EXR*IMP) carries a negative and highly significant coefficient (–0.0078, $p < 0.01$). This implies that ceteris paribus, exchange rate depreciation moderates the impact of imports on domestic prices, potentially because depreciation raises the cost of imports and thus discourages excessive importation. However, the overall inflationary pressure persists, reinforcing the vulnerability of Nigeria's price level to foreign exchange movements.

Interest rate (IR) is not significant contemporaneously, but its lagged value (IR(-1)) is negative and significant at 5% (–0.3750, $p = 0.0149$). This indicates that all things being equal, monetary policy adjustments in the form of interest rate changes affect domestic prices with a lag, providing evidence of delayed transmission from monetary policy to inflation control. Gross fixed capital formation (GFCF) shows mixed effects-while its contemporaneous coefficient is insignificant, the lagged value is negative and highly significant (–2.0444, $p < 0.01$). This suggests that all things being equal, past capital formation investments contribute to reducing price levels by boosting productive capacity and easing supply constraints in the short-run.

Importantly, the coefficient of the error correction term (CointEq(-1)) is negative (–0.2440) and highly significant at 1%. This confirms the existence of a long-run equilibrium relationship among the variables and indicates that about 24.4% of disequilibrium is corrected each period toward long-run stability. The high R-squared (0.9654) and adjusted R-squared (0.9040) show strong explanatory power of the model, while the F-statistic (15.71, p = 0.0001) confirms overall model significance. In sum, the short-run results demonstrate that inflation dynamics, imports, exchange rate–import interactions, interest rate (lagged), and capital formation (lagged) significantly influence price levels in Nigeria. Exports, by contrast, show no immediate short-term effect. This underscores the dominance of import dependency and exchange rate movements in shaping Nigeria's inflationary environment.

4.5.2. Long Run Result

Table 4.5.2 Estimated Long Run Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR	1.748077	4.399278	0.397355	0.7004
EXPT	1.712976	3.790758	0.451882	0.6620
IMP	16.62010	32.60704	0.509709	0.6225
EXR_IMP	-0.042041	0.101777	-0.413068	0.6892
IR	2.302519	5.684722	0.405036	0.6949
GFCF	12.01589	22.08555	0.544061	0.5996
C	-974.0345	1921.524	-0.506907	0.6244

Source: Author's compilation (2025), using output from E-views 10. *, **,* signifies statistical significance at 1%, 5% and 10%.**

The long-run estimation results in Table 4.5.2 indicate that none of the explanatory variables is statistically significant in explaining domestic price levels in Nigeria. Exchange rate (EXR) has a positive but insignificant coefficient (1.7480, p = 0.7004), suggesting that in the long run all things being equal, exchange rate depreciation has a positive but insignificant

influence on domestic prices. This finding implies that while exchange rate volatility is critical in the short run, its long-run pass-through to inflation may be offset by other structural factors such as monetary policy adjustments, parallel market interventions, or domestic production adjustments.

Similarly, exports (EXPT) have a positive but insignificant effect (1.7129, p = 0.6620), showing that Nigeria's export activities-dominated by crude oil, do not translate into long-run price. This result reinforces the argument that oil exports mainly affect government revenue and foreign reserves rather than directly influencing consumer price levels. Imports (IMP), despite being highly significant in the short run, appear positive but insignificant in the long run (16.6201, p = 0.6225). This suggests that holding other factors constant, while Nigeria's dependence on imports triggers immediate inflationary pressures, long-run adjustments, such as trade substitution, local production responses, or policy interventions, reduce their sustained effect on prices.

The interaction of exchange rate and imports (EXR*IMP) also shows an insignificant negative coefficient (–0.0420, p = 0.6892), indicating that in the long run all things being equal, exchange rate depreciation reduces inflation but does not significantly moderate the import–price nexus. Likewise, interest rate (IR) has a positive but insignificant coefficient (2.3025, p = 0.6949), implying that monetary policy through interest rate adjustments lacks strong long-term transmission effects on inflation. Gross fixed capital formation (GFCF), though positive (12.0158), is also insignificant (p = 0.5996), suggesting that investment-led supply responses in Nigeria are weak in influencing long-run price stability, possibly due to structural bottlenecks, infrastructural deficiencies, and poor absorptive capacity of investment flows.

The constant term is negative but insignificant, indicating that even after accounting for other factors, domestic prices are not strongly explained by the model in the long run. Overall, the insignificance of all variables highlights that the short-run dynamics are the key drivers of price levels in Nigeria, while long-run influences remain muted, likely due to persistent structural rigidities, policy inconsistencies, and heavy dependence on oil exports.

4.6 Post Diagnostic Test Results

After the ARDL estimation, the test for autocorrelation and heteroscedasticity was carried out. The Breusch-Godfrey Test is used to test for autocorrelation above the Durbin-Watson statistics. The Breusch-Pagan-Godfrey Test for heteroscedasticity was used in this study. The test assumes the error variances are due to a linear function of one or more explanatory variables in the model. The normality test for the residual series was carried it using the Histogram and Jarque-Bera normality test. Finally, we used the CUSUM diagram to check the reliability of the data.

4.6.1. Autocorrelation

Table 4.6.1 Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.955963	Prob. F(1,8)	0.3568
Obs*R-squared	2.775251	Prob. Chi-Square(1)	0.0957

Source: Authors' Computation Using Eviews 10, (2025)

The test for serial correlation has its null hypothesis that there is no serial correlation in the residuals. The p-values of the F-statistic and Obs*R-squared of 0.3568 and 0.0957 were found to be non-significant, hence we accept the null hypothesis of no serial correlation in the residuals for the model.

4.6.2 Test for Heteroskedasticity

Table 4.6.2 Breusch-Pagan-Godfrey Heteroskedasticity Test

F-statistic	0.566008	Prob. F(16,9)	0.8464
Obs*R-squared	13.04041	Prob. Chi-Square(16)	0.6698
Scaled explained SS	1.505071	Prob. Chi-Square(16)	1.0000

Source: Authors Computation Using Eviews 10, (2025)

The test for heteroscedasticity with a null hypothesis that there is homoscedasticity. From the table above, the p-values of the F-statistics and the Obs*R-squared are 0.8464 and 0.6698 which are greater than 0.05 (5% critical value) so, we accept the null hypothesis of no heteroscedasticity in estimated Model.

