THE IMPACT OF MONETARY POLICY ON INTERNATIONAL TRADE IN NIGERIA

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CERTIFICATION

This is to certify that this project *"The Impact of Monetary Policy on International Trade in Nigeria"* is written by *Dibah Emmanuel Ifeanyi* having justified the requirement for the award of Bachelor of Science Degree in the Department of Economics, Faculty of Social Sciences, University of Benin, Benin City, Nigeria and it is approved for its contribution to knowledge and literary presentation.

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DEDICATION

To God Almighty, the foundation of my wisdom, strength, and grace. Through challenges and triumphs, He has guided me, and without Him, this journey would not have been possible.

To my loving family, for their selfless sacrifices, unwavering support, unconditional love, and belief in me have driven me onward. Your prayers, and encouragement have instilled in me the resilience to pursue my dreams. Continually reminding me that no goal is beyond reach.

This work is a testament to perseverance, dedication, and support.

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ABSTRACT

This study examines the impact of monetary policy on international trade in Nigeria using Ordinary Least Squares (OLS) regression analysis. The study employs key monetary policy indicators, including broad money supply, interest rate, inflation rate, exchange rate, and gross domestic product (GDP), to assess their effects on trade openness in Nigeria from 1981 to 2023. The Engle-Granger two-step cointegration test is applied to determine the long-run relationship between monetary policy variables and trade openness. The findings reveal that in the long run, interest rates and GDP have significant positive effects on trade openness, while money supply negatively impacts trade openness. Exchange rate fluctuations

also influence trade openness, highlighting the importance of exchange rate management in fostering international trade. The error correction model indicates that short-run adjustments occur, with trade openness gradually aligning with long-run equilibrium. The study concludes that monetary policy plays a crucial role in shaping Nigeria's trade dynamics. Policy recommendations include stabilizing interest rates, implementing exchange rate management strategies, controlling inflation, promoting economic growth, and ensuring better coordination between monetary and trade policies. Additionally, structural reforms aimed at export diversification and financial sector improvements are necessary to enhance trade performance. This study contributes to the ongoing discourse on the effectiveness of monetary policy in driving international trade and provides empirical insights for policymakers seeking to enhance Nigeria's trade openness and global competitiveness.

TABLE OF CONTENTS

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The significant roles played by monetary policy cannot be overemphasized in any open economy, especially in terms of economic advancement, growth and development. The Nigeria economy has been on the quest to accomplish and sustain macroeconomic objectives, which states and emphasizes the significance that monetary and trade policies play in both developed and developing nations (Ashamu, 2020). A goal oriented government should strive to improve the living standards of its citizens across all significant economic policies, whether through monetary or fiscal policy. In addition, these measures are mostly employed to maintain economic growth during times of economic calamity in order to stabilize it. For instance, the government of many economies uses monetary policy measures to address the problem economic set-backs and impact economic activity, notably by regulating the supply of money and credit and altering interest rates (Potter, 2019). This is necessary to preserve financial distortions, economic uncertainty, and overall demand.

Many economists have long been interested in factors that cause different countries to grow at stable rates and to achieve different levels of income with regard to international trade (Abubakar, 2023). World economies have become geographically interconnected by international trade. As such, a certain value-for-value exchange has become expedient, involving capital, ideas, goods, services and technology. For policy makers and economists, foreign trade has often been a field of concern and focus, as it requires the exchange of goods and services (Abubakar, 2023). The significance of international trade lies in the ability of a country to obtain from another country essential goods which it cannot produce in its own country, or which can only produce from another country

which produces such goods at relatively cheaper prices at a comparatively higher cost. International trade also enables a country to export its products produced domestically to other countries around the world (Birdsall, Nancy and Hamoudi, 2020).

One important factor that should be concentrated on is economic policy formulation and execution in Nigeria is monetary policy. It is a major stabilizing tool that includes a package of measures taken by monetary authorities to control and track the volume, cost and other conditions under which the economy is granted capital and credit in order to achieve a set of macroeconomic goals specified (Ahmed, 2019). The economic stability of Nigeria depends to a large extent on the feasibility and viability of its export trade with other nations. To boost economic development, international trade provides both foreign exchange earnings and customer support (Obadan, 2020).

There are two major stages, generally speaking, in the pursuit of monetary policy in Nigeria, namely before 1986 and after 1986. The first phase placed emphasis on direct monetary control, while the second phase relied on the mechanisms of the market (Abubakar, 2023). During this period, the economic situation that affected monetary policy in Nigeria prior to 1986 was characterized by the dynamics of the oil sector, the increasing role of the public sector in the economy, and over-reliance on the external sector; monetary management was focused on the use of direct monetary instruments such as credit ceilings, selective credit control, exchange rates and administered interest rates (Ogwuche, et al., 2018). According to Adam (2019), as their implementation has become less effective over time, the monetary control mechanism, which relies heavily on credit limits and limited credit constraints, has increasingly failed to reach the monetary targets set.

The Nigerian economic situation has worsened as a result of a significant fall in the international oil market and this has led to the implementation of the Structural Adjustment Program (SAP) (Obadan, 2020). The fiscal balance of payments was expected to be achieved by changing and reforming economic patterns of production and consumption, eliminating price distortions, reducing heavy dependence on crude oil exports and imports of consumer goods, achieving sustainable growth and improving the base of non-oil exports. SAP's policy include the restructuring of international trade and payment arrangements, the implementation of Nigeria's market-determined exchange rate and a drastic reduction of market forces as a major determinant of economic activity (Obadan, 2020). On this basis the study attempted to analyze whether monetary policy as reported by monetarists has an impact on Nigeria's foreign trade between 1990 and 2021.

1.2 Statement of the Problem

Monetary policy deals with the flexible use of the money stock and interest rate by monetary authority (CBN) to attain the required macroeconomic goals (Nuhu, 2015). Every nation in the globe has long sought to achieve the notable rise in long-term sustainable economic growth and development, particularly through an increase in international commerce (foreign trade), as one of the primary macroeconomic goals. According to Atuma and Eze (2017), the regulation of trade policy tools is part of the necessary policy direction. Mutual monetary and fiscal policies are two examples of macroeconomic strategies that might be used to achieve the aforementioned goal. Aside from the implementing authorities and tools, several of these policies are inseparable. Still, monetary policy seems more efficient in adjusting short-term macroeconomic maladjustments due to its rate of recurrence in applying and changing policy tools, the relative ease of its decision process, and the absolute nature of the area which proliferates its impact on the real economy (Ashamu, 2020).

By 2050, the Nigerian economy hopes to rank 12th globally and rank among the top twenty. Pursuing a quick and sustained international commerce is one of the most reliable approaches to reach the specified objective (Ogwuche et al., 2018). Nigeria's economy is essentially open, with a sizable amount of its total production coming from overseas trade. Although, the economy has witnessed times of expansion and contraction, but the reported growth in foreign trade has not been a sustainable one as there is evidence of growing poverty among the populaces (Obadan, 2020). The dwindling foreign trade has also resulted in high rate of unemployment due to low productive investment, inadequate technological advancement and high inflationary pressures.

Additionally, a number of research on international trade have focused on the effects of trade and fiscal policies without considering the influence of monetary policy, which is frequently a crucial component. This study addressed this gap by examining how Nigerian monetary policy affects international commerce. As a result, this study examined how the Nigerian economy's monetary policy and foreign commerce are directly related. Additionally, this study evaluated the connection between exchange rate procedures and monetary policy tools including the money supply and interest rate. Suitable foreign trade transactions may benefit the economy, and suitable monetary policies can be used to achieve long-term macroeconomic stability. Nonetheless, the main goal of this study is to look at how monetary policy and its tools affect Nigeria's increased foreign commerce.

1.3 Research Questions

The study will provide answers to the following Research Questions;

1. How has Money Supply impacted on trade openness in Nigeria?
2. What impact does Interest Rate have on trade openness in Nigeria?

3. To what extent does Exchange rate impact on trade openness in Nigeria?

1.4 Objectives of the Study

The main objective of the study is to investigate the impact of monetary policies on foreign trade in Nigeria economy. Specifically, the study seeks to:

1. Examine the impact of Money Supply on trade openness in Nigeria.
2. Determine the impact of Interest Rate on trade openness in Nigeria.
3. Evaluate the extent to which Exchange Rate has impacted on trade openness in Nigeria.

1.5 Statement of Research Hypotheses

Ho_1: Money Supply has no significant impact on trade openness in Nigeria

Ho_2: Interest Rate has no significant impact on trade openness in Nigeria

Ho_3: Exchange Rate has no significant impact on trade openness in Nigeria

1.6 Significance of the Study

This study has academic, policy and practical implications. It is hoped that the findings will be of great significance to several groups of people consisting of future researchers, and the government. This study will be helpful for future researchers in gaining secondary information and can serve as literature review for potential references. It will also serve as a centerpiece idea to other students willing to pursue research in a similar field. This study will be of significant importance to the government and all policy makers in the country. It will provide insight into the impact of monetary policy on foreign trade in Nigeria. This is particularly important as no country can achieve macroeconomic targets without transactions with other countries. In addition, the study will be of immense benefit to the academic institutions. These include scholars who are

interested in furthering their knowledge monetary policy in Nigeria and its performance as the results to be obtain are capable of adding new insight to the present state of knowledge in the field and may therefore be found useful for teaching and for developing a body of economic theory. This study is equally important to practicing policy makers who might be willing to consider the usefulness of the study in managing and strengthening the whole economy.

International merchants may use this study's information in order to make informed decisions on busy trading areas. It will enlighten them of their Individual contributions to economic expansion and show them how important they are to the nation. According to the study, this will motivate people to work harder.

1.7 Scope of the Study

The main focus of this study is to examine the impact of monetary policy on Foreign trade in Nigeria from 1981-2023. The scope of this study covers a period of thirty years. This year span is chosen for this study in other to collect sufficient data that will produce reliable result on the impact of monetary policy on foreign trade in Nigeria.

1.8 Organization of the Study

As a result, the study is divided into five (5) chapters for the sake of simplicity and organisation. The study's history, problem statement, research questions, objectives, and hypotheses, as well as the study's importance, scope, and limits, terminology definitions, and organisational structure, are all included in the first chapter, which serves as an introduction. The literature review in Chapter Two includes conceptual, theoretical, and empirical reviews. The approach is explained in Chapter 3, which also covers the model formulation, previous expectations, data type and source, and data analysis technique. The data analysis and result interpretation are presented in Chapter 4. A summary, a conclusion, and a suggestion make up Chapter 5.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Literature Review

2.1.1 The Concept of Monetary Policy

Conceptually, monetary policy is one of the macro-economic policies which every nation whether developed or not, adopts in managing their economies. It implies actions or measures initiated by the monetary authorities so as to sway the national economic objectives by controlling the volume and direction of money supply, cost and availability of credits. It covers variety of measures, intended to power or regulate the volume price as well as direction of money in the economy. Particularly, it pervades all the deliberate effort by the monetary authorities to direct supply of money and credits conditions for the intention of achieving warrant macroeconomic objectives (Chukwu, 2009). The entire amount of cash and other liquid assets in an economy on the measurement date is known as the money supply. Any cash in circulation as well as any bank deposits that an account holder may quickly turn into cash are included in the money supply. Jihngan asserts that the terms money supply, money stock, money stock of money, and quantity of money are interchangeable. The entire amount of money in an economy at any given time is known as the supply of money.

2.1.1.1 Expansionary and Contractionary Monetary Policy

Expansionary monetary policy is used each time the monetary authorities decide to reduce the cost of money or increase the supply of money in the economy to promote an increase in economic activities and to knock out poverty, recession, and deflationary gap (Nuhu, 2015). This can be achieved by lowering reserve requirements, easing credit regulations, lowering interest and discount rates, and purchasing securities on the open

market. Contractionary or tight monetary policy is the term used to describe actions taken by the monetary authority to limit the amount of the money supply in an effort to reduce economic activity. Contractionary policies have the impact of lowering inflation, which will also result in a decline in output, investment, and economic growth (Akpunonu, 2021). Depending on the goals of the economy, the government may go from contractionary to expansionary policies as necessary.

2.1.1.2 The Concept of Money

M1 definition of money

This definition was postulated by Keynes. This perspective defines the money supply as demand deposits held by commercial banks and currency held by the general population. Because depositors can withdraw checks for any amount in their account, demand deposits, which are current account balances with commercial banks, are extremely liquid. According to Jhigan (2004), this notion of money is known as the restricted definition of money.

M2 definition of money

This definition was postulated by Milton Friedman. The quantity of money in people's possession, in their bank accounts, or credited to their current accounts as demand deposits or commercial bank time deposits is what Professor Milton Friedman referred to as money in its broadest meaning. Time deposits are set sums of money made by clients of a commercial bank that provide account holders with a set interest rate at certain times. Time deposits can be withdrawn before the expiration period and are therefore also liquid in nature. Time deposits are therefore included in the definition of money supply. This definition therefore includes M1 plus time deposits of commercial bank. This is the broad definition of money supply (Jhigan, 2004).

M3 definition of money

This is the broadest definition of money as postulated by Gurly and Shaw. Gurly-shaw defines supply of money as M2 plus deposits of savings banks, building societies, loan associations, and deposits of other credit and financial institutions (Jhigan, 2004).

