IMPACT OF MONETARY POLICY ON TRADE BALANCE PERFORMANCE IN NIGERIA (1970-2019)

By

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CERTIFICATION

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DEDICATION

This project is dedicated to God Almighty who made it possible for me to complete my academic programme in Mountain Top University (MTU) at all odds.

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I appreciate almighty for his provisions and enduring grace for me all the way.

My significant appreciation goes my supervisor Mr. Oluyomi Oluwatosin whose contribution criticism and valuable recommendations can never be forgotten to successfully complete my project within the completion timeframe.

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I APPRECIATE YOU ALL

Ademola Gbenga Tosin

MTU! Empowered to Excel

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ABSTRACT

This study examines the impact of monetary policy on trade balance performance in Nigeria for the study period of 1970-2019. Unlike previous studies this study measures monetary policy from two strand with other variables, Interest rate and exchange rate. the relevant variable in these models were sourced from secondary data such as central bank of Nigeria statistical bulletin and the world development index (WDI). In achieving the objectives of this study three research questions and hypotheses were formulated and both descriptive statistic and annual time series econometric methodology was employed, the result revealed that the nominal effective exchange rate (NEER), money supply, gross domestic product (GDP) Degree of openness (DOP) manufacturing capacity utilization (MCU) domestic interest rate (DINT) has a positive but insignificant impact on trade balance performance in the long run over the study period while Real effective exchange rate (REER) and inflation (INF) has a negative and also in significant impact on trade balance performance in Nigeria .the study recommended that recommends that monetary policy authorities should implement monetary policy instrument that will help better trade balance performance.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

Monetary policy is widely accepted as one of the macroeconomic instruments used by economies to ensure long-term economic growth and development in both developed and developing economies. It encompasses all actions taken by a country's government through its central bank with the goal of influencing cost and credit accessibility. It also includes combinations of packages designed to influence furthermore, Nnanna (2006) stated that macroeconomic policies in developing countries are designed to stabilize the economy, stimulate growth and poverty reduction and promote trade balance however the role of money to regulate the volume, prices, and direction of money in such a country's economy. The monetary policy encompasses all efforts made by a country's monetary authorities to control the amount of money supply and achieve various macroeconomic objectives (Ajie & Nenbee, 2010), Similarly, Chamberlin and Yueh (2006) describe the monetary policy as the act of controlling the supply or prices of money are capable of exerting a positive powerful influence over the economy. the aim of achieving trade balance performance has been an area of concern to both academics and policymakers. In view of the relationship between monetary policy and trade balance performance numerous studies have been carried out to examine the causal relationship between monetary policy and trade balance performance

Despite the importance of monetary policy to stabilize a number of macroeconomic objectives especially trade surplus performance in the developed economies it is worrisome that developing economies is challenged with incessant trade vulnerability/deficit in the developing economies like Nigeria as a case study unlike previous studies (lee & Chinn 1998, Prasad 7

Gable 1997, Koray & McMillian 1999, Lane, 2001 and Lim,200la,200lb) have focused on the effect of monetary policy on the trade balance in the developed countries like Italy, France, UK, but lesser studies have been conducted in the African countries like Nigeria as the case study.

Theoretically, the monetary policy can influence trade balance from two channels the expenditure switching and income adsorption respectively According to Kim (2001a, 2001b), monetary policy has two types of impact on the trade balance. The first is the income absorption effect, which is followed by the other spending switching effect. On the one hand, a rise in interest rates corresponding to a contractionary monetary policy will limit output and, as a result, lower income. As a result, income absorption effects will result in a decrease in import demand, allowing for an improvement in the trade balance. On the other hand, an increase in the interest rate leads exchange rates to rise, which promotes demand for foreign commodities over domestic items. As a result, the expenditure switching impact worsens the trade balance by reducing exports and raising imports. The trade balance's response is determined by these two opposing influences. The trade balance will improve if the income absorption impact is more than the expenditure switching effect, and the trade balance will deteriorate if the expenditure switching effect is greater than the income absorption effect.

As a result, the actual influence of monetary policy on the trade balance is transmitted through the exchange rate channel, also known as the exchange rate channel. Channel for exchanging currencies in the case of an open economy like Nigeria, monetary policy is transmitted through net export, which then affects the economy's output (Mishkin, 2004). Because when the domestic real interest rate falls, deposits in domestic currency become less attractive than those in foreign currency, the exchange rate channel (ERC) encompasses all of the effects of interest rates. Therefore, the value of the domestic currency will reduce in comparison

with foreign currency (if the direct method of quotation is embraced, a foreign currency exchanges an amount of domestic currency), and the exchange rate will rise (domestic currency depreciates). As a result, the price of exported goods will be lower for foreigners, while the price of imported goods will be higher for domestic consumers, therefore an increase in export and decrease in import will increase the net export (NX). An increase in NX will result in higher supply and improve economic output (the trade balance) this means that the monetary authority through its monetary policy instrument can control its trade balance since there is no consensus in the monetary policy channel that drive trade balance performance this study empirically investigates the impact of monetary policy on trade balance performance in Nigeria over the study period 1970-2019.

1.2 STATEMENT OF PROBLEM

Nigeria as an emerging economy has been facing the dual challenge in internal and external trade balance performance. The Central Bank of Nigeria (CBN) has been following a tight monetary policy to limit inflationary pressure on the economy for nearly a decade in order to address the internal balance as the primary goal. Nigeria has been a trade deficit country in the external balance, notably in the current accounts, since its formation. The CBN has attempted various attempts at currency devaluation in the past, namely on the domestic currency, in order to minimize the consequences of the trade deficit on the economy It is evident that the CBN has been working hard to correct both Nigeria's internal and external balances. However, the use of contractionary monetary policy to alter the country's internal balance can have an impact on the external balance as well. The empirical evidence of the impact of contractionary monetary policy on the internal balance reveals that monetary economists are in agreement. Nonetheless, the facts on the external balance, notably the trade balance, has elicited conflicting responses.

Both internal and external balances have a crucial role in determining the monetary policy position in Nigeria, according to Malik (2007). He demonstrated that trade balance and exchange rate variations, as well as output and inflation rate, have a major impact on monetary policy attitude. These stylized facts of monetary policy conduct raise concerns about how the (contractionary) monetary policy affects Nigeria's trade balance. The goal of this research is to find a solution to this question**.** Furthermore, we also evaluate the effects on the disaggregated trade balance in order to isolate the effects of monetary policy on two broad categories of trade surplus and trade deficit sectors. Disaggregate analysis, according to Cantavella-Jordá & Gutiérrez De Pieres (2012), is required for a thorough study of monetary policy effects on sectoral activity.

According to Kim (2001a, 2001b), monetary policy has two types of influence on the trade balance. The income absorption effect is one, while the expenditure switching effect is the other. On the one hand, increasing interest rates in line with a contractionary monetary policy will lower output and, as a result, income. As a result, the trade balance will improve, a phenomenon known as income absorption effects. On the other the interest rate increase causes the exchange rate to climb, which promotes demand for foreign items over local ones. Consequently, the trade balance is deteriorated by reducing exports and boosting imports called the expenditure switching effect. The response of trade balance depends on these two opposite effects If the effect of an income absorption is stronger than the effect of an expenditure switching the trade balance improves and if the effect of an expenditure switching is greater than the effect of the income absorption, the trade balance will deteriorate

The short-term economic impact of monetary policy has allowed policymakers to control the country's internal and external balance in order to conduct monetary policy as a stabilizing

tool; policymakers need to understand the direction and scale of policy changes. There are two possible channels through which monetary policy influences the trade balance, the expenditure switching, and the income channel, yet existing studies' results have been mixed and inconclusive. In line with this existing problem, this study fills the gap in the existing study.

1.3 OBJECTIVE OF THE STUDY

The main aim of this research is to investigate the economic impact of monetary policy on trade balance performance in Nigeria between 1970 and 2019. In line with the aim of this study, the specific objectives are to:

1. Examine the effect of the exchange rate on trade balance performance in Nigeria.

2. Investigate the impact of domestic interest rate on trade balance performance in Nigeria.

3. Ascertain whether monetary policy shocks (exchange rate, interest rate,) cause variations in trade balance performance in Nigeria

1.4 RESEARCH QUESTIONS

The research is expected to provide answers to the following questions

1. Does the exchange rate stimulate trade balance performance in Nigeria?

2. To what extent does the domestic interest rate affect trade balance performance in Nigeria?

3. What are the monetary policy shocks in trade balance performance in Nigeria?

1.5 STATEMENT OF HYPOTHESES

In line with the research problem and objective of the study the statement of hypotheses for this study areas

H1: Exchange rate has no significant impact on trade balance performance in Nigeria.

H2: Domestic interest rate does not promote trade balance performance.

H3: Monetary policy shocks (exchange rate and domestic interest rate) do not cause variation in trade balance performance

1.6 SIGNIFICANCE OF THE STUDY

The research work will effectively contribute to the existing body of literature with regard to monetary policy and trade balance performance in Nigeria. The scope of the study has been expanded to capture current trends and issues relating to trade balance performance and the finding of the study is expected to extend previous studies' knowledge. Furthermore, the study outcome is expected to guide policymakers especially the central bank staff on which of the monetary policy instrument are effective to achieve trade balance performance in Nigeria

Finally, this study is beneficial to the academic in terms of understanding theories of the exchange rate, interest rate, and trade balance as well as contributing to the body of existing knowledge in the relationship between monetary policy and trade balance performance

1.7 SCOPE OF STUDY

This study focuses on the relationship between monetary policies and trade balance performance from the year 1970 to 2019 in Nigeria.

1.8 OUTLINE OF CHAPTER

The study is divided into five chapters. Chapter one gives a general introduction to the topic and also went further to identify the research hypothesis to be tested, chapter two reviews both past and recent literature pertaining to the subject under consideration, chapter three deals with the methodology of the research and some theoretical bases for the research, chapter four attempt to quantitatively estimate the parameters of the factors under investigation, evaluate and interpret the result. We will also test for our hypotheses in this chapter finally; chapter five concludes and summarizes the work. Also, in this chapter policy recommendations are proffered while the possible area for further studies is suggested

CHAPTER TWO

LITERATURE REVIEW

2.1 CONCEPTUAL REVIEW

2.1.1 CONCEPT OF TRADE BALANCE

The balance of trade, also known as the commercial balance is denoted by the symbol NX. That's the difference in the monetary value of a country's exports and imports within a specific time period. There is a distinction to be drawn between the goods and services trade balances. The balance of trade is a measurement of a country's flow of exports and imports over a specific time period. The concept of trade balance does not imply that exports and imports are "equal." When a country's exports exceed its imports, it has a trade surplus or a positive balance of trade; when imports exceed exports, it has a trade deficit or a negative balance of trade. As per a report of 2016, out of 200 countries, it's around 60 countries are having a positive balance of trade.

The negative trade balance creates a poor impression in two-sided trading, and it is widely condemned by trade specialists and economists. The trade balance is a part of the current account, which adds some other transactions like the net income from the international investment, international support, international assistance, etc. The expansion of the net international asset position is directly related to the current account surplus or positive, i.e., if the current account is in surplus or positive, the international asset position will also expand, and vice versa Problems with data collection and recording could cause a difficulty with the trade balance computation. One conclusion that might be derived from this conundrum is that if the result of aggregating the official data of all countries in the world reveals that exports are 1% higher than imports, then the world is steadily increasing with a positive trade balance. But in

practice, this is not possible because all the transactions are having equal amounts of debit and credit on both sides of the balance sheet which is the nature of the accounting system. The difference in the value of debit and credit will explain the nature of the illegal transactions or popularly known as smuggling. These kinds of activities are mostly done in the developing countries, so the inconsistency in the respective countries leads to a suspension in the trading.

Trade is widely known as a major engine of economic growth. Foreign trade is the exchange of capital goods and services between countries it allows a country to expand its market for both goods and services export trade has always been seen as a major factor of growth because it increases foreign exchange earnings. Improve the balance of payment position.it also leads to a favorable balance of trade. favorable Balance of Trade: the situation, wherein a country's exports exceed imports is a situation of the favorable or surplus balance of trade while unfavorable trade balance or deficit trade balance is defined as a surplus to the value of the imported goods as a whole above the value of the imported products. Balance of trade equilibrium is defined as equal value between the total value of the export goods and the total value of imported goods

2.1.2 THE CONCEPT OF MONETARY POLICY

The effect of monetary policy on the external balance has been in the focus for recent years, particularly the effects on the trade balance. However, the previous literature provides a mixed response from the trade balance to the monetary policy shock. For instance, Lee & Chinn (1998) confirm that the temporary shock of monetary policy has positive effects on the trade balance in the short run Similarly, Prasad & Gable (1997) linked monetary expansions in industrial economies to improved trade balances.

According to Kim (2001a, 2001b), monetary policy has two types of influence on the trade balance. The income absorption effect is one, while the expenditure switching effect is the other. On the one hand, increasing interest rates in line with a contractionary monetary policy will lower output and, as a result, income. As a result, income absorption effects will result in a decrease in import demand, allowing for an improvement in the trade balance. On the other hand, an increase in the interest rate leads exchange rates to appreciate, which promotes demand for foreign commodities over domestic items. As a result, the expenditure switching impact worsens the trade balance by reducing exports and raising imports. The trade balance's response is determined by these two opposing influences. The trade balance will improve if the income absorption impact is more than the expenditure switching effect, and if the change in expenditure effect is more than the absorption effect, the trade balance will deteriorate. Because of recent methodological advances in examining the dynamic causal interconnections of macroeconomic variables, such as the SVECM, which allows for a theoretical explanation of monetary policy shocks. SVECM is being used in several research to better understand the consequences of monetary policy shocks. For example, Ivrendi and Guloglu (2010) recently looked at the effects of contractionary monetary policy on the trade balance of five inflation-targeting countries. They discovered that monetary policy contraction improves Australia's, Canada's, New Zealand's, and Sweden's trade balances, implying that income absorption effects dominate in these nations. However, they discovered that the UK's trade balance is negatively affected by monetary policy shocks. The dominance of expenditure switching effects on South Africa's trade balance due to contractionary monetary policy shocks is reported by Ncube & Ndou (2013). Similarly, Buyangerel & Kim (2013) discovered that in the case of South Korea, monetary policy

contraction causes the trade balance to worsen, bolstering the expenditure switching effects. Their conclusions are based on the SVECM method as well.

Monetary policy is a central banks action and communications that manage the money supply, the monetary policy increases liquidity to create or achieve macroeconomic goals and objectives (economic growth) and can also reduce liquidity to prevent inflation the central banks also use interest rate bank reserve requirement and a number of government bond that must behold all these tools affect how many banks can lend and the volume of loan available in turn affect the money supply Objectives of Monetary Policy. Monetary policy varies from country to country and is dependent on the level of economic development as well as the particular objectives which the monetary authorities intend to achieve for a developed country such as France or West Germany, the main objective is the achievement and maintenance of economic growth For a developing country such as Nigeria, the major purpose is usually the acceleration of economic development in all locations developed or not certain objectives appear to be pervasive

According to the Central Bank of Nigeria (2002), they include (1) the achievement of full employment (ii) economic growth or development achievement (iii) achievement of price stability (in the domestic front) (iv) Achieving balance of payment balance (v) achieve reasonable social, political and other national objectives which give the general public the impression that the economic system has not generated them. According to Robinson (2014), an efficient monetary policy is assessed as to whether it will not only maintain monetary and economic stability but also contribute to the expanding use of economic resources by the country and ensure the maximum welfare level of the largest number in the economy That is, to attain and maintain internal and external monetary stability, accumulate and safeguard tolerable internal and external monetary resources, regulate and control foreign trade supply the state's and

citizens' financial needs effectively achieve full employment or the highest level of employment, achieve a tolerable and stable level of economic growth, and achieve tolerable social-political and other national objectives that give the population the feeling that they are not the product of the economic system

Monetary policy instrument according to Olekah (2006), monetary policy instruments are the tool at the disposal of the central bank to conduct or implement monetary policy. These are the instruments that are used directly and indirectly. Sectoral credit allocation, credit ceilings, and cash reserve requirements, administrative interest and exchange rate fixing, and the impossibility of special deposits are also examples of direct instruments. Open market operations (OMO), reserve requirements, and discount window operations are indirect or market-based mechanisms in which the Central Bank of Nigeria (CBN) acts as lender of last resort to deposit money banks. According to Danjuma (2013), the Central Bank normally employs two types of monetary policy instruments to achieve specific economic goals: market intervention instruments and portfolio constraint instruments. they are (a) the discount rate: the discount rate is the rate paid by banks with cash deposits when they borrow from the central bank. It is the discretionary rate at which the bank system is prepared to lend when it is short of liquid funds. A high rate of discount will discourage banks from borrowing from the Central Bank. In the country, a low discount rate supports central bank borrowing. The Central Bank normally takes into account the financial climate and the general economic conditions in servicing them (b) Open Market Operation. Most Central Bank's large portfolios of securities used as backing influence financial conditions in the economic system. By buying and selling securities in the open market, interest monetary authorities influence interest rates and the money supply by changing the availability of the various financial assets in which they operate (c) Reserve Requirements: initially the

objective of imposing reserve requirements on the banking system to encourage cautious management and ensure that the banking sector's solvency against a bank run is secured. In essence, central banks require the commercial and other banks to hold a fixed proportion of assets in a certain form. A high reserve requirement will mean a low level of the reserve at the disposal of commercial banks.

