

EDUCATION IN ECONOMICS SERIES

NO. 6

FOREIGN EXCHANGE MARKET PRESSURE



CENTRAL BANK OF NIGERIA

RESEARCH DEPARTMENT

2016

Table of Contents

1.0	Introduction	1
2.0	Definition and Concepts of Foreign Exchange Market Pressure	2
2.1	Definition	2
2.2	Related Concepts	3
2.2.1	Foreign Exchange Market and its Participants	3
2.2.2	Foreign Exchange Market Pressure Index	4
2.2.3	Money Market Pressure Index.....	6
2.2.4	Banking Sector Fragility Index (BSFI)	6
3.0	Measures of Foreign Exchange Market Pressure	8
3.1	Computation of Foreign Exchange Market Pressure Index (EMPI)	8
3.1.1	Computation of EMPI using two components.....	9
3.1.2	Computation of EMPI using three components	10
4.0	Causes of Exchange Market Pressure	14
4.1	External Factors	14
4.1.1	Demand Factors.....	14
4.1.2	Supply Factors.....	20
4.2	Domestic Factors.....	21
4.2.1	Demand Factors.....	21
4.2.2	Supply Factors.....	22
5.0	Effects of Foreign Exchange Market Pressure on Key Macroeconomic Variables	24
5.1	Exchange Rate	24
5.2	Gross Domestic Product and Growth	24
5.3	Inflation	25

5.4	Investment.....	26
6.0	Management of Exchange Market Pressure	27
6.1	Rationale for Management of Exchange Market Pressure.	27
6.2	The Role of the Monetary Authority	29
6.2.1	Indirect Foreign Exchange Intervention	30
6.2.2	Direct Foreign Exchange Intervention	31
6.3	The Role of the Fiscal Authority.....	33
	Bibliography.....	35

List of Figures

Figure 1:	Demand and Supply Gap in the Nigerian Foreign Exchange Market, 2008 – 2014 (US' Million)	14
Figure 2:	Episodes of Exchange Market Pressure in Nigeria using a 2-Component (Spot Exchange Rate and Foreign Reserves Holdings) and Equal Weighting Scheme	15
Figure 3:	Episodes of Exchange Market Pressure in Nigeria using a 2-Component (Spot Exchange Rate and Foreign Reserves Holdings) and Precision Weighting Scheme	16
Figure 4:	Episodes of Exchange Market Pressure in Nigeria using a 3-Component (Exchange Rate, Interest Rate and Foreign Reserves) and Precision Weighting Scheme.....	17

Foreign Exchange Market Pressure¹

1.0 Introduction

This issue of the Educational Series in Economics focuses on exchange market pressure with the objective of explaining concepts on the subject matter in relation to developments in exchange rate movement in the foreign exchange market that has implications for the management of the economy.

The causes, measurements and the effects of exchange market pressure on the macroeconomy are also explained. As an educational resource material, the technical details are explained in a clear and simple language for ease of comprehension.

Following this introduction, Section 2 defines concepts relating to exchange market pressure. Section 3 focuses on the measures of the variable, while Section 4 explains its causes. The effects on key macroeconomic variables are discussed in section 5, while section 6 highlights measures for containing exchange market pressure. The paper also contains figures, and suggested materials for further reading to enhance the reader's understanding of the subject matter.

¹ Contribution to this series are: Adamgbe, E. T., Yilkudi, D. J., Adigun, M. A., Evbuomwan, O. O. and Obiezue, T. O.

2.0 Definition and Concepts of Foreign Exchange Market Pressure

2.1 Definition

Pressure in the foreign exchange market is related to exchange rate depreciation under a flexible exchange rate regime rather than a fixed regime. It is an index associated with movements in two key external sector variables - international reserve holdings and the nominal exchange rate, in some cases money supply. A country's exchange rate can be put under pressure when the demand for foreign currency exceeds its supply. Girton and Roper (1977) viewed EMP as the sum of the changes in exchange rate and international reserves, while Weymark (1995) referred to it as the change in exchange rate required to eliminate excess demand for the currency without intervention in the foreign exchange market. An extension of this definition can be found in Eichengreen et al. (1996) which stated that the EMP is a weighted average of the changes in exchange rate, interest rate and foreign reserves. This definition underscores the role of liquidity in the interaction between domestic money and foreign exchange markets. In the economic literature, market pressure is computed as an index of a set of key market indicators such as interest rate, exchange rate and international reserves.

2.2 Related Concepts

2.2.1 Foreign Exchange Market and its Participants

The foreign exchange market is a market where participants trade in one currency for another. Its importance in the world economy cannot be over-emphasised, as it affects: employment and output through real exchange rates; inflation through commodity prices and the cost of imports; and international capital flows through the returns and risks of different assets.

In Nigeria, the foreign exchange market consists of two segments: the interbank; and the retail (client) segments. The following are the participants in the market:

- **Central Banks** - These are the largest and most influential participants in the foreign exchange market. Central banks keep foreign reserves to intervene in the foreign exchange market as a measure to safeguard the international value of the domestic currency.
- **Banks and Other Financial Institutions** - Banks and other financial institutions are another large group of participants in the foreign exchange market. Banks, on one hand, trade with each other (i.e. interbank transactions) usually via electronic trading platforms and brokering systems such as Bloomberg and Reuters terminals. They act as dealers because they buy (sell) currencies at bid (offer) prices. Other financial

institutions such as Bureaux-De-Change (BDCs), on the other hand, supply and purchase foreign currency for small-scale transactions (e.g. Personal and Basic Travel Allowances).