4.6.3 Normality Test

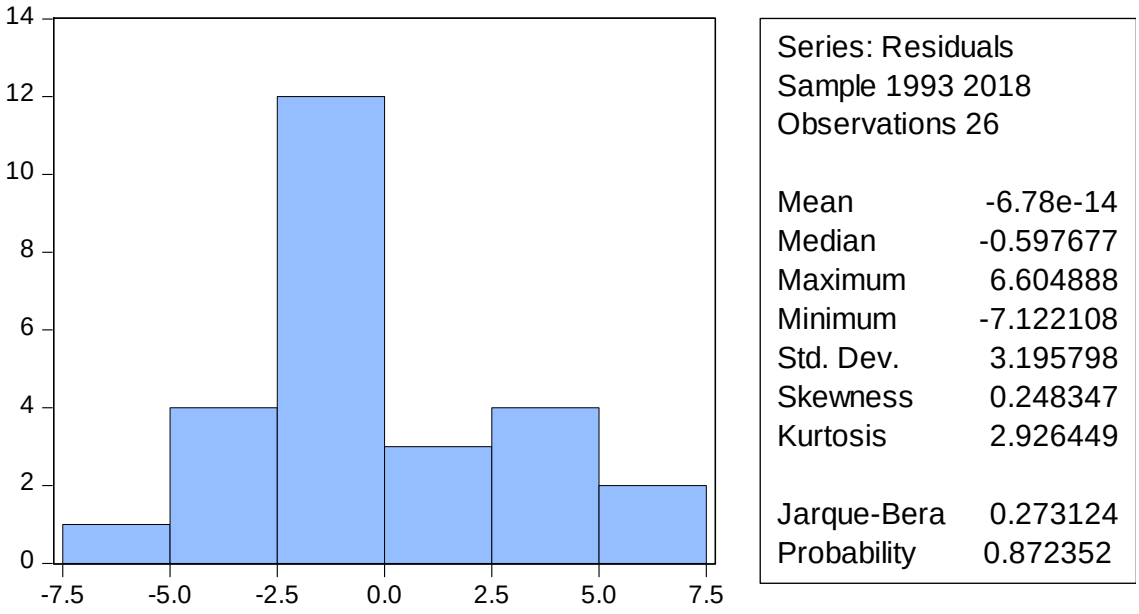
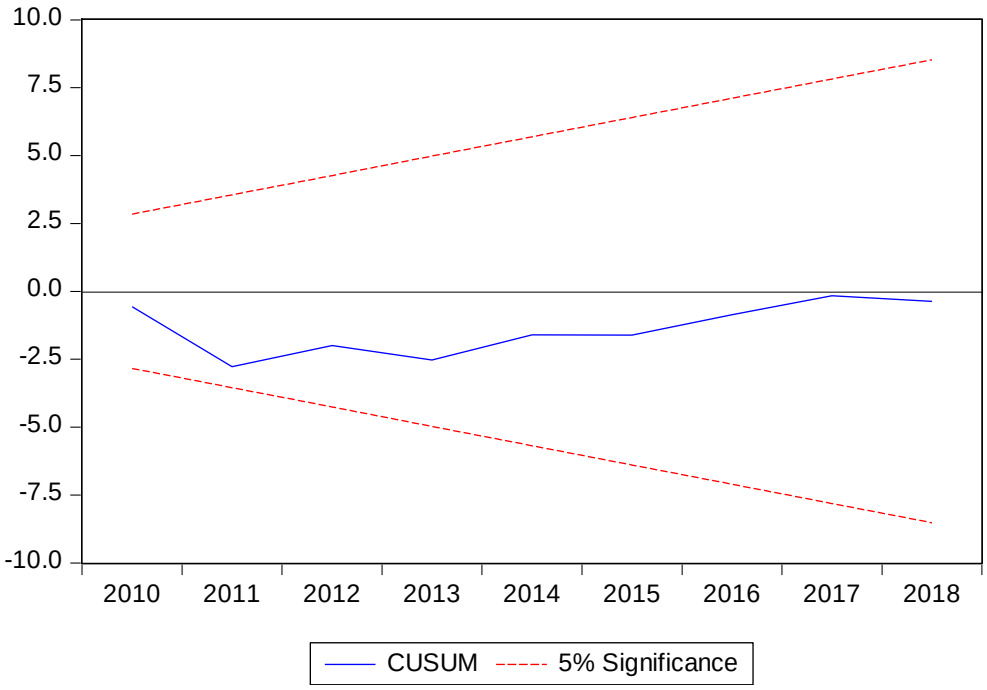


Figure 4.1 Histogram Normality Test

The Jarque-Bera value of 0.2731 and its probability value of 0.8723 which is greater than 0.05 indicates that the residual series maintained a normal distribution as shown above and thus, we will not reject the null hypothesis that the residual series are normally distributed.

4.6.4 CUSUM Reliability Test



The CUSUM test was applied to assess the stability of the coefficients of the estimated ARDL model over the study period. The test is based on the cumulative sum of recursive residuals, and its plot is compared with the 5% significance boundaries. From the CUSUM graph presented in the appendix, the blue line representing the cumulative residuals lies within the two red 5% critical boundaries throughout the sample period. This indicates that the estimated parameters are stable and there is no evidence of structural instability in the model. Hence, the model is reliable for both short-run and long-run policy inferences. If the CUSUM of Squares (CUSUMSQ) graph is also considered, it similarly shows that the residuals remain within the critical bounds, confirming variance stability and absence of major structural breaks in the model. This further validates the robustness of the estimated

ARDL results. In sum, the CUSUM test confirms that the econometric model used in this study is stable, consistent, and suitable for policy recommendations on the link between exchange rate, international trade, and price levels in Nigeria.

4.7 Test for Hypotheses

Hypothesis One:

H_0 : Exchange rate has no impact on the price of domestic products in Nigeria.

Exchange rate (EXR) was found to have a positive but insignificant coefficient (1.7480, $p = 0.7004$), suggesting that in the long run, exchange rate depreciation has a positive but insignificant influence on domestic prices. This finding implies that while exchange rate volatility is critical in the short run, its long-run pass-through to inflation may be offset by other structural factors such as monetary policy adjustments, parallel market interventions, or domestic production adjustments. The short-run results in Table 4.6 clearly show that exchange rate movements significantly affect domestic prices, particularly through their interaction with imports. The exchange rate–import interaction term (EXR*IMP) is negative and highly significant (–0.0078, $p < 0.01$). This suggests that exchange rate depreciation amplifies the cost of imports, discourages excessive importation, and thereby influences the inflationary path of domestic prices. Imports themselves also exhibit a strong positive and significant coefficient (15.5677, $p < 0.01$), confirming that Nigeria's heavy reliance on imported consumer goods and raw materials makes domestic prices highly sensitive to foreign exchange fluctuations.

The null hypothesis is rejected in the short run, confirming that exchange rate has a significant impact on the price of domestic products in Nigeria.

Hypothesis Two:

H_0 : Export trade has no impact on the price of domestic products in Nigeria.

From the short-run error correction results in Table 4.5.1, export trade (EXPT) is statistically insignificant (coefficient = 0.000961, p = 0.9964). This means that in the short term, fluctuations in Nigeria's export trade do not have any meaningful direct impact on the domestic price of goods and services. The long-run results in Table 4.5.2 also show that exports remain insignificant (coefficient = 1.7129, p = 0.6620). This suggests that even over time, Nigeria's export trade does not play a significant role in stabilizing or destabilizing domestic price levels. Instead, other factors-such as import dependence, exchange rate volatility, and structural rigidities-remain more influential in shaping inflationary outcomes. On this basis, the null hypothesis (H_0) that export trade has no impact on domestic prices cannot be rejected.

Hypothesis Three:

H_0 : Import trade has no impact on the price of domestic products in Nigeria.

The short-run error correction results in Table 4.6 reveal that imports exert a very strong and statistically significant impact on domestic prices. The coefficient of imports (IMP) is 15.5677 with a probability of 0.0000, making it significant at the 1% level. This implies that a unit increase in imports leads to a substantial rise in domestic price levels in the short run. Nigeria's heavy reliance on imported consumer goods, intermediate inputs, and capital equipment makes the economy highly vulnerable to imported inflation. When imports increase, higher costs are transmitted directly into local prices, thereby fueling inflationary pressures. In the long-run estimation (Table 4.5.2), imports appear positive but insignificant (coefficient = 16.6201, p = 0.6225). This suggests that while imports strongly drive inflation in the short run, their impact weakens in the long run due to adjustments such as consumer

substitution, government interventions (e.g., tariffs, restrictions, subsidies), and local production responses. Thus, imports remain a short-run driver of price instability rather than a sustained long-run determinant. Based on the evidence, the null hypothesis (H_0) that import trade has no impact on domestic prices is rejected.

Hypothesis Four:

H_0 : Exchange rate has no moderating effect on the relationship between import trade and domestic prices in Nigeria.

