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ANALYSIS OF PARALLEL CURRENCY MARKET PREMIUM AND MACROECONOMIC PERFORMANCE IN NIGERIA: STRUCTURAL AUTOREGRESSIVE APPROACH (SVAR)

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ABSTRACT

The paper investigates the relationship between Parallel Currency Market Premium (PCMP) and macroeconomic variables (such as Inflation, Interest Rate and the growth rate of Gross Domestic Product) in Nigeria. Annual secondary data covering the period 1986-2015 and were obtained from the World Development Indicators (WDI) published by the World Bank and Statistical Bulletin published by the Central Bank of Nigeria (CBN). Annual data on Parallel Currency Market Premium (PCMP), Inflation (INF), Interest Rate (INT) and the growth rate of Gross Domestic Product (GDP). Data collected were analysed using Structural Vector Autoregressive (SVAR). Results, based on the Impulse Response Function (IRF) and Variance Decomposition (VD) obtained from the SVAR models indicated that, shocks to PCMP on average explained more variations in macroeconomic variables than shocks to macroeconomic variables explained PCMP variance in Nigeria. The (GCT) test carried out revealed that, of all the key macroeconomic variables examined, inflation is the only one that has causal relationship with PCMP and it is uni-directional. The study concluded that, the best approach to constraints to the effective performance of the macroeconomic fundamentals and ensure crucial attainment of sustainable growth and development in Nigeria need to be eliminated through further easing of foreign exchange rationing gradually in the official market and consequently eliminating the PCMP.

Keywords: PCMP, Macroeconomic fundamentals, Impulse Response, Variance Decomposition, SVAR, Exchange Rate, GCT

INTRODUCTION

In many developing countries, because of excess demand for foreign currencies, governments impose controls on trade and capital flows to suppress the demand. Usually, when controls are imposed, central banks also set the exchange rate at an officially fixed level and require all market participants to trade at those fixed rates. Furthermore, they introduce guidelines for allocating their limited amount of foreign exchange. Thus, those in need of foreign exchange whose demands are not satisfied have no choice but to engage in the parallel (illegal) or parallel (legal) market activity, though at a rate much higher than the official exchange rate set by the government. The difference between the parallel market rate and the official rate constitutes the parallel currency market premium (PCMP) and which have significant impact on macroeconomic fundamentals and consequently sustainable economic growth and development in most of the developing economies of the world. Since the official exchange rate is fixed, factors that determine the premium must also be the factors that determine the parallel market exchange rate itself. While some factors affect the demand side of the parallel market, some others affect the supply side of the market.

The Parallel Currency Market Premium (PCMP) is determined by the interaction of market forces in the parallel foreign exchange market. This is increasingly recognized to bear important implications for "the transmission process of shortrun macroeconomic policies" (Agenor, 1992) and for economic performance in general as changes in premium lead to portfolio reallocations (between domestic and foreign assets), and alter the incentive for illegal transactions (Kiguel and O'Connel (1995)).

There is some empirical evidence which suggests a high currency premium negatively influences aggregate economic activity (see Edwards (1989), Easterly (1994)). The determination of the parallel exchange rate has, therefore, been the subject of numerous studies, based on different models, samples and types of data (see Agenor (1990), Akinbobola (1996), Ogun (2015).

Therefore, in the literature, the parallel exchange market has been studied and modeled in a number of approaches. The supply and demand approach, proposed by Culbertson (1975) and Sheikh (1976) analyzed the equilibrium conditions in a foreign exchange market where foreign exchange transactions are limited. The monetary approach, initiated by Blejer (1978), emphasizes the role of equilibrium in the monetary market. This approach was then further developed by Agénor (1991) and Olgun (1984). The portfolio approach, developed by Dornbusch, Dantas, Pechman, de Rezende Rocha, and Simões (1983) laid emphasis on the interaction of stock and flow conditions in the parallel market in determining both the premium on foreign exchange and the rate of change of the stock of parallel dollars.

However, Nigeria is a developing country with a flexible exchange rate regime and the use of foreign currency is under control of the monetary authorities. Hence, like other developing countries, Nigeria also has the parallel exchange market that exists together with the official exchange market, though, it is illegal. The existence of the parallel exchange market creates several complications to the Central Bank of Nigeria (CBN) in their attempts to manage the foreign exchange market and the exchange rate. Fluctuations in the parallel market rates affect both the level of international reserves, the position of the economy and portfolio decisions of the public.

Moreover, research on the effect of the parallel foreign exchange market in Nigeria is of interest for a number of reasons. First, the parallel market for foreign exchange is more prevalent and probably one of the determinants of domestic prices and official foreign exchange earnings of the country. The continuous depreciation of the Naira/Dollar in the parallel market may contribute to inflation. In addition, the parallel market premium is an area of research in Nigeria in which much has not been done especially its relationship with selected macroeconomic variables (such as inflation, interest rate and economic growth). Thus, this study contributes to minimizing the information gap for research. Second, the parallel market for foreign exchange imposes social and economic costs. These costs are inflation, loss of revenue, and distortions in resource allocation, rent-seeking, and weakening of monetary policy instruments (Nowak, 1984). Hence, identification of the major determinants of parallel market could contribute to the minimization of these costs. On the other hand, it is argued that in an economy with a prevalence of exchange control and exchange restriction, parallel foreign exchange markets serve as a source of competition, which in return enhance efficiency in the banking system. Therefore, since its pros and cons are an empirical issue, one of the focuses of this study is to identify major determinants of the market.

The discussion above makes it imperative for policy makers to look at the implications of these developments and the extent of the effects of the Parallel Currency Market Premium (PCMP) on selected macroeconomic variables in Nigeria. There is still a paucity of research on the empirical estimates of PCMP for small open and developing economy. Thus, leaving a glaring gap for Nigeria. There is also a growing literature of PCMP on MENA countries including cross-country comparisons as in Kula, Aslan and Ozturk (2014).

The empirical evidence on the experience of sub-Saharan Africa has been rather tenuous, although many countries in the region are known to have active parallel markets for foreign exchange, with sizeable premium. In fact, many countries in sub-Saharan Africa (outside the franc Zone) had traditionally larger premium than other developing countries (World Bank (1994)). In view of the importance of parallel markets in a number of countries in the region judging by the size of the premium and of their possible effects on overall economic activity (Yiheyis (1997)), attempting to identify the economic factors that account for the variation in the premium within a country would be worthwhile. Such an attempt constitutes the objectives of this study.

There are few empirical studies on some Sub-Saharan Africa (SSA) countries [(Brian Pinto (1990), Akinbobola (1996), Yiheyis (1998), Degefa (2001), Tefera (2004), and Ogun (2015)]; but all SSA countries cannot be generalized because of their peculiar problems and economic conditions which are country specific and therefore responsible for the heterogeneous nature of PCMP estimates as obtained in the study by Yiheyis (1997) on few selected African countries. Thus, the need for more country-specific studies on the subject matter is important and crucial so as to further contribute to the debate and assist in the formulation of appropriate monetary policies.

After a thorough survey of the PCMP literature, despite a large body of empirical evidence focusing on PCMP determinants, there are several shortcomings of previous empirical studies on PCMP which this study tries to resolve. There is little work exploring the role of PCMP on open macroeconomic indicators such as inflation, interest rate, and economic growth. This gap in the literature is important, for without a theoretical basis to relate the aforementioned, the empirical findings on the subject still lack some intrinsic aspect of it that are crucial for policy recommendations that are essential as well for sustainable growth

and development. In addition, this study redresses the imbalance in the country specific study coverage by presenting a cross-examination on the chain reaction caused by the mixed results of the previous empirical relationship between PCMP and macroeconomic variables. For instance, some scholars have underscored the importance of the primary economic determinants of Parallel Currency Market Premium (PCMP) while some others have empirically found a strong negative relationship between parallel market activities and macroeconomic variables. This study, however, concentrates on the relationship between the PCMP and macroeconomic variables which has largely been neglected in the empirical literature in Nigeria.

LITERATURE SURVEY

This paper examined the extant literature concerning the parallel market exchange rate premium, but our survey does not limit to this scope. Rather, we would like to provide a full account of the extant literature concerning the behavior of parallel market premium to exploit broader perspectives that the studies of the parallel market exchange rate can offer.

Empirical Evidence from Developed Countries

One of the core issues being largely concerned in the theoretical literature is to address the determination of the parallel market exchange rate and more importantly, its premium as well as its relationship with macroeconomic fundamentals.

Diamandis and Drakos (2005) have conducted a comprehensive survey of the alternative models on this topic and have divided them into three categories. According to the authors, the first class of models is the so-called real trade models. It emphasizes the transactions demand for foreign currencies. The demand for foreign currency is determined from a number of different activities. These are the purchase of illegal imports, the supply of foreign currency derived from illegal sources such as smuggling and under-invoicing of exports. The aforementioned determine the formulation of the black market for foreign currencies. The second strand of models is built upon the monetary approach to the determination of exchange rate. This class of models assumes that the official foreign exchange market satisfies the demand of foreign currencies stemming from the international purchases of goods while the demand of black currencies is generated by the agents' needs to alter the portfolio composition. It pays particular attention to the importance of the monetary factors on the behaviour of the parallel market.

The final set of models, namely, the portfolio balance models combines the features of both theoretical literature strands, mentioned above. They are considered as the foundations of the recent theoretical models of the determination of black-market exchange rate. This type of model was initially developed by Dornbusch *et al.* (1983) and subsequently extended by Phylaktis (1991). In Dornbusch *et al.* (1983), the black market is treated in a partial equilibrium stock and flow framework. Specifically, the stock demand for black dollars arises as the result of portfolio diversification of agents and the flow market arises as the result of international trade, both reported and unreported.