- **Speculators** - Speculators buy and hold currencies with a view to making profit by taking advantage of fluctuations in exchange rate, through arbitrage. This is when they buy at a lower price in a market and sell at a higher price in another market.
- **Retailers** - Retailers include individuals and companies involved in regular trading of foreign currencies for profit. They, however, do not play a major role in determining the trend of an exchange rate.
- These participants play important roles in the direction of currency movement in the foreign exchange market. The market remains the largest market globally with a daily turnover of \$5.1 trillion (Bloomberg, 2016). In recent times, however, the market has undergone transformation with the emergence of high-frequency trading through advanced electronic trading platforms.

2.2.2 Foreign Exchange Market Pressure Index

The Exchange Market Pressure Index (EMPI) is measured as the sum of annualised changes in exchange rate (Δe_t) and external reserves scaled as a ratio of reserve money, EMP index is: $EMP_t = \Delta e_t + \Delta r_t$

Where; Δ is year-on-year change operator,
 e_t is exchange rate,
 r_t is external reserves as a ratio of reserve money
 $(r_t = \Delta R_t / M_{t-12})$.

The exchange rate variable is the monthly average nominal exchange rate, R_t is the external reserves and M_{t-12} is the 12 months lag of reserve money. The index shows the money gap caused by the high demand or supply of the domestic currency, which compels monetary authorities to take measures to moderate, undesirable appreciation or depreciation of the exchange rate.

Weymark (1995) extended the definition of the EMP index developed by Girton and Roper (1977) by incorporating interest rate changes. The index by Weymark (1995) is defined as:

$$EMP_t = \Delta e_t - B \Delta r_t + y \Delta i_t$$

Where; i_t is the interest rate; and
 y is the reserve-to-deposit ratio

This index gives us a picture of what the exchange rate change would have been if the Bank did not intervene in the exchange market or increase interest rates to defend the currency. It shows that depreciation of domestic currency, loss of international reserves and increase in domestic interest rates will increase the EMP index.

2.2.3 Money Market Pressure Index

Money market pressure index (MPI) is a measure of liquidity conditions in the banking sector related to the exchange market pressure through the short-term interest rate. Pressure on the domestic money market liquidity has implication on the foreign exchange market through lower interest rates allow speculators to increase their presence in the foreign exchange market. Von Hagen and Ho (2007) proposed the MPI as:

$$\text{MPI} = \frac{\Delta Y_t}{\sigma \Delta y} + \frac{\Delta r_t}{\sigma \Delta r}$$

Where: Δ is the difference operator;
 y is the ratio of central bank reserves to total bank deposits;
 r is the short-term interest rate; and
 $\sigma \Delta y$ and $\sigma \Delta r$ are the standard deviations of y and r , respectively.

In identifying a banking crisis, they applied two criteria: (i) the MPI needs to exceed the 98.5 percentile of the sample distribution for the country under consideration; and (ii) the increase of the MPI from the previous period should at least be 5.0 per cent.

2.2.4 Banking Sector Fragility Index (BSFI)

The BSFI is the weighted average of net domestic credits to the private sector, total bank deposit, and foreign liabilities

of banks adjusted for their means and scaled by the size of the deviations from the means. The index is commonly used to check the ability of banks to trade among themselves and participate in the foreign exchange market. This is because the activities of banks are as affected by the unanticipated movements in exchange rate (exchange rate risk, that is, banks' increasing unprotected foreign currency liabilities). Thus, an increase in the foreign liabilities of banks connotes upsurge in risk profile, which implies that the banking sector is progressively becoming weaker and more likely to be detrimental to the country's foreign assets position , hence, more pressure on the foreign exchange market.

3.0 Measures of Foreign Exchange Market Pressure

3.1 Computation of Foreign Exchange Market Pressure Index (EMPI)

There exist two main elements of an EMPI: the components and the weights used in its measurement. The common components of the EMPI measure include exchange rate, changes in reserves and interest rate. This is because movements in these components provide information on the status (increasing or decreasing in value) of the domestic currency relative to the foreign currency and how the monetary authority reacts using reserves and interest rates to contain such movements.

In computing an index for exchange market pressure, some scholars make use of two out of the three components (exchange rate and reserves) while others use all three. The argument clearly is that the components of an exchange market pressure index depend on the structure of the economy and the exchange rate regime adopted. For economies practising fixed exchange rate regimes, two components (changes in exchange rate and reserve holdings) are considered. For economies practicing flexible exchange rate, three components (changes in exchange rate, interest rate differential and changes in reserve holdings are used).

Another issue to consider is the assignment of weights to the components. The common weighting schemes adopted by scholars include the equal weighting scheme and the precision weighting scheme (or variance weighting scheme). The former implies that equal weights are assigned to the components used in computing EMPI, while the latter explains that weights are derived by taking the inverse proportion of the variances of selected components.