The short-run error correction results (Table 4.5.1) provide clear evidence that the exchange rate significantly moderates the relationship between imports and domestic prices. The coefficient of the interaction term between exchange rate and imports (EXR*IMP) is –0.0078 and statistically significant at the 1% level (p = 0.0002). This negative coefficient indicates that while imports alone increase domestic prices, the exchange rate dampens this effect when it depreciates. In practical terms, naira depreciation raises the cost of imports, thereby discouraging excessive importation, which in turn reduces the extent to which import trade fuels inflation. Thus, exchange rate dynamics serve as a corrective force, altering the magnitude of imported inflation in the short run. In the long run, however, the interaction term (EXR*IMP) becomes insignificant (coefficient = –0.0420, p = 0.6892, Table 4.5.2). Based on the short-run evidence, the null hypothesis (H_0) that the exchange rate has no moderating effect on the import–domestic price nexus is rejected**.** \

4.8 Discussion and Policy Implications of Findings

The findings of this study provide important insights into the dynamics between exchange rate, international trade, and domestic price levels in Nigeria. The short-run results demonstrate that imports and the exchange rate–import interaction are the most significant drivers of price instability. Specifically,

Also, imports was found to exert a strong inflationary effect on domestic prices, consistent with the Imported Inflation Hypothesis, which holds that heavy reliance on foreign goods exposes an economy to external price shocks. Nigeria's dependence on imported food, energy, and manufactured products means that any increase in imports quickly translates into higher inflation. This highlights the vulnerability of Nigeria's price system to external trade shocks. This finding aligns with several empirical studies. Adeniran *et al*. (2014) found that import dependence significantly explains Nigeria's inflation in the short term, while Akinlo & Lawal (2015) emphasized that import pass-through into consumer prices is immediate due to the structure of Nigeria's consumption basket. More recently, Ogunmuyiwa & Francis (2020) argued that Nigeria suffers from "structural import dependence," making imported inflation the most dominant source of price instability.

The moderating role of the exchange rate in the short run is equally crucial. The negative and significant coefficient of the exchange rate–import interaction term suggests that depreciation of the naira raises the cost of imports, discouraging excessive importation, and thus reducing import-driven inflationary pressures. This finding aligns with earlier empirical studies Olowe and Oseni (2016), which found that exchange rate depreciation significantly alters the import–inflation relationship in Nigeria by raising import costs and discouraging import dependence. Similarly, Akinlo and Lawal (2015) reported that while imports raise inflation, exchange rate fluctuations condition the size of this effect by limiting Nigeria's access to cheap foreign goods. More recently, Nchor and Adamec (2021) emphasized that in developing economies, exchange rate volatility is a key determinant of the extent to which imports transmit into domestic prices.

The result supports the Exchange Rate Pass-Through Theory**,** which argues that exchange rate volatility influences domestic prices by altering import costs. Policy-wise, this means that exchange rate management can be used as a tool to control the inflationary effects of

imports, though care must be taken to balance the trade-offs, as prolonged depreciation could harm investment and growth. Inflation dynamics, as captured by its lags, were also found to be highly significant, indicating that Nigeria experiences strong inflation persistence. This suggests that past inflationary shocks continue to influence current prices, reinforcing the need for consistent and credible anti-inflationary policies. The lagged effect of interest rates indicates that monetary policy measures affect prices with a delay, reflecting weak and sluggish policy transmission channels. Gross fixed capital formation, significant only in its lagged form, shows that investment in productive capacity helps ease supply-side constraints and reduce inflationary pressures, but these benefits materialize over time rather than immediately.

Exports, by contrast, had no significant effect on domestic prices in either the short or long run. This finding reflects the structural reality of Nigeria's export sector, which is dominated by crude oil, a commodity whose earnings improve external reserves but do not directly impact consumer goods prices. This finding confirms empirical studies Okonkwo and Ukeje (2018) which found that while exports contribute significantly to Nigeria's foreign exchange earnings, they have no direct short-term effect on inflation. Similarly, Akinlo and Adejumo (2014) noted that Nigeria's oil export revenue is largely disconnected from domestic price stability due to weak industrialization and over-reliance on imports. These studies support the finding that export trade does not significantly influence domestic prices in Nigeria, either in the short term or the long term.

This outcome aligns with the Structuralist Theory of Inflation, which argues that inflation in developing economies is driven by structural bottlenecks and external dependence rather than trade surpluses. The long-run results further confirm that exchange rate, exports, imports, and investment have little explanatory power over domestic prices once structural rigidities and policy interventions are taken into account. The policy implications of these findings are

multifaceted. First, efforts to reduce import dependence are critical to controlling inflation. This requires encouraging local production, diversifying the economy, and strengthening industrial capacity. Second, exchange rate management should aim at stability rather than abrupt depreciation or appreciation, as volatility exacerbates inflationary pressures. Third, monetary policy needs to be more effective, with interest rate adjustments complemented by fiscal measures to ensure stronger and faster transmission to price stability. Fourth, export diversification into non-oil sectors is essential, not only to strengthen external reserves but also to link export growth to domestic production and inflation control. Finally, sustained investment in infrastructure and productive sectors is vital to addressing supply-side bottlenecks that fuel inflationary persistence. In summary, the results underscore that Nigeria's price levels are largely short-run phenomena shaped by import dependence, exchange rate movements, and inflation persistence. Structural reforms that reduce reliance on imports, stabilize the exchange rate, and enhance productive capacity are therefore essential for achieving long-term price stability.

CHAPTER FIVE

SUMMARY OF FINDINGS, RECOMMENDATIONS, AND CONCLUSION

5.1 Introduction

This chapter comprises five sections. The first section is a summary of the findings of this study. In the second section, policy recommendations are made in line with the findings of the study. The third section discussed the contributions made by this study to the body of knowledge, while the fourth section highlighted some areas for further research work. The study was concluded in the fifth section.

5.2 Summary of Findings

This study examined the impact of exchange rate and international trade on domestic price levels in Nigeria, using annual time series data covering the period 1990–2023. The specific objectives were to investigate the effects of exchange rate, export trade, and import trade on domestic prices, as well as to assess whether exchange depreciation rate moderates the relationship between imports and price levels. The research was anchored on theoretical foundations such as the Purchasing Power Parity (PPP) Theory, the Law of One Price, the Imported Inflation Hypothesis, and the Structuralist Theory of Inflation, all of which emphasize the link between external trade dynamics and domestic price behavior. The review of related literature revealed mixed evidence across countries. In developed economies, exchange rate pass-through to inflation tends to be weak due to diversified production bases and stable macroeconomic structures, while in developing economies like Nigeria, inflation is heavily influenced by exchange rate volatility and import dependence. Prior studies in Nigeria largely agree that depreciation of the naira fuels inflationary pressures, especially in the short run, due to structural reliance on imported goods.

Methodologically, the study employed Augmented Dickey-Fuller (ADF) unit root tests, and ARDL bounds cointegration techniques, and both short-run and long-run error correction

models, using data sourced from the Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS), and World Bank. The unit root test results indicated that most variables (inflation, exchange rate, imports, exports, and interest rate) were integrated of order one, I(1), while gross fixed capital formation was stationary at level, I(0). The ARDL bounds test confirmed the existence of a long-run relationship among the variables. Diagnostic tests (autocorrelation, heteroskedasticity, normality, and CUSUM stability) validated the robustness and reliability of the model. The empirical results revealed several key findings. First, in the short run, imports exerted a strong positive and significant effect on domestic prices, underscoring Nigeria's vulnerability to imported inflation. Second, the interaction term between exchange rate and imports was negative and significant, indicating that exchange rate depreciation moderates the extent to which imports fuel inflationary pressures. Third, inflation itself exhibited persistence through significant lagged effects, highlighting the tendency of past price shocks to influence current price dynamics. Interest rate and gross fixed capital formation influenced prices only with a lag, suggesting delayed policy and investment effects. Fourth, exports were found to be insignificant in both the short run and long run, reflecting Nigeria's dependence on crude oil exports, which do not directly impact domestic consumer prices. Finally, in the long run, all variables-including exchange rate, imports, exports, interest rate, and investment-were statistically insignificant, suggesting that structural rigidities and policy interventions dilute their long-term influence on domestic prices.