The portfolio balance models consider that at any point in time, the black-market rate is determined by the effects of foreign exchange rate restrictions conditions in the asset markets whilst both the black market and official exchange rates are affected by the current account. It also claims that in the long-run, the black-market exchange rate depreciates in the same proportion as the official rate which will give a constant or stationary black-market premium eventually. Regarding to the determination

of the premium, they suggest that the current level of black-market premium is influenced by the expectation of future exchange rates when rational expectations are presumed whilst in general, the level of the black market premium is determined by the official real exchange rate, the official, depreciation-adjusted interest differential, as well as seasonal factors associated with tourism. It is noteworthy that in the Dornbusch *et al.* (1983) model, portfolio preferences are assumed to be constant, it is however, conceivable that the preferences might shift over time, which would widen the premium.

In Phylaktis (1991) paper, the previously analysed stock-flow model is extended, taking into account restrictions on foreign exchange for the international trade and capital transactions. Here, the black market exchange rate is considered as part of a portfolio, which is determined by the fixed local and international interest rates, the official exchange rate, the foreign restrictions on global transactions and the local currency value of non-dollar assets. Changes in the financial markets induce a jump in the premium and the following adjustment for the stock of dollars and the premium, respectively. As a case study here, Chilean exchange rate market is studied and an error correction model is fitted to the previously described theoretical framework.

A modified version of the Dornbusch *et al.* (1983) model, in order to examine the behaviour of the black market rate in a wide number of countries, is formulated by Fishelson (1988). The modifications consist of a substitution of the black market rate of change from the official rate, as a potential devaluation expectations' formulator. Moreover, the Fisher equation is used, so that the domestic interest rate is calculated according to the former. In this way, the author suggests that black market premium is negatively affected by the real official rate while, at the same time, there is a positive effect from expected profits from taking long positions in the foreign exchange market. The empirical approach of Fishelson's model to nineteen (developed and developing) economies indicate that the black market exchange rate behaviour can be uniform, irrespective of the distinctive (economic, political, social) characteristics of each economy.

A model, where the parallel market rate is preferable for the formation of monetary policies, compared to the official exchange rate, is presented by Ghei and Kamin (1996). The authors support the view that, in countries where black market has a prevalent size on the transactions volume, it could be in the interest of the local governments to employ the black market rates in their monetary framework, compared to the official one. In their work, the researchers provide a narrative approach in this concept, providing definitions and descriptive statistics for the prevailing conditions in the economies with strong black markets. As expected, most of them are developing economies from Latin America, Africa and Asia. The parallel market premium ranges quite a while, from as small as around 5% to Venezuela, up until almost 270% to countries like Algeria and Zambia. Getting to their model details, it is a simple small open economy model, with two goods produced (one domestic and one nondomestic), with fixed prices equal to unity. There is also a non-traded good, the output, and price of which are also fixed. There are no distortions to international trade (like trade barriers or tariffs) and the monetary and fiscal policies are at their long run sustainable levels. It is also assumed that the official exchange rate is overvalued, compared to the equilibrium rate. Hence, the flow demand for dollars (it is the taken as the only international currency in this model) is higher than the flow supply.

Empirical evidence from Developing Countries

Research on parallel market for foreign currency in developing countries has flourished since the 1980s. There have been three approaches in this area and these approaches have been adopted to analyze the parallel market premium. The literature on parallel markets usually analyses movements in the premium instead of the parallel rate itself because the premium is a more important economic and policy variable. A premium is thus defined as "the parallel rate minus the official rate over the official rate times 100".

Parallel market premium as earlier defined is the amount by which the parallel market exchange rate exceeds the official market rate. The premium could be negative, a market participant for instance in Nigeria will be paying in excess of the official rate in selling dollars for naira. This negative premium is essentially a "laundering charge" paid by people who have no right to possess the dollars that they are offering for sale. In discussing the determinants of the black market premium, various models discussed previously, for instance using the portfolio balance approach and the monetary model or the real trade model and so on.

Gupta (1981) examined Korea, Taiwan and India. On the basis of cross-correlations between changes in the black market rate and changes in the official rate are anticipated as much as thirteen months ahead. Thus, the black market exchange rates in Taiwan and South Korea anticipate changes in the official exchange rate but not in the case of India.

In another study for Turkey, Booth and Mustafa (1991) examined the relationship between Turkish Lira, the US dollar, and German mark. Although they found that these currencies are informally efficient and behave independently of each other, they arrived at the opposite conclusion for black and official rates.

Agenor and Taylor (1993) examined the causal relationship between official and parallel Exchange rates in 19 developing countries, using a methodological approach based on the statistical theory of cointegration and Granger-causality tests. They illustrated that cointegration was found in 14 cases of 19 developing countries.

Blejer (1978) examined the effects of black market exchange rate expectations on domestic money demand in three developing countries (Brazil, Chile and Columbia) with foreign exchange controls. He then concluded that a depreciation in the black market exchange rate leads to a decrease in domestic money demand and to an increase in domestic money supply. He thus attributed these results to portfolio rebalancing by individuals and he also found that whenever the proxy for expected currency depreciation is omitted from the demand for money function, the variation in the demand for money, due to changes in the expected rate of domestic inflation, tend to be over-estimated.

Tefera Lemma (2004), the author provides systematic analysis in factoring out the main determinants of the parallel foreign exchange market in Ethiopia. However, the long-run result obtained from the regression analysis revealed that foreign exchange availability, money supply, depreciation in the official exchange rate, export tax and intensification of exchange control are the main determinants of the parallel foreign exchange market. The error correction estimation result also indicates that depreciation of the official exchange rate, foreign exchange availability, and one period lagged money supply, as well as export

tax is the main determinants of parallel premium in the short run. The statistical analysis reveals a continuous rise of forex bureaus selling price above the parallel market selling price during the analysis period. In addition, the forex bureaus buying rates are also lower than their counterpart rates in the parallel market (at least by 2 percent).

Yiheyis (1998), took a cursory look at The Economic Determinants of the Parallel Currency Premium: Evidence from Selected African Countries using ECM model. The author clearly explains that the imposition of trade restrictions and capital control generates a demand for foreign currency in the parallel market where it is traded normally at a positive premium. The magnitude of the premium, which has implications for economic performance, varies among countries and over time in the same country. Drawing on the literature, the paper develops a model which integrates the flow and portfolio motives for holding parallel currency on demand side and supply equation that recognizes the dependence of the supply of foreign exchange on the parallel currency premium with a view to identifying the primary economic determinants of the latter in selected African countries. The author, however, found that, the degree of import tightening the term of trade and variably the external debt burden were detected to exert perceptible effects on the premium, while the level of real GDP was highly insignificant. Monetary events were observed to be of consequence. Monetary expansion, a change in the depreciation-adjusted interest rate differential and acceleration of inflation at home relative to abroad were associated with a rise in the premium. Moreover, the premium responded significantly to the current rate of official devaluation, but less so as time progressed, with inertia playing a considerable part in its determination.

Chhibber and Shafi (1990), the authors confirmed that; model using Ghanaian data shows that in the presence of an active parallel market, official devaluation does not cause inflation because prices have already adjusted to the parallel exchange rate. Although structural factors were important in the past, inflation in Ghana has been primarily a monetary phenomenon and the product of weakness in the financial system in recent years. The model results show that there is no fiscal reform, including reduced subsidies and direct relationship between the official exchange and inflation; prices had already adjusted to the exchange rate prevailing in parallel markets. The results also show that official devaluation had a positive effect on Ghana's budget. Revenue improvements came from three channels: the higher grant aid disbursed at a more depreciated exchange rate, a reduction in the subsidies that had accrued to importers through an overvalued exchange rate, and an increase in export taxes as cocoa farmers increasingly marketed their output through official channels. The official devaluation, therefore, did not produce higher budget deficits, demand pressure did not spill onto the parallel market, and the exchange premium narrowed considerably. The key to the success of the program was the adequate level of foreign financing, combined with a coherent set of fiscal policies. Chhibbcr and Shafik argue that although inflation had structural causes in the past, the acceleration in recent years is primarily a monetary Phenomenon. It also reflects weakness in the financial system that must be tackled to sustain reform.

Morris (1993), examined the Inflation Dynamics and the parallel market for foreign exchange in Uganda. This paper showed how unification of official and parallel market exchange rates may lead to an increase in steady-state inflation, because of the fiscal impact of real official exchange rate changes and other comparative static and stability results in Pinto (1990) are reversed under the assumption that official exchange rate devaluation reduces money creation in the economy. It is argued that this was

the case for Uganda in the 1980s, and we give a simple rule of thumb for estimating when unification will increase or decrease steady-state inflation.

Stamalevi (2015), analyzed how Black market Exchange Premium affect Foreign Direct Investment (FDI) in Malawi using Econometric model and regression analysis. The results show that the black market exchange premium does not affect net FDI inflows. The author asserts that, if this result is, in fact, accurate, then liberalization of currency regimes in developing countries, which leads to the disappearance of black markets, should not be expected to bring in more or less foreign investment, the reason being that the black market premium did not in the past impede nor enhance foreign investment.

Empirical evidence on Nigeria

Akinbobola (1996), critically examined both theoretical and empirical evidence on the determinants of the parallel currency market premium in Nigeria. The parallel market premium was traced to the variations in major macroeconomic variables. However, the author found that, the long-run trend in the case of monetary specification, existence of a positive relationship between the direction of export and the premium, a strict foreign exchange control, which will lead to a fall in import, liberalizing the tax/tariff rates will reduce the level of parallel market premium, and unguided monetary policy will lead to a widening gap between the official and the parallel exchange rates, that is premium. Also, the empirical result corroborate Ansu (1991), and Ghei and Kiguel (1992) findings of the relationship between money stock and the parallel market premium, that is, money stock has a positive relationship with the parallel market premium.

Similarly, Ogun (2015), presented a model of the determination of parallel market exchange rate premium in liberalized economies. A clear distinction was made between fundamentals and nominal determinants thus permitting the introduction of some new arguments into the function while also facilitating status' re-specification of some existing/known determinants. Likely data problems that may arise during implementation are discussed and suggestions on circumventing were made.

Lawal and Abdulkadir (2010), using the Z-score statistical technique through SPSS to analyzed the effect of black market operations on foreign exchange controls in Nigeria. The empirical results show that there is no need for a black market for foreign exchange in Nigeria and that users patronize the black market more than the official market for foreign exchange and finally that black market operations adversely affect foreign exchange controls in Nigeria. Based on these findings, the study recommends among others that the government through the Central bank of Nigeria should ensure an adequate supply of foreign exchange while relaxing the procedures involved in obtaining foreign exchange in the official market.