The precision is employed to prevent the more volatile components from dominating the index value. Focus should be on the components rather than the weights in that they provide useful insights into the pressures in the market. In addition, having the right components is crucial for the meaningful interpretation of the weights.

3.1.1 Computation of EMPI using two components

The first effort at computing an EMPI is by Girton and Roper (1977), who developed an index combining exchange rate depreciation and changes in reserves. They made use of a monetary model and assigned equal weights to both variables.

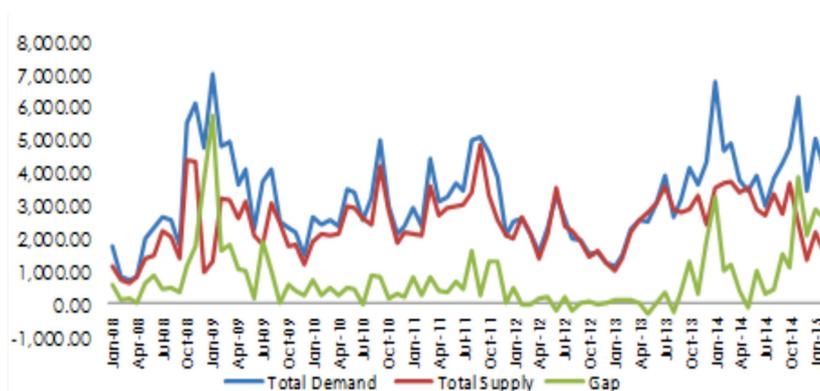
Therefore, the exchange market pressure index (EMPI) gives us a relative change in exchange rate and foreign exchangereserves. Tanner (2001) modified this computation by making use of ratio of external reserves and base money instead of external reserve level data.

3.1.2 Computation of EMPI using three components

Eichengreen et al. (1994) computed EMPI using interest rates, given that they are the response tools of the monetary authorities' to contain pressure and therefore, must be included. In addition, he assigned different weights to various components, arguing that the relative fluctuation of one component might dominate the movement of the EMPI.

The EMPI for a country at a particular point in time is therefore a weighted sum of spot exchange rate changes, relative interest rate change and relative foreign exchange reserve changes.

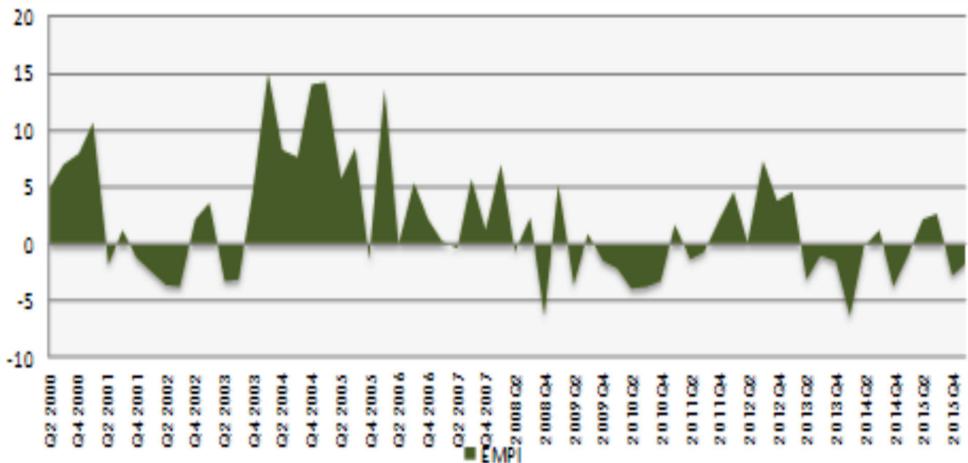
Figure 1: Demand and Supply Gap in the Nigerian Foreign Exchange Market, 2008 – 2014 (US\$ Million)



Source: CBN Statistical Database

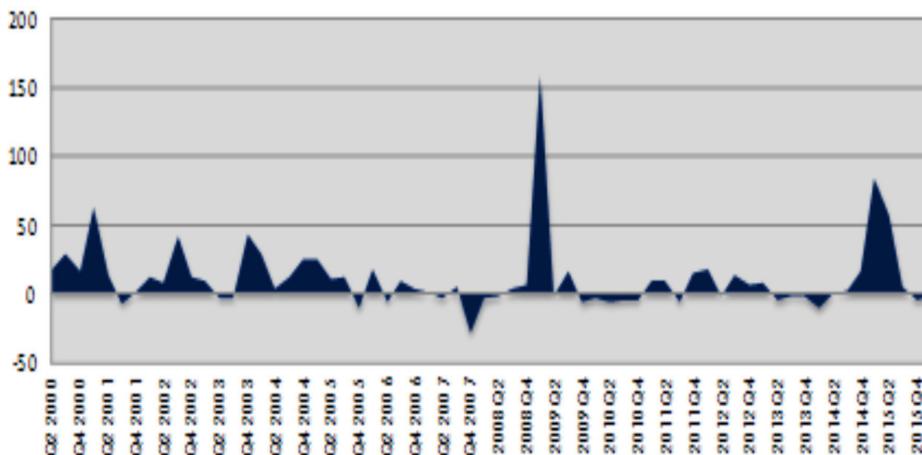
The gap in the Nigerian foreign exchange market is computed simply by deducting total supply for foreign exchange from total demand of foreign exchange. Figure 1 revealed that the gap grew during the global financial crisis (2007 – 2009), but was contained by the exchange rate management policies of the CBN to the extent of a negative gap in March, June, August and November 2012 as well as May and August 2013. The gap widened from July 2014 due to the fall in oil prices in the international market which brought about foreign exchange shortages.