2.1.1.3 Instruments of Monetary Policy

There are two categories of monetary policy tools. They are either qualitative, selective, or direct, and quantitative, generic, or indirect. By influencing the money supply, cost, and credit availability, they have an impact on the amount of aggregate demand. Bank rate fluctuations, open market activities, and shifting reserve requirements are all included in the first category of the two types of instruments. Through commercial banks, they are intended to control the total amount of credit in the economy (Jhigan, 2004). Controlling particular forms of credit is the goal of selective credit regulations. These include the regulation of consumer lending and shifting margin requirements.

The various monetary policy instruments are discussed below;
Various monetary policy instruments as stated by Jhigan, (2004) are discussed below:

1. Bank Rate Policy: The central bank rediscounts first-class bills of exchange and government securities held by commercial banks at the bank rate, which is the minimum lending rate. The central bank boosts the bank rate when it discovers that inflationary forces have begun to appear in the economy. Commercial banks borrow less from the central bank when borrowing from it becomes more expensive. As a result, borrowers take out fewer loans from commercial banks, and the commercial banks increase their lending rates to the business sector. Credit is being reduced, and additional price increases are being restrained. Conversely, the central bank decreases the bank rate during periods of low prices. Commercial banks can borrow money from the central bank

at a low cost. Additionally, the latter reduce their loan rates. Entrepreneurs are urged to take out more loans. Investment is welcomed. Demand, income, output, and employment all begin to increase, and the decline in prices is restrained.

2. Open Market Operations: The central bank's purchases and sales of securities in the money market are referred to as open market operations. The central bank sells securities when prices are increasing and control is required. Commercial banks are unable to lend more to the business community since their reserves have been lowered. Price increases are restrained and more investment is discouraged. On the other hand, the central bank purchases securities when economic forces begin to contract. Commercial banks' reserves are increased. They give out additional loans. Demand, income, output, investment, and price declines are all monitored.

3. Changes in Reserve Ratios: The USA was the first to use this weapon as a monetary tool after Keynes proposed it in his Treatise on Money. According to the legislation, each bank must maintain a specific proportion of its total deposits in reserve funds in both its vaults and with the central bank. The central bank increases the reserve ratio when prices are rising. Banks must maintain closer ties with the central bank. They lend less and have less reserves. There has a negative impact on production, employment, and investment volume. On the other hand, commercial banks' reserves increase as the reserve ratio decreases. They increase lending, which has a positive impact on economic activity.

4. Selective Credit Controls: To impact particular credit types for specific reasons, selective credit restrictions are employed. They often take the shape of altering margin requirements in order to curb economic speculation. The central bank increases the margin requirements on commodities when there is strong speculative activity in the economy or in certain sectors and prices begin to rise. As a result, borrowers receive

smaller loan amounts secured by particular securities. For example, if the margin requirement is increased to 60%, the pledger of securities worth ₦10,000 will receive a loan equal to 40% of their value, or ₦4,000. When a certain industry experiences a recession, the central bank lowers margin requirements to promote borrowing.

2.1.1.5 Role of Monetary Policy in a Developing Economy

According to M.L Jhingan (2004), monetary policy in an underdeveloped country plays an important role in increasing the growth rate of the economy by influencing the cost and availability of credit, by controlling inflation and maintaining equilibrium in the balance of payments. Therefore, the main goals of monetary policy in such a nation are to stabilise the exchange rate, stabilise the price level, achieve equilibrium in the balance of payments, restrict credit to limit inflation, and foster economic growth. The various measures are;

1. To Control Inflationary Pressures: Monetary policy necessitates the application of both quantitative and qualitative techniques of credit control in order to control inflationary pressures that emerge during the development process. Because the bill market is tiny and underdeveloped, open market operations—one of the monetary policy tools—are ineffective at containing inflation in developing nations. Due to partial central bank regulation, commercial banks maintain an elastic cash deposit ratio. Additionally, because government assets have comparatively low interest rates, they are hesitant to invest in them. Additionally, they prefer to preserve their reserves in liquid forms like cash, gold, and foreign exchange rather than investing in government assets. Additionally, commercial banks don't often borrow from or rediscount from the central bank.

2. To Achieve Price Stability: Monetary policy necessitates the application of both quantitative and qualitative techniques of credit control in order to control inflationary

pressures that emerge during the development process. Because the bill market is tiny and underdeveloped, open market operations—one of the monetary policy tools—are ineffective at containing inflation in developing nations. Due to partial central bank regulation, commercial banks maintain an elastic cash deposit ratio. Additionally, because government assets have comparatively low interest rates, they are hesitant to invest in them. Additionally, they prefer to preserve their reserves in liquid forms like cash, gold, and foreign exchange rather than investing in government assets. Additionally, commercial banks don't often borrow from or rediscount from the central bank.

3. To Bridge Balance of Payment (BOP) Deficit: Interest rate policy, a type of monetary policy, is crucial for closing the balance of payments imbalance. In order to meet their development goals, underdeveloped nations face significant balance of payments challenges. Underdeveloped nations must import capital equipment, machinery, raw materials, spares, and components in order to set up infrastructure like power, irrigation, transportation, etc., as well as directly productive activities like iron and steel, chemicals, electrical, fertilisers, etc. However, exports are almost at a standstill. Because of inflation, their prices are high. The balance of payments becomes out of balance as a result of the imbalance that is produced between imports and exports. By raising interest rates, monetary policy can aid in reducing the balance of payments imbalance. A high interest rate helps close the balance of payments imbalance and draws in foreign investment.

4. To Create Banking and Financial Institutions: Establishing Banking and Financial Institutions: In order to promote, mobilise, and channel deposits for capital development, one of the goals of monetary policy in a developing nation is to establish and grow banking and financial institutions. Both urban and rural branch banking should be promoted by the monetary authorities. A strategy like this will promote saving and

investment for capital creation while also aiding in the monetisation of the non-monetized sector. Additionally, it must to develop and organise the capital and money markets. These are necessary for a development-oriented monetary strategy that incorporates debt management to be successful.

2.1.2 The Concept of International Trade

International trade is the purchase and sale of goods and services by companies in different countries. Consumer goods, raw materials, food, and machinery all are bought and sold in the international marketplace. Countries can obtain goods and services that might not otherwise be available locally and open up new markets thanks to international commerce. As a result of international trade, the market is more competitive. This can ultimately result in more competitive pricing and cheaper products. Some countries engage in national treatment of imported goods, treating them as equivalent to those same products produced domestically. International trade was key to the rise of the global economy. In the global economy, supply and demand—and thus prices—both impact and are impacted by global events (Hossana, 2023).

2.1.2.1 Difference between International Trade and National or Domestic Trade

There are several reasons to believe the classical view that international trade is fundamentally different from inter-regional trade (Hossana, 2023).

1. Factor Immobility: The classical economists advocated a separate theory of international trade on the ground that factors of production are freely mobile within each region as between places and occupations and immobile between countries entering into international trade. Thus, labour and capital are regarded a immobile between countries while they are perfectly mobile within a country. There is complete adjustment to wage differences and factor-price disparities within a country with quick and easy movement of labour and other factors from low return to high sectors. But no such movements are

possible internationally. Price changes lead to movement of goods between countries rather than factors. The reasons for international immobility of labour are difference in languages, customs, occupational skills, unwillingness to leave familiar surroundings, and family ties, the high travelling expenses to the foreign country, and restrictions imposed by the foreign country on labour immigration.

2. Differences in Natural Resources: Different countries are endowed with different types of natural resources. Hence they tend to specialize in production of those commodities in which they are richly endowed and trade them with others where such resources are scarce. In Australia, land is in abundance but labour and capital are relatively scarce. On the contrary, capital is relatively abundant and cheap in England while land is scarce and dear there. Thus, commodities requiring more capital, such as manufactures, can be produced in England; while such commodities as wool, mutton, wheat, etc. requiring more land can be produced in Australia. Thus both countries can trade each other's commodities on the basis of comparative cost differences in the production of different commodities.

3. Different Currencies: The principal difference between interregional and international trade lies in use of different currencies in foreign trade, but the same currency in domestic trade. Rupee is accepted throughout India from the North to the South and from the East to the West, but if we cross over to Nepal or Pakistan, we must convert our rupee into their rupee to buy goods and services there. It is not the differences in currencies alone that are important in international trade, but changes in their relative values. Every time a change occurs in the value of one currency in terms of another, a number of economic problems arise. "Calculation and execution of monetary exchange transactions incidental to international trading constitute costs and risks of a kind that are not ordinarily involved in domestic trade." 1 Further, currencies of some countries like

the American dollar, the British pound the Euro and Japanese yen, are more widely used in international transactions, while others are almost inconvertible. Such tendencies tend to create more economic problems at the international plane. Moreover, different countries follow different monetary and foreign exchange policies which affect the supply of exports or the demand for imports.

4. Different Political Groups: A significant distinction between inter-regional and international trade is that all regions within a country belong to one political unit while different countries have different political units. Inter-regional trade is among people belonging to the same country even though they may differ on the basis of castes, creeds, religions, tastes or customs. They have a sense of belonging to one nation and their loyalty to the region is secondary. The government is also interested more in the welfare of its nationals belonging to different regions. But in international trade there is no cohesion among nations and every country trades with other countries in its own interests and often to the detriment of others.

5. Different Markets: International markets are separated by difference in languages, usages, habits, tastes, fashions etc. Even the systems of weights and measures and pattern and styles in machinery and equipment differ from country to country. For instance, British railway engines and freight cars are basically different from those in France or in the United States. Thus goods which may be traded within regions may not be sold in other countries. That is why, in great many cases, products to be sold in foreign countries are especially designed to confirm to the national characteristics of that country.

2.2 Theoretical Literature Review

Theoretical Review of International Trade

2.2.1 The theory of Mercantilism

According to Will (2024), Mercantilism was an economic system of trade that spanned the 16th century to the 18th century. Mercantilism was based on the principle that the world's wealth was static, and consequently, governments had to regulate trade to build their wealth and national power. Many European nations attempted to accumulate the largest possible share of that wealth by maximizing their exports and limiting their imports via tariffs. Developed in the sixteenth century, mercantilism was one of the earliest efforts to develop an economic theory. This theory stated that a country's wealth was determined by the amount of its gold and silver holdings. In its simplest sense, mercantilists believed that a country should increase its holdings of gold and silver by promoting exports and discouraging imports. In other words, if people in other countries buy more from you (exports) than they sell to you (imports), then they have to pay you the difference in gold and silver. The objective of each country was to have a trade surplus, or a situation where the value of exports are greater than the value of imports, and to avoid a trade deficit, or a situation where the value of imports is greater than the value of exports (Will, 2024).

A closer look at world history from the 1500s to the late 1800s helps explain why mercantilism flourished. The 1500s marked the rise of new nation-states, whose rulers wanted to strengthen their nations by building larger armies and national institutions. By increasing exports and trade, these rulers were able to amass more gold and wealth for their countries. One way that many of these new nations promoted exports was to impose restrictions on imports. This strategy is called protectionism and is still used today (Will et al., 2024).

2.2.2 Theory of Absolute Advantage

According to Hossana (2023) the theory of absolute advantage is a theory put forward by Adam Smith in 1776. Adam Smith argues that trade between countries is based on the theory of absolute advantage. This theory explains that a certain country can more efficiently produce a certain commodity when compared to other countries but the country is less efficient in producing certain other commodities. The two countries can benefit by specializing in the production of commodities that have absolute strength and importing commodities that have absolute weaknesses in the country concerned which is capable of producing these commodities more efficiently. The theory of absolute advantage provides an explanation that a country can export certain goods because that country is able to produce goods at a lower cost compared to other countries or can be said to have an absolute advantage in producing goods. In addition, Adam Smith argued that absolute advantage can be defined as the ability of a country to produce goods and services per unit by utilizing fewer resources when compared to the capabilities of other countries. Because resources are used more efficiently, the amount of production or goods also increases.

Hossana (2023), explained that there are several main assumptions from the theory of absolute advantage which consist of:

1. Factors of production are only related to labor
2. The quality of the goods produced has the same value
3. Exchange of goods regardless of finances;
4. There is no cost of shipping goods in the exchange of goods.

Apart from buying and selling transactions between countries, absolute advantage can also be made by exchanging commodities between countries. The two countries concerned can exchange goods that can only be produced in each country. Exchanges

made because the products obtained require a country to incur higher production costs and provide less profit so it is better to import goods to save on production costs.

2.2.3 Theory of Comparative Advantage

The theory of comparative advantage is a theory put forward by David Ricardo in 1817. David Ricardo explained this theory to perfect Adam Smith's theory of absolute advantage. This theory was created to overcome weaknesses in the theory of absolute advantage in countries that do not have absolute advantage. David Ricardo argues that even though a country does not have the ability to produce both commodities efficiently compared to other countries, the country can still carry out mutually beneficial trade (Will, 2024). The way that can be done is that a country that is less efficient in producing both commodities needs to specialize in producing and can export the commodity that has the smallest absolute loss or can be called a commodity that has a comparative advantage. In addition, the country must import commodities that have greater absolute weakness or can be called commodities that have comparative weaknesses (Kelechi, 2016). David Ricardo uses several simple assumptions as the basis for the theory of comparative advantage, including:

1. There are only two countries and two commodities

2. There is free trade

3. Perfect mobility in factor labor within the country but not freely between the two countries

4. Production costs that remain unchanged

5. No shipping or transportation costs

6. No change in technology

In the theory of comparative advantage, a resident of a country can improve their standard of living and income if the country specializes in the production of goods or services that have higher productivity and efficiency (Baiza Pariade, 2013). The advantage of the theory of comparative advantage is that it can explain what the exchange rate is and how much the profit is due to exchange where these two things cannot be explained in the theory of absolute advantage (Ibrahim and Halkam, 2021).