Nwafor (2014), examined the behaviour of the exchange rate in Nigeria using Application of the Pinto Model. The author examined a non-traditional model of exchange rate behavior, namely, the Pinto model within the confines of a reduced-form linear stochastic model with respect to Nigerian naira and US dollar. The results indicate a long-run cointegrating vector between the naira-dollar parallel exchange rate and its aforementioned determinants.

Onuoha (2014), empirically examine the impact of exchange rate variation and inflation on the economic growth of Nigeria. The empirical analysis revealed that export and import showed a positive relationship but not statistically significant at 3.4%.

The coefficient of Exchange rate showed a positive relationship but is statistically significant at 3.4%. This implies a positive relationship between inflation and exchange rate. This is because an increase in the volatility of exchange rate will lead to increase in inflation. Only economic growth recorded a negative relationship. The study contends that while the high rate of inflation and inconsistent exchange rates is detrimental to economic growth, moderate and stable inflation rate supplements returns to savers, enhances investment and therefore economic growth of a country.

Summary of the Gaps

In view of the theoretical and empirical literature reviewed and discussed, we can observe that there is some ambiguity about: what determines parallel market premium, the relationship between PCMP and inflation, PCMP and interest rate as well as PCMP and economic growth across the globe. This is important for crucial policy recommendations that will as well assist in sustainable growth and development process in Nigeria and other developing countries of the world.

There is some empirical evidence suggests that a high Parallel Currency Market Premium (PCMP) negatively influences aggregate economic activity and consequently affect the pace of sustainable growth and development. The determination of the PCMP has, therefore, been the subject of numerous studies, based on different models, samples and types of data. Unlike previous empirical studies, this study concentrates on the effects of the PCMP on macroeconomic variables (inflation, interest rate and economic growth) and its significant impact on sustainable growth and development which has largely been neglected in the literature in Nigeria. This is important because of the little empirical works exploring the relationship between the PCMP and open macroeconomic indicators such as inflation, interest rate, and economic growth. Hence, the process tests for the validity and relevance of the existing relationship between the PCMP and macroeconomic variables in Nigeria.

METHODOLOGY

This section describes the method through which the objectives of the paper are achieved. This comprises of the theoretical framework, model specifications, important econometric issues, estimation techniques, measurement of variables data description and sources.

Theoretical Framework

We make the following assumptions to keep the model simple. The parallel market is assumed as an outlet for capital transactions that are barred from the official market. The small country assumption is retained so that the prices of traded goods are exogenously given. There also exists a non-traded goods sector. There is full employment in the economy and monetary disequilibrium does not affect the rate of growth of real income. Therefore, the monetary approach to the parallel foreign exchange market initially developed by Blejer (1978) and then further developed by Agenor (1991) was used. This approach focuses on the disequilibrium in the money market in explaining movements in output, price, the parallel market exchange rate, and change in foreign assets.

Money market

Starting with the basic relationships of the monetary sector as follow:

$$M_s = R + D \dots \quad (3.1)$$

$$M_d = P^* m_d \dots \quad (3.2)$$

$m_d = f(y, \Pi^e) \dots$ (3.3) where M_s is the nominal money supply, R is the foreign exchange reserve of the central bank, D is the domestic net asset, M_d is the demand for nominal money, P* is the price level, m_d is the real demand for money, which is a function of real income and expected domestic inflation.

The condition for stock equilibrium in the money market is that the changes in the nominal money supply equal changes in the nominal demand for money, that is:

$$\Delta M_s = \Delta M_d \dots \quad (3.4)$$

Differentiating logarithmically equation (3.1) and (3.2) and substituting into equation (3.4), yields

$$(1-\alpha)\Delta R + \alpha \Delta D = p + m_d^* \dots \quad (3.5)$$

Where *p* is the domestic inflation

3.1.2 Domestic price determination

Domestic price level, *P*, is determined by a weighted average of the prices of tradable, P^T, and non-tradable, P^{NT}

$$p_t = \beta_{p^T} + (1-\beta)p^{NT} \dots \quad (3.6)$$

Since the Nigerian economy is a small open economy, the prices of tradable goods is determined by world prices, p^*. Different from the assumption in Blejer (1978) that the demand for current account transactions are satisfied in the official market. In Nigeria, the official exchange market is rationed for priority purpose, other demand for the current account transactions have to find foreign exchange in the parallel exchange market. Hence, the domestic price depends on the world price and the rate of change of the exchange rate in the official rate, *e*, and the parallel market, *b*

$$p^T = \theta e + (1-\theta)b + p^* \dots \quad (3.7)$$

An excess supply of money implies an excess demand for both trade and non-tradable goods – that is, an excess demand for foreign currency in the parallel market since demand for foreign in the official market is rationed. In equation (3.1) the

component of money supply are domestic credit and international reserves. As a flexible exchange rate country, the CBN only can control the ex-ante money supply by changing the domestic credit component of the base. Hence, the ex-ante excess supply of money equal to the ex-ante domestic credit and the money demand D - m_d. Assuming that the excess demand for non-tradable goods varies with the excess demand throughout the economy, the following equation can be postulated for the determination of the price of non-tradable goods.

$$p^{NT} = p^{T} + \lambda(D - md), \;\; \lambda > 0 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(3.8)}$$

Substituting equation (3.7) into equation (3.8) and then equation (3.8) into equation (3.6), the domestic inflation equation are expressed as a function of world inflation, of the official exchange rate, and of the *ex-ante* disequilibrium in the money market as follow:

$$p_t = \varphi[\theta e + (1-\theta)b + p^*] + (1-\varphi)[\lambda(D - m_d)] \ldots\ldots\ldots\ldots \text{(3.9)}$$

where $\varphi = 1/(1+\lambda(1-\theta))$ if all goods are traded $\theta=1$ then $\varphi = 1$ and the domestic rate of inflation in a fixed country is fixed to the world rate.

3.1.3 The parallel market exchange rate

The demand for foreign exchange is derived from the demand for current account transaction, D^c, and the demand for foreign exchange as an asset, D^a

$$D = D^c + D^a \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(3.10)}$$

Because of foreign exchange policy in Nigeria, the demand for foreign exchange assets has to be found in the parallel market. The demand for this purpose depends on the expectation of depreciation in the parallel market, b^*. Hence,

$$D^a = \delta + \delta_1 b^* \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(3.11)}$$

The expectation of depreciation in the parallel market, in turn, depends on the differential between domestic and foreign prices and the expected domestic inflation, Π^*. Thus,

$$b^* = P/P^*b + \Pi^* \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(3.12)}$$

The demand for current account transactions can be partly satisfied in the official market and the rest in the parallel market. The demand depends on income and the deviation of domestic prices from foreign prices.

$$D^c = \gamma + \gamma_1 Y + \gamma_2(P/P^*b) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(3.13)}$$

As mentioned above, the supply of foreign exchange in the parallel market mainly comes from remittance. This supply, S, simply assumes dependence on the differential between the parallel market rate and the official rate.

$$S = \rho + \rho_1(b/e) \quad \ldots\ldots (3.14)$$

The parallel exchange rate is determined by market forces; hence, supply for foreign exchange should be equal to demand of foreign exchange.

$$S = D \ldots\ldots (3.15)$$

To find the equilibrium exchange rate in the parallel foreign exchange, equation (3.12) is substituted into equation (3.11), and then equation (3.13) and equation (3.11) are substituted into equation (3.10). Using supply for foreign exchange in equation (3.14) and the market equilibrium condition in equation (3.15), the parallel market rate is expressed in the form of equation as follows.

$$b = \omega + \omega_1 Y + \omega_2(P/P^*) + \omega_3 i^* + \omega_4 e \quad \ldots\ldots (3.16)$$

Substitute the domestic inflation equation in (3.9) into equation (3.16) to eliminate p would yield the final monetary equation for the black market exchange rate as follow:

$$b = \xi + \xi_1 p^* + \xi_2 y + \xi_3 i^* + \xi_4 e + \xi_5(D - m_d) \ \ldots\ldots (3.17)$$

In equation (3.17), the parallel market rate has positive relationship with the official rate, domestic expectation and money supply, negatively relationship with foreign price, the level of income.

3.1.4 Real income and demand for money

The model assumes that output (real income) responds positively to the excess supply of real money balances and the deviation of the actual output from its trend level. It was simply specified that:

$$y = (M/P)_{t-1} + y^* + y_{t-1} \ldots\ldots (3.18)$$

Where y* denotes the capacity output.