Figure 2: Episodes of Exchange Market Pressure in Nigeria using a 2-Component (Spot Exchange Rate and Foreign Reserves Holdings) and Equal Weighting Scheme



Source: CBN Statistical Database

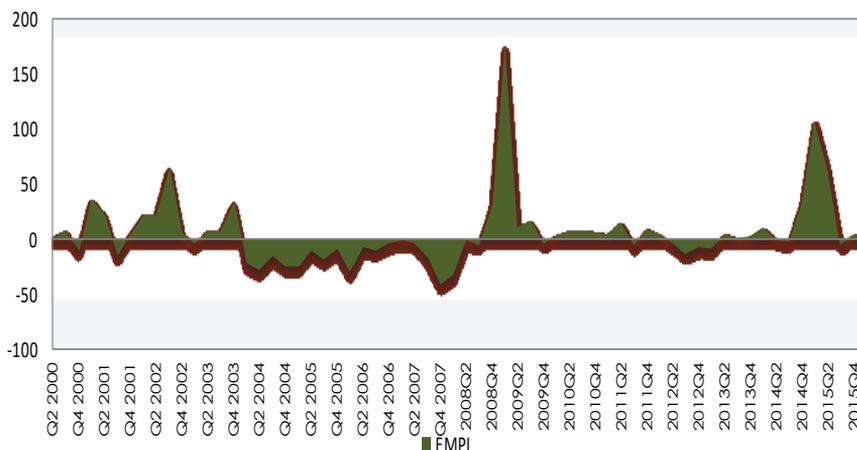
Figure 3: Episodes of Exchange Market Pressure in Nigeria using a 2-Component (Spot Exchange Rate and Foreign Reserves Holdings) and Precision Weighting Scheme



Source: CBN Statistical Database

In figures 2 and 3, the EMP was computed using the same components (spot exchange rate and foreign reserve holdings) but different weighting schemes (equal and precision) as indicated. Figure 2 makes use of equal weights and shows that the Nigerian economy experienced 3 major episodes of exchange market pressure: 2000 to 2001; 2003 to 2008 and 2011 to 2013. Figure 3, on the other hand, makes use of the precision weighting scheme and indicates two major episodes: 2008 to 2009 and 2014 to 2015.

Figure 4: Episodes of Exchange Market Pressure in Nigeria using a 3-Component (Exchange Rate, Interest Rate and Foreign Reserves) and Precision Weighting Scheme



Source: CBN Statistical Database

Figure 4 indicates that Nigeria faced intense exchange market pressure during the global financial crisis of 2007 – 2009. This pressure, although of great magnitude did not last. The economy also faced exchange market pressure due to the recent sharp fall in oil prices in the third quarter of 2014.

4.0 Causes of Exchange Market Pressure

This section discusses the factors that cause pressure in the foreign exchange market, which are classified into: external and domestic factors.

4.1 External Factors

4.1.1 Demand Factors

i. Interest rate

Interest rate influences exchange market pressure through the demand for money and investment channels. Specifically, this can be explained through the opportunity cost of holding money and investors' appetite for domestic and international investment. Increase in foreign interest rate would lead to reduced demand for domestic currency as residents of a country move their monies abroad to benefit from a higher interest rate and earn income on their investments. Also, foreign firms will recall their capital for higher returns and also for safety. This would result to capital outflow on the investment side. This would mount pressure in the value of the domestic currency (due to the increasing demand for foreign currency), resulting to the decrease in its value relative to that of the foreign currency. For example, increase in the US Fed policy rate in December 2015, brought about sudden capital

outflow from emerging economies, including Nigeria as foreign investors divested to invest abroad.

ii. Real Exchange Rate Overvaluation

EMP usually occurs in a fixed exchange rate regime as the government maintains an overvalued domestic currency, where the market value is less than the intrinsic value. This is worsened by speculators' desire to profit from trading in foreign currency. When short-term investors are convinced that the current exchange rate is overvalued and cannot be defended by central bank, they mount pressure on the exchange market by converting their domestic currency to foreign currencies at the overvalued exchange rate which they sell later at a higher rate.

iii. The Current Account Position

Current account measures the receipts and payments of foreign exchange from the export and import of goods and services, respectively. High receipts increases the volume of reserves, this happens during periods of high exports – export booms and reduces during periods when export falls. The current account balance refers to the difference between the value of a country's exports and imports of goods and services over a particular period. When the current account is in deficit (i.e. when imports of

goods and services exceed exports of goods and services), it puts pressure on the exchange rate due to the reduction in export revenue that reduces the ability of the central bank to manage the exchange rate. The current account deficit is unsustainable if it cannot be financed by drawing down on external reserves, through borrowing, or through increased exports of goods and services. When this happens, the exchange rate would depreciate as economic agents increase demand in the foreign exchange market to purchase the available scarce exchange.