5.3 Recommendations

Based on the result gotten, the following recommendations were proposed by the study;

i. **Reduce Import Dependence through Industrialization:** Since imports significantly drive domestic price levels, Nigeria must reduce its reliance on

imported consumer and intermediate goods. Policies should prioritize industrialization, expansion of agro-processing, and support for small and medium enterprises (SMEs) in manufacturing to substitute imports with locally produced goods.

ii. **Stabilize the Exchange Rate through Policy Coordination:** Exchange rate volatility amplifies inflationary pressures. The Central Bank of Nigeria (CBN) should maintain a more transparent, market-reflective exchange rate regime while coordinating with fiscal authorities to align trade, industrial, and monetary policies for naira stability.

iii. **Promote Export Diversification into Non-Oil Sectors:** The insignificance of exports in influencing domestic prices reflects overreliance on crude oil. Nigeria should diversify exports into agriculture, solid minerals, and manufactured goods. This would not only boost foreign exchange reserves but also strengthen backward linkages that benefit domestic production and prices.

iv. **Strengthen Monetary Policy Transmission:** Interest rate effects on inflation are delayed and weak. The CBN should improve policy transmission by deepening financial markets, expanding credit channels, and enhancing access to finance for productive sectors, ensuring that interest rate adjustments more quickly influence domestic prices.

v. **Manage the Exchange Rate Volatility:** Monetary authorities should actively manage exchange rate volatility in the short run, as exchange rate movements significantly moderate the inflationary impact of imports, helping to reduce imported inflation and stabilize domestic prices in Nigeria.

5.4 Contributions to Knowledge

Firstly, unlike many previous studies that analyzed exchange rate and imports separately, this research introduced an interaction term (EXR*IMP) to capture the moderating role of exchange rate on import-induced inflation. The finding that exchange rate depreciation significantly moderates the impact of imports on domestic prices provides a new perspective on the indirect role of exchange rate in Nigeria's inflationary process.

Secondly, while earlier studies often emphasized long-run effects of exchange rate and trade variables, this study provides new evidence that in the short-run imports and exchange rate interactions-are the dominant drivers of price levels in Nigeria. This shifts the focus of policy discussions toward managing short-run shocks rather than relying solely on long-run structural adjustments. Thirdly, the significance of lagged inflation in the model highlights the persistence of price shocks in Nigeria, confirming that past inflation strongly influences current inflationary outcomes. This extends previous findings by quantifying the degree of inflation inertia, which is critical for the design of credible anti-inflationary policies.

Fourthly, the study contributes to knowledge by empirically showing that Nigeria's exports, dominated by crude oil, have no direct influence on domestic prices in both the short and long run. This adds to the debate on the limited role of resource-dependent exports in shaping inflationary outcomes and underscores the importance of export diversification. Fiftly, the results demonstrate that interest rate and gross fixed capital formation affect prices only with a lag, providing new insights into the time dimension of policy effectiveness and investment impact. This finding adds depth to existing studies by showing that monetary and investment policies do not produce immediate effects, but rather take time to influence price stability. Lastly, by employing the ARDL bounds testing approach alongside comprehensive diagnostic tests (heteroskedasticity, autocorrelation, normality, and CUSUM stability), the study enhances the methodological rigor of exchange rate–inflation research in Nigeria. This

ensures robust results and improves the reliability of policy implications compared to earlier works that relied solely on traditional cointegration methods.

In sum, this study expands the literature by demonstrating that Nigeria's inflationary pressures are primarily short-run and import-driven, with exchange rate playing a crucial moderating role. It introduces new methodological and empirical insights that provide a richer understanding of how international trade and exchange rate dynamics jointly influence domestic price behavior.

5.5 Conclusion

This study set out to examine the relationship between exchange rate, international trade, and domestic price levels in Nigeria over the period 1990–2023. Guided by theories such as the Purchasing Power Parity (PPP) Theory, the Law of One Price, and the Structuralist Theory of Inflation**,** the research employed econometric techniques including ADF unit root tests, ARDL bounds testing, and short- and long-run error correction models.

The results provide clear evidence that Nigeria's price levels are largely driven by short-run factors, with import trade and exchange rate volatility playing dominant roles. Imports were found to significantly fuel domestic prices, confirming the vulnerability of Nigeria's economy to imported inflation. More importantly, the exchange rate was shown to moderate this relationship, as depreciation of the naira raises the cost of imports and alters their inflationary effect. Inflation persistence was also confirmed, with past price shocks strongly influencing current outcomes. In contrast, export trade was found to have no significant effect on domestic prices, reflecting Nigeria's narrow export base dominated by crude oil, which does not directly impact consumer price levels.

In the long run, none of the variables-including exchange rate, imports, exports, interest rate, and investment-was statistically significant, suggesting that structural rigidities, policy

inconsistencies, and external shocks dilute their lasting impact on prices. This highlights that Nigeria's inflation is primarily a short-term, externally driven phenomenon rather than a stable long-run outcome of macroeconomic fundamentals. From a policy perspective, the study concludes that stabilizing Nigeria's price environment requires reducing import dependence through industrialization and diversification, ensuring exchange rate stability, promoting non-oil exports, strengthening monetary policy effectiveness, and addressing structural bottlenecks**.** By tackling these underlying vulnerabilities, Nigeria can achieve greater price stability and reduce its exposure to external shocks.

In sum, the study concludes that exchange rate movements and international trade dynamics-especially imports-are central to understanding domestic price levels in Nigeria**.** The persistence of short-run inflationary pressures underscores the urgent need for coordinated trade, monetary, and industrial policies to safeguard macroeconomic stability.

5.6 Suggestions for Further Studies

Although this study has provided valuable insights into the impact of exchange rate and international trade on price levels in Nigeria, certain limitations create opportunities for future research.

1. **Disaggregation of Trade Components:** This study treated exports and imports as aggregate variables. Future researchers may disaggregate trade into oil versus non-oil exports and essential versus non-essential imports to better understand sector-specific effects on domestic prices.
2. **Role of Global Commodity Prices:** Given Nigeria's dependence on crude oil exports and imported food/energy products, future research can incorporate global oil and commodity price shocks to determine how external price movements interact with exchange rate dynamics to shape inflation.

3. **Structural Breaks and Policy Shifts:** This study assumed parameter stability over the sample period. Further studies could employ structural break tests or regime-switching models to capture how policy changes (e.g., subsidy removals, exchange rate reforms) affect the exchange rate–inflation nexus.
4. **Sectoral Price Effects:** While this research focused on overall domestic prices (proxied by inflation), future work may analyze sector-specific price indices (e.g., food, energy, housing) to determine whether exchange rate and trade variables have varying effects across sectors.
5. **Comparative and Regional Studies:** Other researchers could extend the scope beyond Nigeria by conducting comparative studies across African or developing economies. This would reveal whether Nigeria's inflationary dynamics are unique or part of broader regional patterns.

Advanced Econometric Approaches: Future research may adopt more sophisticated methods such as Structural VAR (SVAR)**,** Nonlinear ARDL (NARDL), or Dynamic Stochastic General Equilibrium (DSGE) models to capture asymmetries and non-linear relationships between exchange rate, trade, and prices.