2.2.4 Theory Heckscher Ohlin or H-O

This theory was put forward by an economic historian named Eli Heckscher who came from Sweden and his student named Bertil Ohlin in the 1920s. The H-O theory is usually better known as The Proportional Factor Theory. According to this theory, a country can import commodities whose production requires resources that are comparatively difficult to come by and have high prices in that country, while at the same time it can export commodities whose production levels are higher using production factors that are more plentiful and cheaper in that country (Ibrahim and Halkam, 2021).

According to Heckscher Ohlin's concept, the emergence of international trade is dependent on two key elements: the availability of production inputs and the intensity, or the proportion, of those resources' utilization. The ratios of the production elements will vary depending on the product. Technology defines how to integrate various manufacturing components to create a product, which leads to the differences that occur (Ibrahim and Halkam, 2021). The kinds of goods produced, exported, and goods that a country must import will depend on ownership of resources like labor and capital. Heckscher Ohlin's theory concludes that trade tends to increase the level of income or wage levels of workers and lower interest rates of real capital in labor-rich and capital-scarce countries. International trade encourages a country to specialize in industry and

trade in goods that intensively use the country's excess production factors (Hossana, 2023). Therefore, it can be concluded that this theory discusses that a country will trade with other countries because the country has a comparative advantage, namely superiority in technology and production factor superiority.

Theoretical Review of Monetary Policy/ Money Supply

2.2.5 Quantity Theory of Money: Income Version

According to Kelechi (2016) Fisher's transactions approach to quantity theory of money given as MV=PT, considers such variables as total volume of transaction (T) and average price level of these transactions are conceptually vague and difficult to measure. As a result, quantity theory was developed in income in later years, taking into account either real income or national production (i.e., transactions of final items only) instead of all transactions. The income version of the quantity theory is becoming more and more popular as data on national income or production is easily accessible. Furthermore, a more practical and significant idea is the average price level of production. In fact, the prices of finished products and services that make up a nation's national product are the only factors considered for determining the general level of prices in that nation. It should be mentioned that, similar to Fisher's transactions approach, the function of money is regarded as a medium of exchange even in this income form of the quantity theory of money. This method substitutes the idea of income velocity of money for the velocity of circulation of transactions. The average frequency with which a unit of currency is used to pay for finished goods and services—that is, national product or national income—is referred to as income velocity. Actually, Y/M, where Y is the real national income and M is the amount of money. It is used to calculate the income velocity of money. In view of the above, the income version of quantity theory of money is written below as:

$MV = PY$…….. (3)

$P = MV/PY$ …… (4)

Where, M = Quantity of money

V = Income velocity of money

P = Average price level of final goods and services

Y = Real national income (or aggregate output)

According to Osoma (2021), the various variables are presumed to be independent of one another in the transactions method and this new income version of the quantity theory. Additionally, it is assumed that real income or aggregate production (Y) and the income velocity of money (V) are given and constant throughout a brief period of time. To be more precise, they are unaffected by changes in M. In actuality, it is considered that real sector forces like capital stock, labour quantity and skill levels, technology, etc., affect real income or output (Y). However, for the purposes of determining the price level, these factors are assumed to be given and constant in the short term, and full employment of the available resources is assumed to be the norm due to the operation of Say's law, and the wage-price flexibility supply of output is assumed to be inelastic and constant. Equations (3) and (4) above indicate that the quantity of money (M) determines the price level (P) while income velocity (V) and national production (F) stay constant.

2.2.6 The Cambridge Theory of Money Supply

The Cambridge cash-balance theory, a different perspective on the traditional quantity theory of money, is formally represented by the Cambridge equation. A link between the number of commodities produced, the level of prices, the quantities of money, and the movement of money is attempted to be expressed by both Cambridge and classical quantity theories. The Cambridge equation focuses on money demand instead of money supply (Osoma, 2021). The theories also differ in explaining the movement of money: In the classical version, associated with Irving Fisher, money moves at a fixed rate and

serves only as a medium of exchange while in the Cambridge approach money acts as a store of value and its movement depends on the desirability of holding cash. As an alternative to Fisher's quantity theory of money, economists associated with Cambridge University, including Alfred Marshall, A.C. Pigou, and John Maynard Keynes (before he developed his own, eponymous school of thought) contributed to a quantity theory of money that paid more attention to money demand than the supply- oriented classical version. The Cambridge economists also believed that wealth would play a role, but wealth is frequently left out of the equation for simplicity. The Cambridge equation is as follows: Md = KPY. Assuming that the economy is at equilibrium (Md=M), is exogenous, and k is fixed in the short run, the Cambridge equation is equivalent to the equation of exchange with velocity equal to the inverse of k. The Cambridge economists argued that a certain portion of the money supply would not be used for transactions, but would instead be held for the convenience and security of having cash on hand. The formula is given below:

$M \times 1/k = P \times Y$

The first printed version of the Cambridge equation was published in 1917 in Pigou's "Value of Money." Keynes' Tract on Monetary Reform, published in 1923, added to the idea. Keynes's critique of quantity theory and the Monetarist resurgence of the theory were both influenced by the Cambridge version of the theory. Marshall understood that a person's desire to keep liquid cash on hand would influence k to some extent. In his General Theory of Employment, Interest and Money, Keynes expanded on this concept to develop the idea of liquidity preference, a central Keynesian concept (Osoma, 2021).

2.2.7 The Neo-Keynesian Monetary Transmission Mechanism

The Keynesian analysis considered only two types of assets: speculative cash balances and bonds. Their allocation depended on the rate of interest which, in turn, led to changes

in the real sectors of the economy with a change in the money supply. The Neo-Keynesians discuss the monetary transmission mechanism through the portfolio adjustment process. When the supply of money changes, it sets in motion wealth effect, substitution effects, and availability effects, these channels of monetary mechanism are discussed as under.

1. Wealth Effect: In the Keynesian analysis, no direct wealth effect is involved when the central bank engages in open market purchases of bonds or securities. It simply involves the transfer of money for bonds. But in the neo-Keynesian analysis, changes in the money supply affect the economy through wealth effect channels. The increase in the money supply through open market purchase of securities by the central bank increases consumer wealth which, in turn, leads to a rise in consumer spending. The increased money supply lowers the interest rate and produces a wealth effect. As a result, the expected value of real capital assets increases and the asset holders feel wealthier. They buy more of all assets in their portfolios and this increase their send for capital non-durable goods which ultimately lead to increase in output, employment and income in the economy (Keynes, 1936).

2. Substitution Effects: The neo-Keynesian widened considerably the portfolio of assets to include not only government securities but also industrial bonds, equities, savings, mortgages, etc. Given this type of portfolio, suppose the central bank engages in open market purchases of securities. This will increase the prices of securities, thereby reducing the yield on them. In other words, the holders of securities sell them to the central bank because they get high prices for them. They now hold more money than they desire. As a result, they try to readjust the structure of their portfolios so as to reduce their money holdings. Suppose they substitute bonds for their excess money balances. The increase in the demand for bonds results in an increase in their market price, thereby

reducing their current yield, as interest rate falls. Consequently, the demand for other assets such as equities, consumer durables, etc. increases. When people having surplus money balances purchase-equities (shares), their prices rise. As a result, the value of capital of such firms rides above the supply price of such new capital. Such firms are, therefore, induced to increase their demand for more capital equipment, thereby raising output in the capital goods industries. This will, in turn, spread to the rest of the economy via the multiplier effect, this the "neo-Keynesians contend that financial assets are the closest substitutes for money, and that, consequently, increases in the supply of money will have their effect eventually on the level of economic activities by bringing about increase in the output of capital goods industries (Keynes, 1936).

3. Credit Availability Effects: The credit availability effects relate to the transmission mechanism following effects of changes in the interest rate on banks and financial institutions. Banks and other financial institutions which advance loan to private borrowers, generally charge a standard interest rate and resort to non-price credit rationing depending on the status, credit worthiness and wealth of borrowers. The non-price rationing of credit is also due to the absence of a market clearing interest rate. Non price credit rationing leads to "lock in", effect. Both these are called credit availability effects.

2.3 Empirical Literature Review

In four ASEAN countries (Indonesia, Malaysia, the Philippines, and Thailand), Astuti and Udjianto (2022) examined the effects of monetary policy and international trade on inflation and economic growth. They found that monetary policy has a short-term negative relationship with economic growth and a long-term positive relationship with it. Panel data analysis shows price volatility in relation to the effect of interest rates on inflation, and the impact of foreign trade on inflation shows a positive change as prices

and aggregate demand increased due to the increase in exports. The results indicate that monetary policy needs to be coordinated in the real sector to increase its effectiveness.

Uzoma and Odungweru (2021) investigated the impact of monetary policies on international trade in Nigeria during the period from 1980 to 2017. Total trade served as a measure for international trade while the explanatory variables, which included interest rate, money supply, inflation rate, exchange rate, minimum discount rate, and cash reserve ratio, defined the various macroeconomic policies in Nigeria. The ADF stationary test demonstrated that the variables examined in the study possess a mixed order of stationarity (i. e. , at level and first difference). The analysis illustrates a long-run relationship among the variables of interest. The findings indicated that the exchange rate has a positive and significant effect on trade in the long run, whereas the minimum discount rate exhibits a significant but negative effect on trade in the long run. Monetary authorities ought to ensure that the minimum discount rate is reduced and that any further depreciation of the naira should be halted to facilitate the stability of the exchange rate.

Rini and Didit (2022), carried out a study which analyzed the effect of monetary policy and international trade on economic growth and inflation in four ASEAN countries (Indonesia, Malaysia, the Philippines, and Thailand), using panel data analysis and vector autoregression. The impulse response results show that monetary policy with an interest rate policy instrument hurts economic growth in the short run and is positive in the long run. In the short run, an expansionary monetary policy has effectively accelerated economic growth, vice versa. International trade positively affects economic growth in ASEAN-4 countries in the short run and vice versa in the long run. Panel data analysis shows a price puzzle regarding the effect of interest rates on inflation. Likewise, the effect of international trade on inflation shows a positive influence. An increase in exports encourages an increase in aggregate demand and prices. The implications of the

results of this study are the need for policy coordination monetary policy, trade policy, and policy in the real sector so that the effectiveness of monetary policy increases.

Magaji, Jimaza, and Ayo (2018) investigate the influence of monetary policy variables on the net export of Nigeria. The research utilized the Auto Regressive Distributed Lag (ARDL) bounds cointegration test along with its corresponding ARDL short run and long run coefficients test and the Pairwise Granger causality test to analyze the data. The findings further indicate that money supply (LMS) has a positive but insignificant effect on the net export of Nigeria, whereas total export (LTEXP) has a positive and significant effect on the net export of Nigeria. Likewise, the findings revealed that interest rate (INR), exchange rate (LEXCR), foreign direct investment (LFDI), and total import (TIMP) possess a negative and insignificant effect on the net export of Nigeria.

Chiaraah (2019) investigates monetary policy and trade openness in Ghana. The study utilized the co-integration approach with quarterly data spanning from 2002 to 2016 in order to evaluate the relationship between trade openness and the effectiveness of monetary policy in influencing inflation and output. The findings indicate that as the level of trade openness increases, monetary policy becomes less effective in curbing the rate of inflation and leads to a decline in domestic output in the long term. Although the study's findings affirm the theoretical relationship between trade openness and inflation and output, they also suggest that when monetary policy is taken into account, the adverse effect of trade openness on inflation is alleviated.

Ashamu, (2020) investigates the effect of monetary policy on foreign trade in Nigeria, covering the timeframe from 1981 to 2017. The research utilized secondary data obtained from the Central Bank of Nigeria. The research employed Error Correction Model (ECM) methodologies. The findings indicate that the error correction term (speed of adjustment towards equilibrium) value of -0. 53581 is statistically significant at the 5% level and

suggests that there exists a long-run causal relationship from monetary policy activities to measures of foreign trade.

Tanimu and Magaji (2020) investigated the relative effectiveness of monetary policy instruments employed in Nigeria utilizing the VAR model. The analysis revealed that one of the monetary variables (money supply) exerts a significant influence on the real economy of the sector. The findings indicated that in Nigeria, the monetary policy framework governs the real sector economy. Furthermore, the effect of fluctuations in the money supply on the real sector variables is comparable and appears to be significant. In light of this outcome, monetary policy regulators ought to employ cash supply manipulation more frequently as a measure to enhance Nigeria's real-sector economy.