iv. Domestic Inflation

Changes in the general price level influences exchange rate movement. In particular, higher rate of inflation decreases the real exchange rate, causing a fall in the international competitiveness of exports, thereby, reduces foreign exchange earnings, leading to lower accretion to reserves, hence, pressure on the exchange rate. High inflation rates imply that domestic goods become more expensive than foreign goods, thus, making them less competitive. Since foreign goods become cheaper, demand for foreign currency will increase thereby mounting pressure on the foreign exchange market.

v. Changes in a Country's Income

A country's income determines, largely, the level of its economic activities, such as the demand for imports. When a country's income rises, demand for imports also rises. Thus, the demand for foreign currency to pay for imports rise, increasing the pressure in the foreign exchange market.

vi. Monetary and Fiscal Policies

Monetary and fiscal policies influence economic activities. An expansionary monetary policy such as a cut in the monetary policy rate increases access to credit and the appetite for consumer spending. For an import dependent country, more liquidity means more demand for foreign exchange and this puts pressure on the foreign exchange market. Thus, increased demand for imports has the effect of putting pressure on the foreign exchange market. However, a policy measure such as the prohibition of the 41 items from accessing foreign exchange at the interbank segment in 2015 by the CBN will make import (particularly on the prohibited items) more expensive. This reduces the quantity of imports demanded, and eases the pressure on the foreign exchange market.

Similarly, an expansionary fiscal policy such as reduction in taxes increases consumer and investment spending including demand for goods

used for further production (domestic and foreign). The resultant increase for foreign exchange exerts pressure on the exchange rate.

vii. Speculation

Currency speculation is the act of buying and holding of a currency to be sold at a later date for a profit. This act can be carried out by domestic or foreign investors. Speculative attack on the value of a currency results in huge depreciation of the currency or forces the central bank to either deplete its external reserves in a bid to defend the currency or raise domestic interest rates in order to attract capital infow. If investors believe foreign reserves are inadequate for the central bank to manage the exchange rate, they may sell local currency assets for dollars to be safe, or even borrow local currency with the expectation of paying it back later at a cheaper rate, an operation known as short selling. This occurred during the Asian financial crisis of 1997, Thailand was forced to move from a currency peg to a flexible exchange rate regime due to lack of foreign currency to contain speculative attacks on its currency - the Baht.

viii. Contagion Effect

Contagion refers to the spread of economic booms or crises from one country to another.

Usually these countries may be connected through trade or financial markets. Exchange market pressure, particularly from speculative attacks on one domestic currency might affect interlinked economies. The Asian financial crisis, which led to the collapse of the Thai Baht later spread to other East Asian countries (Indonesia and South Korea), Russia, and Latin American countries through trade and financial channels, ultimately resulting to intense exchange market pressures in these countries.

Contagion effect through the trade channel is simply explained as when one country devalues its currency in response to an attack. This would result to a negative impact on the current account balances of its trading partners, making them more vulnerable. Contagion through the financial channel occurs via the financial markets. This is panic sales of assets in an affected country which lead investors to take money out of the economy to cover their losses. A financial panic in one country may change some investors' beliefs about the financial health of a country with similar characteristics, causing other investors to withdraw capital for fear of a run on the financial system.

4.1.2 Supply Factors

i. Capital Reversal

Capital reversal refers to a sudden stop in capital flows. Capital reversals sometimes arise due to the existence of more attractive investments in foreign countries relative to those available in the domestic economy. It may also arise from the loss of confidence in the financial markets of a country by international investors as the banking sector balance sheet is weakened. Since it is characterised by sudden and huge portfolio outflow, it exacerbates exchange market pressure.

ii. Changes in Domestic Credit

In countries that rely heavily on imports, an excess domestic supply of money or credit will cause the exchange rate to depreciate, through increased demand for foreign currency for the purpose of paying for imports. This results to the depletion of foreign reserves and also exacerbates foreign exchange market pressure. Under a fixed exchange rate regime, changes in domestic credit adjust through changes in reserves and changes in exchange rate under a flexible exchange rate.²

² This is based on the monetary approach to balance of payments

4.2 Domestic Factors

4.2.1 Demand Factors

i. Import Dependence

A high degree of import dependence exposes a country to exchange rate pressure as its foreign exchange reserves may rapidly deplete. For example, in Nigeria, before the exclusion of 41 items from accessing foreign exchange at the official source, the monthly average import bill stood at ₦917.6 billion. This depleted the foreign exchange reserves from about US\$37.3 billion at end-June 2014 to US\$27.2 billion at end-June 2016.

ii. Foreign Debt

Foreign debt repayment (principal and interest) can be a drain on a country's foreign reserves (especially when it is unsustainable), thereby limiting the central bank's ability to maintain a stable exchange rate and reduce pressure on the exchange market. This is particularly for countries where the repayment of foreign debt is unsustainable. For instance, the main causes of the 1994 Mexican Peso crisis included large trade deficits (financed by short-term capital inflow), the composition of public debt which was made up of external debt (dollar-dominated paper) and the tightening of monetary policy in the U.S. The constellation of these factors caused the central bank to devalue the peso

on December 20, 1994, which resulted to foreign investors taking their investment out of Mexico.

iii. Interest Rate

The influence of domestic interest rate on exchange market pressure is two-sided. A decrease in interest rate makes domestic investment relatively less attractive to foreign investors. This results to capital flight and exchange rate depreciation. The higher the exchange rate depreciation, the more intense exchange market pressure becomes. On the other hand, increase in interest rate attracts foreign exchange inflow and consequently eases EMP.