Real money demand depends on real income, y, and expected inflation, i^*

$$m_d = \tau + \tau_1 y_t - \tau_2 i_t^* \ldots\ldots (3.19)$$

The summary of equations in the model are shown as follows

The parallel market exchange rate:

$b = \xi + \xi_1 p^* + \xi_2 y + \xi_3 i^* + \xi_4 e + \xi_5 (D - m_d)$

The real income

$y = (M/P)_{t-1} + y^* + y_{t-1}$

The real money demand

$$m_d = \tau + \tau_1 y_t - \tau_2 i_t^*$$

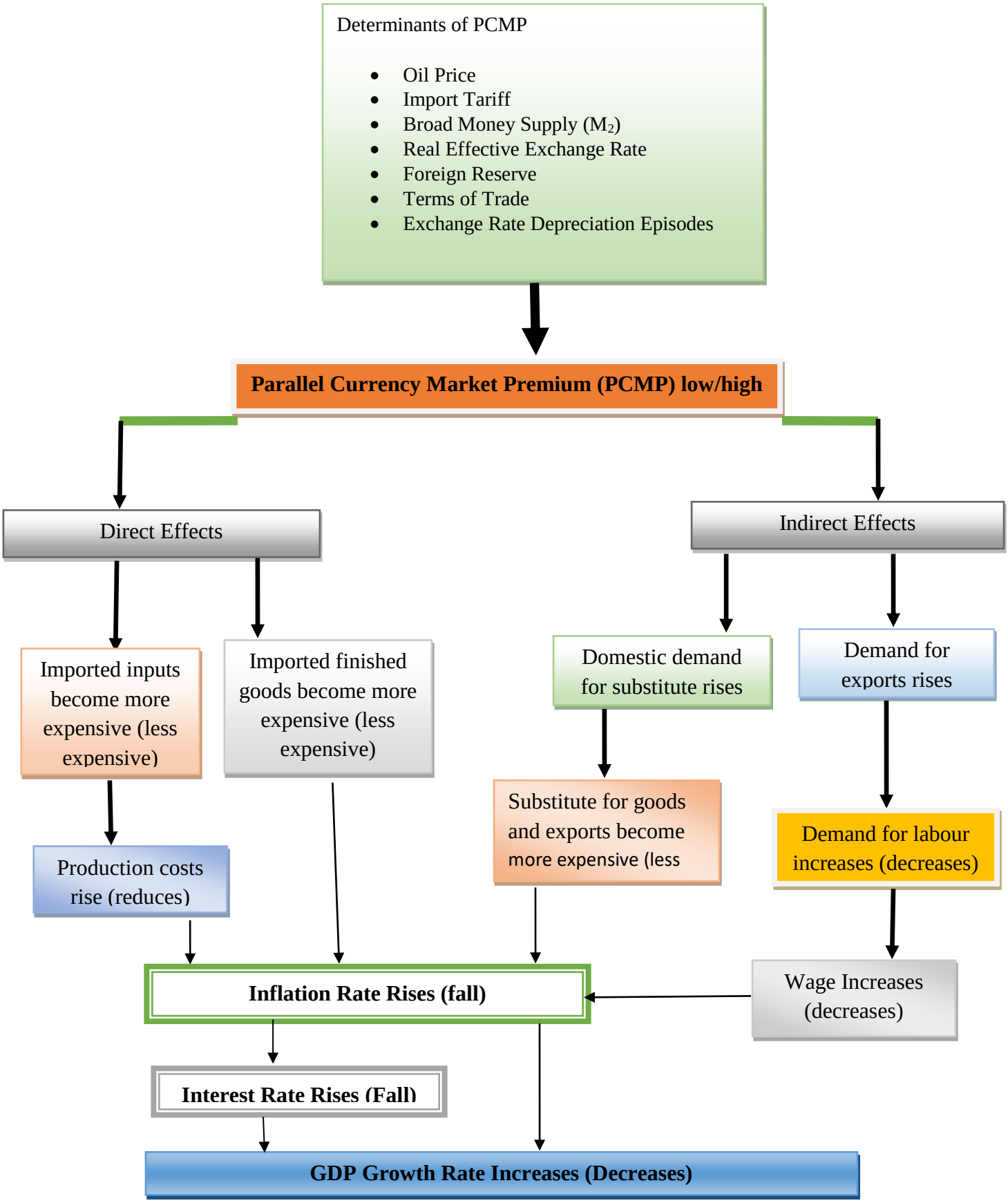
The Conceptual Framework for the Relationship between the Parallel Currency Market Premium (PCMP) and Macroeconomic Variables

The impact of PCMP on inflation, interest rate and growth rate of GDP has been widely discussed and numerous channels through which the effects of low, moderate and high PCMP are transmitted onto the domestic price level (inflation), interest rate and output growth have been identified in the literature.

Given that Nigeria is a developing economy and also open to external trade with other countries, her economy is not in any case impervious to external shocks. More specifically, as a result of its considerable degree of openness to foreign trade, Nigeria's domestic price level is susceptible to exchange rates volatility (depreciation or appreciation) and also changes in import prices (Aliyu, Shehu, Usman, Rano (2008). Figure 3.1 show the transmission mechanism through which PCMP affects Macroeconomic Variables; domestic prices can be influenced through two main channels-direct and indirect. As epitomized, with low/high PCMP which is determined by some factors such as (Oil Price, Import Tariff, Broad Money Supply, Real Effective Exchange Rate, Foreign Reserve, Terms of Trade and Exchange Rate Depreciation episodes) and in turn causes appreciation/depreciation in the value of naira, domestic prices are affected through direct changes in the prices of imported finished goods and imported inputs. These goods simply become expensive in naira terms. Eventually, as a result of higher costs of imported raw materials and capital goods, marginal costs of production decreases/increases and hence, domestically produced goods become more expensive and the pass-through affects Interest Rate and consequently affect growth rate of GDP.

On the other hand, in the case of indirect effect, low/high PCMP affects the domestic demand for substitute and causes a rise/fall in the net exports which in turn the exports become more expensive (less) and influences the demand for labour to increases (decreases) and therefore increases/decreases wages and in turn influences the domestic prices through the change in aggregate demand putting upward pressure on demand for labour and consequently affects wages. Also, import competing firms might increase prices in response to foreign competitor price increase with the aim of maintaining their profit margin.

Figure 3.1: Transmission Mechanism through which PCMP affects Macroeconomic Variables
Source: Author, 2017


Determinants of PCMP
Oil Price
Import Tariff
Broad Money Supply (M_2)
Real Effective Exchange Rate
Foreign Reserve
Terms of Trade
Exchange Rate Depreciation Episodes
Parallel Currency Market Premium (PCMP) low/high
Direct Effects
Indirect Effects
Imported inputs become more expensive (less expensive)
Imported finished goods become more expensive (less expensive)
Domestic demand for substitute rises
Demand for exports rises
Production costs rise (reduces)
Substitute for goods and exports become more expensive (less
Demand for labour increases (decreases)
Inflation Rate Rises (fall)
Wage Increases (decreases)
Interest Rate Rises (Fall)
GDP Growth Rate Increases (Decreases)

Model Specifications

The econometric techniques that have been utilized to model of PCMP are many across the globe, some of them includes: single-equation econometric methods, Stock-Flow model, Pinto Model, Granger-Causality model, Logit and Probit Models, Anticipated and unanticipated models, OLS, ARDL, Binary Choice Model, VEC Model, Base Model, Model of dual foreign exchange markets, Two-Stage Least Squares technique, GMM, Pool Mean Group (PMG) estimator, Fully Optimizing Model VAR models, structural macroeconomics models, VECM, Input-Output model, dynamic stochastic general equilibrium (DSGE) models etc. Most studies applied single-equation econometric methods to estimate the relationship between PCMP and some important macroeconomic variables such as inflation and economic growth with aggregated data. This study however, used Vector Autoregressive Method which accounts for endogeneity problem. One mechanism to solve this difficulty could be to use a multivariate time series models such as VAR.

Use of VAR model helps to account for spurious correlations, and exogeneity bias as it is designed for non-stationary time series and requires no endogenous - exogenous division of variables. A number of studies use variants of the VAR models to analyze the effect of exchange rate and other exogenous shocks on domestic prices. Among these, some use Structural VAR (SVAR) models to capture the dynamic impact of PCMP disturbances on inflation while others utilize the VECM to capture the response of prices to PCMP movements under the assumption of cointegration.

In contrast to analyzing PCMP using a single price by employing a single-equation-based approach, a VAR approach allowed us to investigate PCMP into a set of domestic prices along the pricing chain. In addition, since the exchange rate and inflation rate are expected to be influencing each other in many theoretical models and consequently affect economic growth, it is most appropriate to estimate a system that would treat all of them as endogenous variables. VAR models are useful because it allows for such interaction between exchange rate and domestic variables (Ito and Sato, 2006). The current study used the Structural VAR (SVAR) to estimate the behavior of the PCMP to macroeconomic fundamentals. The approach is powerful in analyzing short run issues while it integrates the short run dynamics with the long run relationship and it is preferable for analyzing short run issues concerning PCMP (short run effect of PCMP on inflation and economic growth).

Based on the theoretical framework, we specify the following models:

Structural VAR Model

The baseline empirical model is estimated as a Vector Autoregressive (VAR) with four endogenous variables which are: Parallel Currency Market Premium (PCMP), Inflation (INF), Interest Rate (INT) and Gross Domestic Product (GDP). The Structural Vector Autoregressive (SVAR) form representation of the model may be written as:

$$B_0 y_t = B_1 y_{t-1} + \cdots \ldots + B_p y_{t-p} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.20)$$

Where y_t = [ΔPREM, ΔINF, ΔINT, ΔGDP] vector of k = 4 variables. B_0 is an invertible ($n \times n$) matrix of coefficients of contemporaneous relations on the endogenous variables; B_i's are ($n \times n$) matrices which capture dynamic interactions between

the k variables in the model, ε_t denotes a mean zero $(n\times 1)$ vector of structural error terms, also referred to as a structural innovation or structural shock and p is the number of lags. Equivalently the model can be written more compactly as:

$B(L)\, y_t = \varepsilon_t$ …….. (3.21)

Where $(L) = B_0 - B_1L + B_2L^2$ ……$+B_pL^p$ is the autoregressive lag order polynomial. The variance-covariance matrix of the structural error term is typically normalized such that: E $(\varepsilon t\ \varepsilon'_t) = \Sigma_\varepsilon = Ik$

In order to allow estimation of the structural model we first need to derive its reduced-form representation (since the structural model is not observable). This involves expressing y_t as a function of its lags. To derive the reduced form representation, we pre-multiply both sides of the structural VAR representation by B_0^{-1}:

$$B_0^{-1}B_0y_t = B_0^{-1}B_1y_{t-1} + \dots\dots + B_0^{-1}B_py_{t-p} + B_0^{-1}\varepsilon_t \quad \text{.....(3.22)}$$

Hence, the same model can be represented as:

$$y_t = A_1y_{t-1} + \dots\dots + A_py_{t-p} + u_t \quad \text{..... (3.23)}$$

Where:

$A_i = B_0^{-1}B_0$, i=1, …, p, and $u_t = B_0^{-1}\varepsilon_t$. Equivalently the model can be written more compactly as:

$$A(L)y_t = u_t \quad \text{..... (3.24)}$$

Where $B(L) = I - A_1L + A_2L^2 \dots\dots + A_pL^p$ and E $(u_t) = 0$ and E $(u_tu_t') = \Sigma_u$

denotes the autoregressive lag order polynomial. Standard estimation methods allow us to obtain consistent estimates of the reduced-form parameters A_i, i=1 ,…, p and the reduced form errors u_t and their covariance matrix E $(u_t u'_t) = \Sigma_u$ (Kilian, 2011).