On the contrary a low reserve, on the other hand, indicates a large number of reserves available to commercial banks. Every bank in Nigeria is required to maintain two major reserve ratios. The cash and liquidity ratios are the two. (d) Direct Control: There is a thin distinction between moral suasion and direct controls. But essentially, direct controls operate by placing limits on the bank's freedom to undertake certain activities such as extending money creation. They are usually embarked upon because it is feared that other methods of influencing bank activities will not work sufficiently quickly or else will cause unacceptable consequences in other directions. The response of trade balances to monetary policy, according to Koray and McMillin (1999), also reinforced the evidence for the J-curve hypothesis

2.1.3 DETERMINANTS OF TRADE BALANCE

2.1.3.1 EXCHANGE RATE

Apart from the effects of monetary policy on the trade balance, exchange rate fluctuations have a significant impact on the trade balance's volume and variability. The J-curve theory is used to explain the short-run impact of the exchange rate on the trade balance. This theoretical assumption shows that the depreciation in the exchange rate first deteriorates the trade balance but eventually improves the trade balance over the long term as trading contracts adapt to the new exchange rates. However, empirical data shows that the J-curve is a rare occurrence. For

example, some studies found Proof of the impacts of J curve on trade balance (Krugman & Baldwin (1987), Bahmani-Oskooee (1992), Wilson (1993), Gomes & Paz (2005), and Nadenichek (2006)), while others found mixed results (Hayes & Stone (1982), Bahmani-Oskooee (1985), Marwah & Klein (1996), Hsing (2005), Bahmani-oskooee A number of research, including Rose & Yellen (1989), Shirvani & Wilbratte (1997), Upadhyaya & Dhakal (1997), Baharumshah (2001), Ng et al. (2008), and most recently Costamagna et al. (2008), have not found the J-curve response of trade balance (2014). The J-curve impact is determined by how quickly export and import amounts react to changes in exchange rates; if adjustments do not occur quickly enough, the trade balance will not reflect the J-curve response.

Since we are interested in the behavior of Nigeria's trade balance to monetary policy and exchange rate shocks, it is imperative to report previous studies on Nigeria. Several studies have investigated the exchange rate effects on the trade balance of Nigeria. The previous studies dedicated to tracing the j-curve phenomenon in Nigeria have reported mixed results J-curve effects on Pakistan's trade balance have been recorded by Bahmani-Oskooee (1992), Aftab & Aurangzeb (2002), and Rehman & Afzal (2003), for example. The J-curve effects, on the other hand, have not been found in recent work (see Aftab & Khan (2008), Bahmani-Oskooee & Cheema (2009), Hameed & Kanwal (2009), and Shahbaz & Kanwal (2009)). (2009). Similarly, Shahbaz et al. (2012) carried out different tests to study the long-run and short-run effects of real exchange rates on the aggregate trade balance of Nigeria, they concluded that the devaluation policy will not improve the trade balance for Nigeria due to the absences of the J-curve phenomenon. To the best of our knowledge, no attempts have been made pertaining to investigate the monetary policy effects on the trade balance of Nigeria. The purpose of this research is to fill that gap by providing empirical evidence on the effects of contractionary

monetary policy on Nigeria's trade balance. The rate at which one national currency is exchanged for another is known as an exchange rate.

The J-curve hypothesis explains the short-run impact of the exchange rate on the trade balance. This theoretical assumption shows that the depreciation in the exchange rate first deteriorates the trade balance but eventually improves the trade balance over the long term as trading contracts adapt to the new exchange rates. Empirical data reveals, however, that J-curve is not a frequent event.

A number of researches, including Rose & Yellen (1989), Shirvani & Wilbratte (1997), Upadhyaya & Dhakal (1997), Baharumshah (2001), Ng et al. (2008), and most recently Costamagna et al. (2008), did not detect the J-curve response of trade balance (2014). The J-curve effect is determined by how quickly export and import quantities react to exchange rate changes; if they do not, the trade balance will not reflect the J-curve response.

2.1.3.2 INTEREST RATE

The interest rate is the amount of interest due for each period as a share of the amount loaned, deposited or loaned (called the principal sum). The total interest on a loaned amount depends on the amount of the principal, the interest rate, the compounding frequency and the length over which the interest rate is loaned or loaned; the rate may also be determined as the proportion of an amount loaned which is normally expressed as an annual percentage, which the lender charges as an interest to the borrower. It also pays a bank or other lender to borrow their money or the rate a bank pays its savers to maintain money on a bank account Monetary Policy has a certain effect on Trade Balance. Particularly, the interest rate will decrease imports but not

export. Therefore, it can help improve the Trade Balance after two months. However, in the first month when there is an increasing shock in interest rate, the Trade Balance will become worse.

2.1.3.3 MONEY SUPPLY

The money supply (or money stock) is the total amount of money owned by the public at any given time in the economy. Cash and deposits that can be utilized virtually as quickly as cash are roughly included in the money supply. Increasing the money supply shock has a negative impact on the trade balance. It is because the shock will raise exports less than imports can thus lead to trade balance deficits.

2.2 THEORETICAL REVIEW

2.2.1 TRADE BALANCE THEORIES

2.2.1.1 INCOME ABSORPTION THEORY

The balanced payments absorption approach asserts that the balance of trade of a country will only improve if it's output of goods and services improves by more than its absorption, whereby "absorption" denotes domestic spending on goods and services. Alexander initially proposed this idea (1952, 1959). The novelty of this approach may be appreciated by considering the particular question 'will a devaluation improve a country's balance of trade?' The approach of elasticity, which was common when Alexander wrote, answers the question by focusing on price elasticity of import and supply and demand. It considers that the devaluation succeeds, provided the price elasticities of the export and import demand are large enough to more than offset the terms of trade loss caused by the devaluation by the increase in exports sold to foreigners and the reduction in imports acquired by the residents together. (A special case of this result is

formalized in the Marshall-Lerner conditions the absorption approach, on the other hand, contends that the devaluation will only succeed if the gap between domestic output and domestic absorption expands. Alexander criticizes the elasticity of the movement along the supply and demand curves on specific export/import markets as opposed to the output and expenditure of the country as a whole, which moves these curves (a macroeconomic approach). The traditional Mundell–Flemming–Dornbusch (MFD) model predicts that monetary expansion causes the nominal exchange rate to depreciate and the conditions of trade to deteriorate. This adjustment resulting in the improved trade balance is known as the expenditure-switching effect however the income-absorption effect occurs when this same policy stimulates domestic demand, through an increase in imports worsening the trade balance. While the two effects move the trade balance in opposite directions, the movements of the trade balance are determined by the dominant effect (Kim 2001).

2.2.1.2 EXPENDITURE SWITCHING THEORY

Expenditure switching is a macroeconomic policy which influences the composition of the foreign and domestic expenditure of a country. In particular, it is a policy to balance the current account of a country by changing the composition of foreign and domestic commodity expenditure. The most targeted strategy for influencing current account balances and the level of balancing performance is spending switching policies, devaluation or revaluation. Devaluation increases domestic import prices and reduces foreign export price; hence it reduces imports and increases exports

The traditional Mundell–Flemming–Dornbusch (MFD) model predicts that monetary expansion causes the nominal exchange rate to depreciate and the conditions of trade to

deteriorate. This adjustment resulting in the improved trade balance is known as the expenditure-switching effect

2.2.1.3 EXCHANGE RATE(J-CURVE) THEORY

Aside from the effects of monetary policy on the trade balance, exchange rate fluctuations have a significant impact on the volume and variability of the trade balance. The J-curve hypothesis explains the short-run impact of the exchange rate on the trade balance. This theoretical assumption shows that the depreciation in the exchange rate first worsens the trade balance but eventually improves the trade balance over the long term as trading contracts adapt to the new exchange rates. The empirical evidence nevertheless reveals that J-curve is not a regular phenomenon. For example, some studies found evidence of J-curve effects on trade balance (Krugman & Baldwin (1987),while others found mixed results (Hayes & Stone (1982), Bahmani-Oskooee (1985), Marwah & Klein (1996), Hsing (2005), Bahmani-oskooee A number of research, including Rose & Yellen (1989), Shirvani & Wilbratte (1997), Upadhyaya & Dhakal (1997), Baharumshah (2001), Ng et al. (2008), and most recently Costamagna et al. (2008), did not detect the J-curve response of trade balance (2014). The J-curve impact is determined by how quickly export and import amounts react to changes in exchange rates. If the trade balance does not alter, the J-curve reaction will not be seen.

2.2.1.4 MONETARY THEORIES

Inelasticity approach, the direction of commercial balance adjustment is seen on the basis of import and export demand elasticity. Although the elasticity technique is usually recognized as the Bickerdike-Robinson-Metzler Condition, the elasticity of demand is defined as the quantity responsiveness of sought goods or services to changes in price., Bickerdike was in actually the

one who devised and laid the groundwork for this technique by modelling nominal import and export prices as import and export quantity functions. Later, Robinson and Metzler added to the elasticity approach by clarifying and elaborating on Bickerdike's innovative concepts. Bickerdike-Robinson-Metzler the change in the foreign currency value of the trade balance is conditional on the elasticity of import and export supply and demand, as well as the beginning volume of trade. As can be observed, the elasticity approach's arguments revolve around volume and value responses to changes in the actual exchange rate. Because reduced pricing in the domestic country will generally raise external demand on domestic goods as a result of currency devaluation, only if foreign demand is elastic. On the other hand, if external demand elasticity for domestic products is weak, domestic goods will not increase in that they are above the decrease in export value generated by the same conceptions in cheaper prices, the case of domestic demand elasticity may be understood in the same context. When domestic demand for foreign goods is elastic, a change in domestic price will cause the domestic consumer's behavior to shift. Consumers will compensate for the drop in the value of imported goods by purchasing domestic rather than imported goods. In conclusion, if the value drop of domestic imports exceeds the value decrease of domestic exports, the trade balance will improve. Politicians actually adopt the Elasticity Approach if there is a trade balance deficit in a country. They should assess the reactivity of imports and exports in order to adjust the currency rate so that depreciation has an impact on the trade balance. If, on the other hand, international and local demand for imports and exports is elastic, a minor adjustment in the spot exchange rate can have a big influence on the trade balance.

Marshall-Lerner Condition is a further extension of the elasticity approach. The condition could be considered as a consequence of Bickerdike's work. It was named after Alfred Marshall,

who was born in 1842 and died in 1924, and is known as the "Father of Elasticity," with Lerner serving as his later exposure. According to this method, the demand for the nation's exports and imports should be sufficiently elastic if monetary policies weaken the currency in order to improve its trade balance. The Marshall Learner Convention says that, if trade in services, investment-income flows and unilateral transfers is equal to zero so as to equal the current account, the total of the absolute values of both elasticities must be greater than unit. In contrast, if the amount is less than one, the balance of trade worsens when the depreciation occurs. In contrast to Bickerdike's method, the condition of Marshall-Lerner is based primarily on two assumptions. The first is that trade was initially balanced when exchange rates fell, such that the foreign currency value of exports equaled the foreign currency value of imports. Secondly and most importantly, seller currencies set prices; therefore, supply elasticity is infinite. The effect can be explained in the diagram.

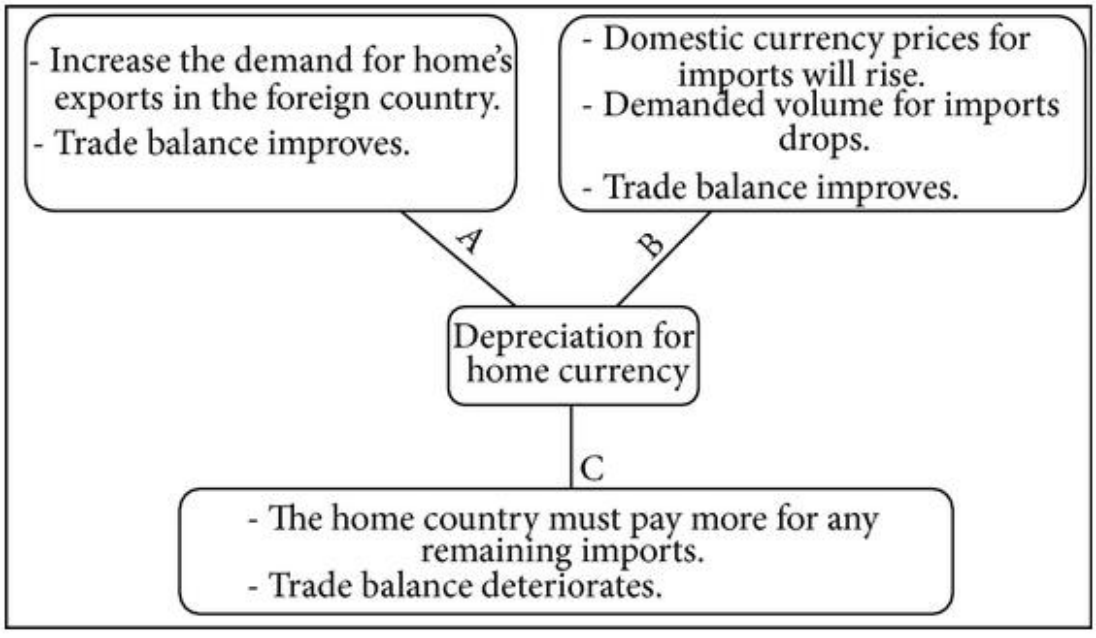

Figure 2.1 the Marshall Lerner condition

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Only when the volume effect seen in A and B overcomes the price effect shown in C will the trade balance improve after a currency devaluation. Thus, ML = (A + B) > (C).

The Marshall-Lerner condition, however, also shows stability. If the sum of the two import and export demand elasticities does not surpass a unity, the balance is unstable and a stable economic model could be inadequate to measure the result of a trade depreciation in exchange rates. The J-Curve theory came into being about three decades after the generalization of the Marshall-Lerner condition. As Magee initially illustrates, the J-Curve phenomenon depicts how an exchange rate devaluation impacts the balance of trade of a country over time as a result, it's referred to as a dynamic perspective of the Marshall-Lerner Condition or, more broadly, the elasticity method. In the short term, immediately after the devaluation of currency, domestic importers face inflated domestic import prices as paid, thus a decline in net exports. In the devaluing country, however, domestic exporters face lower export prices because demand for exports and imports is fairly inelastic in the short term. This inelasticity of demand is caused by the sluggishness in the change of consumer behavior and the lag of renegotiating deals in other words, in the short term, where prices are generally steady, the balance of trade is declining because prices are sticking and demand changes are slow. The stickiness of the price occurs when products are still traded before the devaluation at price levels. The trade balance is deteriorated by the value of all foreign-currency imports multiplied by the amount of the increase in foreign-currency prices since depreciation contracts were made before fixed prices and volumes. The short-term phase is generally referred to as the "exchange rate transition period. Home demand then begins to shift from foreign production to domestic manufacture of substitution items in response to the increased import prices, leading to an improvement of the trade balance. In addition, export

volumes have increased on the domestic markets as export prices have fallen. These two long-lasting elements are generally referred to as the "volume adjustment phase," and have a beneficial effect on the trade balance.

However, the J-Curve phenomenon predicts the trade balance to improve in the long run to a higher level compared to its level before depreciation the dynamic reaction of the balance of trade as a short run and long run recovery takes the form of a flattened J letter, hence the phenomenon of J-Curve.

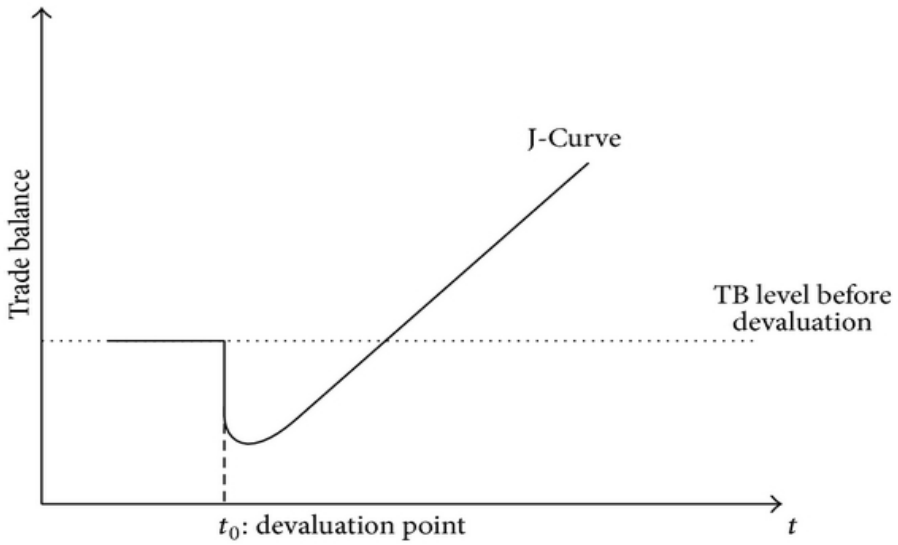

Figure. 2.2 The J-Curve

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The exchange rate depreciation should be big enough to have a positive long-run influence on the trade balance, which has implications for monetary policy. In terms of the Marshall-Lerner Condition, we can consider the Marshall-Lerner Condition fully satisfied if the trade balance

improves in the long run as a result of currency devaluation to a level greater than before devaluation under the J-Curve assumptions. If not, the Marshall-Lerner Condition will not be satisfied, and the J-Curve will flatten at a lower level than before the devaluation.