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APPENDIX

ECONOMIC STATISTICS OF NIGERIA DATA

YEAR	INF	EXR	EXPT	IMP	EXR_IMP	IR	GFCF
1990	7.364400306	8.038285	35.34	20.5	164.7848425	17.46624	53.12219353
1991	13.0069731	9.909491667	41.7	22.1	218.9997658	0.990847	48.40018216
1992	44.58884272	17.298425	37.51	24.3	420.3517275	-14.9872	43.77439439
1993	57.16525283	22.0654	20.07	26.7	589.14618	-7.05247	44.47636408
1994	57.03170891	21.996	13.55	28.9	635.6844	-15.9202	42.06783621
1995	72.8355023	21.89525833	24.16	30.2	661.2368017	-31.4526	37.20593267
1996	29.26829268	21.884425	23.02	29.5	645.5905375	-5.26078	36.58167005
1997	8.529874214	21.88605	28.65	27.8	608.43219	12.12661	38.42226127
1998	9.996378124	21.886	18.14	25.6	560.2816	11.48467	40.55340148
1999	6.618373395	92.3381	21.33	24.1	2225.34821	6.047248	38.278001
2000	6.933292156	101.6973333	36.02	23.5	2389.887333	-1.14089	34.04928497
2001	18.87364621	111.23125	28.25	24	2669.55	12.1387	30.03794342
2002	12.8765792	120.5781583	23.24	25.3	3050.627406	3.023542	26.76865607
2003	14.03178361	129.22235	26.75	26.7	3450.236745	9.935713	28.37089582
2004	14.99803382	132.888025	20.25	27.9	3707.575898	-2.60485	26.06325442
2005	17.86349337	131.2743333	21.03	29.1	3820.0831	-1.59368	24.96612489
2006	8.22522152	128.6516667	29.52	30.4	3911.010667	-5.62797	26.1664999
2007	5.388007969	125.8081083	21.24	31.7	3988.117034	9.187171	20.18003679
2008	11.58107517	118.5666667	25.67	33	3912.7	6.684909	18.85976721
2009	12.55496039	148.88	18.63	34.2	5091.696	18.18	21.11545461
2010	13.72020184	150.2975	25.66	35.5	5335.56125	1.067736	16.81501324
2011	10.84002754	153.8625	31.62	36.8	5662.14	5.68558	15.67631067
2012	12.21778174	157.5	31.55	38	5985	6.224809	14.21112008
2013	8.475827285	157.3116667	18.05	39.2	6166.617333	11.20162	14.16872621
2014	8.062485824	158.5526417	18.44	40.5	6421.381988	11.35621	15.08353336
2015	9.009387183	192.4403333	10.67	41.7	8024.7619	13.59615	14.82717543
2016	15.67534055	253.492	9.22	42.9	10874.8068	6.686234	14.72495522
2017	16.52353998	305.7901092	13.17	44.2	13515.92282	5.790567	14.71561664
2018	12.09473155	306.0836882	15.5	45.4	13896.19945	6.055977	19.01838355
2019	11.39679497	306.9209515	14.22	46.6	14302.51634	24.62523	24.62523429
2020	13.24602343	358.8107973	8.83	47.9	17187.03719	28.64594	28.64594369
2021	16.95284572	401.1520292	10.74	49.1	19696.56463	33.10736	33.10735924
2022	18.84718	425.9791581	11.26	50.3	21426.75165	31.06754	31.06754
2023	26.37643572	614.1416083	10.28	51.5	31628.29283	48.64113	48.64112924

DESCRIPTIVE STATISTICS TEST RESULT

	INF	EXR	EXPT	IMP	IR	GFCF
Mean	18.49486	115.2871	23.72241	31.36897	3.078962	28.23107
Median	12.55496	125.8081	23.02000	29.50000	6.047248	26.16650
Maximum	72.83550	306.0837	41.70000	45.40000	18.18000	53.12219
Minimum	5.388008	8.038285	9.220000	20.50000	-31.45260	14.16873
Std. Dev.	17.14224	83.09229	8.115221	7.135980	10.81490	11.91809
Skewness	2.019549	0.576691	0.302508	0.485549	-1.294679	0.399545
Kurtosis	5.907345	2.996246	2.528034	2.082965	4.922643	1.908131
Jarque-Bera	29.92675	1.607452	0.711463	2.155645	12.56828	2.212124
Probability	0.000000	0.447658	0.700661	0.340336	0.001866	0.330859
Sum	536.3510	3343.326	687.9500	909.7000	89.28989	818.7010
Sum Sq. Dev.	8227.981	193321.2	1843.991	1425.822	3274.935	3977.147
Observations	29	29	29	29	29	29

CORRELATION RESULT

	INF	EXR	EXPT	IMP	IR	GFCF
INF	1.000000	-0.423552	-0.070575	-0.171988	-0.828341	0.416623
EXR	-0.423552	1.000000	-0.517930	0.826809	0.363049	-0.847801
EXPT	-0.070575	-0.517930	1.000000	-0.616072	-0.118972	0.462322
IMP	-0.171988	0.826809	-0.616072	1.000000	0.210737	-0.836251
IR	-0.828341	0.363049	-0.118972	0.210737	1.000000	-0.340518
GFCF	0.416623	-0.847801	0.462322	-0.836251	-0.340518	1.000000

UNIT ROOT TEST RESULTS

Null Hypothesis: INF has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.170604	0.2202
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INF)
Method: Least Squares
Date: 08/21/25 Time: 00:26
Sample (adjusted): 1991 2023
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF(-1)	-0.260380	0.119957	-2.170604	0.0377
C	5.284999	2.885605	1.831505	0.0767

R-squared	0.131933	Mean dependent var	0.576122
Adjusted R-squared	0.103931	S.D. dependent var	11.54701
S.E. of regression	10.93051	Akaike info criterion	7.679684
Sum squared resid	3703.754	Schwarz criterion	7.770381
Log likelihood	-124.7148	Hannan-Quinn criter.	7.710201
F-statistic	4.711522	Durbin-Watson stat	1.492029
Prob(F-statistic)	0.037739		

Null Hypothesis: D(INF) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.629699	0.0008
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INF,2)
Method: Least Squares
Date: 08/21/25 Time: 00:27
Sample (adjusted): 1992 2023
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF(-1))	-0.836223	0.180621	-4.629699	0.0001
C	0.359026	2.074428	0.173072	0.8638

R-squared	0.416730	Mean dependent var	0.058959
Adjusted R-squared	0.397287	S.D. dependent var	15.10797
S.E. of regression	11.72901	Akaike info criterion	7.822469
Sum squared resid	4127.089	Schwarz criterion	7.914077
Log likelihood	-123.1595	Hannan-Quinn criter.	7.852834
F-statistic	21.43411	Durbin-Watson stat	1.821964
Prob(F-statistic)	0.000066		

Null Hypothesis: EXR has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on AIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		4.783393	1.0000
Test critical values:	1% level	-2.636901	
	5% level	-1.951332	
	10% level	-1.610747	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXR)
Method: Least Squares

Date: 08/21/25 Time: 00:37
Sample (adjusted): 1991 2023
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR(-1)	0.140972	0.029471	4.783393	0.0000

R-squared	0.267368	Mean dependent var	18.36677
Adjusted R-squared	0.267368	S.D. dependent var	36.82858
S.E. of regression	31.52303	Akaike info criterion	9.769148
Sum squared resid	31798.44	Schwarz criterion	9.814497
Log likelihood	-160.1909	Hannan-Quinn criter.	9.784407
Durbin-Watson stat	1.482755		

Null Hypothesis: D(EXR) has a unit root
Exogenous: None
Lag Length: 2 (Automatic - based on AIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.750871	0.8711
Test critical values:	1% level	-2.644302	
	5% level	-1.952473	
	10% level	-1.610211	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXR,2)
Method: Least Squares
Date: 08/21/25 Time: 00:36
Sample (adjusted): 1994 2023
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXR(-1))	0.270264	0.359934	0.750871	0.4592
D(EXR(-1),2)	-0.707408	0.361123	-1.958910	0.0605
D(EXR(-2),2)	-0.626290	0.326524	-1.918053	0.0657

R-squared	0.161022	Mean dependent var	6.113183
Adjusted R-squared	0.098876	S.D. dependent var	39.04293
S.E. of regression	37.06250	Akaike info criterion	10.15773
Sum squared resid	37087.98	Schwarz criterion	10.29785
Log likelihood	-149.3659	Hannan-Quinn criter.	10.20255
Durbin-Watson stat	1.488364		

Null Hypothesis: D(EXR,2) has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on AIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.601452	0.0000
Test critical values:	1% level	-2.644302	
	5% level	-1.952473	
	10% level	-1.610211	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXR,3)
Method: Least Squares
Date: 08/21/25 Time: 00:35
Sample (adjusted): 1994 2023
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXR(-1),2)	-2.040811	0.443515	-4.601452	0.0001
D(EXR(-1),3)	0.503888	0.280709	1.795056	0.0834