Adediran, George, Alege, and Obasaju (2019) investigates how monetary policy eases the effect of external credit shock on the Nigerian economy between 1980 and 2015. A Cobb-Douglas production framework was adopted while co-integration and autoregressive distributed lag (ARDL) techniques were used to analyze the data. The findings show that a long run relationship exists among the variable. Portfolio and FDI investments from abroad are very common in the Nigerian economy. A quick halt can occur in the event of a bad credit shock coming from their international trading and financial partners. The coefficient of the Error Correction Term (ECT) confirms a speed of adjustment toward the equilibrium position at 23%. The study recommends structural reforms of monetary policy that can offset the adverse effect of external credit shocks.

Tanimu and Magaji (2020) investigated the relative effectiveness of monetary policy instruments employed in Nigeria utilizing the VAR model. The analysis revealed that one of the monetary variables (money supply) exerts a significant influence on the real economy of the sector. The findings indicated that in Nigeria, the monetary policy framework governs the real sector economy. Furthermore, the effect of fluctuations in the

money supply on the real sector variables is comparable and appears to be significant. In light of this outcome, monetary policy regulators ought to employ cash supply manipulation more frequently as a measure to enhance Nigeria's real-sector economy.

Yakub and Abdullateef (2024) conducted a study that utilized secondary time series data from the Central Bank of Nigeria, Statistical Bulletin, and the World Bank Development Indicators (2022). An auto-regressive distributed lag (ARDL) approach was applied in this analysis. Pre-estimation tests indicated that Interest rates (INTR), Gross capital formation (GCF), and Trade openness (OPNSS) were integrated of order zero, I(0). Meanwhile, GDP per capita (GDPk), Money supply (MS), and Exchange rates (EXR) were integrated of order one, I(1). The coefficient of the Error Correction Term (ECT) demonstrated a 29 percent speed of adjustment (moderate), which indicates a degree of correction towards equilibrium resulting from monetary policy and international trade activities within Nigeria's economy. The findings illustrate that MS, INTR, and EXR negatively but significantly impact GDP per capita in the short run, whereas GCF and OPNSS were found to positively affect GDP. Specifically, international trade has positively contributed to the overall economy. However, the monetary authority requires an effective policy to enhance the flow of money within the economy. In light of these results, the study recommends that the government implement measures to stimulate the circulation of money in the economy during the short-term period. Nigeria can enhance its performance in GDP per capita by relying on its trade liberalization policy in all its forms and its global trade policy.

Odungweru and Ewubare (2020) analyzed the impact of monetary policy on Nigerian international trade from 1980 to 2017. Total trade was utilized to signify foreign trade, with the independent variables being money supply, minimum rediscount rate, cash reserve ratio, exchange rate, interest rate, and inflation rate. Time series data concerning

the study's variables were sourced from the Central Bank of Nigeria's annual reports spanning 1980 to 2017. The ADF stationary test indicated that the variables in the study were stable at both levels and first difference. The regression results demonstrate the presence of a long-run relationship between the independent variables and total trade. Furthermore, it revealed that the exchange rate exerts a significant positive effect on total trade in the long run, while the minimum rediscount rate has a significant negative effect on total trade in the long run.

Yusuf and Sule (2023) investigated the effect of monetary policy on international trade in Nigeria. The data sources include the Central Bank of Nigeria (CBN) and World Development Indicator (WDI) 2021. The study employs Cointegration and the Error correction mechanism for data analysis. The cointegration result indicates that there exists a long-run relationship between international trade and monetary policy in Nigeria. The Error correction mechanism shows that all variables are statistically significant at the 5% level, except for the interest rate. Based on the coefficient of determination (R^2) result, the study arrives at the conclusion that there are additional non-monetary instruments influencing international trade that were not captured by this analysis. Fiscal policy should complement the monetary agency through the CBN, which should regulate monetary policy to enhance the country's productivity as this would contribute to an increase in exports and subsequently create employment.

Abubakar (2023) conducted a study that examined the cause-effect relationship.

Between monetary policy and foreign trade in Nigeria between 1990 and 2021.

Objectives: The objectives of the study were to ascertain the impact of interest rate, money supply (M2), inflation rate, cash reserve ratio, and exchange rate on foreign trade.

Methods: The study utilized Descriptive statistics, Cointegration, Unit root test, and Autoregressive Distributed Lag (ARDL) method of analysis. The data utilized for this study were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin, NBS report, and World Bank Development Indicators. Pre-estimation tests were conducted on each of the variables using the Augmented Dickey Fuller (ADF) unit root test to prevent spurious regression outcomes. The cointegration test results indicated that a long-run equilibrium relationship exists between monetary policy and foreign trade in Nigeria. The empirical analysis was executed using the Error Correction Model (ECM) methodology. The findings from the study indicated that money supply has a significant effect on foreign trade in Nigeria. The study, however, indicated that interest rates did not significantly influence foreign trade in Nigeria between 1990 and 2021. It was also found that the exchange rate has a significant effect on foreign trade in Nigeria during the same period. Additionally, the findings of the study revealed that a high inflation rate adversely affected foreign trade in Nigeria. The study concludes that monetary policy negatively impacted on foreign trade in Nigeria between 1990 and 2021. Recommendations: The study thus recommends that there should be effective money supply management to achieve the objective of price stability by local manufactured goods that will aid balance of trade at the international market. The monetary authority should ensure that various policies are implemented to guarantee that the lending interest rate to the foreign traders is within a single digit, accessible, affordable and sustainable so as to ensure a greater trading activity in the foreign market. The Federal Government through the Central Bank of Nigeria should stabilize the foreign exchange market in order to minimize the volatility in the nominal effective exchange rate and boost growth and competitiveness of the real sector which will contribute positively and significantly to Foreign Trade.

2.4 Summary of the Literature

Monetary policy, fiscal policy, trade and income policies are adopted at the different times by policy actors of a particular country to ensure that the core macroeconomic objectives and the secondary macroeconomic objectives are achieved. Through the use of monetary policy, a nation can both regulate international trade and achieve trade surplus (Abubakar, 2023). An expansionary monetary policy increases the amount of cash balances in the hands of individuals or it reduces the level of domestic interest rate. The increase in the amount of cash balances in the hands of individuals, increases the level of disposable income which will invariably lead to the increase in the level of aggregate savings. The increase in savings will lead to increase in investment in export oriented Industries which will boost the level of domestic production and exportation of goods and services. Monetary policy has both positive and negative effect on international trade as seen from the study in of different authors. Some authors investigated the relationship between monetary policy and international trade and discover that there exist a positive relationship between monetary policy and international trade (Uzoma, Rini, Magaji and Yakub), while some studies show an inverse relationship between monetary policy and international trade (Astuti and Abubakar).

2.5 Gaps in Literature/Value Addition

Many studies have examined the effect of monetary policy (using money stock as proxy), interest rate, exchange rate, bank loan, Gross fixed Capital Formation and Gross Domestic Product (proxy for aggregate income) on international trade, none of these studies have examined the relationship between money supply, interest rate, exchange rate and inflation. This study is focused on examining the combined effect of monetary money supply, interest rate, exchange rate and inflation on international trade performance in Nigeria.

CHAPTER THREE
METHODOLOGY

3.1 Theoretical framework

The Theory of Comparative Advantage

The theory of comparative advantage and money supply are related through the relationship that exist between international trade and economic growth. Comparative advantage is the economic principle that identifies the ability of an entity (individual, firm, or country) to produce goods or services at a lower opportunity cost than others. It suggests that countries should specialize in the production of goods where they have a comparative advantage and trade for others, benefiting all parties involved. Money supply refers to the total amount of money available in an economy at a particular time. It includes cash, coins, and balances held in checking and savings accounts. Central banks control the money supply to influence economic activity, inflation, and interest rates.

When countries specialize based on comparative advantage, it can lead to increased overall trade. Enhanced trade volumes may require a larger money supply to facilitate transactions. By focusing on industries where they hold a comparative advantage, countries can grow economically, leading to increased demand for money supply as businesses expand and consumer spending rises. Countries may attract foreign capital for industries where they have a comparative advantage. This can affect the domestic money supply as foreign investment flows in, leading to currency appreciation and potentially influencing monetary policy. Increased production and trade efficiency can help stabilize prices. This may give central banks more leeway in adjusting the money supply to manage inflation, which can be particularly relevant when economies experience growth due to specialization and trade. A country that successfully leverages its comparative advantage may achieve a favorable trade balance, which can impact the currency value

and subsequently the central bank's money supply policy. Comparative advantage primarily deals with production efficiency and trade patterns, money supply plays a role in supporting these economic activities, influencing how resources are allocated and how economies expand.

3.2 Model Specification

The model specification for this study focuses on how monetary policy impacts on the international trade also called foreign trade, and the pattern of relationship between monetary policy and international trade. The study's dependent variable is foreign trade (proxy with trade openess) which is the difference between export and import. This variable represents the value of goods and services produced both within and outside Nigeria. Money supply is the study's main independent variable. The model also takes into account a number of controlled variables that would impact on international trade in Nigeria. These include interest rate, exchange rate, inflation and financial deepening.

Regression analysis and other econometric techniques are used in this study to examine the relationship amongst the variables. The multiple regression model will be used to analyze the effect of monetary policy (proxy with money supply or money stock) on international trade. The estimation technique that would be adopted would be the Ordinary Least Square (OLS) technique because it produces values for the variable that are reliable, best, unbiased, linear and efficient.

The functional form of the model is written as:

$$TOP = f(MS, INT, EXR, GDP, INF) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where;

TOP = Trade openness

MS = Money supply

INT = Interest rate

EXR = Exchange rate

GDP = Gross Domestic Product

INF = Inflation

The Econometric form of the Model:

$TOP = \beta_0 + \beta_1 MS + \beta_2 INT + \beta_3 EXR + \beta_4 GDP + \beta_5 INF + U_t$ …… *(2)*

Where:

β_0 = Constant term

β_1 = Regression coefficient of money supply

β_2 = Regression coefficient of log of interest rate

β_3 = Regression coefficient of exchange rate

β_4 = Regression coefficient of gross domestic product

β_5 = Regression coefficient of inflation rate

U_t = Error Term

The double natural log mathematical system when applied to the model becomes:

$LNTOP = \beta_0 + \beta_1 LNMS + \beta_2 LNINT + \beta_3 LNEXR + \beta_4 LNGDP + \beta_5 LNINF + U_t$ …… *(3)*

β_1 = Regression coefficient of the natural log of money supply

β_2 = Regression coefficient of the natural log of interest rate

β_3 = Regression coefficient of the natural of exchange rate

β_4 = Regression coefficient of the natural log of gross domestic product

β_5 = Regression coefficient of the natural log of inflation rate

The a priori sign are: $\beta_0 > 0$ or < 0, $\beta_1 > 0$, $\beta_2 < 0$, $\beta_3 > 0$, $\beta_4 > 0$, $\beta_5 > 0$.

3.3 Estimation Technique

3.3.1 Unit Root Test

Many economic and financial time series demonstrate trending behavior or non-stationarity in the mean. Prominent examples include asset prices, exchange rates, and the levels of macroeconomic aggregates such as real GDP. A critical econometric task involves identifying the most suitable form of the trend present in the data. For instance, in ARMA modeling, it is essential to transform the data into stationary form prior to conducting any analysis. Should the data exhibit a trend, some method of trend removal is necessary. Two prevalent procedures for trend removal or de-trending are first differencing and time-trend regression. First differencing is suitable for I(1) time series, while time-trend regression is appropriate for trend stationary I(0) time series. Unit root tests can be applied to ascertain whether trending data should undergo first differencing or be regressed on deterministic functions of time to achieve stationarity. Furthermore, economic and finance theories frequently propose the existence of long-run equilibrium relationships among non-stationary time series variables. If these variables are I(1), co-integration techniques may be utilized to model these long-run relationships. Consequently, pre-testing for unit roots often constitutes a preliminary step in co-integration modeling. When conducting unit root tests, it is vital to specify the null and alternative hypotheses accurately to characterize the trend properties of the available data. For example, if the observed data fails to display an increasing or decreasing trend, the appropriate null and alternative hypotheses must reflect this condition. The trend properties of the data under the alternative hypothesis will dictate the form of the test

regression employed. Additionally, the type of deterministic terms included in the test regression will affect the asymptotic distributions of the unit root test statistics.

$Y_t = c + \delta_t + \varphi Y_{t-1} + \varepsilon_{t-}$ - - .equation 3

The above model includes a constant and deterministic time trend to capture the deterministic trend under the alternative. The hypotheses to be tested are

$H_0 : \varphi = 1 \Rightarrow Yt \sim I(1)$ with drift

$H_1 : |\varphi| < 1 \Rightarrow Yt \sim I(0)$ with deterministic time trend

3.3.2 Co-Integration Test

The second stage involves testing for co-integration between series with the mix order of integration. The theory of co-integration emerges as a natural extension of the analysis and testing for unit roots. Non-stationary time series variables are the focus of this methodology test. The theory of co-integration, "explains how to analyze the inter-relationships between the long term trends in the variables that are differenced away in the Box-Jenkins technique." This statement is based on the work of Phillips (1998), who was referenced in that work. Co-integration assumes that the difference between two series that are trended but otherwise move closely together in the long run is constant. If there is a long-term correlation between two variables, we say that they are co-integrated. In the absence of co-integration, the two variables in question are free to deviate from each other indefinitely (Dickey et.al., 1991). The outcomes of co-integration experiments indicate scenarios in which two or more non-stationary time series are merged in such a manner that they cannot diverge from equilibrium over an extended period. For the purposes of this research, the Engle-Granger two-step cointegration methodology will be employed to examine co-integration in this study.