2.2.1.5 KEYNESIAN ABSORPTION APPROACH.

The elasticity technique is mostly criticized for being a partial equilibrium strategy that ignores the macroeconomic consequences of price changes and output fluctuations in reaction to currency depreciation. In actuality, it merely takes into consideration the value and volume responses to changes in price Depreciation, on the other hand, is linked to macroeconomic factors in the absorption and monetary approaches, which usually impair the beneficial impact of exchange rate devaluation on the trade balance. The Absorption Approach combines Keynesian macroeconomics with the elasticity approach. Meade, Alexander, and others formally modeled it in the early 1950s. This method is based on the idea that a country's expenditures are divided into four categories: consumption (c), investment (i), government expenditures (g), and imports (m). Because prices are assumed to be constant in this technique, all variables are measured in real terms. Domestic Absorption (a) is defined as the total of these four categories: a c + I + g + m.

A country's real income (y) equals its total output expenditures, where x is real exports; real income is expressed as y c + I + g + x. The difference between real income (y) and absorption (a) equals the current account balance of a country, which is written as y a = (c + I + g + x) (c + I + g + m) = x m. As a result, the change in the current account equals the change in real income minus the sum of the remaining three variables, consumption, investment, and exports.

This means that only when domestic output growth exceeds domestic absorption does the trade balance improve. If the substitution of domestic goods for foreign ones in reaction to the relative

price shift enhances production more than absorption, a currency depreciation improves the trade balance. In practice, this is more likely to occur in an economy with excess capacity, when the Keynesian multiplier effect kicks in a near-full-employment economy or one with significant production bottlenecks, output is unlikely to rise, and the trade balance will only improve if absorption falls. Inflationary pressures also stifle relative price shifts that lead to increased export production and decreased import consumption. In summary, the trade balance is a function of real income and absorption (domestic consumption) under the Absorption Approach, TB = (Y, A). If there is an increase in output (Y) or a drop in domestic consumption (A), or both, the trade balance can improve. Assume A is constant and the economy is not at full employment (as it is in most developing nations); when currency depreciation happens, the final outcome is expected to be a rise in output, resulting in a positive trade balance.

2.2.1.6 MONETARY APPROACH

The Monetary Approach, popularized by contributions from Harry Johnson and Jacob Frenkel in the early 1970s, around the same time as the J-Curve hypothesis, indicates that devaluation should be understood in a monetary context. Thus, a balance of payments deficit is solely a monetary phenomenon mainly caused by excessive money supply. Only the effect of currency depreciation on the real money supply has an impact on the balance of payments. As a result, depreciation improves the balance of payments by raising domestic prices and reducing the real money supply. If devaluations are followed by further increases in the nominal money supply, the original disequilibrium is restored. As a result, the long-term impact on the trade balance is unclear. When a country devalues its currency, the actual value of the money supply falls as the price of traded goods and services rises, as measured in domestic prices. This can be expressed mathematically as Ms p = Md (Y, E), where Ms is the nominal money supply, Md denotes the

nominal money demand, Y denotes income (output), and E denotes the nominal exchange rate. The following is a summary of the relationship: Depreciation in E produces an increase in the prices of traded goods and services, lowering the actual worth of the cash balance and, as a result, causing a reduction in spending to restore the real value of its money holdings. The decrease in consumption leads to a decrease in absorption and an improvement in the trade balance. Furthermore, as Johnson argues, an increase in the money supply will increace the level of real balances; as a result, people expect their wealth to rise, prompting expenditures to rise relative to income and the trade balance to worsen. As a result, the money supply has a negative impact on the trade balance. Under the same vein, Miles claims that the detrimental effect may not be seen in the following situations. To begin with, the nominal money balance may represent a small portion of total wealth. Second, money may not be perceived as net wealth in the private sector. Third, the reaction of spending to changes in wealth may be negligible. The most important conclusion of the Monetary Approach is that the effect of devaluation is expected to be sustained if monetary authorities grow money supply after devaluation to meet new demand for money. Some empirical studies argued that excess money supply might increase consumption and lower the trade balance.

2.3 THEORETICAL FRAMEWORK

Trade balance theoretical frame work

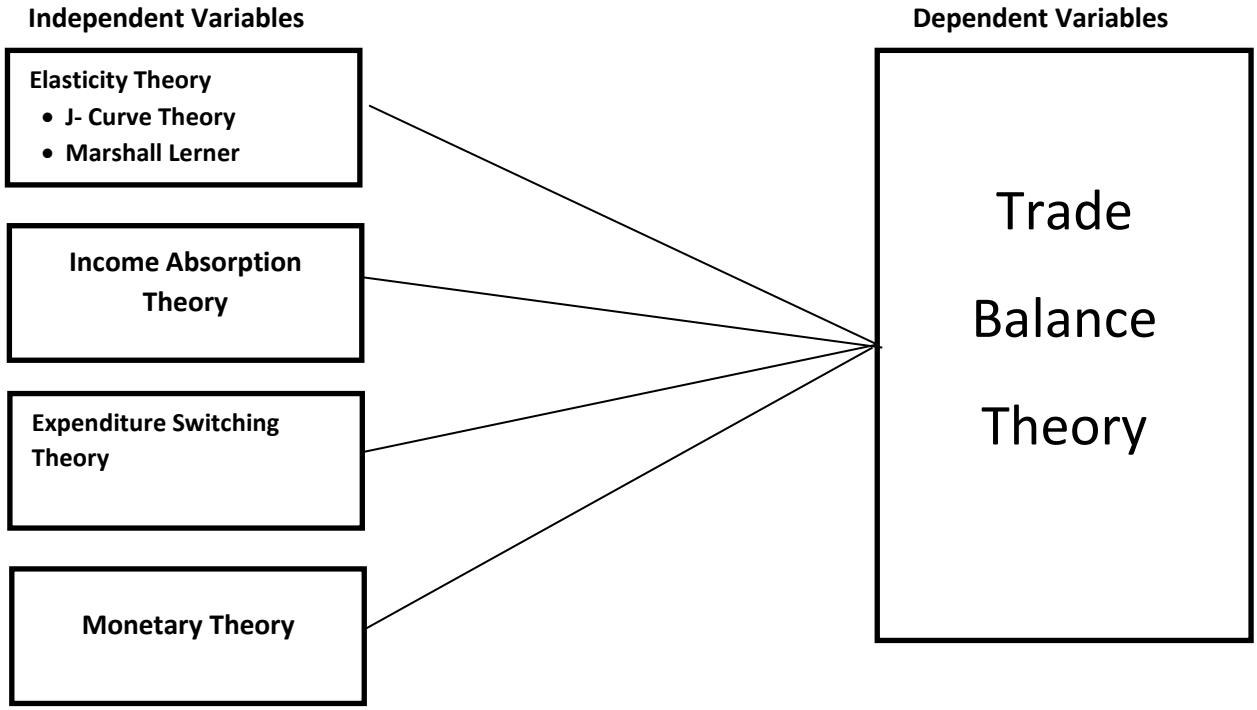

Figure 2.3

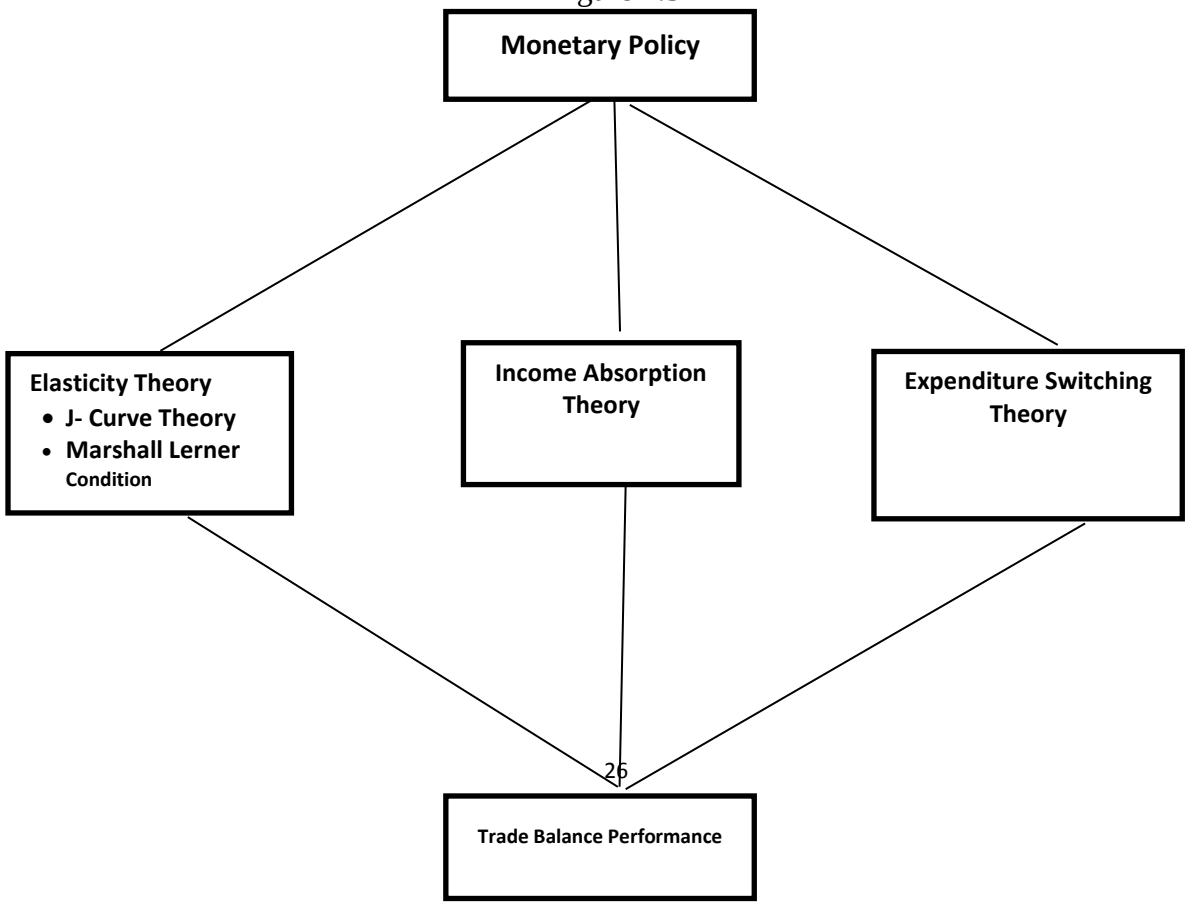

Figure 2.4

Source: Researcher's compilation, 2021

the diagram in Figure 2.3 and 2.4 above explains the relationship between trade balance and monetary policy showing monetary policy instrument which are the trade use as the independent variable while trade balance as the dependent variable the theories use are:

Elasticity approach which talks about j-curve theory and the Marshall Lerner condition

the elasticity approach believes in exchange rate devaluation to affect trade balance while the j-curve hypothesis is taking about the short run effect while the Marshall Lerner talk about the long run effect expenditure switching theory is talking about how a country affect its trade balance by the composition of its expenditure on foreign and domestic goods income absorption is talking about how a country can affect its trade balance when its increase its output of goods and services than what it absorbs

2.4 EMPIRICAL REVIEW

Nizamani, karim, Zaidi, Zulkefly, and Khalid (2016) examined the effects of monetary policy and exchange rate shocks on the trade balance of Pakistan. They employed a monthly data that ranged from 2003:07 to 2015:12. Also the estimation technique is Structural Vector Error Correction Model (SVECM) to estimate long run and short run relationship. Their findings shown that contractionary monetary policy shocks cause the trade balance to deteriorate,

supporting the expenditure switching effects of monetary policy. In addition, they found that exchange rate shock does not affect trade balance as theorized in the j-curve hypothesis

Odungweru, and Ewubare, (2020) investigated the effect of monetary policies on foreign trade in Nigeria. they made use of time series data from 1980-2017.they employed E-views 9.0 software. A model was formulated for the study the Augumented Dickey Fuller (ADF) stationary test. the results revealed exchange rate exerts a significant positive effect on Total Trade in the long run while Minimum rediscount rate exerts a significant negative effect on total trade in the long run. The study thus concluded that the monetary policy channels through which foreign trade in Nigeria can be influenced are money supply, minimum rediscount rate and exchange rate.

Rincón (1998) examined the Short-and-Long-Run Exchange Rate Effects on Trade Balance in Colombia employed is the Bickerdike-Robinson-Metzler (BRM) and Marshall Lerner (ML) conditions. And a regression model formulation. The key finding is that exchange rates do influence the short- and long-term dynamics of Colombia's trade balance. Devaluation also improves the trade balance, which is in line with BRM or ML circumstances. The findings also suggest that if an exchange rate depreciation is followed with a drop in the money stock and/or a reduction in the trade balance, the long-run effect on the trade balance is enhanced

Okwo, et al (2012) examined the effect of monetary policy outcomes on macroeconomic stability in Nigeria. The study made use OLS technique. None of the variables were statistically significant, implying that monetary policy was ineffective in influencing price stability.

Bernhard (2013) examined the channels of monetary transmission mechanism in Nigeria using Granger casualty test to estimate the relationship between the various channels and the selected

macroeconomic aggregates. The study shows that three channels of transmission were functional for inflation targeting. They include the interest rate, exchange rate and credit channels.

Okoro (2013) investigated the effects of monetary policy on Nigerian economic growth by examining the impact of interest rates, inflation, exchange rates, money supply, and credit on GDP. Augumented Dickey Fuller (ADF) test, Philips–Perron Unit Test, Co-integration test and Error Correction Model (ECM) techniques were employed. The results show the existence of long–run equilibrium relationship between monetary policy instruments and economic growth

Chukwu (2009), analyzed the impact of Nigeria's monetary policy innovations the impacts of monetary policy stocks on output and prices in Nigeria were studied using a Structural Vector Auto-Regression (SVAR) technique. The research looked at three different policy instruments: broad money (M2), minimal rediscount rate (MRR), and real effective exchange rate (REER) (REER). Depending on the policy variable chosen, the study found evidence that monetary policy innovations have both real and nominal effects on economic parameters.

Micheal and Ebibai (2014) Using OLS regression analysis, researchers looked at the impact of monetary policy on key macroeconomic indicators in Nigeria, such as GDP, inflation, and the balance of payments. The findings demonstrate that creating an investment-friendly climate in Nigeria will boost the country's GDP growth rate.

Akujobi (2012), Using a multiple regression technique, the impact of monetary policy instruments on Nigeria's economic development was explored, and it was discovered that the treasury bill, minimum rediscount rate, and liquidity rate have a substantial impact on Nigeria's economic development.

2.5 GAP IN THE LITERATURE

Despite a number of existing studies, it was observed that most reviewed studies on the impact of monetary policy on trade balance performance focused on Asia economies like China, Pakistan to the best of our knowledge, no any attempts have been made pertaining to investigate the monetary policy effects on the trade balance of Nigeria.

Beside the scope of the gap this also identified the empirical gap. Unlike previous studies (Rincón (1998) examined the Short-and-Long-Run Exchange Rate Effects on Trade Balance in Colombia, Nizamani, karim, Zaidi, Zulkefly, and Khalid (2016) examined the effects of monetary policy and exchange rate shocks on the trade balance of Pakistan, Ncube and Ndou (2013) examined the effect monetary policy and exchange rate shocks on south African trade) they employed OLS but this study used both OLS regression and SVECM and decomposition technique to estimate short run and long run impact as well as the exchange rate and interest rate shock on trade balance performance within 1970-2019

CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

This chapter discusses the methods and procedures used in estimating the models specified for the purpose of this research and the techniques employed in the data collection in this study.

3.2 SOURCES OF DATA AND VARIABLE DESCRIPTION

This study employed data that were sourced from international monetary fund (IMF) international financial statistic (IFS) world development index (WDI) and Central Bank of Nigeria statistical bulletin for the annual timeseries from 1970 – 2019.