4.2.2 Supply Factors

i. Political Stability and Security

The state of a country's political and security situation influences the currency and exchange market pressure. These factors lead to deterioration in the investment climate and reduction in foreign direct investment. For instance, in Nigeria, a number of investors fled the country due to insurgency and political uncertainty. This may have been due to fact that policies put in place by the present government may be changed by the incoming government. It may also be explained by the loss of confidence in the present government to provide security of assets in places with unrest.

ii. Commodity Prices

For resource-rich countries, movement in commodity prices, majorly at the international market as in the case of prices of crude oil can affect foreign exchange earnings either positively or negatively. If the prices of commodities exported by these countries rise the earnings of such a country increase and vice versa. In the case of Nigeria, oil is the main source of foreign exchange earnings and government revenue, accounting for about 70.0 per cent of both. A fall in oil prices reduces foreign exchange receipts, thereby, mounting severe pressure on the foreign exchange market. This would lead to a fall in foreign reserve build-up, depreciating the exchange rate and ushering EMP. As oil price fell from a peak of US\$114/barrel in July 2014 to US\$33/barrel in January 2016, the country's foreign exchange market suffered great pressure from round-tripping and speculative attacks from operators in the foreign exchange market.

5.0 Effects of Foreign Exchange Market Pressure on Key Macroeconomic Variables

Intense and prolonged exchange market pressure has effect on the macro-economy subject to the performance of an economy, the exchange rate regime, investors' expectations and timely information.

5.1 Exchange Rate

When EMPI is attributed to massive capital outflow as in the case of risky currencies, the currency of the domestic economy is expected to fall in value (depreciate) demand for foreign currency increases. However, if EMP is attributed to massive capital inflow as in the case of safe haven currencies³, the currency of the domestic economy is expected to rise in value (appreciate) due to increased demand for domestic currency and reduced demand for foreign currency.

5.2 Gross Domestic Product and Growth

With reference to expenditure side, output comprise: consumption, investment, government operations and net exports (export minus import). EMP may have positive or

³ Safe haven currencies refer to any globally traded currency that serves as a reliable and stable store of value. It may also be referred to as hard or strong currency. These currencies are expected to retain their value or even increase in value in times of market turbulence. Safe havens are sought after by investors to limit their exposure to losses in the event of market downturns. Examples of such currencies include the U.S. dollar, the Swiss franc and the Japanese yen.

negative effects on economic growth depending on the workings of the economy.

When EMP arises as a result of massive capital outflow, exports of an economy becomes relatively cheaper, thereby improving its competitiveness in the international market. Imports, on the other hand, become more expensive for domestic consumers. In other words, EMP helps to increase the demand for the country's exports and switches demand towards domestically produced goods thereby reducing imports.

5.3 Inflation

EMP affects inflation through the exchange rate channel. Taking a scenario where a surge in capital inflow leads to nominal exchange rate appreciation, EMP would lead to low inflation as imports are perceived to be less expensive. If EMP occurs when foreign investors repatriate their currencies (capital reversal) or when they stop bringing in their currencies suddenly (sudden stops), the foreign exchange market may come under pressure depreciating the domestic currency. If the country has a strong export sector, competitiveness of export goods may improve. However, a high import demand would lead to a transfer of foreign prices to the domestic economy worsening the value of the domestic currency. This situation where we have to depend on which size of export or import is bigger

in finding out what happens to the exchange rate is the Marshall Lerner Condition.

5.4 Investment

EMP influences gross domestic investment and foreign investment through the capital flows channel. It leads to sudden changes in the prices of assets which in turn poses a threat to financial stability of the economy. Capital flows may comprise short-term portfolio flows and long-term foreign direct investment. External global factors (such as risk appetite, global liquidity, monetary policy stance of advanced economies, (such as the U.S., U.K., Japan and the Euro area), financial crises, and commodity prices), mobility of capital and the exchange rate regime adopted determine the degree to which EMP may affect domestic investment.

When EMP arises as a result of massive capital outflow, foreign investment reduces, particularly portfolio investment which is more liquid and can be moved faster than direct investment. This phenomenon, referred to as capital reversals, was the case in advanced economies during the global financial crisis of 2007 – 09 when foreign investors were uncertain about the stability of the financial markets, thus moved their investments out of these countries to emerging economies with less risky investment climates. Alternatively, when capital inflow in terms of portfolio and direct investment results to EMP, foreign investment

increases. The existence of capital controls might limit the effect EMP might have on the investment as in the case of China.

6.0 Management of Exchange Market Pressure

6.1 Rationale for Management of Exchange Market Pressure

In a floating exchange rate system, the exchange rate is the rate that equates the market demand and supply for currency in the foreign exchange market. In a free market based economy, the government does not necessarily play any role in the determination of the exchange rate. Occasionally, however, when there is intense pressure (EMP) in the market, reflecting persistent depreciation of the domestic currency, government may need to take actions (i.e. intervene) to lower the exchange rate. Through the intervention, the government intends to prevent the negative impact of intense depreciation of the domestic currency on the overall economy. Hence, governments all over the world have paid increasing attention to the development of appropriate early warning signals to effectively manage the EMP and ensure overall macro-economic stability.