R-squared	0.516403	Mean dependent var	5.531909
Adjusted R-squared	0.499131	S.D. dependent var	51.95931
S.E. of regression	36.77268	Akaike info criterion	10.11173
Sum squared resid	37862.44	Schwarz criterion	10.20514
Log likelihood	-149.6759	Hannan-Quinn criter.	10.14161
Durbin-Watson stat	1.373195		

Null Hypothesis: EXPT has a unit root
Exogenous: None
Lag Length: 2 (Automatic - based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.693514	0.0851
Test critical values:	1% level	-2.641672	
	5% level	-1.952066	
	10% level	-1.610400	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXPT)
Method: Least Squares
Date: 08/21/25 Time: 00:39
Sample (adjusted): 1993 2023
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXPT(-1)	-0.091243	0.053878	-1.693514	0.1015
D(EXPT(-1))	-0.172895	0.171512	-1.008059	0.3221
D(EXPT(-2))	-0.287959	0.169375	-1.700125	0.1002

R-squared	0.172366	Mean dependent var	-0.878387
Adjusted R-squared	0.113250	S.D. dependent var	7.168562
S.E. of regression	6.750450	Akaike info criterion	6.748861
Sum squared resid	1275.920	Schwarz criterion	6.887634
Log likelihood	-101.6073	Hannan-Quinn criter.	6.794098
Durbin-Watson stat	1.969711		

Null Hypothesis: D(EXPT) has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.490087	0.0000
Test critical values:	1% level	-2.641672	
	5% level	-1.952066	
	10% level	-1.610400	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXPT,2)
Method: Least Squares
Date: 08/21/25 Time: 00:39
Sample (adjusted): 1993 2023
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXPT(-1))	-1.460686	0.266059	-5.490087	0.0000
D(EXPT(-1),2)	0.288566	0.174744	1.651360	0.1095

R-squared	0.604703	Mean dependent var	0.103548
Adjusted R-squared	0.591072	S.D. dependent var	10.89092
S.E. of regression	6.964468	Akaike info criterion	6.781860
Sum squared resid	1406.611	Schwarz criterion	6.874376
Log likelihood	-103.1188	Hannan-Quinn criter.	6.812018
Durbin-Watson stat	1.970608		

Null Hypothesis: IMP has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.789590	0.9996
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IMP)
Method: Least Squares
Date: 08/21/25 Time: 00:41
Sample (adjusted): 1993 2023
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IMP(-1)	0.012021	0.006717	1.789590	0.0847
D(IMP(-1))	1.553955	0.095733	16.23217	0.0000
D(IMP(-2))	-0.850529	0.097620	-8.712616	0.0000
C	-0.162910	0.223151	-0.730044	0.4717

R-squared	0.933917	Mean dependent var	0.877419
Adjusted R-squared	0.926574	S.D. dependent var	1.063864
S.E. of regression	0.288278	Akaike info criterion	0.470129
Sum squared resid	2.243807	Schwarz criterion	0.655159
Log likelihood	-3.286992	Hannan-Quinn criter.	0.530444
F-statistic	127.1916	Durbin-Watson stat	2.141249
Prob(F-statistic)	0.000000		

Null Hypothesis: D(IMP) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.055805	0.0003
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IMP,2)
Method: Least Squares
Date: 08/21/25 Time: 00:42
Sample (adjusted): 1993 2023
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(IMP(-1))	-0.262283	0.051878	-5.055805	0.0000

D(IMP(-1),2)	0.811738	0.098856	8.211281	0.0000
C	0.216809	0.071768	3.020950	0.0053

R-squared	0.733203	Mean dependent var	-0.032258
Adjusted R-squared	0.714146	S.D. dependent var	0.559992
S.E. of regression	0.299402	Akaike info criterion	0.517705
Sum squared resid	2.509959	Schwarz criterion	0.656478
Log likelihood	-5.024421	Hannan-Quinn criter.	0.562941
F-statistic	38.47432	Durbin-Watson stat	1.883807
Prob(F-statistic)	0.000000		

Null Hypothesis: IR has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.114076	0.9390
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IR)
Method: Least Squares
Date: 08/21/25 Time: 00:44
Sample (adjusted): 1994 2023
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IR(-1)	-0.024673	0.216288	-0.114076	0.9101
D(IR(-1))	-0.231728	0.252274	-0.918558	0.3671
D(IR(-2))	-0.051719	0.235741	-0.219391	0.8281
D(IR(-3))	-0.213617	0.211757	-1.008785	0.3227
C	2.514341	2.262351	1.111384	0.2770

R-squared	0.104336	Mean dependent var	1.856453
Adjusted R-squared	-0.038970	S.D. dependent var	10.52566
S.E. of regression	10.72879	Akaike info criterion	7.734751
Sum squared resid	2877.675	Schwarz criterion	7.968284
Log likelihood	-111.0213	Hannan-Quinn criter.	7.809460
F-statistic	0.728063	Durbin-Watson stat	1.742324
Prob(F-statistic)	0.581211		

Null Hypothesis: D(IR) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.142646	0.0031
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IR,2)
Method: Least Squares
Date: 08/21/25 Time: 00:44
Sample (adjusted): 1994 2023
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(IR(-1))	-1.542074	0.372244	-4.142646	0.0003
D(IR(-1),2)	0.293075	0.277359	1.056662	0.3004
D(IR(-2),2)	0.226095	0.177846	1.271298	0.2149
C	2.394668	1.966004	1.218038	0.2341

R-squared	0.619093	Mean dependent var	0.321295
Adjusted R-squared	0.575143	S.D. dependent var	16.14454
S.E. of regression	10.52318	Akaike info criterion	7.668605
Sum squared resid	2879.173	Schwarz criterion	7.855431
Log likelihood	-111.0291	Hannan-Quinn criter.	7.728372
F-statistic	14.08607	Durbin-Watson stat	1.749177
Prob(F-statistic)	0.000012		

Null Hypothesis: GFCF has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on AIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.387565	0.0015
Test critical values:	1% level	-2.650145	
	5% level	-1.953381	
	10% level	-1.609798	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GFCF)
Method: Least Squares
Date: 08/21/25 Time: 00:46
Sample (adjusted): 1991 2018
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GFCF(-1)	-0.050258	0.014836	-3.387565	0.0022

R-squared	0.140539	Mean dependent var	-1.217993
Adjusted R-squared	0.140539	S.D. dependent var	2.616321
S.E. of regression	2.425516	Akaike info criterion	4.645027
Sum squared resid	158.8445	Schwarz criterion	4.692605
Log likelihood	-64.03037	Hannan-Quinn criter.	4.659572
Durbin-Watson stat	1.796044		

Null Hypothesis: MSUP has a unit root
Exogenous: None
Lag Length: 8 (Automatic - based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		3.244750	0.9993
Test critical values:	1% level	-2.660720	
	5% level	-1.955020	
	10% level	-1.609070	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MSUP)
Method: Least Squares
Date: 08/21/25 Time: 00:48
Sample (adjusted): 1999 2023
Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MSUP(-1)	0.370866	0.114297	3.244750	0.0051
D(MSUP(-1))	-0.332166	0.411235	-0.807728	0.4311
D(MSUP(-2))	-0.100063	0.370317	-0.270210	0.7905
D(MSUP(-3))	-0.046956	0.370004	-0.126906	0.9006
D(MSUP(-4))	0.437327	0.441739	0.990011	0.3369
D(MSUP(-5))	-0.593056	0.429576	-1.380562	0.1864
D(MSUP(-6))	0.208327	0.579278	0.359633	0.7238
D(MSUP(-7))	-0.986402	0.579740	-1.701455	0.1082
D(MSUP(-8))	-1.850575	0.657151	-2.816058	0.0124

R-squared	0.809605	Mean dependent var	2520.970
Adjusted R-squared	0.714407	S.D. dependent var	3229.043
S.E. of regression	1725.630	Akaike info criterion	18.01828
Sum squared resid	47644776	Schwarz criterion	18.45708
Log likelihood	-216.2286	Hannan-Quinn criter.	18.13999
Durbin-Watson stat	1.949782		