The variable used in this study were collected from the theoretical framework and the existing empirical studies. The definition and measurement of these variables are classified into dependent variable and independent variable. When trade balance is the dependent variable, it is calculated as the difference in the value of a country's imports and exports, as shown below. value of exports – value of imports = trade balance. While the independent variables include, the nominal effective exchange rate (NEER) is used to measure the international competitiveness and strength of a country's currency within the foreign exchange (FOREX) market, real effective exchange rate (REER) is calculated by multiplying NEER with the effective relative price indices of trading partners. Th e relative price indices are calculated by the weighted wholesale price index of trading partners and the consumer price index for the home country, inflation rate is measure by Subtract the past date consumer price index. Degree of openness is measured by the sum of imports and exports to GDP and, money supply, gross domestic product (GDP) can

be calculated by adding up all of the money spent by consumers, businesses, and government in a given period

Table 3.1 LIST OF VARIABLES AND DESCRIPTION

Variable Notation	Variable	Description	Sources of data
TB	Trade balance	It's the difference in the value of a country's imports and exports	Central bank of Nigeria statistical bulletin
NEER	Nominal effective exchange rate	It's considering a currency's worth in relation to a weighted average of numerous foreign currencies	Central bank of Nigeria Statistical Bulletin
REER	Real effective exchange rate	It's the measurement of the value of a country currency against a weighted average of several of foreign currencies divided by a price deflator or index of cost	World bank developing index
INF	Inflation rate	it's the tare by which the value of a country currency is falling it's also the general rising in the price level of goods and services in a country	Central bank of Nigeria statistical bulletin
DOP	Degree of openness	A measure of the extent to which an economy depends on trade with other countries	World bank developing index
MCU	manufacturing capacity utilization		World bank developing index
DINT	Domestic interest rate	The is refer to the amount a lender charge for the use of assets expressed as a percentage of the principle	Central bank of Nigeria statistical bulletin
MS	Money supply	The total stock of money circulating in an economy	Central bank of Nigeria statistical bulletin
GDP	Real Gross domestic product	Monetary value of goods and services produced in the economy over a period of time, irrespective of the nationalities of the person producing the goods and services	Central bank of Nigeria statistical bulletin

3.3 THEORETICAL FRAMEWORK

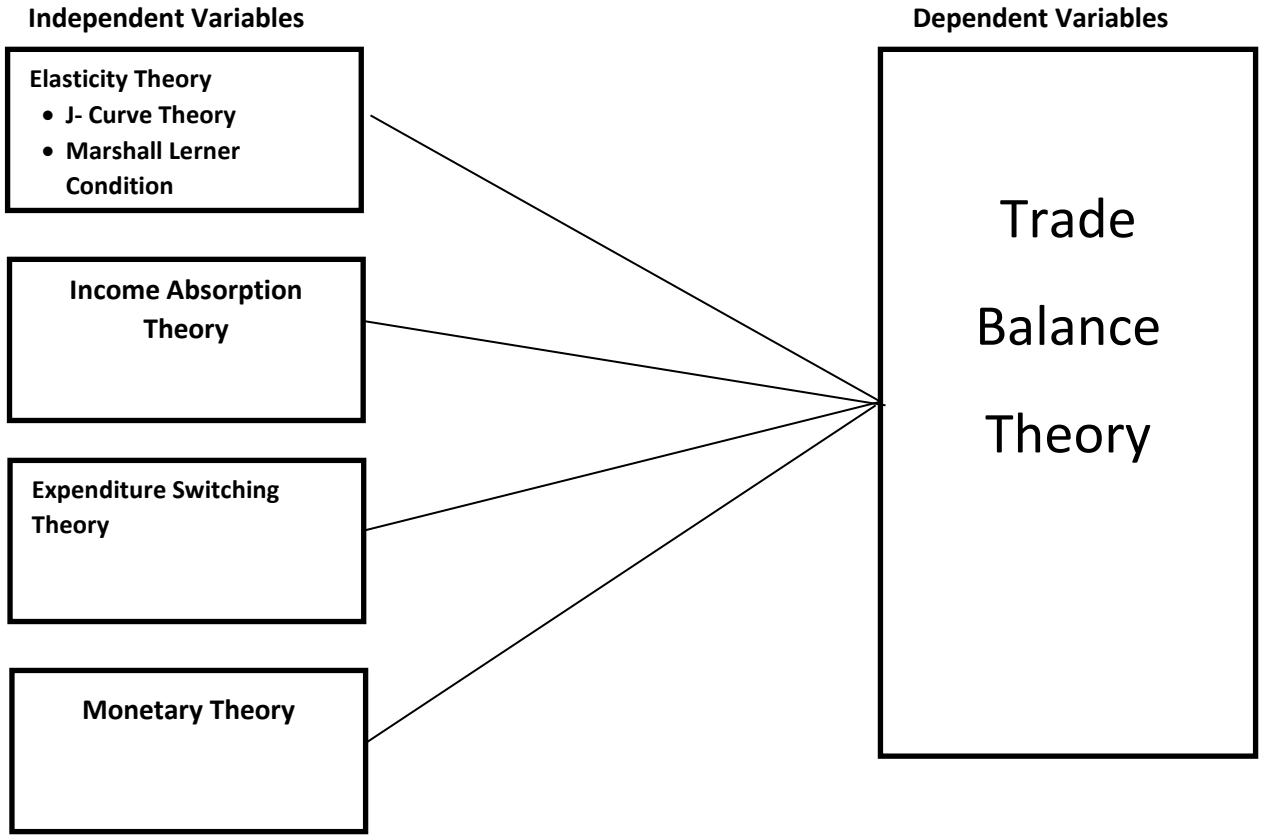

Figure 3.1 Theoretical framework of trade balance performance and monetary policy instruments.
Source: Researcher's chart, 2021

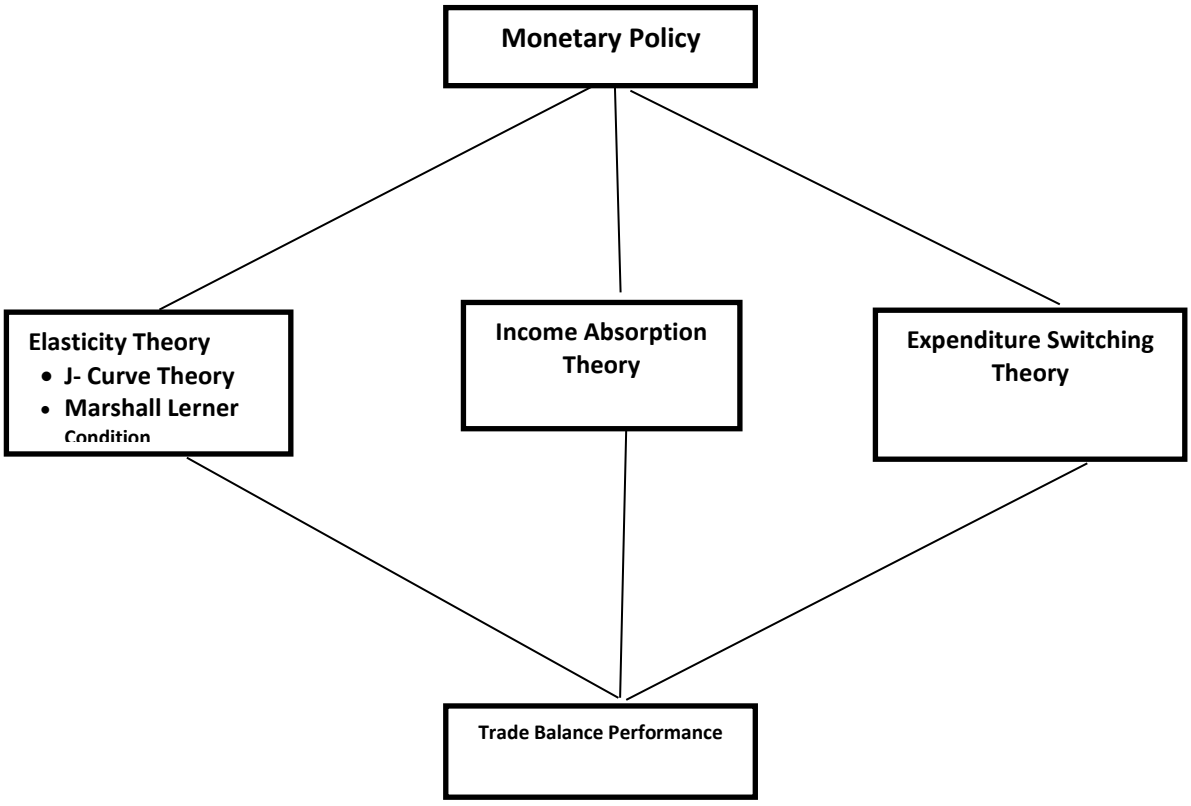

Figure 3.2 Theoretical frameworks of trade balance performance and monetary policy instruments.
Source: Researcher's chart, 2021

the diagram in Figure 3.1 and 3.2 above explains the relationship between trade balance and monetary policy showing monetary policy instrument which are the trade use as the independent variable while trade balance as the dependent variable the theories use are:

Elasticity approach which talks about j-curve theory and the Marshall Lerner condition

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3.4 METHODOLOGICAL APPROACH

3.4.1 ESTIMATION TECHNIQUE

This study uses descriptive statistic and time series econometric technique. Firstly, the descriptive statistics employed univariate analysis to describe the included variables and ascertain the distribution pattern of each data in this study. Secondly the time series econometric technique employed OLS time series property test such as unit root and cointegration to ascertain the integrated order of each variable and the comovement stability of the joint variables in the long run. To estimate the objectives in this study OLS regression is employed whether it is ARDL or VEC depend on the unit root out come

3.4.2 Models Specification

3.4.2.1 Model specification for objective one

TBP=F(EXCH)

TBP=F (NEER, REER, INF, DOP, MCU)

$$TBPt=\alpha + \beta_1 NEER_t + \beta_2 REER_t + \beta_3 INF_t + \beta_4 DOP_t + \beta_5 MCU_t + \mu_t \text{ ----------(1)}$$

Where NEER- Nominal effective exchange rate, REER- Real effective exchange rate, INF- Inflation, DOP- Degree of openness, MCU-manufacturing capacity utilization are all independent variables while TBP is the dependent variable and measured as difference between export and import values of goods only over the study periods as indicated in equation 1.

3.4.2.2 Model specification for objective two

TBP=F(DINT)

TBF= F (DINT, MS, INF, GDP, MCU)

$TBPt=\alpha + \beta_1 DINT_t + \beta_2 INF_t + \beta_3 MS_t + \beta_4 MCU_t ++ \beta_5 GDP_t\mu_t$---------- (2)

Where DINT- domestic interest rate, Inflation rate, MS- broad money supply, MCU-manufacturing capacity utilization and GDP-gross domestic product are all independent variables while the TBP is the dependent variable in indicated in equation 2.

3.4.2 .3 Model specification for objective three

In order to study the dynamic response of trade balance to monetary policy shock, proxy as exchange rate and interest rate, we have employed the structural vector error correction model (SVECM) developed by Breitung et al. (2004). Unlike the standard VECM, the SVECM allows the identification of structural shocks on the basis of economic theory. It separates the permanent and transitory shocks in the system by imposing long run and short run restrictions. As a result, it captures the meaningful dynamics of the variables. Assuming the economy is represented by the VAR (P) process and this expressed in equation 4

$yt = A1yt-1 + A2yt-2 + \cdots + Apyt-p + \mu t$ ----------(4)

Where yt is $(n \times 1)$ vector of endogenous variables, $Ap = (A1, A2, \ldots Ap)$ are parameter matrices, μt is $(n \times 1)$ vector of unobservable error terms. If the variables in yt are cointegrated of order r then the Structural-VECM can be written as

$B\Delta yt = \Pi * yt-1 + \Gamma 1 * \Delta yt-1 + \cdots + \Gamma p * -1\Delta yt-p+1 + \varepsilon t$ ----------(5)

Where B is a contemporaneous matrix coefficient, $\Pi*$ and $\Gamma*$ are structural parameter matrices and εt is a $(n \times 1)$ structural form error with zero mean and covariance matrix $\Sigma\varepsilon$. Let matrix B an invertible matrix, then (2) will take the following form

$\Delta yt = \Pi yt-1 + \Gamma 1 \Delta yt-1 + \cdots + \Gamma p-1 \Delta yt-p+1 + \mu t$ ----------(6)

Where $\Pi = B-1\Pi*$,$\Gamma j = B-1\Gamma j$ $(j = 1, \ldots p-1)$ and $\mu t = B-1\varepsilon t$.Π has a reduced rank $(r \leq n-1)$, and the matrix Π can be factored as $\Pi = \alpha\beta'$ where β is as $(n \times r)$ matrix contains the long run relationship, α is a $(n \times r)$ matrix of speed of adjustment coefficient. The Γj are $(n \times n)$ matrices of structural form short run coefficients. The μt is a white noise error with zero mean and covariance matrix $\Sigma\mu$.

The impulse response functions are estimated by the relationship given below of structural form error (εt) and reduced form errors (μt)

$\mu t = B-1\varepsilon t$ ----------(7)

$\Sigma\mu = B-1\Sigma(B-1)\,'$----------(8)

The relationship between structural form error (εt) and reduced form errors (μt) in (4) is with correspondence to variance-covariance $(\Sigma\mu, \Sigma\varepsilon)$ matrices in (5). To identify the structural form parameters requires the imposition of $(n2 - n)/2$ additional restrictions on the elements of $B-1$. The traditional VAR imposes the Cholesky decomposition to identify the structural errors. However, the structural approach differs by the ability to choose any restrictions on $B-1$ as to achieve the identification. Particularly, the structural approach is more relevant in the case of small open economies (Karim et al., 2012)

3.5 A *Priori* Specification

A Priori specification for the relationship between the independent variable and the dependent variable are shown in table 3.5 in this study.

Table 3.1: *A Priori* Expectation

Coefficient	Variables	A priori expected sign
β_0	INTERCEPT	Positive
β_1	NEER	Negative
β_2	REER	Negative
β_3	INF	Negative
β_4	DOP	Positive or negative
β_5	MCU	Positive
β_6	DINT	Positive or Negative
β_7	MS	Positive
β_8	GDP	Positive

Source: Researcher's compilation, 2021

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSIONS

4.1 Introduction

This chapter presents the data analysis and interpretation of results for the three objectives in this study. The results presented are in three broad sections as follows: descriptive statistics, pre-tests estimation, and the results for the three objectives in this study.

4.2 Data Presentation

Table 4.1 Data Presentation for the study

Year	REER	DOP	INFL	NEER	TBP	MCU	MS	DINT	G
1970	NA	19.62059923	13.75708	0.714286	NA	NA	10.92786	-29.26951735	1.43E
1971	NA	24.46363514	15.99911	0.712856	NA	NA	10.04202	5.576788732	1.63E
1972	NA	22.76364559	3.45765	0.657895	NA	NA	10.91285	3.991658474	1.69E
1973	NA	31.26775278	5.402664	0.657895	NA	NA	11.18303	1.569257787	1.78E
1974	NA	39.74699041	12.67439	0.630282	NA	NA	13.22281	-25.6667594	1.98E
1975	NA	41.17034351	33.96419	0.615502	NA	NA	17.58566	-13.96816185	1.88E
1976	NA	42.1380988	24.3	0.626601	NA	NA	19.94904	-6.867482824	2.05E
1977	NA	47.39526574	15.08783	0.644701	2692720862	NA	22.85336	-4.257604524	2.17E
1978	NA	43.31484204	21.70925	0.635272	-1166429508	NA	20.86095	-6.28956771	2.04E
1979	NA	43.87840231	11.70973	0.604007	4913847293	NA	22.95116	-2.994708212	2.18E
1980	288.2722	48.57131421	9.972262	0.546781	11216558754	NA	28.62522	-3.547418212	2.27E
1981	320.7152	18.17172618	20.81282	0.617708	-1139696751	73.3	10.9388	-65.8571487	1.97E
1982	328.9163	13.77983316	7.697747	0.673461	-2724729847	63.6	11.19984	-4.586180209	1.84E
1983	389.306	10.04496861	23.21233	0.72441	-1079499400	49.7	11.99003	-8.022386443	1.64E
1984	536.7679	9.380541231	17.82053	0.766527	3000544863	43	12.80806	4.342492624	1.62E
1985	482.5732	10.39197861	7.435345	0.893774	5666980162	38.3	12.32653	2.34323058	1.72E
1986	263.6202	9.135845723	5.717151	1.754523	1946967918	38.8	11.91441	4.310292242	1.72E
1987	83.97806	19.49533511	11.29032	4.016037	3478304309	40.4	11.80946	-4.769644808	1.77E
1988	85.29546	16.94060969	54.51122	4.536967	2520186027	42.4	12.16855	-2.962676481	1.9E
1989	76.29573	34.18261725	50.46669	7.364735	4178018625	43.8	10.45432	-6.612412439	1.94E
1990	70.99796	30.92474008	7.3644	8.038285	8652793558	40.3	11.63537	17.46624444	2.17E
1991	60.04865	37.02160486	13.00697	9.909492	4440729483	42	13.39988	0.990847349	2.18E
1992	49.73298	38.22738831	44.58884	17.29843	4610500451	38.1	14.24738	-14.98716799	2.28E
1993	54.39384	33.71975493	57.16525	22.0654	3248303663	37.19	15.78772	-7.052474658	2.23E
1994	100.552	23.05923645	57.03171	21.996	2947626841	30.4	15.09194	-15.92023297	2.19E
1995	160.0478	39.52837841	72.8355	21.89526	1093122222	29.29	10.28191	-31.4525655	2.19E
1996	207.4396	40.25772925	29.26829	21.88443	3032581187	32.46	9.063329	-5.260784138	2.28E
1997	235.952	51.46101079	8.529874	21.88605	1740478024	30.4	9.725269	12.12661189	2.35E
1998	272.9201	39.27860747	9.996378	21.886	-68426484.03	32.4	10.93903	11.48466906	2.41E
1999	69.17385	34.45783118	6.618373	92.3381	4288294864	34.6	12.76339	6.047248346	2.42E
2000	70.13911	48.99559947	6.933292	101.6973	10415248515	36.1	14.66963	-1.140888642	2.54E
2001	78.15771	49.68050029	18.87365	111.2313	6895211553	42.7	15.90097	12.1387025	2.69E
2002	78.39319	40.03516859	12.87658	120.5782	4737881287	54.9	13.527	3.023542275	3.11E
2003	73.6478	49.33496486	14.03178	129.2224	7823815230	56.5	13.02659	9.935713387	3.33E

2004	75.3126	31.89587044	14.99803	132.888	19757761168	55.7	11.75879	-2.60484706	3.64E
2005	86.26505	33.05946007	17.86349	131.2743	29198364164	54.8	11.30051	-1.593680481	3.88E
2006	91.44425	42.5665658	8.225222	128.6517	34946520061	53.3	11.72897	-5.627968049	4.11E
2007	90.52778	39.33693151	5.388008	125.8081	37754970589	53.38	19.29109	9.187171228	4.38E
2008	99.55972	40.79683535	11.58108	118.5667	45913700054	53.84	23.81187	6.684908635	4.68E
2009	92.65238	36.05871041	12.55496	148.88	25391504843	58.92	25.14416	18.18000167	5.06E
2010	100	43.32075684	13.7202	150.2975	30098247902	55.82	21.35585	1.067736064	5.46E
2011	100.5189	53.27795833	10.84003	153.8625	32828147578	54.6	22.47905	5.685579859	5.75E
2012	110.519	44.53236805	12.21778	157.5	39190291025	57.2	24.92823	6.224808614	5.99E
2013	117.4135	31.04885996	8.475827	157.3117	42171745821	55.4	25.44805	11.20162222	6.39E
2014	124.4955	30.88519372	8.062486	158.5526	21059588723	47.5	22.68961	11.35621303	6.8E
2015	119.0528	21.33265187	9.009387	192.4403	-6447020438	58.2	22.36683	13.59615325	6.98E
2016	110.1792	20.72251888	15.67534	253.492	-536057877.7	48.6	27.37879	6.686233617	6.87E
2017	100.8227	26.347599	16.52354	305.7901	13148150339	52.9	24.78142	5.790566873	6.92E
2018	109.1111	33.00783349	12.09473	306.0837	20467324945	54.7	25.36246	6.055977154	7.05E
2019	122.6999	34.02387783	11.39679	306.921	2867512150	55.9	23.92961	4.522188497	7.21E

Source: World Development Index (WDI) 2020; CBN Statistical Bulletin, 2020.