One of the important motivations for managing EMP is to stabilise fluctuations in the exchange rate. Future exchange

rate affects returns on international investments and is, therefore, critical to the profitability of an international trade or investment deal. Traders and investors are faced with great uncertainty about profitability of transactions and find it more difficult to engage in transactions when the exchange rate changes rapidly. This is because frequent changes in exchange rate may impact negatively on the desire to invest. Governments and central banks are thus, occasionally under pressure to take actions in periods of rapid depreciation or appreciation to prevent exchange rate instability and facilitate steady trade and investment.

Another important reason why authorities manage EMP is to address the challenges of deterioration in a country's trade deficit. Trade or current account deficits may increase suddenly and sharply where a country's exchange rate appreciates significantly, a phenomenon which makes foreign goods and services cheaper, relatively to domestic merchandise. The relative price difference ultimately stimulates imports and reduces exports. Hence, where significant appreciation causes trade deficit that is big enough to be viewed as a problem, authorities find it imperative to influence appropriate adjustment in the exchange rate.

Overall, authorities have taken up the management of EMP with the main objective of avoiding currency crisis and slow growth associated with short-term position investment

which may arise due to intense exchange market pressure. Specifically, by efficiently managing the EMP, authorities:

Reduce the possible effect that frequent changes in exchange rate may have on prices of goods and services in the local market by ensuring that the exchange rate is appropriately determined by demand and supply;⁴

Give the populace an idea of what policy government will adopt and implement in the future on monetary and exchange rate policies;

Control wrong movement in macroeconomic variables like exchange rate, interest rate, among others, that could be detrimental to economic progress; and

Guard against the activities of people who buy and sell foreign exchange so that they can hide it and add prices to make profit.⁵

6.2 The Role of the Monetary Authority

The EMP is a monetary phenomenon. Hence, the central bank, as the monetary authority, is best suited to initiate and implement policies to manage the EMP. Since EMP arises either as a result of excess demand or excess supply of foreign exchange in the money market, it is disequilibrium. There is need for appropriate action by the authority to restore equilibrium. In this regard, central

⁴ To limit the effects of exchange rate volatility on domestic prices and inflation

⁵ Speculative activities

banks have been at the fore front of government activities to manage exchange market pressure, mainly, through actions (interventions) that impact supply or demand in the market and ultimately influence the exchange rate. Interventions by central banks to influence the exchange rate could be through either the direct or indirect method.

6.2.1 Indirect Foreign Exchange Intervention

The indirect method of intervention, which is mainly about changes in the domestic money supply, focuses on the use of traditional instruments of monetary policy for stabilization purposes. Under this method, the central bank raises or lowers the exchange rate through changes in domestic money supply. A form of the indirect intervention transmits from open market operations to change the domestic money supply to changes in domestic interest rates which cause changes in exchange rates through the impact on rates of returns. On the other hand, the central bank may initiate the process through a change in the domestic interest rate which causes a change in the money supply, asset prices and rate of return on assets. Primarily, increase in interest rate makes domestic investment more attractive and encourages inflow of foreign exchange. Reduced domestic interest rate makes domestic investment less attractive and discourages inflow of foreign investment. Ultimately, the change in interest rate or money supply sets off a chain of events through the transmission mechanism

leading to change in the exchange rate. Thus, this method may take several periods for the effect on exchange rates to be realized. In this regard, increase in the domestic money supply will cause depreciation, while a decrease in the money supply will cause appreciation of the domestic currency.

6.2.2 Direct Foreign Exchange Intervention

The direct method of intervention focuses on direct purchases and sales of foreign currency by the monetary authority. Intervention in this instance involves the participation by the central bank in the foreign exchange market to supply or demand for foreign exchange and influence the automatic price mechanism of the market. It is the most obvious and direct way through which central banks influences the exchange rate. In the period of rapid appreciation of the domestic currency, the central bank sells domestic currency in exchange for foreign currency to increase the supply of the domestic currency causing its depreciation. However, when the domestic currency depreciates in value, the central bank sells foreign currency in exchange for domestic currency to increase supply of the foreign currency in the market. The increased demand for the domestic currency will raise the value and cause its appreciation. The ability of a central bank to intervene is however limited by the stock of its foreign currency

otherwise its foreign exchange reserves. Interventions by the central bank could either be unsterilised or sterilised.

Sterilised Intervention

Intervention by the central bank means the bank buy or sell foreign currency in the market and correspondingly release or withdraw domestic currency in the market. This implies that the first effect of central bank's intervention is the change in the bank's assets denominated in foreign currency⁶ and money supply. Foreign exchange intervention by a central bank is sterilised when the Bank takes an offsetting action after the purchase or sale of foreign assets to neutralize the change in money supply. In the first instance, when central bank purchases foreign currency/assets, it pays domestic currency to commercial banks. This leads to increase in commercial bank deposit with the central bank and ultimately increase domestic money supply. The monetary authority then offsets the increase in money supply by selling domestic government securities to mop up the additional liquidity arising from increase money supply.