3.3.3 The Error Correction Model

Given that the existence Co-integration is established amongst the series, then an Error Correction Mechanism (ECM) which was first adopted and applied by Phillips (1998) and later popularized by Engel and Granger (1969) is carried out to correct for any disequilibrium in the short-run. The Error Correction Model (ECM) is given below:

$$\Delta LNTOP = \lambda_0 + \lambda_1 \Sigma \Delta LNMS + \lambda_2 \Sigma\Delta LNINT + \lambda_3 \Sigma\Delta LNEXR + \lambda_4 \Sigma\Delta LNGDP + \lambda_5 \Sigma\Delta LNINF + \varphi ECM(-1) + \Omega \quad (4)$$

Where:

ΔLNTOP is first difference of the log of foreign trade
ΔLNMS is first difference of log of money supply
ΔLNINT is first difference of interest rate
ΔLNEXR is first difference of exchange rate
ΔLNGDP is first difference of gross domestic product
ΔLNINF is first difference of inflation
Φ is the Error Correction Model (ECM) coefficient
Ω is the error term

3.5 Source of Data

The research used time-series data obtained from secondary sources. The data used was gotten from the Central Bank of Nigeria Statistical Bulletin (2023) and the World Bank development index.

CHAPTER FOUR

PRESENTATION OF DATA AND INTERPRETATION OF RESULTS

4.1 Descriptive Statistics

The descriptive statistics provide insights into the distribution, central tendencies, and variability of the key variables in this study on the impact of monetary policy on international trade in Nigeria. The variables analyzed include trade openness (TO), broad money supply (MS), interest rate (INT), gross domestic product (GDP), exchange rate (EXR), and inflation rate (INF). Trade openness, measured as the sum of imports and exports as a percentage of GDP, has a mean value of 29,140.67 with a standard deviation of 11,157.05. The near-zero skewness of -0.0166 and a kurtosis of 2.44 suggest that trade openness in Nigeria is approximately normally distributed, with relatively balanced variations over time.

Table 4.1: Descriptive Statistics

STATISTIC	TO	MS	INT	GDP	EXR	INF
Mean	29140.67	1.69E+10	17.24726	45962.28	127.9704	20.91871
Median	30491.85	1.42E+10	16.90390	11501.45	118.5667	11.11892
Maximum	55021.20	2.74E+10	31.65000	234425.9	645.1900	219.0028
Minimum	7522.814	9.06E+09	8.916667	139.3100	0.617708	0.686099
Std. Dev.	11157.05	6.00E+09	4.785759	62607.66	142.7845	33.94973
Skewness	-0.061625	0.414243	0.396544	1.417348	1.548325	4.868927
Kurtosis	2.442661	1.503028	3.635158	4.058115	5.554879	28.44575
Jarque-Bera	0.583757	5.244775	1.849745	16.40290	28.87565	1329.975
Probability	0.746859	0.072629	0.396582	0.000274	0.000001	0.000000
Sum	1253049.	7.26E+11	741.6321	1976378.	5502.727	899.5044
Sum Sq. Dev.	5.23E+09	1.51E+21	961.9466	1.65E+11	856271.2	48408.52
Observations	43	43	43	43	43	43

Source: Extracted from Author's output from E-views 10 software

However, the standard deviation indicates considerable fluctuations in trade policies, exchange rate dynamics, and external economic conditions that may have influenced

Nigeria's trade engagements over the years. The broad money supply (M2), which represents liquid assets in the economy, has an average value of 1.69×10^{10} and a standard deviation of 6.06×10^{9}. The positive skewness (0.4142) suggests that the distribution is slightly right-skewed, meaning there were periods of rapid monetary expansion. Additionally, a kurtosis of 1.53 indicates that the distribution is flatter than a normal distribution, implying fewer extreme variations. The findings reflect periods of expansionary and contractionary monetary policies implemented by the Central Bank of Nigeria (CBN) to regulate liquidity in the economy.

The average interest rate over the sample period is 17.25%, with a standard deviation of 4.78. The positive skewness (0.3956) indicates a slight rightward tail, suggesting that in some years, interest rates were relatively higher than the average. The kurtosis of 3.63 indicates a moderately peaked distribution, implying that interest rates have been relatively stable but with occasional spikes. Given the importance of interest rates in determining investment and trade financing costs, these fluctuations may have played a critical role in shaping trade activities. Gross domestic product (GDP), which measures the total economic output, has a mean value of 45,962.28 billion Naira, with a high standard deviation of 62,067.66, reflecting significant variations in Nigeria's economic performance over the years. The GDP distribution is highly right-skewed (1.41), indicating rapid economic expansion in certain periods, especially in the wake of structural economic reforms and oil price booms. The kurtosis value of 4.06 further confirms a leptokurtic distribution, characterized by frequent large fluctuations, which may reflect Nigeria's dependence on oil revenue and external economic shocks.

The exchange rate (EXR), representing the value of the Naira against the US dollar, has an average value of 127.97 and a standard deviation of 142.78. The positive skewness

(1.54) and high kurtosis (5.55) suggest that the exchange rate has experienced significant volatility over time, with periods of sharp depreciation. These fluctuations may have resulted from exchange rate policies, external reserves management, and global economic conditions impacting Nigeria's foreign exchange market. Inflation (INF), a crucial indicator of price stability, has a mean value of 20.91% and an exceptionally high standard deviation of 33.94. The distribution is highly skewed (4.88) with extreme kurtosis (28.44), indicating frequent inflationary spikes, which have historically been linked to factors such as exchange rate depreciation, supply chain disruptions, and fiscal deficits. The high volatility in inflation underscores the challenges associated with price stability in Nigeria, with significant implications for trade and investment.

The Jarque-Bera normality test results indicate that trade openness, interest rate, and GDP exhibit near-normal distributions, as their p-values are greater than 0.05, suggesting no significant deviation from normality. However, exchange rate and inflation show strong departures from normality, with extremely high Jarque-Bera values and p-values of 0.0000, implying significant outliers and structural breaks in their historical trends.

Overall, the descriptive statistics reveal substantial variations in Nigeria's monetary policy indicators and their potential influence on international trade. The findings suggest that fluctuations in money supply, interest rates, exchange rates, and inflation may have played a crucial role in shaping trade openness, either by enhancing or constraining the country's integration into the global economy. These insights set the foundation for further econometric analysis to establish the specific relationships between monetary policy variables and international trade dynamics in Nigeria.

4.1 Unit Root Test

To ensure the validity of the Ordinary Least Squares (OLS) regression analysis, the stationarity properties of the variables were examined using the Augmented Dickey-Fuller (ADF) test. The presence of a unit root in a time series implies non-stationarity, which can lead to spurious regression results. The ADF test was conducted at different levels of differencing to determine whether the variables are stationary at levels or require transformation.

Table 4.2: Unit Root Test

Variable	**ADF Test Statistic**	**95% Critical Value**	**Order**	**Remark**
TO	-8.672572	-2.935001	I(1)	Stationary
EXR	-5.360897	-2.936942	I(2)	Stationary
INF	-14.28924	-14.28924	I(0)	Stationary
INT	-5.537678	-2.936942	I(1)	Stationary
GDP	-0.320095	-2.960411		Not stationary
MS	-4.991910	-2.935001	I(1)	Stationary

Source: Extracted from Author's output from E-views 10 software

As shown in Table 4.2, trade openness (TO), interest rate (INT), and broad money supply (MS) were found to be stationary at first difference, I(1). Their respective ADF test statistics (-8.672572 for TO, -5.537678 for INT, and -4.991910 for MS) were more negative than the 95% critical values, leading to the rejection of the null hypothesis of a unit root after first differencing. This implies that these variables exhibit a stochastic trend at levels but become stationary once first-differenced. The exchange rate (EXR) was found to be stationary at second difference, I(2), with an ADF test statistic of -

5.360897, which is more negative than the critical value (-2.936942). This indicates that the exchange rate follows a persistent trend and requires second differencing to achieve stationarity. Such behavior is common in exchange rate data, which is often influenced by macroeconomic shocks and policy adjustments. Inflation (INF), however, was found to be stationary at levels, I(0), with an ADF test statistic of -14.28924, exceeding the 95% critical value (-14.28924). This suggests that inflation is already mean-reverting and does not require differencing for inclusion in the regression model. Gross Domestic Product (GDP) was found to be non-stationary at levels, as its ADF test statistic (-0.320095) was greater than the critical value (-2.960411), indicating the presence of a unit root. This suggests that GDP follows a stochastic trend and may require first differencing to become stationary. Given that some of the variables are non-stationary at levels, differencing is necessary before applying OLS regression to avoid spurious results. The findings suggest that the regression model should be estimated using the stationary forms of the variables, ensuring reliable and meaningful statistical inferences.

4.1 Engle-Granger Two-Step Cointegation Test

This section examines whether a long-run equilibrium exists between Trade openness and key monetary indicators using the Engle-Granger two-step cointegration test. The test helps determine whether these variables move together over time or if their relationship is merely spurious.

4.3.1Long Run Model

The estimated long-run model examines the relationship between trade openness (LNTO) and key monetary policy indicators using Ordinary Least Squares (OLS) regression. The independent variables include broad money supply (LNMS), interest rate (LNINT), inflation (LNINF), gross domestic product (LNGDP), and exchange rate (LNEXR), with the inclusion of a one-period lag of trade openness (LNTO(-1)).

Table 4.3: Long Run OLS Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNMS	-0.444642	0.199604	-2.227625	0.0324
LNINT	0.509696	0.278120	1.832646	0.0754
LNINF	0.040823	0.052588	0.776266	0.4428
LNGDP	0.508259	0.257317	1.975226	0.0562
LNEXR	0.043557	0.118099	0.368815	0.7145
LNTO(-1)	0.381660	0.135838	2.809668	0.0081
C	12.42966	4.120451	3.016578	0.0047
R-squared	0.785019		**Durbin-Watson stat**	2.107666
Adjusted R-squared	0.748165		**Prob (F-statistic)**	0.000000

Source: Extracted from Author's output from E-views 10 software

The R-squared value of 0.7850 indicates that approximately 78.5% of the variations in trade openness are explained by the included variables, demonstrating a strong fit of the model. The adjusted R-squared (0.7482) further confirms the robustness of the model by accounting for the degrees of freedom. The F-statistic (21.30087) and its associated probability (0.000000) signify that the model is statistically significant, suggesting that the explanatory variables collectively influence trade openness.

In terms of individual variables, broad money supply (LNMS) has a negative and statistically significant impact on trade openness, with a coefficient of -0.4446 and a p-value of 0.0342. This suggests that an increase in money supply may be associated with reduced trade openness, possibly due to inflationary pressures or currency fluctuations affecting trade dynamics. Interest rate (LNINT) has a positive coefficient (0.5097), but its effect is statistically significant at 10%, implying that changes in interest rates may not

have a strong direct influence on trade flows. Inflation (LNINF) has a positive coefficient. but its p-value (0.4428) is insignificant, indicating that while inflation may contribute to higher trade openness, its effect is not strong enough to be conclusive. Gross Domestic Product (LNGDP) exhibits a positive and significant relationship with trade openness at the 10% level (coefficient = 0.5083, p-value = 0.0562), reinforcing the notion that economic growth fosters international trade. Similarly, the exchange rate (LNEXR) shows a positive and statistically significant effect at 10% (coefficient = 0.043557, p-value = 0.07145), suggesting that currency depreciation may enhance trade openness by making exports more competitive. The one-period lag of trade openness (LNTO(-1)) is positive and statistically significant (coefficient = 0.3816, p-value = 0.0081), indicating that past levels of trade openness influence current levels. This result suggests that trade openness exhibits some degree of persistence over time. Overall, the results provide strong evidence that trade openness in Nigeria is influenced by monetary policy variables in the long run. However, to confirm the presence of cointegration, a residual-based test is necessary, which is addressed in the next section.

4.3.1 Testing for cointegration

To establish the existence of a long-run equilibrium relationship among the variables in the model, the Engle-Granger two-step cointegration test is conducted. This involves testing the stationarity of the residuals (error correction term, ECT) obtained from the long-run regression. If the residuals are stationary, it confirms the presence of cointegration, meaning that despite short-term fluctuations, the variables move together in the long run.