4.3 Descriptive Statistics Results

4.3.1 Descriptive Statistics for Monetary Policy and Trade balance performance (1970-2019)

Table 4.2 Descriptive Statistics for each variable in this study (1970-2019)

Variable	Mean	Minimum	Maximum	Skewness	Jarque-Bera Probability	No. of Observation
TBP	1.13	-6.45	4.59	1.11	8.77 (0.01)	43
NEER	75.57	0.55	306.92	1.12	10.85 (0.00)	50
REER	152.20	49.73	536.77	1.75	28.82 (0.00)	40
INFL	18.29	3.46	72.84	1.94	49.49 (0.00)	50
DOP	33.28	9.14	53.28	-0.45	2.77 (0.25)	50
MCU	47.22	29.29	73.30	0.06	0.73 (0.69)	39
DINT	-1.39	-65.86	18.18	-2.18	142.82 (0.00)	50
MS	16.37	9.06	28.63	0.57	5.75 (0.06)	50
GDP	3.26	1.43	7.21	1.05	9.65 (0.01)	50

Source: Researcher's computation, 2021

Table 4.2 above shows the descriptive statistics for nine variables used in this study. The nine

variables consist of trade balance performance (TBP), nominal exchange rate (NEER), real exchange rate (REER), and inflation rate (INFL), degree of openness (DOP), manufacturing capacities utilization (MCU), domestic interest rate (DINT), money supply (MS), and gross domestic product (GDP) for the study period 1970 to 2019. Each of the descriptive results is discussed below:

Mean: The mean is used to measure the average value for each variable. Here, we have a minimum and maximum observations of 39 and 50, hence, this study is large sample, which spans from from1970-2019.The highest and lowest average values are 152.20 and -1.39 for REER and DINT in this study.

Skewness: Skewness is the measure of deviation from symmetry distribution. Table 4.2 revealed that all the variables are away from the symmetry distribution, which is expected to be zero. All the variables except degree of openness (DOP) and domestic interest rate (DINT) exhibit a negative skewed distribution in this study.

Jarque-Bera (JB): The Jarque-Bera value shows the pattern of distribution for a variable. A variable could be normally or abnormally distributed. The Jarque-Bera test is used to test against the null hypothesis of a normal distribution exists, if the probability value is above either 10% or otherwise stated. Table 4.2 revealed that all the variables except degree of openness (DOP) are not normally distributed; hence, the null hypothesis of a normal distributed cannot be accepted in this study.

4.3.2 Graphical Analysis for Monetary Policy Instruments and Trade balance Performance

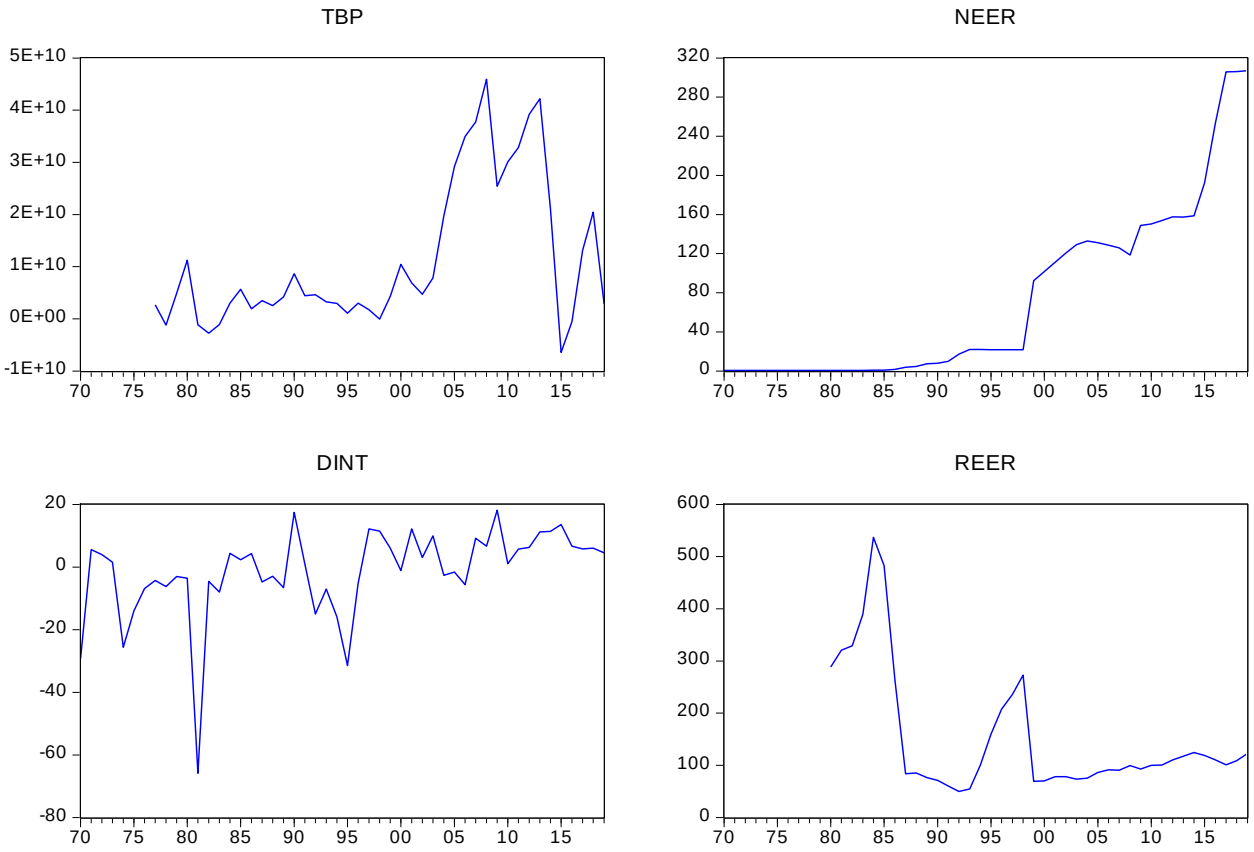

Figure 4.1: Trend in Monetary Analysis for Monetary Policy variables and Trade balance performance between 1970-2019 in Nigeria
Source: Researcher's Chart, 2021

Figure 4.1 shows the graphical analysis of the main monetary policy variables between 1970 and 2019 in Nigeria. First, the trade balance performance trend for the study period 1970 to 2019 exhibits unstable performance. In specific, the TBP has high Trade Balance Performance in year 2008 and 2013 respectively, unlike other years. Second, the nominal exchange rate (NEER)

shows constant trend between 1970 and 1984 until 1985 when the exchange rate started exhibiting a rising but unstable trend from 1990 to 2019. Third, the domestic interest rate since 1970 has constantly exhibits unstable trend throughout the study periods, 1970-2019. Lastly, the real exchange rate (REER) unlike nominal exchange rate does not exhibit an upward trending but largely unstable over the study periods

4.3.3 Correlation Matrix

Table 4.3: Correlation matrix results for the variables

Variable	TBP	NEER	REER	INFL	DOP	MCU	DINT	MS	GDP
TBP	1.00								
NEER	0.408	1.00							
REER	-0.329	-0.402	1.00						
INFL	-0.309	-0.351	-0.132	1.00					
DOP	0.424	0.267	-0.590	-0.056	1.00				
MCU	0.392	0.477	-0.036	-0.398	-0.069	1.00			
DINT	0.278	0.380	-0.195	-0.512	0.228	-0.0821	1.00		
MS	0.506	0.808	-0.309	-0.270	0.135	0.441	0.400	1.00	
GDP	0.504	0.926	-0.356	-0.345	0.222	0.512	0.380	0.899	1.00

Source: Researcher's computation, 2021

Table 4.3 shows the result of the correlation matrix among the included variable in specific. The result revealed that degrees of positive and negative association existed between trade balance performance and other variable in this study. All the variable have low positive degree of association between trade balance performance and other included variables expect inflation rate and real effective exchange rate that exhibited a negative degree of association within the studyperiod 1970-2019 in this study further the table 4.3 found that the strongest degree of association was between trade balance performance and money supply while the weakest degree of association was between trade performance and inflation rate within the study period of 1986 to2019 in Nigeria.

4.4 Time Series Econometric Result

To avoid spurious regression. The time series econometrics result are tested using unit root test and the cointegration test to ascertain individual stationary level and the long-run co-movement of the included non-stationary variables respectively. These estimation techniques are performed using Eviews 9.0 econometric software in this study

4.5 Objective One Result

4.5.1 Pre-Tests Estimation

4.5.1.1 Unit Root Test Result

Table 4.4: Unit Root test using Augmented Dickey Fuller (ADF)

Variable	Unit Root @ Level		Unit @ 1st Difference		Order of Integration
	ADF Value	Prob.	ADF Value	Prob.	
TBP	-2.038	0.270	-5.802***	0.000	I(1)
REER	-1.920	0.320	-4.299***	0.002	I(1)
NEER	2.1013	0.999	-4.704***	0.000	I(1)
INF	-3.442***	0.014	-	-	I(0)
DOP	-2.838*	0.06	-7.863***	0.000	I(0)
MCU	-2.610	0.10	-5.36***	0.000	I(0)

Note: ***, ** and * denote 1%, 5% and 10% level of significance. The null hypothesis is rejected if the ADF statistics value is greater than critical values of 1%, 5% and 10% significant values respectively.

Table 4.4 reports the Augmented Dickey Fuller (ADF) unit root test for all the included variables. The ADF unit root test found that all variables are stationary at first difference integrate order of one, I(1), except inflation rate (INF), Degree of openness (DOP), domestic interest rate (DINT) and manufactory capacity utilization (MCU) in this study. Importantly, the

ADF Unit Root test in Table 4.4 confirmed a mixed integrate order of zero, I(0) and integrate order of one I(1) and thus, justify the use of ARDL Bounds Co-integration test in this study.

4.5.1.2 ARDL Cointegration Bounds Test

Table 4.5: ARDL Cointegration Bounds Test

Variable	F-statistic	Degree of freedom (k)	Upper Critical Values		
			10%	5%	1%
All variables	5.323	5	3.35	3.79	4.68

Source: EViews 9 output

Note: The null hypothesis is rejected if the F statistic value is less than critical values of 1%, 5% and 10% significant values respectively.

Table 4.5 found that all the variables in this model has a long-run relationship because the F-statistics value is greater than the three critical values of 10%, 5% and 1% respectively within the study periods, 1970-2019. Therefore, the null hypothesis of no cointegration relationship among the variables cannot be rejected in this study.

4.5.2 Ordinary Least Squares (OLS) Result

Table 4.6: Long run ARDL Result				
Selected Model: ARDL (1, 1, 1, 1, 1, 1) TBP				
Dependent variable: Trade balance Performance				
Variable	Coefficient	Standard Error	t-statistics	Probability
NEER	0.0396	0.0678	0.5673	0.575
REER	-0.0011	0.0624	-0.018	0.986
INFL	0.057	0.412	0.139	0.891
DOP	0.0849	0.592	1.435	0.163
MCU	0.602	0.624	0.965	0.343
C	-46.991	51.593	-0.911	0.371

Table 4.6 presents the long run ARDL result of the impact of exchange rate on trade balance performance in Nigeria over the study periods, 1970-2019. Specifically, the nominal exchange

rate (NEER) of 0.039 revealed that the NEER has a positive and insignificant impact on trade balance performance in the long run. This suggested that the NEER although establishes the Marshall Lerner Condition but not reliable for the long-run trade balance performance in Nigeria in this study. Similarly, other regressors except real exchange rate have positive and insignificant impact on the long-run trade balance performance in Nigeria over the study period 1970-2019. Also, the constant value of -46.99 indicated that other related variables not included in this model do have a negative impact on the long run trade balance performance in Nigeria.

4.5.3 ARDL Short-Run Result

Table 4.7: ARDL Short run OLS Result

Variables	Coefficient	Standard Error	t-statistics	Probability
D(NEER)	-0.085	0.102	-0.838	0.410
D(REER)	-0.030	0.029	-1.04	0.306
D(INFL)	-0.009	0.143	-0.06	0.949
D(DOP)	0.260	0.22	1.17	0.253
D(MCU)	-0.391	0.40	-0.972	0.399
ECT (-1)	-0.373	0.144	-2.60	0.015

Source: EViews 9 output

Table 4.7 results confirmed the long-run existence among the variables in this model with the expected error correction term (ECT) that is negative and statistically significant at 1% significant level. All the changes in the regressors except change in degree of openness D(DOP) have a negative impact on the changes in the trade balance performance over the study periods 1970-2019 in Nigeria. Specifically, the changes in exchange rate (neer) and real exchange rate (reer) confirm the J-curve hypothesis that changes the changes in Nominal exchange rate d(neer) and changes in real exchange rate d(reer) has a negative impact on the changes in the trade balance performanceover the study period 1970-2019 in Nigeria. Although, all changes in the regressors are not statistically significant except the speed of recovery to long run equilibrium in this study.

4.6 Objective Two Result

4.6.1 Pre-tests Estimation

4.6.1.1 Unit Root Test

Table 4.8 Unit root test using Augmented Dickey Fuller (ADF) for model 2

Variable	Unit Root @ Level		Unit @ 1st Difference		Order of Integration
	ADF Value	Prob.	ADF Value	Prob.	
TBP	-2.038	0.270	-5.802***	0.000	I(1)
INF	-3.442***	0.014	-	-	I(0)
DINT	-5.488***	0.00	-	-	I(0)
MS	-2.055	0.263	-7.280***	0.000	I(1)
GDP	1.355	0.999	-3.562***	0.010	I(1)

Note: ***, ** and * denote 1%, 5% and 10% level of significance. The null hypothesis is rejected if the ADF statistics value is greater than critical values of 1%, 5% and 10% significant values respectively.

Table 4.8 reports the Augmented Dickey Fuller (ADF) unit root test for all the included variables. The ADF unit root test found that all variables are stationary at first difference integrate order of one, I(1), except inflation rate (INF) and domestic interest rate (DINT) that stationary at level in this study. Importantly, the ADF Unit Root test in Table 4.8 confirmed a mixed integrate order of zero, I(0) and integrate order of one I(1) among the variables in this study.

4.6.1.2 ARDL Cointegration Bounds Test

Table 4.9ARDL Cointegration Bounds Test

Variable	F-statistic	Degree of freedom (k)	Upper Critical Values		
			10%	5%	1%
All variables	2.697	5	3.35	3.79	4.68

Source: EViews 9 output

Note:. The null hypothesis is rejected if the F statistic value is less than critical values of 1%, 5% and 10% significant values respectively.

Table 4.9 found that all the variables in this model have no long-run joint relationships because the F-statistics value is lesser than the three critical values of 10%, 5% and 1% respectively

within the study periods, 1970-2019. Therefore, the null hypothesis of no cointegration relationship among the variables cannot be rejected in this study.

4.6.2 Ordinary Least Squares ARDL Estimates

Table 4.10 ARDL OLS SHORT RUN AND LONG RUN ESTIMATE

ARDL Cointegrating And Long Run Form
Dependent Variable: TBP
Selected Model: ARDL(1, 1, 1, 1, 1, 1)
Date: 08/26/21 Time: 17:52
Sample: 1970 2019
Included observations: 38

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DINT)	-0.627122	0.236122	-2.655923	0.0133
D(MS)	2.391742	0.812433	2.943927	0.0067
D(INFL)	-0.214379	0.141670	-1.513229	0.1423
D(GDP)	4.222676	1.769429	2.386462	0.0246
D(MCU)	-0.157914	0.360464	-0.438085	0.6649
CointEq(-1)	-0.570296	0.180909	-3.152398	0.0041

Cointeq = TBP - (-0.9252*DINT + 0.5090*MS -0.1025*INFL -0.0714*GDP + 0.3326*MCU -16.4752)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DINT	-0.925232	0.487068	-1.899597	0.0686
MS	0.509030	1.080933	0.470917	0.6416
INFL	-0.102512	0.249667	-0.410595	0.6847
GDP	-0.071401	0.330909	-0.215771	0.8308
MCU	0.332557	0.415914	0.799581	0.4312
C	-16.475180	18.425864	-0.894133	0.3795

Source: EViews 9 output, 2021

Table 4.10 results confirmed the long-run existence among the variables in this model with the expected error correction term (ECT) that is negative and statistically significant at 1% significant level. All the changes in the regressors except change in domestic interest rate,inflation rate, gross domestic product (gdp) and money supply (MS) are contrary to *a priori* expectation in this study. Specifically, a change in domestic interest rate (DINT) causes a

significant decrease change in the trade balance performance at 1% significant level over the study period, 1970-2019 in Nigeria. On a contrary, both changes in money supply and gdp cause a high and positive significant impact changes in trade balance performance at 1% significant levels respectively. Unfortunately, the result revealed that a rise change in domestic interest rate has not resulted to an increase in trade balance surplus, but rather trade balance deficit in Nigeria within the short run periods between 1970-2019 in Nigeria in this study. On the other hand, the Long run coefficients from the ARDL cointegration result revealed that all the regressors except domestic interest rate have no significant impact on trade balance performance in the long run over the study period, 1970-2019 in Nigeria.