The structural model represented by equation (3.20) must be identified for the purpose of policy analysis and must be given an economic interpretation. The fundamental problem here is that ε_t is not directly observed but needs to be identified (Stulz, 2006). The next question is how to recover the elements of B_0^{-1} from consistent estimates of the reduced-form parameters because knowledge of B_0^{-1} would enable us to reconstruct ε_t from $\varepsilon_t = B_o u_t$ and B_i, i=1 … … p from $B_i = B_0A_i$

By construction, $= {}_0^{-1}\varepsilon_t$. Hence, the variance of is:

$E(u_t u') = B_0^{-1} E(\varepsilon_t \varepsilon'_t) B_0^{-1'}$

$\Sigma_u = B_0^{-1} \Sigma_\varepsilon B_0^{-1'}$ but, $\Sigma_\varepsilon = I$

$\Sigma_u = B_0^{-1} B_0^{-1'}$

One popular way of recovering the structural innovations ε_t from the reduced-form innovations u_t is to apply Cholesky orthogonalization to the reduced-form residuals. Mechanically, this can be accomplished as follows. Define a lower-triangular K×K matrix S with positive main diagonal such that $SS' = \Sigma_u$. It follows immediately from the condition $\Sigma_u = B_0^{-1} B_0^{-1'}$ that $B_0^{-1} = S$ is one possible solution to the problem of how to recover u_t. Thus, the Cholesky decomposition encompasses the decomposition of the variance-covariance matrix Σ_u of the reduced form residuals in a lower triangular matrix S and an upper triangular matrix S′ which allows as recovering the structural shocks (Ito and Sato, 2006). Accordingly, the relationship between the reduced-form VAR residuals and the structural disturbances can be written as follows:

$$\begin{bmatrix} U_t^{PREM} \\ U_t^{INF} \\ U_t^{INT} \\ U_t^{GDP} \end{bmatrix} = \begin{bmatrix} S_{11} & 0 & 0 & 0 \\ S_{21} & S_{22} & 0 & 0 \\ S_{31} & S_{32} & S_{33} & 0 \\ S_{41} & S_{42} & S_{43} & S_{44} \end{bmatrix} \begin{bmatrix} \varepsilon_t^{PREM} \\ \varepsilon_t^{INF} \\ \varepsilon_t^{INT} \\ \varepsilon_t^{GDP} \end{bmatrix} \text{..... (3.25)}$$

Where $\varepsilon_t^{\text{PREM}}$, $\varepsilon_t^{\text{INF}}$, $\varepsilon_t^{\text{INT}}$ and $\varepsilon_t^{\text{GDP}}$ are the structural disturbances, that is, Parallel Currency Market Premium (PCMP), Inflation (INF), Interest Rate (INT) and Gross Domestic Product (GDP) shocks respectively, while u_t^{PREM}, u_t^{INF}, u_t^{INT} and u_t^{GDP} and are residuals in the reduced form equations.

The structural model is identified because the k (k −1)/2 economic restrictions, necessary to identify the structural model, are imposed as zero restrictions on the matrix S, which links the reduced form and the structural residuals. The resulting lower-triangular matrix S implies that some structural shocks have no contemporaneous effect on some endogenous variables given the ordering of endogenous variables. Economic interpretation attached to this model by the selected ordering of the variables, as the ordering indicates which shocks are not allowed to contemporaneously affect which variables (Hahn, 2003 and Ito and Sato, 2006).

Measurement of variables and Data Sources

To estimate the concerned models and examine the statistical significance of the variables that relate to the parallel premium for foreign exchange, this study employed annual data time series covering 1986 – 2015.

Data on the parallel rate are to be collected from several issues of Pick's Currency Yearbook, which was subsequently renamed International Currency Analysis Inc., and lately Currency Alerts and the Central Bank of Nigeria (CBN) Statistical Bulletin. Parallel Market Premium (PREM) is the difference between the parallel rate and official rate. GDP is Gross Domestic Product

(growth rate), and also sourced from the CBN, while inflation and interest rate data were obtained from the data base of the World Development Indicators.

DATA ANALYSIS AND INTERPRETATION OF RESULTS

This section presents and discusses the results of the empirical analysis based on econometric frameworks given in the previous section.

Test for Stationarity

Testing for non-stationarity in the form of unit roots has become a clip of time series econometrics (Engle and Granger, 1987). Macroeconomics have been aware that most macroeconomics time series or variables are non-stationary in their levels and that several of these series are most adequately represented by the first difference. These time series are therefore said to be integrated of order one and are denoted by I(1). The level of such variables can become arbitrary large or small so that there is no tendency for them to revert to their mean level. Test for stationarity of variables is therefore known as the unit root test. Since the issue of stationarity of time series affects the consistency of data estimates, it becomes essential therefore to examine the order of integration of data employed in this study as failure to do this can lead to estimates that appear to be significant and meaningful but in reality, are meaningless and insignificant (Hamilton, 1994).

Formal testing for stationarity and the order of integration of each variable are therefore undertaken mainly, using Augmented Dickey-Fuller (ADF) and Phillips-Perron methods of unit roots test with intercept only and intercept with trend using automatic lag length selection based on Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC).

Unit Root Test

The results of the unit roots are presented in Tables 4.1 and 4.2 respectively. Table 4.1 presents the results of the unit root using (ADF) for SVAR data series, the test with intercept only and intercept and trend. The results showed that all variables were stationary at level and at 5% level of significance as well with intercept alone and with intercept and trend respectively.

However, table 4.2 displayed Phillip-Perron results which confirmed the series to be stationary at level and at 5% level of significance as well as when the trend was included for the variable. Thus, it can be concluded that all data series for SVAR analysis were integrated of order zero (i.e I(0)) by considering the unit root test with an intercept and linear trend for both the ADF and PP.

Table 4.1: Unit Root Test Using Augmented Dickey Fuller (ADF) Technique (SVAR Data series)

Statistics / Variables	Statistics at Level		Statistics at First Difference		Order of Integration
	Intercept	Trend & Intercept	Intercept	Trend & Intercept	
LPREM	-2.96**	-3.89**	-7.84	-7.62	I(0)
INF	-3.90**	-3.04	-2.53	-3.52	I(0)
INT	-3.22**	-3.88**	-6.02	-6.09	I(0)
GDP	-4.41**	-4.45**	-7.97	-8.01	I(0)
Critical Values					
1%	-3.67	-4.37	-3.68	-4.32	
5%	-2.96	-3.60	-2.97	-3.58	
10%	-2.62	-3.23	-2.62	-3.22	

Note: *, ** and * implies 1%, 5% and 10% level of significance respectively.**

Source: Author's computation based on Eviews estimation.

Table 4.2: Unit Root Test Using Phillips-Perron (PP) Technique (SVAR Data series)

Variables	Statistics at Level		Statistics at First Difference		Order of Integration
	Intercept	Trend & Intercept	Intercept	Trend & Intercept	
LPREM	-3.12**	-3.31**	-7.73	-7.53	I(0)
INF	-2.62**	-3.67**	-6.26	-6.11	I(0)
INT	-3.29**	-3.87**	-6.12	-6.29	I(0)
GDP	-4.38**	-4.41**	-10.76	-12.87	I(0)
Critical Values					
1%	-3.67	-4.30	-3.68	-4.32	
5%	-2.96	-3.57	-2.97	-3.58	
10%	-2.62	-3.22	-2.62	-3.22	

Note: *, ** and * implies 1%, 5% and 10% level of significance respectively.**

Source: Author's computation based on E-views estimation.

Analysis of the relationship between PCMP and Macroeconomic Variables: Structural Vector Autoregressive Approach

As we have mentioned earlier in previous section that the baseline empirical model to be estimated is a VAR with four (4) endogenous variables which are: Parallel Currency Market Premium (PCMP), Inflation (INF), Interest Rate (INT), and Gross Domestic Product (GDP). The SVAR form representation of the model was presented in equation 3.20 in previous section.

The relationship between PCMP and macroeconomic variables: Impulse Response Analysis

The impulse response function (IRF) enables one to analyze the response of one variable to a random shock in another variable while maintaining the original units of the data as well as providing an estimate of uncertainty. The results presented here (see Figures 4.1, 4.2, 4.3, 4.4, and 4.5 respectively in Appendix A) were based on a structural decomposition of the estimated residual covariance matrix of the estimated SVAR. Substantively, the IRF is useful because it provides a more statistically principled means of measuring a variable's response to changes in another.

In the present context, the IRF helps in determining how quickly macroeconomic variables adjusted after being shocked by an unanticipated change in PCMP variable. Such tests provide support for substantive hypothesis tests with respect to variable dynamics over time.

Response of PCMP to macroeconomic variables (Structural one Standard Deviation Innovation Shocks)

Figure 4.1 displayed the response of PCMP to structural one standard deviation innovation shocks (that is, own shocks). The figure showed the impulse response of PCMP to one standard innovation shock at time *t* on expected values of the endogenous variables in the SVAR at time t + n. For each of the variables, the horizontal axis of the IRF shows the number of quarters that have passed after the impulse has been given, while the vertical axis measures the response of relevant variable. Moreover, variables measured in logs are multiplied by 100 so that the impulse response approximates the percentage change of the PCMP in response to a shock to macroeconomic variables.