Null Hypothesis: MSUP has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		9.801869	1.0000
Test critical values:	1% level	-2.636901	
	5% level	-1.951332	
	10% level	-1.610747	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MSUP)
Method: Least Squares
Date: 08/21/25 Time: 00:52
Sample (adjusted): 1991 2023
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MSUP(-1)	0.169352	0.017278	9.801869	0.0000

R-squared	0.643929	Mean dependent var	1923.181
Adjusted R-squared	0.643929	S.D. dependent var	2995.282
S.E. of regression	1787.336	Akaike info criterion	17.84467
Sum squared resid	1.02E+08	Schwarz criterion	17.89002
Log likelihood	-293.4371	Hannan-Quinn criter.	17.85993
Durbin-Watson stat	1.099675		

Null Hypothesis: D(MSUP) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		2.002968	0.9873
Test critical values:	1% level	-2.639210	
	5% level	-1.951687	
	10% level	-1.610579	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MSUP,2)
Method: Least Squares
Date: 08/21/25 Time: 00:52
Sample (adjusted): 1992 2023
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MSUP(-1))	0.279458	0.139522	2.002968	0.0540

R-squared	0.061400	Mean dependent var	469.4688
Adjusted R-squared	0.061400	S.D. dependent var	1946.135
S.E. of regression	1885.442	Akaike info criterion	17.95246
Sum squared resid	1.10E+08	Schwarz criterion	17.99827
Log likelihood	-286.2394	Hannan-Quinn criter.	17.96765
Durbin-Watson stat	2.216512		

Null Hypothesis: EXR_IMP has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		6.492494	1.0000
Test critical values:	1% level	-2.636901	
	5% level	-1.951332	
	10% level	-1.610747	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXR_IMP)
Method: Least Squares
Date: 08/21/25 Time: 00:58
Sample (adjusted): 1991 2023
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR_IMP(-1)	0.192396	0.029634	6.492494	0.0000

R-squared	0.455672	Mean dependent var	953.4396
Adjusted R-squared	0.455672	S.D. dependent var	1893.920
S.E. of regression	1397.308	Akaike info criterion	17.35232
Sum squared resid	62478996	Schwarz criterion	17.39767
Log likelihood	-285.3132	Hannan-Quinn criter.	17.36758
Durbin-Watson stat	1.516289		

Null Hypothesis: D(EXR_IMP) has a unit root
Exogenous: None
Lag Length: 7 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		4.031555	0.9999
Test critical values:	1% level	-2.660720	
	5% level	-1.955020	
	10% level	-1.609070	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXR_IMP,2)
Method: Least Squares
Date: 08/21/25 Time: 00:59
Sample (adjusted): 1999 2023
Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXR_IMP(-1))	2.197251	0.545013	4.031555	0.0009
D(EXR_IMP(-1),2)	-2.867136	0.727656	-3.940237	0.0011
D(EXR_IMP(-2),2)	-3.480014	0.746270	-4.663210	0.0002
D(EXR_IMP(-3),2)	-2.830800	0.849978	-3.330440	0.0040
D(EXR_IMP(-4),2)	-2.675687	0.791930	-3.378693	0.0036
D(EXR_IMP(-5),2)	-3.041413	0.700273	-4.343180	0.0004
D(EXR_IMP(-6),2)	-2.250195	0.749534	-3.002126	0.0080
D(EXR_IMP(-7),2)	-0.952861	0.622739	-1.530112	0.1444

R-squared	0.689902	Mean dependent var	409.9877
Adjusted R-squared	0.562215	S.D. dependent var	1944.390
S.E. of regression	1286.512	Akaike info criterion	17.41159
Sum squared resid	28136915	Schwarz criterion	17.80163
Log likelihood	-209.6449	Hannan-Quinn criter.	17.51977
Durbin-Watson stat	1.633276		

VAR Lag Order Selection Criteria
Endogenous variables: INF EXR EXPT IMP EXR_IMP IR GFCF
Exogenous variables: C
Date: 08/21/25 Time: 01:08
Sample: 1990 2023
Included observations: 27

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-767.6395	NA	1.96e+16	57.38070	57.71666	57.48060
1	-603.2831	231.3164	4.34e+12	48.83579	51.52345	49.63497
2	-481.3761	108.3618*	4.65e+10*	43.43527*	48.47464*	44.93374*

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

ARDL RESULTS

Dependent Variable: INF
Method: ARDL
Date: 08/21/25 Time: 01:20
Sample (adjusted): 1993 2018
Included observations: 26 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): EXR EXPT IMP EXR_IMP IR GFCF
Fixed regressors: C
Number of models evalulated: 2187
Selected Model: ARDL(3, 0, 1, 1, 1, 2, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
INF(-1)	-0.019422	0.219166	-0.088619	0.9313
INF(-2)	0.311162	0.227486	1.367830	0.2045
INF(-3)	0.464232	0.320866	1.446810	0.1819
EXR	0.426581	0.606229	0.703663	0.4994
EXPT	0.000961	0.413352	0.002326	0.9982
EXPT(-1)	0.417054	0.364082	1.145496	0.2815
IMP	15.56779	5.885106	2.645287	0.0267
IMP(-1)	-11.51201	4.135680	-2.783584	0.0213
EXR_IMP	-0.007869	0.014580	-0.539730	0.6025
EXR_IMP(-1)	-0.002390	0.002551	-0.936654	0.3734
IR	-0.248614	0.414018	-0.600491	0.5630
IR(-1)	0.435466	0.267592	1.627352	0.1381
IR(-2)	0.375028	0.224888	1.667620	0.1297
GFCF	0.531712	0.852702	0.623561	0.5484
GFCF(-1)	0.356077	1.080074	0.329679	0.7492
GFCF(-2)	2.044432	0.968906	2.110041	0.0641
C	-237.6924	171.2700	-1.387822	0.1986

R-squared	0.965448	Mean dependent var	18.13042
Adjusted R-squared	0.904022	S.D. dependent var	17.19259
S.E. of regression	5.326329	Akaike info criterion	6.430022
Sum squared resid	255.3281	Schwarz criterion	7.252624
Log likelihood	-66.59029	Hannan-Quinn criter.	6.666902
F-statistic	15.71720	Durbin-Watson stat	2.513763
Prob(F-statistic)	0.000113		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Error Correction Regression
Dependent Variable: D(INF)
Selected Model: ARDL(3, 0, 1, 1, 1, 2, 2)
Case 2: Restricted Constant and No Trend
Date: 08/21/25 Time: 01:22
Sample: 1990 2023
Included observations: 26

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF(-1))	-0.775394	0.112491	-6.892932	0.0001
D(INF(-2))	-0.464232	0.107793	-4.306682	0.0020
D(EXPT)	0.000961	0.206251	0.004661	0.9964
D(IMP)	15.56779	2.108333	7.383935	0.0000
D(EXR_IMP)	-0.007869	0.001336	-5.890707	0.0002
D(IR)	-0.248614	0.185274	-1.341872	0.2125
D(IR(-1))	-0.375028	0.124884	-3.003006	0.0149
D(GFCF)	0.531712	0.329902	1.611728	0.1415
D(GFCF(-1))	-2.044432	0.470609	-4.344221	0.0019
CointEq(-1)*	-0.244029	0.029616	-8.239715	0.0000

R-squared	0.918421	Mean dependent var	-1.249774
Adjusted R-squared	0.872533	S.D. dependent var	11.18898
S.E. of regression	3.994747	Akaike info criterion	5.891561
Sum squared resid	255.3281	Schwarz criterion	6.375444
Log likelihood	-66.59029	Hannan-Quinn criter.	6.030901
Durbin-Watson stat	2.513763		

* 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	4.773720	10%	1.99	2.94
k	6	5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99