4.7 Objective Three Result

Table 4.11 Structural Forecast-Error Variances Decompositions of Nominal Exchange Rate (NEER) Shock

Variance Decomposition of NEER:

Period	S.E.	TBP	NEER	DINT
1	15.33040	0.506836	99.49316	0.000000
		(3.86594)	(3.86594)	(0.00000)
2	25.35760	11.25270	88.04418	0.703124
		(8.52155)	(8.77707)	(2.29430)
3	33.23198	19.16885	77.08215	3.748999
		(12.8885)	(13.3985)	(6.03836)
4	39.92237	23.24494	69.97856	6.776507
		(16.0544)	(17.2002)	(9.35908)
5	46.23785	25.29008	65.94010	8.769824
		(18.2004)	(19.9617)	(11.4116)
6	52.67986	26.56339	63.53237	9.904247
		(19.8891)	(21.9041)	(12.3516)
7	59.44813	27.57453	61.83790	10.58757
		(21.3151)	(23.3147)	(12.7887)
8	66.59551	28.45304	60.47942	11.06754
		(22.5428)	(24.3943)	(13.0565)
9	74.15417	29.21002	59.34992	11.44006
		(23.5722)	(25.2763)	(13.3078)
10	82.17430	29.85010	58.41501	11.73489
		(24.4409)	(26.0226)	(13.5214)

Source: EViews 9 output, 2021

Table 4.11 presents the result of the structural forecast error variance decomposition of nominal exchange rate (NEER) over the study period 1970-2019 in Nigeria. Table 411 result of variance

decomposition of exchange rate of Nigeria denotes the 10-year period. In this 10-year period, there are two economy periods, Short-run and long run. The third period denotes the short run while the 10th period is referred to as the long run. In the short run, the exchange rate shock accounts for 77.08% variation of the fluctuation in exchange rate, implying its own shock at the 3rd period, which is the short run period. Also, the exchange rate shock accounts for 19.17% variation in trade balance performance which is higher than the variation of 3.75% in domestic interest rate in the short run period in Nigeria. In the 10th period, the exchange rate shock accounts for 58.42% variation in the exchange rate but the contribution of the exchange rate shock to the variations in trade balance performance rose to 29.85% which is higher than the short run period in this study. This suggests that in the long run period, the exchange rate shock causes lesser fluctuations in the exchange rate but more variations in trade balance performance and domestic interest rate when compared with the short run in this study. Further, the result in Table 4.11 revealed that the exchange rate shock persistently increases variation in the trade balance performance and domestic interest rate while its own exchange rate decreases in variation over the study 10-year period in Nigeria.

Table 4.12 Structural Forecast-Error Variance Decompositions of Domestic Interest Rate (DIR) Shock

Variance Decomposition of DINT:

Period	S.E.	TBP	NEER	DINT
1	14.10338	1.359254	0.375984	98.26476
		(5.11939)	(2.97215)	(6.00158)
2	14.50154	1.646943	1.186564	97.16649
		(5.79618)	(4.15174)	(7.09788)
3	14.60312	1.648283	1.255002	97.09671
		(6.17530)	(4.38265)	(7.60445)
4	14.61312	1.647384	1.327017	97.02560
		(7.34501)	(4.32863)	(8.46685)
5	14.63558	1.680116	1.578264	96.74162
		(8.74738)	(4.42441)	(9.76841)
6	14.66605	1.795392	1.836602	96.36801
		(9.79201)	(4.50907)	(10.8003)
7	14.69968	1.946374	2.071190	95.98244

		(10.6598)	(4.58059)	(11.5764)
8	14.73651	2.107554	2.318398	95.57405
		(11.4557)	(4.72335)	(12.2652)
9	14.77875	2.284216	2.608264	95.10752
		(12.2401)	(4.92182)	(12.9455)
10	14.82852	2.488520	2.953138	94.55834
		(13.0481)	(5.21970)	(13.6702)

Cholesky Ordering: TBP NEER DINT
Standard Errors: Monte Carlo (100 repetitions)
Source: EViews 9 output, 2021

Table 4.12 also presents the result of the structural forecast error variance decomposition of domestic interest rate (DINT) over the study period 1970-2019 in Nigeria. In the 3th period, the domestic interest rate shock accounts for 97.10% variation of the fluctuation in the domestic interest rate. However, the domestic interest rate shock contributes to a low variation in trade balance performance by 1.65% in the short run. Similarly, in the 10th period, the result of domestic interest rate decomposition shock found that the domestic interest rate remains dominantly impacted by 94.56% while a low variation of 2.49% was accounted for in trade balance performance in the long run. This suggests that the domestic interest rate shock has contributed to insignificant increase variation in trade balance performance in the short run as well as in the long run over the study periods, 1970-2019 in Nigeria.

In summary, Tables 4.11 and 4.12 found that both, exchange rate and domestic interest rate shocks contribute to increase variation in trade balance performance in the short run and long run. However, the exchange rate shock has a higher increase variation than domestic interest rate in trade balance performance over the study period, 1970-2019 in Nigeria.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 SUMMARY OF THE FINDINGS

The results of this study are summarized in three hypotheses as follow:

Hypothesis one investigated whether the exchange rate stimulate trade balance performance in Nigeria from 1970-2019. It employed both descriptive statistic and econometric methodology.

The descriptive statistic result reviewed that degrees of positive and negative association existed between trade balance performance and other variable in this study also that all variable has low positive degree of association between trade balance performance and other included variables expect inflation rate and real effective exchange rate that exhibited a negative degree of association within the study. on the other hand, the econometric time series methodology employed unit root test, cointegration test, long and short run ordinary least square and OLS error correction model respectively. The results found that all the variables in this model has a long-run relationship because the F-statistics value is greater than the three critical values of 10%, 5% and 1% respectively within the study periods Therefore, the null hypothesis of no cointegration relationship among the variables cannot be rejected in this study also the nominal exchange rate (NEER) of 0.039 in the Long run ARDL Result revealed that the NEER has a positive and insignificant impact on trade balance performance in the long run. This suggested that the NEER although establishes the Marshall Lerner Condition but not reliable for the long-run trade balance performance in Nigeria in this study. Similarly, other regressors except real exchange rate have positive and insignificant impact on the long-run trade balance performance in Nigeria over the study period 1970-2019. Also, the constant value of -46.99 indicated that

other related variables not included in this model do have a negative impact on the long run trade balance performance in Nigeria. The ARDL Short run OLS Result results confirmed the long-run existence among the variables in this model with the expected error correction term (ECT) that is negative and statistically significant at 1% significant level. All the changes in the regressors except change in degree of openness D(DOP) have a negative impact on the changes in the trade balance performance over the study periods 1970-2019 in Nigeria. Specifically, the changes in exchange rate (NEER) and real exchange rate (REER) confirm the J-curve hypothesis that changes the changes in Nominal exchange rate d(NEER) and changes in real exchange rate d(REER) has a negative impact on the changes in the trade balance performance over the study period 1970-2019 in Nigeria. Although, all changes in the regressors are not statistically significant except the speed of recovery to long run equilibrium in this study.

Hypothesis two investigated the impact of Domestic interest rate on trade balance performance. in Nigeria over the study period 1970-2019 using descriptive and econometric methodology. The descriptive statistic result reviewed that degrees of positive and negative association existed between trade balance performance and other variable in this study also that all variable has low positive degree of association between trade balance performance and other included variables expect inflation rate and real effective exchange rate that exhibited a negative degree of association within the study. on the other hand, the econometric time series methodology, the econometric time series methodology employed unit root test, cointegration test, long run ordinary least square and OLS error correction model respectively the results found that all the variables in this model have no long-run joint relationships because the F-statistics value is lesser than the three critical values of 10%, 5% and 1% respectively within the study periods, 1970-2019. Therefore, the null hypothesis of no cointegration relationship among the variables cannot

be rejected in this study while ARDL OLS short run and long run estimate results confirmed the long-run existence among the variables in this model with the expected error correction term (ECT) that is negative and statistically significant at 1% significant level. All the changes in the regressors except change in domestic interest rate, inflation rate, gross domestic product (GDP) and money supply (MS) are contrary to *a priori* expectation in this study. Specifically, a change in domestic interest rate (DINT) causes a significant decrease change in the trade balance performance at 1% significant level over the study period, 1970-2019 in Nigeria. On a contrary, both changes in money supply and GDP cause a high and positive significant impact changes in trade balance performance at 1% significant levels respectively. Unfortunately, the result revealed that a rise change in domestic interest rate has not resulted to an increase in trade balance surplus, but rather trade balance deficit in Nigeria within the short run periods between 1970-2019 in Nigeria in this study. On the other hand, the Long run coefficients from the ARDL cointegration result revealed that all the regressors except domestic interest rate have no significant impact on trade balance performance in the long run over the study period, 1970-2019 in Nigeria.

Hypothesis three test monetary policy shocks (exchange rate and domestic interest rate) variation in trade balance performance using both Structural Forecast-Error Variances Decompositions of Nominal Exchange Rate (NEER) Shock and Structural Forecast-Error Variance Decompositions of Domestic Interest Rate (DIR) Shock the result found that both, exchange rate and domestic interest rate shocks contribute to increase variation in trade balance performance in the short run and long run. However, the exchange rate shock has a higher increase variation than domestic interest rate in trade balance performance over the study period, 1970-2019 in Nigeria

5.2 CONCLUSION

Based on the empirical result from the three hypotheses and research objectives. The study concluded that monetary policy has impact on trade balance performance within the study period 1970-2019 in Nigeria in specific objectives the study concluded that all variable in the study has a low positive degree of association with trade balance performance expect inflation rate Real effective exchange rate that has negative degree of association with trade balance performance in Nigeria over the study period 1970-2019. lastly the study concluded that both, exchange rate and domestic interest rate shocks contribute to increase variation in trade balance performance in the short run and long run. However, the exchange rate shock has a higher increase variation than domestic interest rate in trade balance performance over the study period, 1970-2019 in Nigeria.

5.3 RECOMMENDATIONS

Based on the conclusion the study recommended is that monetary authority should place more emphasis on interest rate and other variable that has positive degree on association on trade balance performance in Nigeria so as to help improve the level of degree of positivity and also put in place necessary facilitate that will reduce does variable that has negative degree of association on trade balance performance

Finally knowing that, exchange rate and domestic interest rate shocks contribute to increase variation in trade balance performance in the short run and long run. However, since the exchange rate shock has a higher increase variation than domestic interest rate in trade balance performance more emphasis should be place on exchange rate.

5.4 LIMITATION OF THE STUDY

This study was constrained due to the following factors

i. Scope of the study
ii. Use of a single country study
iii. Use of time series econometrics
iv. Use of OLS
v. Financial and time constraints of the project completion

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APPENDIX

EViews Results

Data presentation

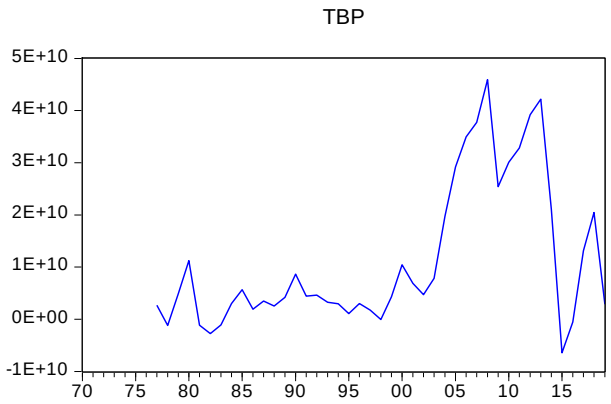
	REER	DOP	INFL	NEER	TBP	MCU	MS	DINT	GDP
1970	NA	19.62059923	13.75708	0.714286	NA	NA	10.92786	-29.26951735	1.43E+13
1971	NA	24.46363514	15.99911	0.712856	NA	NA	10.04202	5.576788732	1.63E+13
1972	NA	22.76364559	3.45765	0.657895	NA	NA	10.91285	3.991658474	1.69E+13
1973	NA	31.26775278	5.402664	0.657895	NA	NA	11.18303	1.569257787	1.78E+13
1974	NA	39.74699041	12.67439	0.630282	NA	NA	13.22281	-25.6667594	1.98E+13
1975	NA	41.17034351	33.96419	0.615502	NA	NA	17.58566	-13.96816185	1.88E+13
1976	NA	42.1380988	24.3	0.626601	NA	NA	19.94904	-6.867482824	2.05E+13
1977	NA	47.39526574	15.08783	0.644701	2692720862	NA	22.85336	-4.257604524	2.17E+13
1978	NA	43.31484204	21.70925	0.635272	-1166429508	NA	20.86095	-6.28956771	2.04E+13
1979	NA	43.87840231	11.70973	0.604007	4913847293	NA	22.95116	-2.994708212	2.18E+13
1980	288.2722	48.57131421	9.972262	0.546781	11216558754	NA	28.62522	-3.547418212	2.27E+13
1981	320.7152	18.17172618	20.81282	0.617708	-1139696751	73.3	10.9388	-65.8571487	1.97E+13
1982	328.9163	13.77983316	7.697747	0.673461	-2724729847	63.6	11.19984	-4.586180209	1.84E+13
1983	389.306	10.04496861	23.21233	0.72441	-1079499400	49.7	11.99003	-8.022386443	1.64E+13
1984	536.7679	9.380541231	17.82053	0.766527	3000544863	43	12.80806	4.342492624	1.62E+13
1985	482.5732	10.39197861	7.435345	0.893774	5666980162	38.3	12.32653	2.34323058	1.72E+13
1986	263.6202	9.135845723	5.717151	1.754523	1946967918	38.8	11.91441	4.310292242	1.72E+13
1987	83.97806	19.49533511	11.29032	4.016037	3478304309	40.4	11.80946	-4.769644808	1.77E+13
1988	85.29546	16.94060969	54.51122	4.536967	2520186027	42.4	12.16855	-2.962676481	1.9E+13
1989	76.29573	34.18261725	50.46669	7.364735	4178018625	43.8	10.45432	-6.612412439	1.94E+13
1990	70.99796	30.92474008	7.3644	8.038285	8652793558	40.3	11.63537	17.46624444	2.17E+13
1991	60.04865	37.02160486	13.00697	9.909492	4440729483	42	13.39988	0.990847349	2.18E+13
1992	49.73298	38.22738831	44.58884	17.29843	4610500451	38.1	14.24738	-14.98716799	2.28E+13
1993	54.39384	33.71975493	57.16525	22.0654	3248303663	37.19	15.78772	-7.052474658	2.23E+13
1994	100.552	23.05923645	57.03171	21.996	2947626841	30.4	15.09194	-15.92023297	2.19E+13
1995	160.0478	39.52837841	72.8355	21.89526	1093122222	29.29	10.28191	-31.4525655	2.19E+13
1996	207.4396	40.25772925	29.26829	21.88443	3032581187	32.46	9.063329	-5.260784138	2.28E+13
1997	235.952	51.46101079	8.529874	21.88605	1740478024	30.4	9.725269	12.12661189	2.35E+13
1998	272.9201	39.27860747	9.996378	21.886	-68426484.03	32.4	10.93903	11.48466906	2.41E+13
1999	69.17385	34.45783118	6.618373	92.3381	4288294864	34.6	12.76339	6.047248346	2.42E+13
2000	70.13911	48.99559947	6.933292	101.6973	10415248515	36.1	14.66963	-1.140888642	2.54E+13
2001	78.15771	49.68050029	18.87365	111.2313	6895211553	42.7	15.90097	12.1387025	2.69E+13
2002	78.39319	40.03516859	12.87658	120.5782	4737881287	54.9	13.527	3.023542275	3.11E+13
2003	73.6478	49.33496486	14.03178	129.2224	7823815230	56.5	13.02659	9.935713387	3.33E+13
2004	75.3126	31.89587044	14.99803	132.888	19757761168	55.7	11.75879	-2.60484706	3.64E+13
2005	86.26505	33.05946007	17.86349	131.2743	29198364164	54.8	11.30051	-1.593680481	3.88E+13
2006	91.44425	42.5665658	8.225222	128.6517	34946520061	53.3	11.72897	-5.627968049	4.11E+13
2007	90.52778	39.33693151	5.388008	125.8081	37754970589	53.38	19.29109	9.187171228	4.38E+13
2008	99.55972	40.79683535	11.58108	118.5667	45913700054	53.84	23.81187	6.684908635	4.68E+13
2009	92.65238	36.05871041	12.55496	148.88	25391504843	58.92	25.14416	18.18000167	5.06E+13
2010	100	43.32075684	13.7202	150.2975	30098247902	55.82	21.35585	1.067736064	5.46E+13
2011	100.5189	53.27795833	10.84003	153.8625	32828147578	54.6	22.47905	5.685579859	5.75E+13
2012	110.519	44.53236805	12.21778	157.5	39190291025	57.2	24.92823	6.224808614	5.99E+13
2013	117.4135	31.04885996	8.475827	157.3117	42171745821	55.4	25.44805	11.20162222	6.39E+13
2014	124.4955	30.88519372	8.062486	158.5526	21059588723	47.5	22.68961	11.35621303	6.8E+13
2015	119.0528	21.33265187	9.009387	192.4403	-6447020438	58.2	22.36683	13.59615325	6.98E+13
2016	110.1792	20.72251888	15.67534	253.492	-536057877.7	48.6	27.37879	6.686233617	6.87E+13
2017	100.8227	26.347599	16.52354	305.7901	13148150339	52.9	24.78142	5.790566873	6.92E+13
2018	109.1111	33.00783349	12.09473	306.0837	20467324945	54.7	25.36246	6.055977154	7.05E+13