In response to a shock to Inflation, PCMP was zero in the first, but increase to 23% and maintained the stability till the fourth quarter before dropped to 9% in the fifth quarter. A positive shock to macroeconomic variables results in an increase in premium for the entire forecast horizon as we can see in figure 4.1 that PCMP respond to one standard innovation shock in inflation by 20% as at the end of the 10^{th} quarter. It should be noted that the PCMP began to respond positively to shocks to all the macroeconomic variables from the second quarter as a unit shock to inflation resulted to an increase in PCMP by 6%, interest rate 14% while only the growth rate of GDP recorded negative shock of 15%. This implies that the response of PCMP to one standard innovation shock to the growth of GDP will decrease the size of the PCMP by 15% and the trends were maintained till the 5^{th} horizon. Moreover, the response of PCMP to shock in GDP changed to a positive value of 12% after the 5^{th} horizon and further decreased to less than 1% by the end of the entire forecast horizon. However, the response of PCMP to shock in interest rate took positive responses up till the 5^{th} horizon and thereafter maintained a negative response till the end of forecast

horizon (that is -6% at the 10th horizon). Thus, this confirms the dynamic relationships (that is, positive and negative) between PCMP and macroeconomic variables in Nigeria. This result confirms the result of Kate Phylaktis and Eric Girardin (2001).

All other factors being equal, higher interest rates in a country increase the value of that country's currency relative to nations offering lower interest rates. However, such simple straight-line calculations rarely, if ever, exist in foreign exchange. Although interest rates can be one the major factor influencing currency value, exchange rates and the premium. The final determination of a currency's exchange rate with other currencies is the result of a number of interrelated elements that reflect and impact the overall financial condition of a country with respect to that of other nations.

Generally, higher interest rates increase the size of a given country's premium. The higher interest rates that can be earned tend to attract foreign investment, increasing the demand for and value of the home country's currency. Conversely, lower interest rates tend to be unattractive for foreign investment and decrease the currency's relative value.

However, this simple equation is complicated by a host of other factors that impact currency value and exchange rates which consequently result into the high/low premium. One of the primary complicating factors is the interrelationship that exists between higher interest rates and inflation. If a country can manage to achieve a successful balance of increased interest rates without an accompanying increase in inflation, then the value and exchange rate of its currency is more likely to rise which will, in turn, affect the size of the premium.

Response of Inflation to PCMP and other macroeconomic variables (Structural one Standard Deviation Innovation Shocks)

Figure 4.2 presents the response of inflation to structural innovation shock to PCMP, interest rate and growth of GDP. Concerning impulse response of inflation to PCMP, 7.3% of the shock to PCMP were seen to be transferred to inflation in the first horizon and inflation respond to the negative shock of -3.1% to PCMP in the 5th horizon. This implies that a unit increase in PCMP increases inflation by 7.3% in the 1st horizon and decreases inflation by -3.1% by the 5th horizon. Thereafter, the response of inflation to structural standard deviation innovations shocks to PCMP were negative and fluctuating between 3% and 15% till the end of the forecast horizon that is, 1-15% at the 10th horizon. We can, therefore, conclude that PCMP has significant effects on inflation (both positive and negative). Various reasons can be given to explain the (positive and negative) relationship between PCMP and inflation in Nigeria. First, during the periods of exchange rate stability (1992 – 1998), there were low premium and low premium will reduce the level of inflation and secondly, the periods of positive effects are more significant because the activities of parallel market in Nigeria were on the increase as a result of the instability in the Naira/US dollar rates in both official and parallel market systems in Nigeria. Thus, this result is line with the trends and pattern as analysed in chapter four of the study. It is also in line with the findings of Rudiger Dornbusch, Daniel Valence Dantas, Clarice Pechman, Demetrio Simqes and Roberto de Rezende (1980) Ogun (2015), Pierre-Richard Agenor (1992) and Hassanain, Khalifa (2005).

Whereas, the impulse response of inflation to its own shock were positive throughout the entire horizon. The response of Inflation to shock in the interest rate took a significant value of -9.3% in the 1st horizon. This signifies that shocks to interest rate affect inflation significantly in Nigeria, and thereafter maintained the negative value to the 5th horizon and 4% in the 10th

horizon. The relationship depicted from the 5th horizon explained negative influences of the responses of the inflation to shocks in the interest rate. This result is in support of the previous empirical findings that Inflation and interest rates are linked and frequently referenced in macroeconomics. The response innovation of the inflation on the other hand to the shock in the growth of GDP took a 0.0% in the 1st quarter and became a positive value of 2.5% in the 5th quarter and subsequently to -75% in the 10th quarter. This result implied that shock to GDP explained 75% of the fluctuation in inflation in the longrun in Nigeria.

Generally, Inflation, interest rates and GDP are often mentioned in the same breath, and this is because the three are closely related. In the Nigeria, baseline interest rates are set by the Central Bank of Nigeria (CBN), and its Monetary Policy Committee meets occasionally within a year to set short-term inflation and interest rate targets. During these meetings, the Inflation and interest rate are significant factors in the CBN's decision, because of the CBN, as well as other major central banks, have a specific interest rate target in mind for the economy to achieve, usually 7-14% annually. This is known as inflation targeting. If inflation is the cost of saving money, interest rates are the cost of borrowing it.

Interest rates directly affect lending and borrowing because higher interest rates make servicing loans costlier. By changing interest rates, the CBN tries to achieve maximum employment, stable prices and a good level growth. As interest rates drop, consumer spending increases, and this, in turn, stimulates economic growth which can spur inflation. The central bank also wants to keep growth in check, since excessive economic growth can, in fact, be quite detrimental. At one extreme, an economy that is growing too fast can experience hyperinflation, resulting in the problems we mentioned earlier. At the other extreme, an economy with no inflation has essentially stagnated and can experience a deflationary spiral. The right level of economic growth, and thus inflation, is somewhere in the middle. It's the CBN's job to maintain that delicate balance. A tightening, or rate increase, attempts to head off future inflation. An easing, or rate decrease, aims to spur economic growth.

Inflation targeting originated as an official policy in the late 1970's with the Reserve Bank of New Zealand. The practice has since spread throughout much of the world. However, inflation targeting has come under fire over the past few years. First, despite inflation targeting, the rate of inflation has remained above its target in the Nigeria. For nearly every year since the Great Recession in 2008. Moreover, in Europe, they have even experienced deflation a few times over the past decade. A larger point is that the 2-3% inflation target, while it seems reasonable, is actually an arbitrary number with little to no empirical evidence that it is a valid level to target in the first place.

Keep in mind that while inflation is a major issue, it is not the only factor informing the CBN's decisions on interest rates. For example, the CBN might ease interest rates during a financial crisis to provide liquidity (flexibility to get out of investments) to Nigerian financial markets, thus preventing a market meltdown.

Inflation is also related closely to unemployment. The Phillips Curve relates the inverse relationship between the two. The theory states that with economic growth comes inflation, which in turn should lead to more jobs and less unemployment. However, the original concept has been challenged empirically due to the occurrence of stagflation in the 1970's when there were high levels of both inflation and unemployment. Economists have responded by allowing for many different Phillips

Curves to exist, or by amending the relationship between inflation and unemployment to changes in the rates of inflation and unemployment.

Response of Interest Rate to PCMP and other macroeconomic variables (Structural one Standard Deviation Innovation Shocks)

Figure 4.3 showed the impulse response of interest rate to shocks in PCMP, inflation and growth rate of GDP. Shock to Interest rate account for 4.1% in the 1st quarter and decrease to -0.6% in the 5th quarter and to the positive value of 10% by the end of the 10th quarter (i.e own shock). Shocks to PCMP account for 5.3% in the 1st quarter, -0.8% in the 5th quarter and further to 21% by the end of forecast period. This result implies that shocks to PCMB explain 21% of the fluctuation in interest rate in the longrun and conform with the previous empirical evidence found by Zelealem Yiheyis (1998) and Aleh Plashchynski and Andreas Willgert (2013). While shock or innovation to inflation accounts for 2.6% of the fluctuation in interest rate in quarter one, decrease to -32% in quarter 5 and to -16% at the end of the 10th quarter. This fact has already been established by previous empirical evidence on the relationship between the two macroeconomic variables. Interest rate responds to 0.0% shock to GDP in the 1st quarter, 75% in the 5th quarter and to a negative value of -11% in the 10th quarter. This implies that a rise in the growth rate of GDP leads to a rise in interest rates, as demand for funds increases, interest rate increases and the reverse also true. There are several reasons that an increase in the growth of GDP affects a rise/fall in interest rate in Nigeria. First, during the economic boom, more investors invested more money into the economy. This increased demand for funds led the lenders asked for higher interest rates. Secondly, during economy booms, inflation will generally increase. This will lead to an increase in the interest rate commanded by lenders, so as to keep pace with inflation.

Response of Growth Rate of GDP to PCMP and other macroeconomic variables (Structural one Standard Deviation Innovation Shocks)

In the 1st quarter, GDP respond to -77% percent of the shock to PCMP, the impulse response of GDP to one standard innovation shock to PCMP in the 5th quarter was 12% and decreased to -9% by the end of the forecast period (see Figure 4.4). The results signify negative shocks to the PCMP influences the response of GDP throughout the forecast quarters most especially with 12% shock to PCMP in the 5th quarter. This result corroborates the empirical evidence of Edwards (1989) and Easterly (1994) which suggests a high currency premium negatively influences aggregate economic activity.

Inflation, on the other hand, account for -81% of the fluctuation in the GDP in the 1st quarter and decreased to 25% by the 5th quarter. This upward trend is in line with the relationship that has been established in the literature between the two macroeconomic variables. The response of GDP to the shock to inflation by the 10th quarter was 4% which signifies that the relationship between the two macroeconomic variables fluctuates from time to time in Nigeria. Whereas the impulse response of GDP to one standard or innovation shock to the interest rate at the 1st quarter was –1.2%, and thereafter became negative and respond to -20% by the 5th quarter and decreased to 8% by the end of the forecast periods. These results imply an inverse relationship between these two terms as when interest rate increase the growth rate of GDP decreases. While on the other hand,

a decrease in interest rate gives incentives to companies to invest in business leading to increasing in investment component leading in an increase in growth of GDP.