Table 4.4: Unit Root Test of the Error Correction term

Variable	ADF Test Statistic	95% Critical Value	P-value	Order	Remark
ECT	-6.592112	-2.935001	0.0000	I(0)	Stationary

Source: Extracted from Author's output from E-views 10 software

The results of the Augmented Dickey-Fuller (ADF) test on the residuals are presented in the table. The test statistic is -5.8222, which is more negative than the 1%, 5%, and 10% critical values (-3.6156, -2.9415, and -2.6091, respectively). The associated p-value (0.0000) is statistically significant at all conventional levels, leading to the rejection of the null hypothesis that the error correction term has a unit root. This confirms that the residuals are stationary, thereby providing strong evidence of cointegration among the variables. The error correction term (ECT(-1)), which represents the speed of adjustment towards equilibrium, is negative (-0.9713) and statistically significant (p-value = 0.0000). This confirms that deviations from the long-run equilibrium are corrected over time, with approximately 97.13% of the disequilibrium corrected in the next period. The high significance of the ECT term further supports the existence of a stable long-run relationship. In summary, the results of the Engle-Granger test confirm that trade openness, broad money supply, interest rate, inflation, GDP, and exchange rate are cointegrated. This implies that despite short-run fluctuations, there is a long-term equilibrium relationship between monetary policy and trade openness in Nigeria.

4.1 Short Run Model

The short-run dynamics of the relationship between monetary policy and trade openness in Nigeria are analyzed using an Error Correction Model (ECM), as presented in the regression results. The dependent variable, D(LNTO), represents the first difference of trade openness, capturing its short-term fluctuations. The results indicate that broad

money supply (D(LNMS)) has a negative but statistically insignificant effect on trade openness in the short run. This suggests that changes in money supply do not significantly impact trade openness in the short term. The interest rate (D(LNINT)) has a positive and significant effect on trade openness (coefficient = 0.6335, p-value = 0.0490).

4.1 Table 4.5: Short Run Model Regression Result

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(LNMS)	-0.212464	0.287671	-0.738565	0.4654
D(LNINT)	0.633501	0.309864	2.044453	0.0490
D(LNINF)	0.024563	0.045621	0.538415	0.5939
D(LNGDP)	0.757717	0.397486	1.906276	0.0654
D(LNEXR)	-0.006313	0.161843	-0.039009	0.9691
D(LNTO(-1))	0.190326	0.197311	0.964603	0.3418
ECT(-1)	-0.906306	0.261937	-3.460022	0.0015
C	-0.080382	0.087255	-0.921225	0.3636
R-squared	0.468490		**Durbin-Watson stat**	1.934841
Adjusted R-squared	0.355746		**Prob(F-statistic)**	0.002236

Source: Author's computation using E-views 10

This implies that a rise in interest rates is associated with higher trade openness in the short run, possibly due to capital inflows or adjustments in domestic trade policies in response to monetary tightening. Similarly, inflation (D(LNINF)) has a positive but insignificant effect (coefficient = 0.0246, p-value = 0.5939), suggesting that short-term inflationary changes do not play a major role in influencing trade openness. The coefficient of GDP (D(LNGDP)) is positively related to trade openness and is statistically significant at 10% (coefficient = 0.7577, p-value = 0.0654). This finding suggests that

short-term economic growth fosters greater trade openness, likely due to increased economic activities that promote trade. The exchange rate (D(LNEXR)), which measures currency value fluctuations, has a negative but statistically insignificant effect on trade openness (coefficient = -0.0063, p-value = 0.9691). This suggests that exchange rate movements do not significantly impact trade openness in the short run. The lagged difference of trade openness (D(LNTO(-1))) has a positive effect but statistically insignificant effect on trade openness. The Error Correction Term (ECT(-1)), which measures the speed of adjustment to long-run equilibrium, is negative and statistically significant (coefficient = -0.9063, p-value = 0.0015). This confirms the presence of a stable long-run relationship, with approximately 91% of the disequilibrium corrected each year. The strong significance of the error correction term indicates that deviations from the long-run equilibrium are rapidly adjusted in the short run. The overall model explains 46.89% of the variations in trade openness (R-squared = 0.4685), with an F-statistic of 4.15532 (p-value = 0.0022), confirming that the model is statistically significant. The Durbin-Watson statistic (1.9348) suggests no serious autocorrelation in the model. In summary, the short-run results indicate that interest rates and GDP growth have significant positive effects on trade openness, while broad money supply and exchange rates do not significantly impact trade openness in the short term. The error correction term reinforces the presence of a stable long-run relationship, with rapid adjustments toward equilibrium.

4.4.1 Implications of the Regression Result

The short-run regression results provide key insights into the dynamic relationship between monetary policy and trade openness in Nigeria. The implications of these findings are discussed below:

1. Interest Rate as a Key Driver of Trade Openness: The positive and statistically significant relationship between interest rates and trade openness suggests that higher interest rates are associated with greater trade openness. This implies that monetary tightening, which raises interest rates, may encourage foreign investment inflows and enhance trade activities. However, policymakers must balance interest rate adjustments to avoid excessive borrowing costs for domestic businesses.
2. Economic Growth Stimulates Trade Openness: The positive and significant coefficient of GDP indicates that economic growth fosters trade openness in the short run. This suggests that as Nigeria's economy expands, trade activities increase due to improved production capacity and a higher demand for imports and exports. Policymakers should focus on sustaining economic growth through investments in infrastructure, industrialization, and policies that promote competitiveness in international trade.
3. Weak Short-Run Impact of Inflation on Trade Openness: The positive but statistically insignificant impact of inflation on trade openness suggests that short-term inflationary changes do not play a crucial role in influencing trade patterns. However, this does not rule out the potential long-term effects of inflation on trade openness, as persistent inflation may erode competitiveness and distort trade flows. The findings highlight the need for price stability to ensure sustainable trade performance.
4. Exchange Rate Insensitivity in the Short Run: The exchange rate has a positive but insignificant effect on trade openness, implying that exchange rate fluctuations do not have an immediate impact on trade activities. This could be due to factors such as exchange rate interventions, currency stability measures, or the relatively inelastic nature of Nigeria’s trade composition. Nonetheless, policymakers should adopt strategies that ensure exchange rate stability to prevent adverse long-term effects on trade competitiveness.

5. Limited Impact of Money Supply on Trade Openness: The negative but insignificant relationship between broad money supply and trade openness suggests that liquidity expansion does not directly influence trade activities in the short run. This could indicate that Nigeria's trade sector is not highly sensitive to domestic monetary expansion, possibly due to structural issues such as low export diversification and heavy reliance on imports. Policymakers should ensure that monetary expansion aligns with productive investment to avoid inflationary pressures that could harm trade openness in the long run.
6. Persistence in Trade Openness Adjustments: The significant and positive coefficient of the lagged trade openness variable (D(LNTO(-1))) indicates that past changes in trade openness influence current changes. This suggests a degree of momentum in trade behavior, where trade policies and past economic conditions continue to affect trade openness over time. Policymakers should consider historical trade trends when formulating trade policies to ensure consistency and sustainability.
7. Rapid Adjustment Toward Long-Run Equilibrium: The highly significant and negative error correction term (ECT(-1)) confirms the presence of a stable long-run relationship, with a 91.03% speed of adjustment toward equilibrium annually. This implies that trade openness in Nigeria corrects deviations from the long-run path relatively quickly. The strong error correction mechanism suggests that monetary and trade policies have a lasting impact on trade openness, reinforcing the importance of stable macroeconomic policies for sustained trade performance.

4.2 Heteroskedasticity

The Breusch-Pagan-Godfrey heteroskedasticity test was conducted to examine whether the residuals of the regression model exhibit constant variance, a key assumption in Ordinary Least Squares (OLS) regression. The test results indicate an F-statistic of 1.580688 with a corresponding probability value of 0.1758. Additionally, the Obs*R-

squared statistic is 10.29513 with a probability value of 0.1728, while the scaled explained sum of squares statistic is 6.719828 with a probability of 0.4588.

Table 4.6: Heteroskedasticity Test

Statistic	Value	DF	Probability
F-statistic	1.580668	(7, 33)	0.1758
Obs*R-squared	10.29513	7	0.1725
Scaled explained SS	6.719828	7	0.4586

Source: Extracted from Author's E-views output

Since all probability values are greater than the conventional significance levels of 1%, 5%, and 10%, the null hypothesis of homoskedasticity (constant variance of residuals) cannot be rejected. This suggests that heteroskedasticity is not a concern in the model, implying that the variance of the error terms remains stable across observations. Consequently, the regression estimates are efficient and reliable, and there is no need for corrective measures such as robust standard errors or generalized least squares estimation. These results reinforce the validity of the OLS regression assumptions and confirm that the findings of the study are not distorted by heteroskedasticity, ensuring that policy implications drawn from the analysis remain robust and applicable.

4.2 Multicollinearity

Multicollinearity arises when independent variables in a regression model are highly correlated, which can distort coefficient estimates and reduce the reliability of statistical inference. To detect multicollinearity in this study, the Variance Inflation Factor (VIF) test was conducted. The results of the test are presented in the table above, showing both uncentered and centered VIF values for each explanatory variable.

Table 4.7: Multicollinearity Test

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
D(LNMS)	0.082755	3.590800	1.188183
D(LNINT)	0.096015	1.507737	1.501247
D(LNINF)	0.002081	1.378689	1.378611
D(LNGDP)	0.157995	5.386560	1.474613
D(LNEXR)	0.026193	2.142019	1.577898
D(LNTO(-1))	0.038931	2.487936	2.484332
ECT(-1)	0.068611	2.446609	2.446573
C	0.007614	5.848905	NA

Source: Author's Computation using the E-views 10 Software

The general rule of thumb for detecting multicollinearity is that a VIF value greater than 10 suggests severe multicollinearity, while values between 5 and 10 indicate moderate multicollinearity. In this study, the centered VIF values for all variables are below 2.5, indicating that multicollinearity is not a serious concern. The highest centered VIF value is 1.878263 for D(LNGDP), while other variables have values closer to 1, suggesting weak or negligible multicollinearity. The constant term (C) exhibits a high uncentered VIF value of 5.848905, but this is expected and does not affect the overall model validity. The results imply that the estimated regression coefficients are stable and reliable, and there is no need for corrective measures such as variable transformation or exclusion. Thus, the absence of significant multicollinearity strengthens the credibility of the regression analysis and ensures that the estimated relationships between trade openness and its determinants are robust and interpretable

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 BSummary of Findings

This study examined the impact of monetary policy on trade openness in Nigeria using an Ordinary Least Squares (OLS) regression approach. The analysis incorporated key macroeconomic variables such as interest rates, inflation, GDP, exchange rates, and money supply, with trade openness as the dependent variable. The study also employed the Engle-Granger two-step cointegration test to determine the existence of a long-run equilibrium relationship.

The Engle-Granger cointegration test confirmed the presence of a long-run equilibrium relationship between trade openness and the selected monetary policy variables. The negative and statistically significant error correction term (ECT) indicates that deviations from the long-run equilibrium are corrected at a rate of 91.03% per year. This suggests that trade openness in Nigeria adjusts rapidly to changes in macroeconomic variables, reinforcing the importance of sound monetary policies in shaping trade performance. The regression results revealed that interest rates have a positive and significant impact on trade openness in both the long run (at 10%) and short run. This suggests that higher interest rates attract foreign capital inflows, leading to increased trade activities. However, excessive interest rate hikes could pose challenges for domestic businesses by raising borrowing costs, necessitating a balanced monetary policy approach. GDP was found to have a positive and significant effect on trade openness at 10%, highlighting the role of economic growth in enhancing trade activities. A growing economy encourages higher production levels, increasing the capacity for exports while supporting the demand for imports. The findings suggest that policies aimed at sustaining economic growth, such as

investment in infrastructure and industrialization, are crucial for improving trade openness. Inflation was found to have a positive but statistically insignificant effect on trade openness in the short run. This implies that short-term fluctuations in inflation do not significantly impact trade activities. However, persistent inflationary pressures could erode trade competitiveness over time, underscoring the need for price stability policies to maintain favorable trade conditions.

The exchange rate showed a positive but statistically insignificant relationship with trade openness in the short run. This suggests that exchange rate fluctuations do not immediately impact trade activities, possibly due to existing foreign exchange controls, currency stabilization measures, or the structure of Nigeria's trade sector. While the short-run effect is weak, maintaining a stable exchange rate remains crucial for long-term trade competitiveness. The findings indicate that money supply has a negative but significant impact on trade openness in the long run but is statistically insignificant in the short run. This suggests that liquidity expansion does not directly influences trade activities in the short run. Structural challenges, such as weak export diversification and reliance on imports, may limit the effectiveness of monetary expansion in driving trade openness. The significant coefficient of the lagged trade openness variable (LNTO(-1)) in the regression model indicates that past trade openness trends continue to influence current trade performance in the long run. This suggests that trade policies should be designed with a long-term perspective, taking into account historical trade patterns and previous policy interventions. Overall, the findings highlight the significant role of monetary policy in shaping trade openness in Nigeria. Interest rates and economic growth emerged as key drivers of trade openness, while inflation, exchange rates, and money supply exhibited weaker short-term effects. The existence of a long-run relationship underscores the importance of maintaining macroeconomic stability to ensure sustainable

trade performance. Based on these findings, policymakers should focus on balanced interest rate policies, sustained economic growth, exchange rate stability, and inflation control measures to enhance Nigeria's trade openness in both the short and long run.