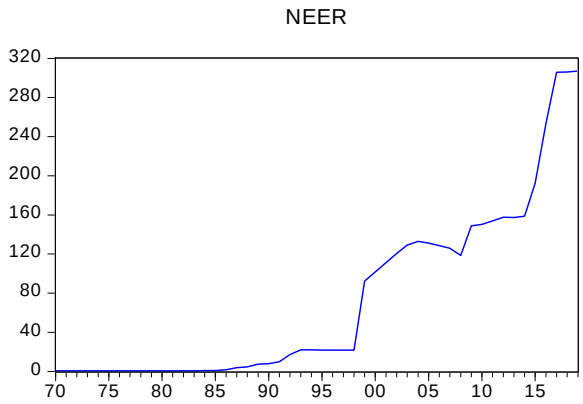
2019	122.6999	34.02387783	11.39679	306.921	2867512150	55.9	23.92961	4.522188497	7.21E+13

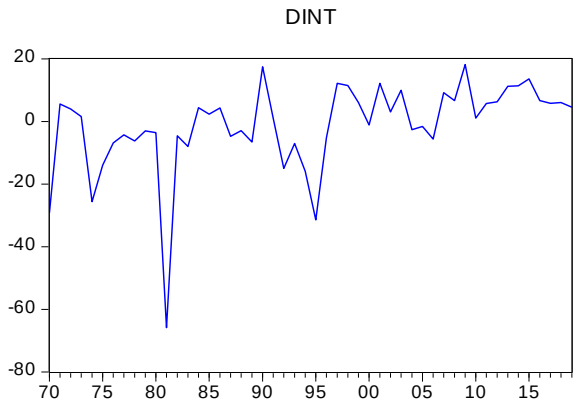
Descriptive Statistics

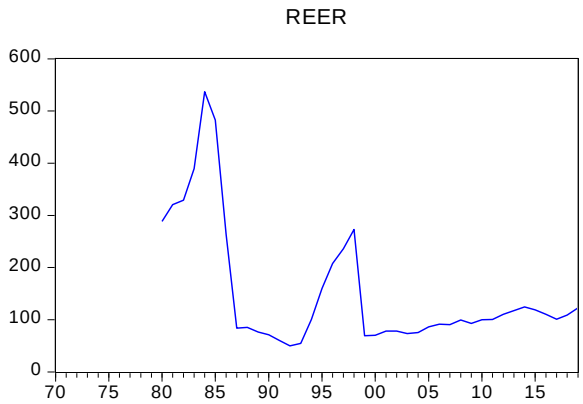
	TBP	NEER	REER	INFL	DOP	MCU	DINT	MS	GDP
Mean	1.13E+10	73.57282	152.1978	18.29492	33.28102	47.21538	-1.394516	16.37077	3.26E+13
Median	4.61E+09	21.88603	100.5355	12.77549	34.32022	48.60000	1.318497	13.46344	2.28E+13
Maximum	4.59E+10	306.9210	536.7679	72.83550	53.27796	73.30000	18.18000	28.62522	7.21E+13
Minimum	-6.45E+09	0.546781	49.73298	3.457650	9.135846	29.29000	-65.85715	9.063329	1.43E+13
Std. Dev.	1.40E+10	90.62339	119.1170	15.61761	12.03035	10.51630	14.21432	5.845422	1.86E+13
Skewness	1.105805	1.124063	1.747312	1.938259	-0.449736	0.061772	-2.182151	0.574742	1.054859
Kurtosis	2.929109	3.394842	5.254317	5.954505	2.278704	2.339726	10.03608	1.799739	2.575323
Jarque-Bera	8.772435	10.85411	28.82391	49.49269	2.769415	0.733239	142.8200	5.754045	9.648468
Probability	0.012448	0.004396	0.000001	0.000000	0.250397	0.693073	0.000000	0.056302	0.008033
Sum	4.85E+11	3678.641	6087.911	914.7461	1664.051	1841.400	-69.72582	818.5387	1.63E+15
Sum Sq. Dev.	8.21E+21	402417.3	553365.6	11951.58	7091.738	4202.521	9900.297	1674.279	1.70E+28
Observations	43	50	40	50	50	39	50	50	50

Graph for main variables









Correlation Matrix

	TBP	NEER	REER	INFL	DOP	MCU	DINT	MS	GDP
TBP	1.000000	0.407501	-0.328758	-0.309484	0.424444	0.392210	0.278147	0.505662	0.503622
NEER	0.407501	1.000000	-0.401596	-0.351066	0.267414	0.477109	0.379838	0.807741	0.926030
REER	-0.328758	-0.401596	1.000000	-0.132292	-0.589648	-0.035625	-0.194733	-0.308719	-0.356045
INFL	-0.309484	-0.351066	-0.132292	1.000000	-0.056458	-0.397729	-0.511943	-0.269609	-0.345280
DOP	0.424444	0.267414	-0.589648	-0.056458	1.000000	-0.068636	0.227631	0.134591	0.221762
MCU	0.392210	0.477109	-0.035625	-0.397729	-0.068636	1.000000	-0.081532	0.440541	0.511512
DINT	0.278147	0.379838	-0.194733	-0.511943	0.227631	-0.081532	1.000000	0.399628	0.388803
MS	0.505662	0.807741	-0.308719	-0.269609	0.134591	0.440541	0.399628	1.000000	0.898892
GDP	0.503622	0.926030	-0.356045	-0.345280	0.221762	0.511512	0.388803	0.898892	1.000000

Unit Root Tests for all variables

TBP@ LEVEL

Null Hypothesis: TBP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.038098	0.2701
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(TBP)
Method: Least Squares
Date: 08/26/21 Time: 15:28
Sample (adjusted): 1978 2019
Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TBP(-1)	-0.187966	0.092226	-2.038098	0.0482
C	2.16E+09	1.66E+09	1.299636	0.2012

R-squared	0.094077	Mean dependent var	4161697.
Adjusted R-squared	0.071428	S.D. dependent var	8.63E+09
S.E. of regression	8.32E+09	Akaike info criterion	48.56774
Sum squared resid	2.77E+21	Schwarz criterion	48.65049
Log likelihood	-1017.923	Hannan-Quinn criter.	48.59807
F-statistic	4.153842	Durbin-Watson stat	1.534680
Prob(F-statistic)	0.048190		

TBP@1ST DIFF

Null Hypothesis: D(TBP) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.802478	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(TBP,2)
Method: Least Squares
Date: 08/26/21 Time: 15:29
Sample (adjusted): 1980 2019
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TBP(-1))	-1.192880	0.205581	-5.802478	0.0000
D(TBP(-1),2)	0.413718	0.161254	2.565633	0.0145
C	-62457141	1.30E+09	-0.047937	0.9620

R-squared	0.492794	Mean dependent var	-5.92E+08
Adjusted R-squared	0.465377	S.D. dependent var	1.12E+10
S.E. of regression	8.22E+09	Akaike info criterion	48.56982
Sum squared resid	2.50E+21	Schwarz criterion	48.69649
Log likelihood	-968.3964	Hannan-Quinn criter.	48.61562
F-statistic	17.97430	Durbin-Watson stat	2.140176
Prob(F-statistic)	0.000004		

REER@ LEVEL

Null Hypothesis: REER has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.919921	0.3201
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(REER)
Method: Least Squares
Date: 08/26/21 Time: 15:29
Sample (adjusted): 1981 2019
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
REER(-1)	-0.162987	0.084893	-1.919921	0.0626
C	20.68413	16.45275	1.257183	0.2166

R-squared	0.090598	Mean dependent var	-4.245444
Adjusted R-squared	0.066020	S.D. dependent var	65.29156
S.E. of regression	63.09949	Akaike info criterion	11.17722
Sum squared resid	147317.2	Schwarz criterion	11.26253
Log likelihood	-215.9558	Hannan-Quinn criter.	11.20783
F-statistic	3.686096	Durbin-Watson stat	1.262640
Prob(F-statistic)	0.062603		

REER@1ST DIFF

Null Hypothesis: D(REER) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.298714	0.0016
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(REER,2)
Method: Least Squares
Date: 08/26/21 Time: 15:30
Sample (adjusted): 1982 2019
Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(REER(-1))	-0.675110	0.157049	-4.298714	0.0001
C	-3.679146	10.27038	-0.358229	0.7223

R-squared	0.339194	Mean dependent var	-0.496163
Adjusted R-squared	0.320838	S.D. dependent var	76.62315
S.E. of regression	63.14610	Akaike info criterion	11.17998
Sum squared resid	143547.5	Schwarz criterion	11.26616
Log likelihood	-210.4195	Hannan-Quinn criter.	11.21064
F-statistic	18.47894	Durbin-Watson stat	1.812230
Prob(F-statistic)	0.000125		

NEER @ LEVEL

Null Hypothesis: NEER has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		2.101336	0.9999
Test critical values:	1% level	-3.571310	
	5% level	-2.922449	
	10% level	-2.599224	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(NEER)
Method: Least Squares
Date: 08/26/21 Time: 15:30
Sample (adjusted): 1971 2019
Included observations: 49 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NEER(-1)	0.054802	0.026079	2.101336	0.0410
C	2.478175	2.834585	0.874264	0.3864

R-squared	0.085881	Mean dependent var	6.249117
Adjusted R-squared	0.066431	S.D. dependent var	15.89643
S.E. of regression	15.35935	Akaike info criterion	8.341286
Sum squared resid	11087.75	Schwarz criterion	8.418503
Log likelihood	-202.3615	Hannan-Quinn criter.	8.370582
F-statistic	4.415611	Durbin-Watson stat	1.497266
Prob(F-statistic)	0.041000		

NEER@1ST DIFF

Null Hypothesis: D(NEER) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.703837	0.0004
Test critical values:	1% level	-3.574446	
	5% level	-2.923780	
	10% level	-2.599925	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(NEER,2)
Method: Least Squares
Date: 08/26/21 Time: 15:31
Sample (adjusted): 1972 2019
Included observations: 48 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NEER(-1))	-0.649150	0.138004	-4.703837	0.0000
C	4.147276	2.360427	1.757003	0.0856

R-squared	0.324781	Mean dependent var	0.017474
Adjusted R-squared	0.310103	S.D. dependent var	18.27616
S.E. of regression	15.18019	Akaike info criterion	8.318633
Sum squared resid	10600.15	Schwarz criterion	8.396600
Log likelihood	-197.6472	Hannan-Quinn criter.	8.348097
F-statistic	22.12609	Durbin-Watson stat	1.959987
Prob(F-statistic)	0.000024		

INF@ LEVEL

Null Hypothesis: INFL has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.442077	0.0141
Test critical values:	1% level	-3.571310	
	5% level	-2.922449	
	10% level	-2.599224	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INFL)
Method: Least Squares
Date: 08/26/21 Time: 15:32
Sample (adjusted): 1971 2019
Included observations: 49 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFL(-1)	-0.403815	0.117317	-3.442077	0.0012
C	7.396448	2.832172	2.611581	0.0121

R-squared	0.201331	Mean dependent var	-0.048169
Adjusted R-squared	0.184338	S.D. dependent var	14.17215
S.E. of regression	12.79943	Akaike info criterion	7.976639
Sum squared resid	7699.799	Schwarz criterion	8.053856
Log likelihood	-193.4277	Hannan-Quinn criter.	8.005935
F-statistic	11.84789	Durbin-Watson stat	1.669863
Prob(F-statistic)	0.001222		

DOP@ LEVEL

Null Hypothesis: DOP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.838119	0.0604
Test critical values:	1% level	-3.571310	
	5% level	-2.922449	
	10% level	-2.599224	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DOP)
Method: Least Squares
Date: 08/26/21 Time: 15:32
Sample (adjusted): 1971 2019
Included observations: 49 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DOP(-1)	-0.278552	0.098147	-2.838119	0.0067
C	9.560203	3.471858	2.753627	0.0084

R-squared	0.146307	Mean dependent var	0.293944
Adjusted R-squared	0.128143	S.D. dependent var	8.851394
S.E. of regression	8.264836	Akaike info criterion	7.101857
Sum squared resid	3210.453	Schwarz criterion	7.179074
Log likelihood	-171.9955	Hannan-Quinn criter.	7.131153
F-statistic	8.054919	Durbin-Watson stat	2.017910
Prob(F-statistic)	0.006680		

DOP@1ST DIFF

Null Hypothesis: D(DOP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.863454	0.0000
Test critical values:	1% level	-3.574446	
	5% level	-2.923780	
	10% level	-2.599925	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(DOP,2)
Method: Least Squares
Date: 08/26/21 Time: 15:33
Sample (adjusted): 1972 2019
Included observations: 48 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DOP(-1))	-1.144091	0.145495	-7.863454	0.0000
C	0.239359	1.288379	0.185783	0.8534

R-squared	0.573418	Mean dependent var	-0.079729
Adjusted R-squared	0.564145	S.D. dependent var	13.51380
S.E. of regression	8.921725	Akaike info criterion	7.255629
Sum squared resid	3661.470	Schwarz criterion	7.333596
Log likelihood	-172.1351	Hannan-Quinn criter.	7.285093
F-statistic	61.83391	Durbin-Watson stat	2.003558
Prob(F-statistic)	0.000000		

MCU@ LEVEL

Null Hypothesis: MCU has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.609999	0.0998
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(MCU)
Method: Least Squares
Date: 08/26/21 Time: 15:34
Sample (adjusted): 1982 2019
Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MCU(-1)	-0.196103	0.075135	-2.609999	0.0131
C	8.756383	3.616128	2.421480	0.0206

R-squared	0.159116	Mean dependent var	-0.457895
Adjusted R-squared	0.135758	S.D. dependent var	5.190928
S.E. of regression	4.825726	Akaike info criterion	6.036995
Sum squared resid	838.3547	Schwarz criterion	6.123184
Log likelihood	-112.7029	Hannan-Quinn criter.	6.067661
F-statistic	6.812096	Durbin-Watson stat	1.580121
Prob(F-statistic)	0.013111		

MCU@1ST DIFF

Null Hypothesis: D(MCU) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.362141	0.0001
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MCU,2)
Method: Least Squares
Date: 08/26/21 Time: 15:34
Sample (adjusted): 1983 2019
Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MCU(-1))	-0.857066	0.159837	-5.362141	0.0000
C	-0.136255	0.832411	-0.163687	0.8709

R-squared	0.451002	Mean dependent var	0.294595
Adjusted R-squared	0.435317	S.D. dependent var	6.706620
S.E. of regression	5.039717	Akaike info criterion	6.125115
Sum squared resid	888.9561	Schwarz criterion	6.212192
Log likelihood	-111.3146	Hannan-Quinn criter.	6.155814
F-statistic	28.75256	Durbin-Watson stat	2.160004
Prob(F-statistic)	0.000005		

DINT@ LEVEL

Null Hypothesis: DINT has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.487535	0.0000
Test critical values:	1% level	-3.571310	
	5% level	-2.922449	
	10% level	-2.599224	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(DINT)
Method: Least Squares
Date: 08/26/21 Time: 15:35
Sample (adjusted): 1971 2019
Included observations: 49 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DINT(-1)	-0.740536	0.134949	-5.487535	0.0000
C	-0.432481	1.925627	-0.224592	0.8233

R-squared	0.390505	Mean dependent var	0.689627
Adjusted R-squared	0.377537	S.D. dependent var	16.98834
S.E. of regression	13.40318	Akaike info criterion	8.068821
Sum squared resid	8443.323	Schwarz criterion	8.146038
Log likelihood	-195.6861	Hannan-Quinn criter.	8.098117
F-statistic	30.11304	Durbin-Watson stat	1.936676
Prob(F-statistic)	0.000002		

MS@LEVEL

Null Hypothesis: MS has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.055178	0.2632
Test critical values:	1% level	-3.571310	
	5% level	-2.922449	
	10% level	-2.599224	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MS)
Method: Least Squares
Date: 08/26/21 Time: 15:35
Sample (adjusted): 1971 2019
Included observations: 49 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MS(-1)	-0.173185	0.084268	-2.055178	0.0454
C	3.073798	1.449683	2.120324	0.0393

R-squared	0.082457	Mean dependent var	0.265342
Adjusted R-squared	0.062935	S.D. dependent var	3.499399
S.E. of regression	3.387492	Akaike info criterion	5.318017
Sum squared resid	539.3299	Schwarz criterion	5.395234
Log likelihood	-128.2914	Hannan-Quinn criter.	5.347313
F-statistic	4.223756	Durbin-Watson stat	1.958020
Prob(F-statistic)	0.045443		