ARDL Long Run Form and Bounds Test
Dependent Variable: D(INF)
Selected Model: ARDL(3, 0, 1, 1, 1, 2, 2)
Case 2: Restricted Constant and No Trend
Date: 08/21/25 Time: 01:23
Sample: 1990 2023

Included observations: 26

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-237.6924	171.2700	-1.387822	0.1986
INF(-1)*	-0.244029	0.366329	-0.666146	0.5220
EXR**	0.426581	0.606229	0.703663	0.4994
EXPT(-1)	0.418015	0.439823	0.950416	0.3667
IMP(-1)	4.055781	3.215887	1.261170	0.2390
EXR_IMP(-1)	-0.010259	0.013790	-0.743942	0.4759
IR(-1)	0.561881	0.597163	0.940916	0.3713
GFCF(-1)	2.932221	1.620280	1.809700	0.1038
D(INF(-1))	-0.775394	0.305153	-2.540998	0.0317
D(INF(-2))	-0.464232	0.320866	-1.446810	0.1819
D(EXPT)	0.000961	0.413352	0.002326	0.9982
D(IMP)	15.56779	5.885106	2.645287	0.0267
D(EXR_IMP)	-0.007869	0.014580	-0.539730	0.6025
D(IR)	-0.248614	0.414018	-0.600491	0.5630
D(IR(-1))	-0.375028	0.224888	-1.667620	0.1297
D(GFCF)	0.531712	0.852702	0.623561	0.5484
D(GFCF(-1))	-2.044432	0.968906	-2.110041	0.0641

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

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR	1.748077	4.399278	0.397355	0.7004
EXPT	1.712976	3.790758	0.451882	0.6620
IMP	16.62010	32.60704	0.509709	0.6225
EXR_IMP	-0.042041	0.101777	-0.413068	0.6892
IR	2.302519	5.684722	0.405036	0.6949
GFCF	12.01589	22.08555	0.544061	0.5996
C	-974.0345	1921.524	-0.506907	0.6244

EC = INF - (1.7481*EXR + 1.7130*EXPT + 16.6201*IMP -0.0420*EXR_IMP
+ 2.3025*IR + 12.0159*GFCF -974.0345)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	4.773720	10%	1.99	2.94
k	6	5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99
			Finite	
Actual Sample Size	26		Sample: n=35	

10%	2.254	3.388
5%	2.685	3.96
1%	3.713	5.326
	Finite Sample: n=30	
10%	2.334	3.515
5%	2.794	4.148
1%	3.976	5.691

POST DIAGNOSTIC TESTS

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.955963	Prob. F(1,8)	0.3568
Obs*R-squared	2.775251	Prob. Chi-Square(1)	0.0957

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 08/21/25 Time: 01:25
Sample: 1993 2018
Included observations: 26
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF(-1)	0.136414	0.260262	0.524143	0.6144
INF(-2)	-0.043819	0.232406	-0.188546	0.8551
INF(-3)	-0.020408	0.322330	-0.063315	0.9511
EXR	-0.032612	0.608632	-0.053583	0.9586
EXPT	0.004555	0.414393	0.010992	0.9915
EXPT(-1)	-0.024113	0.365808	-0.065916	0.9491
IMP	-0.908886	5.972344	-0.152182	0.8828
IMP(-1)	0.630419	4.195675	0.150255	0.8843
EXR_IMP	2.25E-05	0.014616	0.001542	0.9988
EXR_IMP(-1)	0.000814	0.002690	0.302639	0.7699
IR	0.026675	0.415930	0.064134	0.9504
IR(-1)	0.066523	0.276743	0.240378	0.8161
IR(-2)	0.021625	0.226523	0.095465	0.9263
GFCF	-0.084466	0.859151	-0.098314	0.9241
GFCF(-1)	0.034310	1.083294	0.031672	0.9755
GFCF(-2)	-0.127618	0.980016	-0.130220	0.8996
C	13.91645	172.2796	0.080778	0.9376
RESID(-1)	-0.412799	0.422200	-0.977734	0.3568

R-squared	0.106740	Mean dependent var	-6.78E-14
Adjusted R-squared	-1.791436	S.D. dependent var	3.195798
S.E. of regression	5.339408	Akaike info criterion	6.394067
Sum squared resid	228.0742	Schwarz criterion	7.265057
Log likelihood	-65.12287	Hannan-Quinn criter.	6.644881

F-statistic	0.056233	Durbin-Watson stat	2.325955
Prob(F-statistic)	0.999999		

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.566008	Prob. F(16,9)	0.8464
Obs*R-squared	13.04041	Prob. Chi-Square(16)	0.6698
Scaled explained SS	1.505071	Prob. Chi-Square(16)	1.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 08/21/25 Time: 01:26
Sample: 1993 2018
Included observations: 26

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-430.8458	525.9347	-0.819200	0.4338
INF(-1)	0.144376	0.673015	0.214522	0.8349
INF(-2)	0.188283	0.698561	0.269529	0.7936
INF(-3)	0.999729	0.985312	1.014632	0.3368
EXR	1.441466	1.861602	0.774315	0.4586
EXPT	1.178915	1.269317	0.928779	0.3772
EXPT(-1)	0.270517	1.118019	0.241961	0.8142
IMP	20.93510	18.07194	1.158431	0.2765
IMP(-1)	-13.75018	12.69981	-1.082707	0.3071
EXR_IMP	-0.031628	0.044773	-0.706400	0.4978
EXR_IMP(-1)	-0.001512	0.007835	-0.193014	0.8512
IR	1.391510	1.271363	1.094503	0.3022
IR(-1)	0.204805	0.821719	0.249240	0.8088
IR(-2)	0.760644	0.690585	1.101449	0.2993
GFCF	0.085183	2.618472	0.032532	0.9748
GFCF(-1)	2.408587	3.316682	0.726204	0.4862
GFCF(-2)	1.111620	2.975309	0.373615	0.7173

R-squared	0.501554	Mean dependent var	9.820310
Adjusted R-squared	-0.384572	S.D. dependent var	13.90019
S.E. of regression	16.35605	Akaike info criterion	8.673893
Sum squared resid	2407.683	Schwarz criterion	9.496495
Log likelihood	-95.76061	Hannan-Quinn criter.	8.910773
F-statistic	0.566008	Durbin-Watson stat	1.998685
Prob(F-statistic)	0.846377		

FMOLS

Dependent Variable: INF
Method: Fully Modified Least Squares (FMOLS)
Date: 08/21/25 Time: 01:32
Sample (adjusted): 1994 2023
Included observations: 30 after adjustments

Cointegrating equation deterministics: C
Long-run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF(-1)	0.138489	0.083945	1.649751	0.1229
INF(-2)	0.281386	0.070461	3.993528	0.0015
INF(-3)	0.938975	0.118936	7.894810	0.0000
EXR	0.327824	0.115001	2.850609	0.0136
EXR(-1)	-0.165892	0.103362	-1.604965	0.1325
EXR(-2)	-0.489358	0.102560	-4.771449	0.0004
EXPT	0.075022	0.086801	0.864303	0.4031
IMP	28.73407	2.894673	9.926535	0.0000
IMP(-1)	-38.11923	4.634078	-8.225851	0.0000
IMP(-2)	8.843183	2.208300	4.004521	0.0015
EXR_IMP	-0.005933	0.002326	-2.550925	0.0242
EXR_IMP(-1)	0.004242	0.002598	1.632351	0.1266
EXR_IMP(-2)	0.008556	0.002431	3.519535	0.0038
IR	-0.107326	0.081814	-1.311828	0.2123
IR(-1)	-0.070539	0.064889	-1.087077	0.2967
IR(-2)	0.301474	0.066028	4.565886	0.0005
C	0.387275	12.32275	0.031428	0.9754

R-squared	0.945750	Mean dependent var	16.70149
Adjusted R-squared	0.878982	S.D. dependent var	14.31632
S.E. of regression	4.980313	Sum squared resid	322.4458
Long-run variance	3.146516		