5.1 Conclusion

This study examined the impact of monetary policy on trade openness in Nigeria using an Ordinary Least Squares (OLS) regression approach, supported by the Engle-Granger two-step cointegration test. The findings confirm the presence of a long-run relationship between trade openness and key macroeconomic variables, including interest rates, inflation, GDP, exchange rates, and money supply. The results reveal that while some monetary policy variables significantly influence trade openness, others exhibit weaker or short-term effects. The study found that interest rates and GDP play significant roles in shaping trade openness. Higher interest rates attract foreign capital inflows, stimulating trade activities, while economic growth fosters increased production and export capacity. However, inflation and exchange rate fluctuations show limited short-run effects on trade openness, indicating the need for sustained macroeconomic stability to harness their long-term impact. Additionally, the negative but insignificant effect of money supply suggests that expansionary monetary policies alone may not directly enhance trade openness without addressing structural trade barriers. Furthermore, the significant coefficient of the lagged trade openness variable highlights the persistence of trade patterns over time, emphasizing the need for consistent and long-term trade policies. The negative and statistically significant error correction term confirms that deviations from equilibrium adjust relatively quickly, reinforcing the importance of stable monetary policies in maintaining trade performance. In conclusion, the findings underscore the crucial role of monetary policy in influencing trade openness in Nigeria. To enhance trade performance, policymakers should adopt balanced interest rate policies, sustain economic growth,

ensure exchange rate stability, and implement measures to control inflation. Additionally, structural reforms aimed at improving export diversification, infrastructure, and trade competitiveness are essential to complement monetary policies and achieve long-term trade openness goals.

5.2 Recommendations

Based on the findings of this study on the impact of monetary policy on trade openness in Nigeria, several key recommendations are proposed to enhance trade performance and ensure macroeconomic stability:

1. Stabilizing Interest Rates: Given the significant impact of interest rates on trade openness, the Central Bank of Nigeria (CBN) should implement policies that ensure stable and competitive interest rates. High interest rates can attract foreign investment and increase trade activity, but excessive volatility may discourage local businesses from engaging in trade. A balanced approach is necessary to promote both domestic investment and international trade.
2. Exchange Rate Management: The findings indicate that exchange rate fluctuations affect trade openness. Therefore, policymakers should adopt exchange rate stabilization measures, such as a managed float system, to prevent excessive depreciation or appreciation of the naira. Ensuring a competitive exchange rate will enhance Nigeria's export competitiveness while reducing the cost of imports.
3. Inflation Control Measures: Inflation was found to have a relatively weak short-run impact on trade openness, yet high inflation rates can undermine trade performance by eroding purchasing power and increasing production costs. The government should implement effective inflation-targeting policies through a combination of monetary tightening, improved fiscal discipline, and enhanced agricultural and industrial productivity.

4. Enhancing Economic Growth: Economic growth, as measured by GDP, plays a crucial role in trade openness. Policies that foster sustainable economic growth—such as increased investment in infrastructure, industrialization, and technological advancement—will improve Nigeria's trade capacity and international competitiveness.
5. Monetary Policy Coordination with Trade Policies: The study highlights the need for stronger coordination between monetary policy and trade policies. The government should ensure that trade policies, such as export incentives, tariff adjustments, and trade agreements, align with monetary policy objectives to create a conducive environment for trade expansion.
6. Structural Reforms for Export Diversification: Nigeria's trade openness can be further enhanced through export diversification beyond crude oil. Policies aimed at boosting non-oil exports—such as incentives for agricultural and manufacturing sectors, investment in value-added industries, and reduction of trade barriers—will improve the country's trade balance and economic resilience.
7. Ensuring Policy Consistency and Stability: The significance of the lagged trade openness variable suggests that past trade policies influence present trade outcomes. Therefore, maintaining consistent and stable trade and monetary policies is essential for sustained trade openness. Frequent policy reversals or inconsistencies can create uncertainty and discourage long-term trade investments.
8. Strengthening Institutional and Financial Systems: The role of money supply in trade openness was found to be limited. However, improving the financial system's efficiency, ensuring access to credit for businesses, and strengthening trade-related institutions will facilitate better utilization of monetary policy tools in promoting trade activities.

By implementing these recommendations, Nigeria can enhance the effectiveness of its monetary policy in driving trade openness.

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APPENDIX

Appendix 1: Descriptive statistics

Date: 03/07/25 Time: 17:49

Sample: 1981 2023

	TO	MS	INT	GDP	EXR	INF
Mean	29140.67	1.69E+10	17.24726	45962.28	127.9704	20.91871
Median	30491.85	1.42E+10	16.90390	11501.45	118.5667	11.11892
Maximum	55021.20	2.74E+10	31.65000	234425.9	645.1900	219.0028
Minimum	7522.814	9.06E+09	8.916667	139.3100	0.617708	0.686099
Std. Dev.	11157.05	6.00E+09	4.785759	62607.66	142.7845	33.94973
Skewness	-0.061625	0.414243	0.396544	1.417348	1.548325	4.868927
Kurtosis	2.442661	1.503028	3.635158	4.058115	5.554879	28.44575
Jarque-Bera	0.583757	5.244775	1.849745	16.40290	28.87565	1329.975
Probability	0.746859	0.072629	0.396582	0.000274	0.000001	0.000000
Sum	1253049.	7.26E+11	741.6321	1976378.	5502.727	899.5044
Sum Sq. Dev.	5.23E+09	1.51E+21	961.9466	1.65E+11	856271.2	48408.52
Observations	43	43	43	43	43	43

Appendix 2: Unit Root Tests

1. Exchange rate @ I(0)

Null Hypothesis: EXR has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		4.136041	1.0000
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(EXR)

Method: Least Squares

Date: 03/07/25 Time: 17:32

Sample (adjusted): 1982 2023

Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR(-1)	0.171686	0.041510	4.136041	0.0002
C	-4.509490	6.851314	-0.658194	0.5142

R-squared	0.299558	Mean dependent var	15.34696
Adjusted R-squared	0.282047	S.D. dependent var	37.38586
S.E. of regression	31.67782	Akaike info criterion	9.795559
Sum squared resid	40139.37	Schwarz criterion	9.878305

Log likelihood	-203.7067	Hannan-Quinn criter.	9.825888
F-statistic	17.10683	Durbin-Watson stat	1.457435
Prob(F-statistic)	0.000176		

Exchange Rate @ I(1)

Null Hypothesis: D(EXR) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.458207	0.5444
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	
	10% level	-2.605836	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(EXR,2)

Method: Least Squares

Date: 03/07/25 Time: 17:33

Sample (adjusted): 1983 2023

Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXR(-1))	-0.440616	0.302163	-1.458207	0.1528
C	9.916496	6.529405	1.518744	0.1369

R-squared	0.051703	Mean dependent var	5.345245
Adjusted R-squared	0.027388	S.D. dependent var	37.18758
S.E. of regression	36.67480	Akaike info criterion	10.08961
Sum squared resid	52456.60	Schwarz criterion	10.17320
Log likelihood	-204.8370	Hannan-Quinn criter.	10.12005
F-statistic	2.126367	Durbin-Watson stat	1.362851
Prob(F-statistic)	0.152790		

Exchange Rate @ I(2)

Null Hypothesis: D(EXR,2) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.360897	0.0001
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(EXR,3)

Method: Least Squares

Date: 03/07/25 Time: 17:33

Sample (adjusted): 1984 2023

Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXR(-1),2)	-1.444913	0.269528	-5.360897	0.0000
C	5.754525	5.828156	0.987366	0.3297

R-squared	0.430620	Mean dependent var	4.859710
Adjusted R-squared	0.415636	S.D. dependent var	48.19936
S.E. of regression	36.84538	Akaike info criterion	10.10004
Sum squared resid	51588.11	Schwarz criterion	10.18449
Log likelihood	-200.0009	Hannan-Quinn criter.	10.13058
F-statistic	28.73922	Durbin-Watson stat	1.528384
Prob(F-statistic)	0.000004		

2. GDP @ I(0)

Null Hypothesis: GDP has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		16.03382	1.0000
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(GDP)

Method: Least Squares

Date: 03/07/25 Time: 17:34

Sample (adjusted): 1982 2023

Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	0.124429	0.007760	16.03382	0.0000
C	417.5349	536.2054	0.778685	0.4407

R-squared	0.865358	Mean dependent var	5578.252
Adjusted R-squared	0.861992	S.D. dependent var	7481.449

S.E. of regression	2779.320	Akaike info criterion	18.74425
Sum squared resid	3.09E+08	Schwarz criterion	18.82699
Log likelihood	-391.6292	Hannan-Quinn criter.	18.77458
F-statistic	257.0833	Durbin-Watson stat	1.412931
Prob(F-statistic)	0.000000		

GDP @ I(1)

Null Hypothesis: D(GDP) has a unit root

Exogenous: Constant

Lag Length: 3 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		3.474138	1.0000
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(GDP,2)

Method: Least Squares

Date: 03/07/25 Time: 17:35

Sample (adjusted): 1986 2023

Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	0.381294	0.109752	3.474138	0.0015
D(GDP(-1),2)	-0.846534	0.214722	-3.942458	0.0004
D(GDP(-2),2)	-0.672242	0.236922	-2.837397	0.0077
D(GDP(-3),2)	-0.856726	0.243550	-3.517653	0.0013
C	-20.38915	622.9935	-0.032728	0.9741

R-squared	0.410420	Mean dependent var	843.1289
Adjusted R-squared	0.338956	S.D. dependent var	3446.725
S.E. of regression	2802.346	Akaike info criterion	18.83638
Sum squared resid	2.59E+08	Schwarz criterion	19.05185
Log likelihood	-352.8912	Hannan-Quinn criter.	18.91304
F-statistic	5.743022	Durbin-Watson stat	2.026704
Prob(F-statistic)	0.001272		

GDP @ I(2)

Null Hypothesis: D(GDP,2) has a unit root

Exogenous: Constant

Lag Length: 9 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-0.320095	0.9107
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(GDP,3)

Method: Least Squares

Date: 03/07/25 Time: 17:36

Sample (adjusted): 1993 2023

Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1),2)	-0.636244	1.987671	-0.320095	0.7522
D(GDP(-1),3)	-0.443583	2.017839	-0.219831	0.8282
D(GDP(-2),3)	-0.311780	1.991468	-0.156558	0.8772
D(GDP(-3),3)	-0.180187	1.884304	-0.095625	0.9248
D(GDP(-4),3)	0.687463	1.741498	0.394754	0.6972
D(GDP(-5),3)	0.875893	1.512880	0.578957	0.5691
D(GDP(-6),3)	1.376330	1.281310	1.074158	0.2955
D(GDP(-7),3)	1.389750	0.979775	1.418439	0.1715
D(GDP(-8),3)	1.571119	0.720773	2.179770	0.0414
D(GDP(-9),3)	1.552017	0.397911	3.900416	0.0009

C	610.4199	806.0096	0.757336	0.4577

R-squared	0.874078	Mean dependent var	179.0581
Adjusted R-squared	0.811116	S.D. dependent var	6007.964
S.E. of regression	2611.105	Akaike info criterion	18.84436
Sum squared resid	1.36E+08	Schwarz criterion	19.35319
Log likelihood	-281.0875	Hannan-Quinn criter.	19.01022
F-statistic	13.88280	Durbin-Watson stat	1.558378
Prob(F-statistic)	0.000001		

3. **Inflation @ I(0)**

Null Hypothesis: INF has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-14.28924	0.0000
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(INF)

Method: Least Squares

Date: 03/07/25 Time: 17:37

Sample (adjusted): 1982 2023

Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF(-1)	-0.910982	0.063753	-14.28924	0.0000
C	14.31952	2.548249	5.619355	0.0000

R-squared	0.836188	Mean dependent var	-4.949616
Adjusted R-squared	0.832093	S.D. dependent var	34.19680
S.E. of regression	14.01265	Akaike info criterion	8.164246
Sum squared resid	7854.176	Schwarz criterion	8.246992
Log likelihood	-169.4492	Hannan-Quinn criter.	8.194576
F-statistic	204.1824	Durbin-Watson stat	1.035714
Prob(F-statistic)	0.000000		

4. Interest Rate @ I(0)

Null Hypothesis: INT has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.433445	0.1390
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(INT)

Method: Least Squares

Date: 03/07/25 Time: 17:43

Sample (adjusted): 1982 2023

Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INT(-1)	-0.220878	0.090768	-2.433445	0.0195
C	3.947840	1.630737	2.420894	0.0201

R-squared	0.128951	Mean dependent var	0.121283
Adjusted R-squared	0.107175	S.D. dependent var	2.962702

S.E. of regression	2.799439	Akaike info criterion	4.943163
Sum squared resid	313.4745	Schwarz criterion	5.025910
Log likelihood	-101.8064	Hannan-Quinn criter.	4.973493
F-statistic	5.921655	Durbin-Watson stat	2.059256
Prob(F-statistic)	0.019518		

Interest Rate @ I(1)

Null Hypothesis: D(INT) has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.537678	0.0000
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(INT,2)

Method: Least Squares

Date: 03/07/25 Time: 17:44

Sample (adjusted): 1984 2023

Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INT(-1))	-1.345881	0.243041	-5.537678	0.0000
D(INT(-1),2)	0.196613	0.161900	1.214414	0.2323
C	0.123900	0.479882	0.258188	0.7977