On the other hand, where the intervention involved selling of foreign currency denominated securities in exchange for domestic currency, the action reduces commercial banks' deposit and money supply. The central bank then

⁶ Change in net foreign assets

buys domestic government securities and pay domestic currency to increase commercial bank's deposit/liquidity. The resulting increase in money supply neutralizes the initial liquidity withdrawal/squeeze caused by the intervention. Overall, under the sterilised intervention, every change in the asset side is replicated in change in liabilities through corresponding increase or decrease in the domestic money supply. This way the central bank is able to reduce EMP and at the same time avoid threat to other monetary and price stability objectives.

Unsterilised Intervention

In the case of unsterilised intervention the central bank does not sell or buy domestic securities to cause change in money supply. Unsterilized intervention therefore leads to changes in the monetary liabilities of the central bank in which case the Bank does not take any offsetting action to relieve the increase or decrease in money supply that followed an intervention.

6.3 The Role of the Fiscal Authority

The central governments play supporting role in the formulation and implementation of appropriate policies to prevent or moderate EMP. When the domestic currency depreciates due to demand pressure/supply shortage, the central government may resort to external borrowing or disposal of its foreign assets to increase the supply of

foreign exchange. The inflow from such borrowing or sale of foreign assets is added to the foreign reserves which can ultimately be released through direct intervention to increase supply of foreign currency and moderate EMP. To curtail excess demand, the government may adopt measures such as importation ban or restrict access to supply of foreign exchange for certain items to reduce the demand for foreign exchange. The government may also introduce policies to facilitate investment in domestic assets by foreign investors. Conversely, in times of currency appreciation and where the objective is to reduce excess supply of foreign exchange, the government may introduce policies to reduce bottlenecks and facilitate access to foreign investment channels by domestic investors.

Bibliography

- Arize, A. C., Osang, T. & Slottje, D. J. (2004). Exchange Rate Volatility in Latin America and its Impact on Foreign Trade. Texas A&M University, Texas: Mimeo, College of Business and Technology.
- Chaudhary, M.A. & Shabbir, G. (2004). The Impact of Domestic Credit, Deficit and Exchange Rate Regimes on Foreign Reserves of Pakistan, *Pakistan Economic and Social Review*, Vol. 42, No. ½, pp. 1 – 20.
- Eichengreen, B., Rose, A. K. & Wyplosz, C. (1996). Contagious Currency Crises . Cambridge, Massachusetts, USA.: National Bureau of Economic Research; NBER Working Paper No. 5681.,.
- Girton, L. & Roper, D. (1977). A Monetary Model of Exchange Market Pressure Applied to the Postwar Canadian Experience. *American Economic Review*; Vol. 67, No. 4 , 537-548.
- Gustavo, A., & Rui, C. M. (2016). The Cost of Foreign Exchange Intervention: Concepts and Measurement. IMF Working Paper .
- Heriqbaldi, U. (2012). Exchange Market Pressure in Indonesia: A Univariate Markov Switching Analysis. *Asian Economic and Financial Review*, Vol. 2, No. 5, 603-616.
- Investopedia (2016). Market Participants. Retrieved June 2016, from Investopedia, located at <http://www.investopedia.com>

investopedia.com/walkthrough/forex/beginner/level2/market-participants.aspx

Kibritcioglu, A. (2003). Monitoring Banking Sector Fragility, *Arab Bank Review*, Vol. 5, No. 2, pp. 51-66.

Kim, I. (1985). Exchange Market Pressure in Korea: An Application of the Girton-Roper Monetary Model, *Journal of Money, Credit and Banking*, Vol. 17, No. 2, pp. 258-263

Mete, F. (2009). Determinants of Exchange Market Pressure in Turkey: An Econometric Investigation. *Emerging Markets Finance & Trade*, Vol. 45, No. 2, 65–81.

Mussa, M. (1981). The role of official intervention . Group of Thirty Occasional Papers No. 6, Group of Thirty, New York.

Roper, D., & Turnovsky, S. J. (1980). Optimal Exchange Market Intervention in a Simple Stochastic Macro model. *Canadian Journal of Economics* ,Vol.13, 296-309.

Sarno, L., & Taylor, M. (2001). Official intervention in the foreign exchange market: is it effective and if so how does it work? . *Journal of Economic Literature* XXXIX, 839–868.

Tanner, E. (2000). Exchange Market Pressure and Monetary Policy: Asia and Latin America in the 1990s . *IMF Staff Papers*, Vol. 47, No. 3.

- Taylor, M. (1995). The economics of exchange rates. *Journal of Economic Literature* 83(1), 13–47.
- Von Hagen, J., & Ho, T. (2007). Money Market Pressure and the Determinants of Banking Crises. *Journal of Money, Credit, and Banking*, Vol.39 (5), 1037-66.
- Weymark, D. (1995). Estimating Exchange Market Pressure and the Degree of Exchange Market Intervention for Canada. *Journal of International Economics*, Vol.39, 273-295.
- Xiaohui, L., & Jing, Z. (2009). RMB Exchange Market Pressure and Central Bank Exchange Market Intervention. *China & World Economy*.