Variance Decomposition Analysis

The Variance Decomposition (VD) analysis for the PCMP shows that in the first quarter, a shock to the Inflation contributes zero (0) percent variation to the PCMP, while the Interest rate and GDP have 0.00 and 0.00 percent contributions respectively. It should be noted that the shock to PCMP accounted for 100 percent variation in PCMP (that is, own shock). After the first period, the contribution of Inflation increases to 13.8 percent in period five, while that of interest rate and growth of GDP increases to 5.3 and 7.2 percent respectively. Inflation contributes 14.4 percent of the variation in PCMP in the 10th period while the contribution of Interest rate decreases to around 5.2 percent in the 10th period. GDP contribution increased marginally from the percentage contribution in the variation in the PCMP and it became 7.4 percent as the forecast horizon is extended. (See Table 4.3 in Appendix B)

Table 4.4 showed that PCMP has 30.4 percent contribution to the variation in Inflation in the first period and increase to 37.3 percent in the 5th period and maintained the steady increase but slightly to 37.5 in the 10th period in the forecast horizon respectively. The contribution of PCMP in the variation of Inflation is high compared to its contribution to the variation of Interest rate and growth of GDP which is consistent with the impulse response result. Interest Rate contributes only 0.0 percent in the first period to the variation in Inflation and increases to 4.7 in the 5th period ahead in the forecast horizon. Interest Rate slightly increased to 4.9 percent in the tenth period. GDP contributes 0.0 percent of the variation in Inflation in the first period while its contribution increases to 9.6 percent in the 5th period and thereafter maintained the steadiness to 10.6 percent till the end of the forecast horizon. It should be noted that the growth of GDP maintained its steadiness throughout the forecast horizon. This result is in line with the previous empirical findings and also in line with the result of the impulse response. The significant contribution of PCMP, Interest Rate and GDP to variations in Inflation indicates that exchange rate and domestic structural factors have a significant effect on inflation. Inflation explains 69.5 percent of its own variation at the first period, 48.2 percent in the 5th periods and 47.2 percent in the tenth period. This indicates the increase in consumer prices is mainly attributed to its own variations; this suggests that the inflation process in Nigeria has significant inertia.

We also found that the PCMP has a significant contribution to the variation of Interest Rate. It accounted for 53.5 percent of the variation in Interest Rate in the first period and increases to 58.2 percent in the 5th period and decreased to 57.9 in the 10th period ahead. This showed the existence of the significant influence of PCMP on the domestic interest rate. Inflation explained 13.2 percent of the variation in the 1st period, increase to 14.0 percent in the 5th period and to 14.1 percent in the 10th period. This indicates that the increase in shock to Inflation has significant influence in the variation in Interest Rate. The contribution of GDP to the variation in Interest rate stood at 0.0 percent at the beginning of the forecast horizon, the one standard innovation shock increased to 3.9 percent in the 5th horizon and thereafter maintained steady but slight increase to 4.5 by the end of the forecast horizon. This confirmed the result of impulse response analysis on the influence GDP on Interest Rate. Although, the relationship between the two macroeconomic variables can take negative and positive depending on other factors such as inflation, PCMP etc. (See Table 4.5)

Table 4.6 depicts the proportions of forecast explained by the innovations of the considered variables. Structural innovation or shock to the Growth of GDP accounted for 94.3 percent of the variation of the fluctuation in GDP (own shock) in the 1st period, decrease to 85.8 percent in the 5th period and to 85.5 percent in the 10th period. Shock to PCMP contributed 1.2 percent variation of the fluctuation in GDP in the 1st period, increase significantly to 6.6 percent in the 5th period and thereafter maintained the steadiness at 6.7 percent till the end of the forecast horizon. This result signifies that PCMP has a significant impact on the growth of GDP in Nigeria and also, the result corroborates the empirical evidence of Edwards (1989) and Easterly (1994) which suggests a high currency premium negatively influences aggregate economic activity.

Shock to Inflation, on the other hand, contributed 1.3 percent variation of the fluctuation in GDP in the 1st period, the one standard innovation or shock increased to 3.1 percent in the 5th period and further maintained a slight increase to 3.2 percent variation of the fluctuation in GDP in the 10th period. It should be noted that shock to inflation account for less variation in GDP compared to shock to PCMP in the forecast horizon. However, variation in GDP respond to 3.0 percent shock to Interest Rate in the 1st period, 4.3 percent in the 5th period and 4.4 percent in the 10th period. Shocks to Interest rate maintained steadiness throughout the forecast horizon. These results are in line with the results of the impulse response.

Test of Causality among PCMP and Macroeconomic Variables

To provide empirical evidence on the fundamental question of whether PCMP causes Macroeconomic variables or macroeconomic variables cause variation in the PCMP, this study adopted the VAR Granger causality test (GCT). Given that the key macroeconomic variables in this study are Inflation (INF), Interest Rate (INT) and Growth of GDP, the causality test to be carried out is to examine if a uni-directional or bi-directional relationship exist between each of the macroeconomic variables, and Parallel Currency Market Premium (PCMP) and the direction of causality between PCMP and Inflation.

In Table 4.7 in Appendix B, the GCT test carried out revealed that no short-run uni-directional causality exist between PCMP and macroeconomic variables at 5 percent level of significance since the Probability value is more than 0.05; that is at 5 percent level of significance except inflation. In table 4.8, only INF was seen to be granger causing PCMP but not the other way round. The implication of the result is that INF has facilitated the growth of PCMP in Nigeria but PCMP, INT and GDP have not caused INF to grow. However, the result indicated that all the variables were not jointly significant at 5% level of significance. This signifies no uni-directional causality exist among PCMP, INT and GDP and which cannot jointly cause INF in Nigeria. We also observed that, no causal relationship between INT and PCMP, INF and GDP as indicated in table 4.9 in Appendix B. When INT was used as dependent variable, neither all the independent variables granger causes INT individually and does not granger causes INT jointly as their probabilities were not significant at 5% level.

Also, no causality was observed between GDP and PCMP, INF and INT at 5 percent level of significance. This implies that no causality runs between GDP and the aforementioned variables in Nigeria. The implication of this is that the growth of output in Nigeria has not been caused by PCMP, INF and INT (see Table 4.10 in Appendix B). Of all the key macroeconomic variables and PCMP examined, INF is the only one that has a causal relationship with PCMP and it is uni-directional. The significant contribution and causality of INF to variation in PCMP indicates that domestic structural factors have a significant effect on

PCMP and this have significant impact on sustainable growth and development process. This result was in line with the view of the neo-classical argument which holds that inflation affects the PCMP simply because it affects the parallel market for foreign exchange in two ways. First, it causes the fixed nominal exchange rate to become increasingly over-valued, which in turn leads to an expansion in the size of the parallel market. Second, by reducing real domestic interest rates, inflation induces capital flight. In this regard, inflation may cause the PCMP to rise. The result also conformed to the empirical evidence of Linglan Wang and Guy Judge (1993) and Derrese Degefa (2001).

CONCLUSION AND RECOMMENDATION

This paper has sought to discuss in a consistent and comprehensible framework of recent theoretical and empirical developments in the analysis of the Parallel Currency Market Premium (PCMP) and its implications on macroeconomic fundamental and consequently effects on sustainable growth and development in developed, developing and in Nigeria in particular.

Therefore, the empirical results of the dynamic relationship between the PCMP and macroeconomic variables based on Structural Vector Autoregressive estimates, showed that, the PCMP has a direct and significant effect on macroeconomic variables. This is due to the fact that the Structural innovation shocks to PCMP on average explained more variations in macroeconomic variables as indicated by both the Impulse response Function and Variance Decomposition. In addition, the empirical evidence on the fundamental question of whether PCMP causes Macroeconomic variables or macroeconomic variables cause the PCMP using VAR Granger causality test (GCT). The test carried out revealed that no short-run uni-directional causality existed between PCMP and macroeconomic variables. Only inflation was seen to be granger causing PCMP but not the other way round. The implication of the result is that inflation has facilitated the growth of PCMP in Nigeria.

The paper concluded that, the best approach to constraints to the effective performance of the macroeconomic fundamentals and ensure crucial support in the attainment of sustainable growth and development in Nigeria need to be eliminated through further easing of foreign exchange rationing gradually in the official market and consequently eliminating the PCMP.