MS@1ST DIFF

Null Hypothesis: D(MS) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.279941	0.0000
Test critical values:	1% level	-3.574446	
	5% level	-2.923780	
	10% level	-2.599925	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MS,2)
Method: Least Squares
Date: 08/26/21 Time: 15:36
Sample (adjusted): 1972 2019
Included observations: 48 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MS(-1))	-1.072042	0.147260	-7.279941	0.0000
C	0.310989	0.515933	0.602771	0.5496

R-squared	0.535342	Mean dependent var	-0.011396
Adjusted R-squared	0.525241	S.D. dependent var	5.168579
S.E. of regression	3.561295	Akaike info criterion	5.418899
Sum squared resid	583.4097	Schwarz criterion	5.496866
Log likelihood	-128.0536	Hannan-Quinn criter.	5.448363
F-statistic	52.99754	Durbin-Watson stat	2.013084
Prob(F-statistic)	0.000000		

GDP@LEVEL

Null Hypothesis: GDP has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.355399	0.9986
Test critical values:	1% level	-3.574446	
	5% level	-2.923780	
	10% level	-2.599925	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(GDP)
Method: Least Squares
Date: 08/26/21 Time: 15:37
Sample (adjusted): 1972 2019
Included observations: 48 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	0.017043	0.012574	1.355399	0.1821
D(GDP(-1))	0.478652	0.137276	3.486775	0.0011
C	5.49E+10	4.04E+11	0.135882	0.8925

R-squared	0.352262	Mean dependent var	1.16E+12
Adjusted R-squared	0.323474	S.D. dependent var	1.64E+12
S.E. of regression	1.35E+12	Akaike info criterion	58.75408
Sum squared resid	8.15E+25	Schwarz criterion	58.87103
Log likelihood	-1407.098	Hannan-Quinn criter.	58.79828
F-statistic	12.23629	Durbin-Watson stat	2.104253
Prob(F-statistic)	0.000057		

GDP@1ST DIFF

Null Hypothesis: D(GDP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.561852	0.0103
Test critical values:	1% level	-3.574446	
	5% level	-2.923780	
	10% level	-2.599925	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP,2)
Method: Least Squares
Date: 08/26/21 Time: 15:37
Sample (adjusted): 1972 2019
Included observations: 48 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-0.430341	0.120819	-3.561852	0.0009
C	4.96E+11	2.42E+11	2.050147	0.0461

R-squared	0.216178	Mean dependent var	-8.33E+09
Adjusted R-squared	0.199138	S.D. dependent var	1.52E+12
S.E. of regression	1.36E+12	Akaike info criterion	58.75243
Sum squared resid	8.48E+25	Schwarz criterion	58.83040
Log likelihood	-1408.058	Hannan-Quinn criter.	58.78189
F-statistic	12.68679	Durbin-Watson stat	2.196255
Prob(F-statistic)	0.000870		

Lag Length for model 1

VAR Lag Order Selection Criteria
Endogenous variables: TBP NEER REER INFL DOP MCU
Exogenous variables: C
Date: 08/26/21 Time: 15:40
Sample: 1970 2019
Included observations: 36

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1711.333	NA	1.10e+34	95.40739	95.67131	95.49951
1	-1560.848	242.4481	1.95e+31	89.04711	90.89455*	89.69192*
2	-1517.885	54.89719*	1.58e+31*	88.66028	92.09124	89.85778
3	-1473.930	41.51281	1.69e+31	88.21835*	93.23283	89.96854

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

Bound test

ARDL Bounds Test
Date: 08/26/21 Time: 16:44
Sample: 1982 2019
Included observations: 38
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	1.322876	5

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Test Equation:
Dependent Variable: D(TBP)
Method: Least Squares
Date: 08/26/21 Time: 16:44
Sample: 1982 2019
Included observations: 38

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NEER)	-87879336	1.01E+08	-0.866030	0.3944
D(REER)	-29703881	29160186	-1.018645	0.3178
D(INFL)	-9818773.	1.43E+08	-0.068691	0.9458
D(DOP)	2.57E+08	2.22E+08	1.158577	0.2572
D(MCU)	-3.91E+08	4.02E+08	-0.973902	0.3391
C	-1.73E+10	1.92E+10	-0.901708	0.3755
NEER(-1)	14958432	26595936	0.562433	0.5786
REER(-1)	-353002.1	23286498	-0.015159	0.9880
INFL(-1)	18725995	1.53E+08	0.122409	0.9035
DOP(-1)	3.17E+08	2.18E+08	1.455531	0.1575
MCU(-1)	2.21E+08	2.43E+08	0.908833	0.3718
TBP(-1)	-0.374705	0.143420	-2.612644	0.0147

R-squared	0.289619	Mean dependent var	1.05E+08
Adjusted R-squared	-0.010927	S.D. dependent var	8.72E+09
S.E. of regression	8.76E+09	Akaike info criterion	48.87753
Sum squared resid	2.00E+21	Schwarz criterion	49.39466
Log likelihood	-916.6731	Hannan-Quinn criter.	49.06152
F-statistic	0.963642	Durbin-Watson stat	1.449235
Prob(F-statistic)	0.500901		

MODEL 1

TBP = F(NEER, REER, INFL, DOP, MCU)

ARDL (SHORT AND LONG RUN ESTIMATE)

ARDL Cointegrating And Long Run Form
Dependent Variable: TBP
Selected Model: ARDL(1, 1, 1, 1, 1, 1)
Date: 08/26/21 Time: 17:22
Sample: 1970 2019
Included observations: 38

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NEER)	-0.085296	0.101811	-0.837786	0.4098
D(REER)	-0.030470	0.029191	-1.043826	0.3062
D(INFL)	-0.009287	0.143160	-0.064869	0.9488
D(DOP)	0.259675	0.222057	1.169408	0.2528
D(MCU)	-0.391284	0.402424	-0.972319	0.3399
CointEq(-1)	-0.373763	0.143723	-2.600584	0.0151

Cointeq = TBP - (0.0396*NEER -0.0011*REER + 0.0572*INFL + 0.8490 *DOP + 0.6022*MCU -46.9908)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NEER	0.039581	0.069776	0.567252	0.5754
REER	-0.001121	0.062382	-0.017977	0.9858
INFL	0.057173	0.412391	0.138638	0.8908
DOP	0.849024	0.591565	1.435218	0.1631
MCU	0.602199	0.623722	0.965493	0.3432
C	-46.990755	51.593478	-0.910789	0.3708

MODEL II

TBP=F(DINT, MS, CPI, GDP, MCU)

DESCRIPTIVE STAT

	TBP	DINT	MS	GDP	INFL	MCU
Mean	11.26907	-1.394516	16.37077	32.55200	18.29492	47.21538
Median	4.610000	1.318497	13.46344	22.75000	12.77549	48.60000
Maximum	45.91000	18.18000	28.62522	72.10000	72.83550	73.30000
Minimum	-6.450000	-65.85715	9.063329	14.30000	3.457650	29.29000
Std. Dev.	13.99102	14.21432	5.845422	18.60485	15.61761	10.51630
Skewness	1.103623	-2.182151	0.574742	1.054859	1.938259	0.061772
Kurtosis	2.925470	10.03608	1.799739	2.575323	5.954505	2.339726
Jarque-Bera	8.738838	142.8200	5.754045	9.648468	49.49269	0.733239
Probability	0.012659	0.000000	0.056302	0.008033	0.000000	0.693073
Sum	484.5700	-69.72582	818.5387	1627.600	914.7461	1841.400
Sum Sq. Dev.	8221.445	9900.297	1674.279	16960.88	11951.58	4202.521
Observations	43	50	50	50	50	39

UNIT ROOT TESTS

DINT@LEVEL

Null Hypothesis: DINT has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.487535	0.0000
Test critical values:	1% level	-3.571310	
	5% level	-2.922449	
	10% level	-2.599224	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DINT)
Method: Least Squares
Date: 08/26/21 Time: 17:45
Sample (adjusted): 1971 2019
Included observations: 49 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DINT(-1)	-0.740536	0.134949	-5.487535	0.0000
C	-0.432481	1.925627	-0.224592	0.8233

R-squared	0.390505	Mean dependent var	0.689627
Adjusted R-squared	0.377537	S.D. dependent var	16.98834
S.E. of regression	13.40318	Akaike info criterion	8.068821
Sum squared resid	8443.323	Schwarz criterion	8.146038
Log likelihood	-195.6861	Hannan-Quinn criter.	8.098117
F-statistic	30.11304	Durbin-Watson stat	1.936676
Prob(F-statistic)	0.000002		

MS@ LEVEL

Null Hypothesis: MS has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.055178	0.2632
Test critical values:	1% level	-3.571310	
	5% level	-2.922449	
	10% level	-2.599224	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MS)
Method: Least Squares
Date: 08/26/21 Time: 17:46
Sample (adjusted): 1971 2019
Included observations: 49 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MS(-1)	-0.173185	0.084268	-2.055178	0.0454
C	3.073798	1.449683	2.120324	0.0393

R-squared	0.082457	Mean dependent var	0.265342
Adjusted R-squared	0.062935	S.D. dependent var	3.499399
S.E. of regression	3.387492	Akaike info criterion	5.318017
Sum squared resid	539.3299	Schwarz criterion	5.395234
Log likelihood	-128.2914	Hannan-Quinn criter.	5.347313
F-statistic	4.223756	Durbin-Watson stat	1.958020
Prob(F-statistic)	0.045443		

MS@1ST DIFF

Null Hypothesis: D(MS) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.279941	0.0000

Test critical values:	1% level	-3.574446
	5% level	-2.923780
	10% level	-2.599925

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MS,2)
Method: Least Squares
Date: 08/26/21 Time: 17:46
Sample (adjusted): 1972 2019
Included observations: 48 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MS(-1))	-1.072042	0.147260	-7.279941	0.0000
C	0.310989	0.515933	0.602771	0.5496

R-squared	0.535342	Mean dependent var	-0.011396
Adjusted R-squared	0.525241	S.D. dependent var	5.168579
S.E. of regression	3.561295	Akaike info criterion	5.418899
Sum squared resid	583.4097	Schwarz criterion	5.496866
Log likelihood	-128.0536	Hannan-Quinn criter.	5.448363
F-statistic	52.99754	Durbin-Watson stat	2.013084
Prob(F-statistic)	0.000000		

BOUND TEST

ARDL Bounds Test
Date: 08/26/21 Time: 17:50
Sample: 1982 2019
Included observations: 38
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	2.696688	5

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Test Equation:
Dependent Variable: D(TBP)
Method: Least Squares
Date: 08/26/21 Time: 17:50
Sample: 1982 2019

Included observations: 38

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DINT)	-0.627122	0.236122	-2.655923	0.0133
D(MS)	2.391742	0.812433	2.943927	0.0067
D(INFL)	-0.214379	0.141670	-1.513229	0.1423
D(GDP)	4.222676	1.769429	2.386462	0.0246
D(MCU)	-0.157914	0.360464	-0.438085	0.6649
C	-9.395726	10.45350	-0.898812	0.3770
DINT(-1)	-0.527656	0.270777	-1.948677	0.0622
MS(-1)	0.290298	0.632222	0.459170	0.6499
INFL(-1)	-0.058462	0.143330	-0.407885	0.6867
GDP(-1)	-0.040719	0.187695	-0.216944	0.8299
MCU(-1)	0.189656	0.224600	0.844416	0.4061
TBP(-1)	-0.570296	0.180909	-3.152398	0.0041

R-squared	0.469775	Mean dependent var	0.105526
Adjusted R-squared	0.245449	S.D. dependent var	8.728570
S.E. of regression	7.582064	Akaike info criterion	7.141537
Sum squared resid	1494.680	Schwarz criterion	7.658670
Log likelihood	-123.6892	Hannan-Quinn criter.	7.325529
F-statistic	2.094161	Durbin-Watson stat	1.754117
Prob(F-statistic)	0.059346		

ARDL (SHORT AND LONG RUN)

ARDL Cointegrating And Long Run Form
Dependent Variable: TBP
Selected Model: ARDL(1, 1, 1, 1, 1, 1)
Date: 08/26/21 Time: 17:52
Sample: 1970 2019
Included observations: 38

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DINT)	-0.627122	0.236122	-2.655923	0.0133
D(MS)	2.391742	0.812433	2.943927	0.0067
D(INFL)	-0.214379	0.141670	-1.513229	0.1423
D(GDP)	4.222676	1.769429	2.386462	0.0246
D(MCU)	-0.157914	0.360464	-0.438085	0.6649
CointEq(-1)	-0.570296	0.180909	-3.152398	0.0041

Cointeq = TBP - (-0.9252*DINT + 0.5090*MS -0.1025*INFL -0.0714*GDP + 0.3326*MCU -16.4752)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.

DINT	-0.925232	0.487068	-1.899597	0.0686
MS	0.509030	1.080933	0.470917	0.6416
INFL	-0.102512	0.249667	-0.410595	0.6847
GDP	-0.071401	0.330909	-0.215771	0.8308
MCU	0.332557	0.415914	0.799581	0.4312
C	-16.475180	18.425864	-0.894133	0.3795

OBJECTIVE THREE: STRUCTURAL VECTOR ERROR CORRECTION MODEL (SVECM)

VARIANCE DECOMPOSITION

Variance Decomposition of TBP: Period	S.E.	TBP	NEER	DINT
1	8.05E+09	100.0000	0.000000	0.000000
		(0.00000)	(0.00000)	(0.00000)
2	1.23E+10	92.91893	6.929036	0.152031
		(6.07130)	(6.03346)	(2.06219)
3	1.44E+10	86.42415	13.15549	0.420352
		(10.1048)	(9.76772)	(3.91159)
4	1.55E+10	83.15848	16.46698	0.374541
		(11.7066)	(11.2443)	(5.13339)
5	1.61E+10	81.60255	18.01120	0.386245
		(12.1373)	(11.5392)	(5.72008)
6	1.65E+10	80.64264	18.91300	0.444358
		(12.2929)	(11.5796)	(6.03108)
7	1.68E+10	79.83868	19.66503	0.496295
		(12.4306)	(11.6673)	(6.37886)
8	1.70E+10	79.06770	20.39049	0.541811
		(12.6445)	(11.8395)	(6.72231)
9	1.71E+10	78.32048	21.08793	0.591592
		(12.9312)	(12.0908)	(7.02149)
10	1.73E+10	77.60086	21.74746	0.651679
		(13.2608)	(12.3650)	(7.24927)

Variance Decomposition of NEER: Period	S.E.	TBP	NEER	DINT
1	15.33040	0.506836	99.49316	0.000000
		(3.86594)	(3.86594)	(0.00000)
2	25.35760	11.25270	88.04418	0.703124
		(8.52155)	(8.77707)	(2.29430)
3	33.23198	19.16885	77.08215	3.748999
		(12.8885)	(13.3985)	(6.03836)
4	39.92237	23.24494	69.97856	6.776507

		(16.0544)	(17.2002)	(9.35908)
5	46.23785	25.29008	65.94010	8.769824
		(18.2004)	(19.9617)	(11.4116)
6	52.67986	26.56339	63.53237	9.904247
		(19.8891)	(21.9041)	(12.3516)
7	59.44813	27.57453	61.83790	10.58757
		(21.3151)	(23.3147)	(12.7887)
8	66.59551	28.45304	60.47942	11.06754
		(22.5428)	(24.3943)	(13.0565)
9	74.15417	29.21002	59.34992	11.44006
		(23.5722)	(25.2763)	(13.3078)
10	82.17430	29.85010	58.41501	11.73489
		(24.4409)	(26.0226)	(13.5214)

Variance Decomposition of DINT: Period	S.E.	TBP	NEER	DINT
1	14.10338	1.359254	0.375984	98.26476
		(5.11939)	(2.97215)	(6.00158)
2	14.50154	1.646943	1.186564	97.16649
		(5.79618)	(4.15174)	(7.09788)
3	14.60312	1.648283	1.255002	97.09671
		(6.17530)	(4.38265)	(7.60445)
4	14.61312	1.647384	1.327017	97.02560
		(7.34501)	(4.32863)	(8.46685)
5	14.63558	1.680116	1.578264	96.74162
		(8.74738)	(4.42441)	(9.76841)
6	14.66605	1.795392	1.836602	96.36801
		(9.79201)	(4.50907)	(10.8003)
7	14.69968	1.946374	2.071190	95.98244
		(10.6598)	(4.58059)	(11.5764)
8	14.73651	2.107554	2.318398	95.57405
		(11.4557)	(4.72335)	(12.2652)
9	14.77875	2.284216	2.608264	95.10752
		(12.2401)	(4.92182)	(12.9455)
10	14.82852	2.488520	2.953138	94.55834
		(13.0481)	(5.21970)	(13.6702)

Cholesky Ordering: TBP NEER DINT
Standard Errors: Monte Carlo (100 repetitions)

VAR Granger causality test

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 08/26/21 Time: 19:43
Sample: 1970 2019
Included observations: 41

Dependent variable: TBP

Excluded	Chi-sq	df	Prob.
NEER	7.546631	2	0.0230
DINT	0.429383	2	0.8068
All	7.551726	4	0.1094

Dependent variable: NEER

Excluded	Chi-sq	df	Prob.
TBP	7.691748	2	0.0214
DINT	2.241812	2	0.3260
All	10.08453	4	0.0390

Dependent variable: DINT

Excluded	Chi-sq	df	Prob.
TBP	0.291174	2	0.8645
NEER	1.006416	2	0.6046
All	2.144963	4	0.7091