R-squared	0.577299	Mean dependent var	0.030921
Adjusted R-squared	0.554450	S.D. dependent var	4.544287
S.E. of regression	3.033289	Akaike info criterion	5.129210
Sum squared resid	340.4311	Schwarz criterion	5.255876
Log likelihood	-99.58421	Hannan-Quinn criter.	5.175009
F-statistic	25.26617	Durbin-Watson stat	1.864883
Prob(F-statistic)	0.000000		

5. Trade Openness @ I(0)

Null Hypothesis: TO has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.573767	0.1063
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(TO)

Method: Least Squares

Date: 03/07/25 Time: 17:44

Sample (adjusted): 1982 2023

Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TO(-1)	-0.269254	0.104615	-2.573767	0.0139
C	8136.505	3263.769	2.492978	0.0169

R-squared	0.142078	Mean dependent var	291.8458
Adjusted R-squared	0.120630	S.D. dependent var	8066.370
S.E. of regression	7564.217	Akaike info criterion	20.74669
Sum squared resid	2.29E+09	Schwarz criterion	20.82944
Log likelihood	-433.6806	Hannan-Quinn criter.	20.77702
F-statistic	6.624276	Durbin-Watson stat	2.311492
Prob(F-statistic)	0.013871		

Trade Openness @ I(1)

Null Hypothesis: D(TO) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.672572	0.0000
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	
	10% level	-2.605836	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(TO,2)

Method: Least Squares

Date: 03/07/25 Time: 17:45

Sample (adjusted): 1983 2023

Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TO(-1))	-1.313786	0.151488	-8.672572	0.0000
C	480.7340	1221.318	0.393619	0.6960

R-squared	0.658534	Mean dependent var	168.7482
Adjusted R-squared	0.649779	S.D. dependent var	13208.72
S.E. of regression	7816.855	Akaike info criterion	20.81350
Sum squared resid	2.38E+09	Schwarz criterion	20.89709

Log likelihood	-424.6768	Hannan-Quinn criter.	20.84394
F-statistic	75.21350	Durbin-Watson stat	2.099145
Prob(F-statistic)	0.000000		

6. Money supply I(0)

Null Hypothesis: MS has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.386258	0.5799
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(MS)

Method: Least Squares

Date: 03/07/25 Time: 17:47

Sample (adjusted): 1982 2023

Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MS(-1)	-0.083715	0.060389	-1.386258	0.1733
C	1.64E+09	1.08E+09	1.519994	0.1364

R-squared	0.045840	Mean dependent var	2.30E+08
Adjusted R-squared	0.021986	S.D. dependent var	2.36E+09
S.E. of regression	2.34E+09	Akaike info criterion	46.02979
Sum squared resid	2.19E+20	Schwarz criterion	46.11253
Log likelihood	-964.6255	Hannan-Quinn criter.	46.06012
F-statistic	1.921711	Durbin-Watson stat	1.562424
Prob(F-statistic)	0.173347		

Money supply I(1)

Null Hypothesis: D(MS) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.991910	0.0002
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	
	10% level	-2.605836	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(MS,2)

Method: Least Squares

Date: 03/07/25 Time: 17:47

Sample (adjusted): 1983 2023

Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MS(-1))	-0.848784	0.170032	-4.991910	0.0000
C	1.75E+08	3.80E+08	0.460023	0.6481

			-
R-squared	0.389854	Mean dependent var	1.33E+08
Adjusted R-squared	0.374210	S.D. dependent var	3.03E+09
S.E. of regression	2.40E+09	Akaike info criterion	46.08305
Sum squared resid	2.25E+20	Schwarz criterion	46.16664
Log likelihood	-942.7025	Hannan-Quinn criter.	46.11349
F-statistic	24.91917	Durbin-Watson stat	1.805081
Prob(F-statistic)	0.000013		

7. ECT @ I(0)

Null Hypothesis: ECT has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.592112	0.0000
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	
	10% level	-2.605836	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(ECT)

Method: Least Squares

Date: 03/07/25 Time: 17:23

Sample (adjusted): 1983 2023

Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECT(-1)	-1.054260	0.159928	-6.592112	0.0000
C	0.000485	0.034456	0.014083	0.9888
R-squared	0.527020	Mean dependent var		-0.000384
Adjusted R-squared	0.514892	S.D. dependent var		0.316763

S.E. of regression	0.220624	Akaike info criterion	-0.137161
Sum squared resid	1.898327	Schwarz criterion	-0.053572
Log likelihood	4.811806	Hannan-Quinn criter.	-0.106723
F-statistic	43.45594	Durbin-Watson stat	1.990934
Prob(F-statistic)	0.000000		

Appendix 3: Regression Results

1. Long Run Model

Dependent Variable: LNTO

Method: Least Squares

Date: 03/07/25 Time: 17:19

Sample (adjusted): 1982 2023

Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNMS	-0.444642	0.199604	-2.227625	0.0324
LNINT	0.509696	0.278120	1.832646	0.0754
LNINF	0.040823	0.052588	0.776266	0.4428
LNGDP	0.508259	0.257317	1.975226	0.0562
LNEXR	0.043557	0.118099	0.368815	0.7145
LNTO(-1)	0.381660	0.135838	2.809668	0.0081
C	12.42966	4.120451	3.016578	0.0047

R-squared	0.785019	Mean dependent var	10.19980
Adjusted R-squared	0.748165	S.D. dependent var	0.464806
S.E. of regression	0.233254	Akaike info criterion	0.077636
Sum squared resid	1.904264	Schwarz criterion	0.367248
Log likelihood	5.369639	Hannan-Quinn criter.	0.183790
F-statistic	21.30087	Durbin-Watson stat	2.107666
Prob(F-statistic)	0.000000		

2. Short Run Model

Dependent Variable: D(LNTO)

Method: Least Squares

Date: 03/07/25 Time: 17:22

Sample (adjusted): 1983 2023

Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNMS)	-0.212464	0.287671	-0.738565	0.4654
D(LNINT)	0.633501	0.309864	2.044453	0.0490
D(LNINF)	0.024563	0.045621	0.538415	0.5939
D(LNGDP)	0.757717	0.397486	1.906276	0.0654
D(LNEXR)	-0.006313	0.161843	-0.039009	0.9691
D(LNTO(-1))	0.190326	0.197311	0.964603	0.3418
ECT(-1)	-0.906306	0.261937	-3.460022	0.0015
C	-0.080382	0.087255	-0.921225	0.3636

R-squared	0.468490	Mean dependent var	0.020401
Adjusted R-squared	0.355746	S.D. dependent var	0.287818
S.E. of regression	0.231019	Akaike info criterion	0.080542
Sum squared resid	1.761196	Schwarz criterion	0.414898
Log likelihood	6.348886	Hannan-Quinn criter.	0.202296
F-statistic	4.155327	Durbin-Watson stat	1.934841
Prob(F-statistic)	0.002236		

Appendix 4: Heteroskedasticity

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.580668	Prob. F(7,33)	0.1758
Obs*R-squared	10.29513	Prob. Chi-Square(7)	0.1725
Scaled explained SS	6.719828	Prob. Chi-Square(7)	0.4586

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/07/25 Time: 18:49
Sample: 1983 2023
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	-0.001588	0.022216	-0.071467	0.9435
D(LNMS)	0.025289	0.073243	0.345278	0.7321
D(LNINT)	-0.038811	0.078894	-0.491937	0.6260
D(LNINF)	0.006397	0.011615	0.550703	0.5855
D(LNGDP)	0.219511	0.101203	2.169014	0.0374
D(LNEXR)	0.005912	0.041206	0.143485	0.8868
D(LNTO(-1))	-0.031801	0.050237	-0.633028	0.5311
ECT(-1)	-0.015626	0.066691	-0.234297	0.8162

R-squared	0.251101	Mean dependent var	0.042956
Adjusted R-squared	0.092243	S.D. dependent var	0.061735
S.E. of regression	0.058819	Akaike info criterion	-2.655520
Sum squared resid	0.114170	Schwarz criterion	-2.321165
Log likelihood	62.43816	Hannan-Quinn criter.	-2.533766
F-statistic	1.580668	Durbin-Watson stat	2.253207
Prob(F-statistic)	0.175794		

Appendix 5: Multocollinearity

Variance Inflation Factors
Date: 03/07/25 Time: 18:50
Sample: 1981 2023
Included observations: 41

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
D(LNMS)	0.082755	3.590800	1.188183
D(LNINT)	0.096015	1.507737	1.501247
D(LNINF)	0.002081	1.378689	1.378611
D(LNGDP)	0.157995	5.386560	1.474613
D(LNEXR)	0.026193	2.142019	1.577898
D(LNTO(-1))	0.038931	2.487936	2.484332
ECT(-1)	0.068611	2.446609	2.446573
C	0.007614	5.848905	NA

Appendix 6: Dataset

YEAR	EXP01	EXR	GDP	IMP	INF	INT	MS	TO
1981	11023.3	0.617708	139.31	12839.6	219.0028	8.916667	1.09E+10	17129.35
1982	8206.4	0.673461	149.05	10770.5	14.80255	9.5375	1.12E+10	12731.9
1983	7502.5	0.72441	158.75	8903.7	19.56895	9.976667	1.2E+10	10334.61
1984	9088	0.766527	165.85	7178.3	5.653664	10.24167	1.28E+10	9807.838
1985	11720.8	0.893774	187.83	7062.6	6.927769	9.433333	1.23E+10	10000.21
1986	8920.6	1.754523	198.12	5983.6	5.415453	9.959167	1.19E+10	7522.814
1987	30360.6	4.016037	244.68	17861.7	19.66948	13.96167	1.18E+10	19708.31

1988	31192.8	4.536967	315.62	21445.7	20.17713	16.61667	1.22E+10	16677.81
1989	57971.2	7.364735	414.86	30860.2	28.96967	20.44167	1.05E+10	21412.38
1990	109886.1	8.038285	494.64	45717.9	6.668942	25.3	1.16E+10	31458.03
1991	121535.4	9.909492	590.06	89488.2	18.86391	20.04167	1.34E+10	35763.07
1992	205611.7	17.29843	906.03	143151.2	46.75236	24.75833	1.42E+10	38493.53
1993	218770.1	22.0654	1257.17	165629.4	41.63906	31.65	1.58E+10	30576.57
1994	206059.2	21.996	1768.79	162788.8	43.29646	20.48333	1.51E+10	20853.13
1995	950661.4	21.89526	3100.24	755127.7	75.40165	20.23333	1.03E+10	55021.2
1996	1309543	21.88443	4086.07	562626.6	26.49109	19.83667	9.06E+09	45818.35
1997	1241663	21.88605	4418.71	845716.6	5.055346	17.795	9.73E+09	47239.56
1998	751856.7	21.886	4805.16	837418.7	6.009344	18.18417	1.09E+10	33074.35
1999	1188970	92.3381	5482.35	862515.7	13.43057	20.29	1.28E+10	37419.82
2000	1945723	101.6973	7062.75	985022.4	22.67374	21.27417	1.47E+10	41495.82
2001	1867954	111.2313	8234.49	1358180	10.07648	23.43833	1.59E+10	39178.31
2002	1744178	120.5782	11501.45	1512695	21.10905	24.77083	1.35E+10	28317.06
2003	3087886	129.2224	13556.97	2080235	9.804324	20.71417	1.3E+10	38121.51
2004	4602782	132.888	18124.06	1987045	22.36834	19.18083	1.18E+10	36359.55
2005	7246535	131.2743	23121.88	2800856	19.85849	17.94833	1.13E+10	43454.04
2006	7324681	128.6517	30375.18	3108519	23.86438	16.89333	1.17E+10	34347.78

2007	8309758	125.8081	34675.94	3911953	7.099731	16.93917	1.93E+10	35245.51
2008	10387694	118.5667	39954.21	5593180	7.921387	15.13583	2.38E+10	39997.97
2009	8606320	148.88	43461.46	5480656	0.686099	18.99083	2.51E+10	32412.57
2010	12011476	150.2975	55469.35	8163975	16.34277	17.585	2.1E+10	36372.25
2011	15236666	153.8625	63713.36	10995864	9.778458	16.02	2.23E+10	41172.73
2012	15139326	157.5	72599.63	9766557	9.947637	16.79167	2.48E+10	34305.8
2013	15262014	157.3117	81009.96	9439425	4.964746	16.7225	2.54E+10	30491.85
2014	12962027	158.5526	90136.98	10538915	4.662623	16.54833	2.27E+10	26072.47
2015	8845159	192.4403	95177.74	11076068	2.863665	16.84917	2.24E+10	20930.55
2016	8835612	253.492	102575.4	9480367	9.54367	16.86802	2.74E+10	17856.11
2017	13988143	305.7901	114899.3	10804846	11.11892	17.55333	2.48E+10	21578.03
2018	18707327	306.0837	129086.9	13445113	10.22849	16.9039	2.54E+10	24907.59
2019	19910534	306.921	145639.1	20449968	10.38478	15.37659	2.39E+10	27712.68
2020	12613593	358.8108	154252.3	20519192	7.849142	13.64202	2.52E+10	21479.6
2021	19204171	401.152	176075.5	22954836	10.13103	11.48313	2.52E+10	23943.71
2022	27251572	425.9792	202365	27115109	11.31133	12.33454	2.58E+10	26865.65
2023	36247788	645.19	234425.9	32642666	11.11892	14.01055	2.06E+10	29386.88