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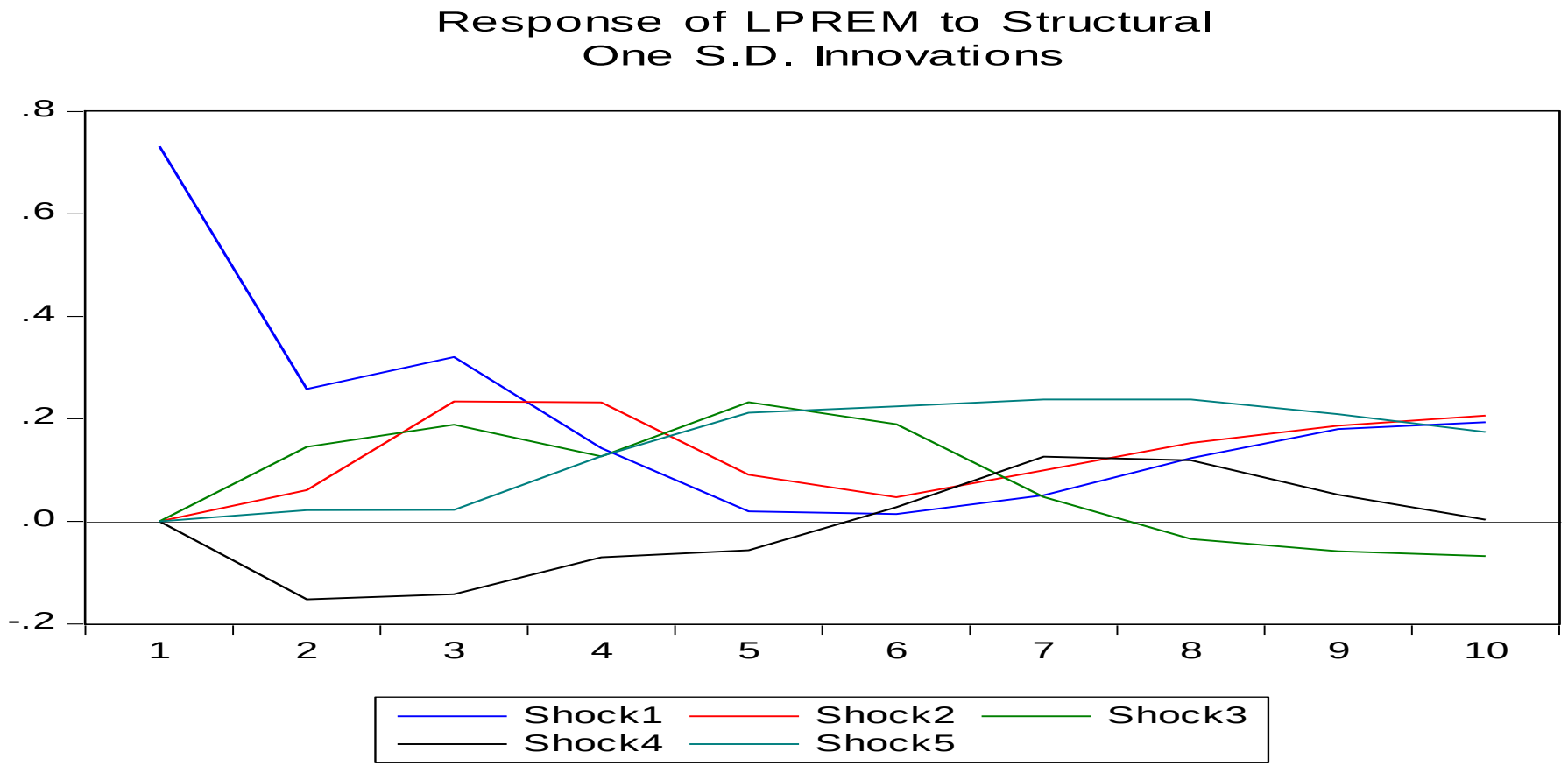
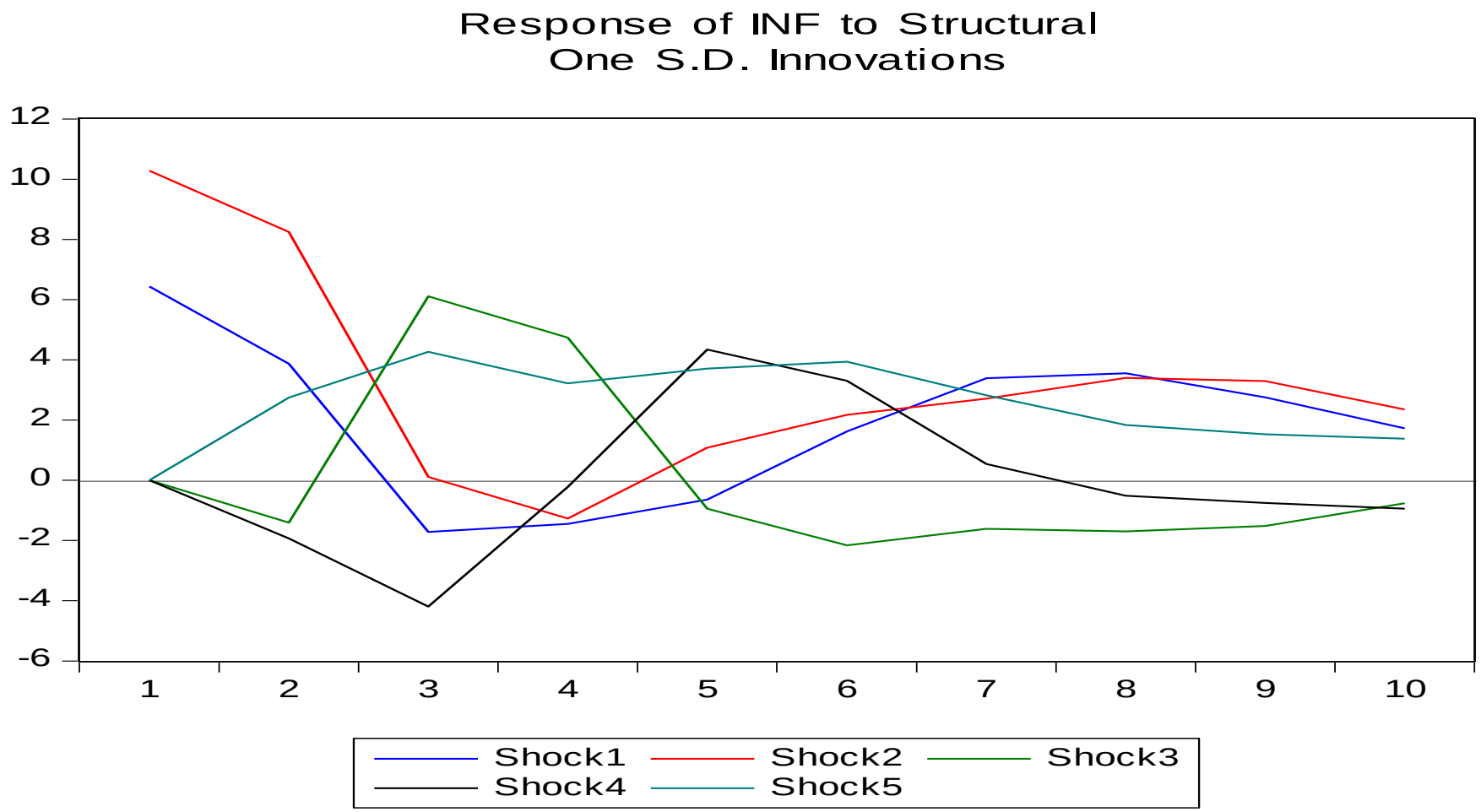
Appendix A



Note: Shock 1 = PCMP, Shock 2 = Inflation, Shock 3 = Interest Rate, Shock 4 = GDP and Shock 5 = Dummy

Figure 4.1: Response of PCMP to macroeconomic variables (Combine structural standard innovation)

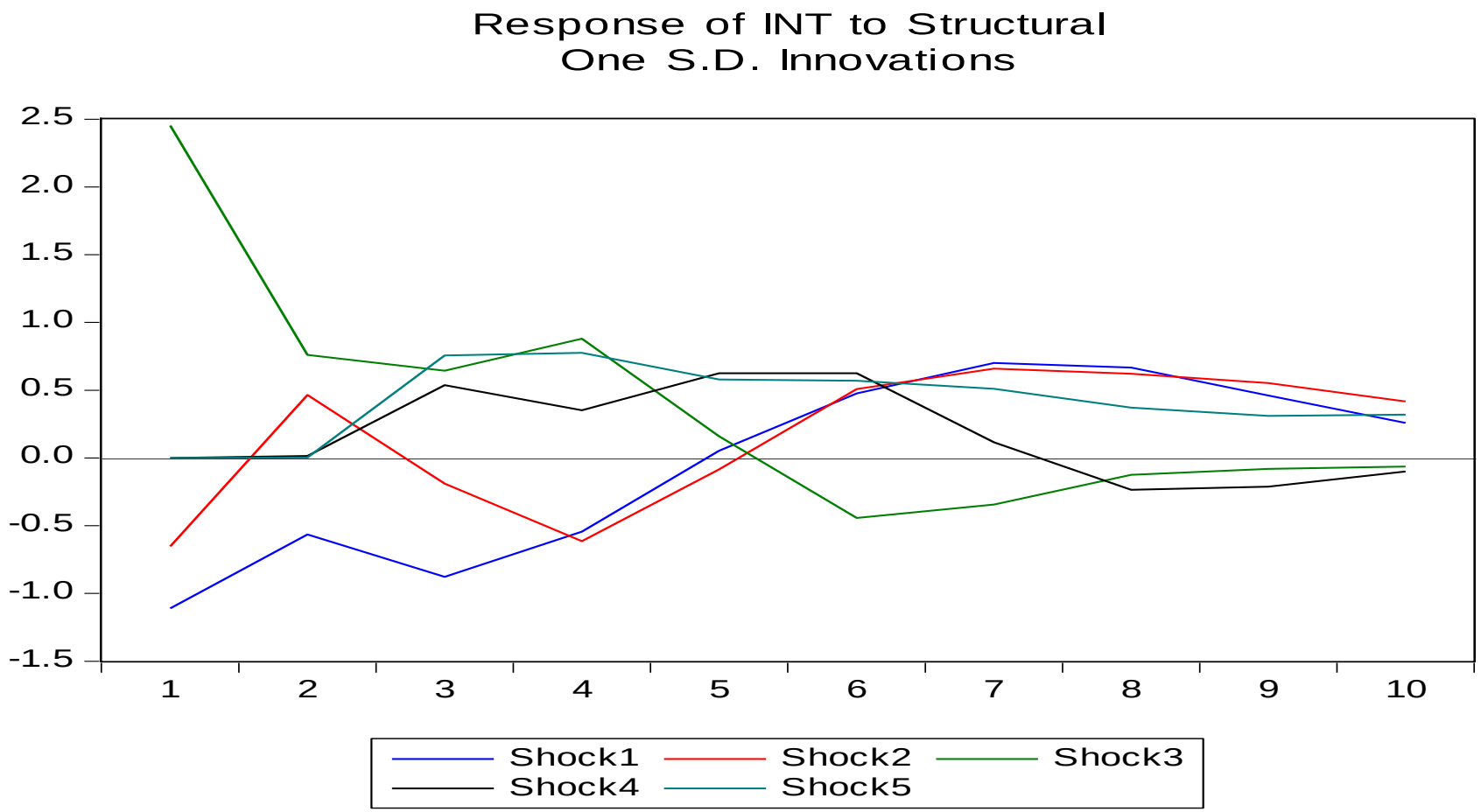
Source: Author's computation based on Eview's estimates



Note: Shock 1 = PCMP, Shock 2 = Inflation, Shock 3 = Interest Rate, Shock 4 = GDP and Shock 5 = Dummy

Figure 4.2: Response of Inflation to PCMP and other macroeconomic variables (Combine structural standard innovation)

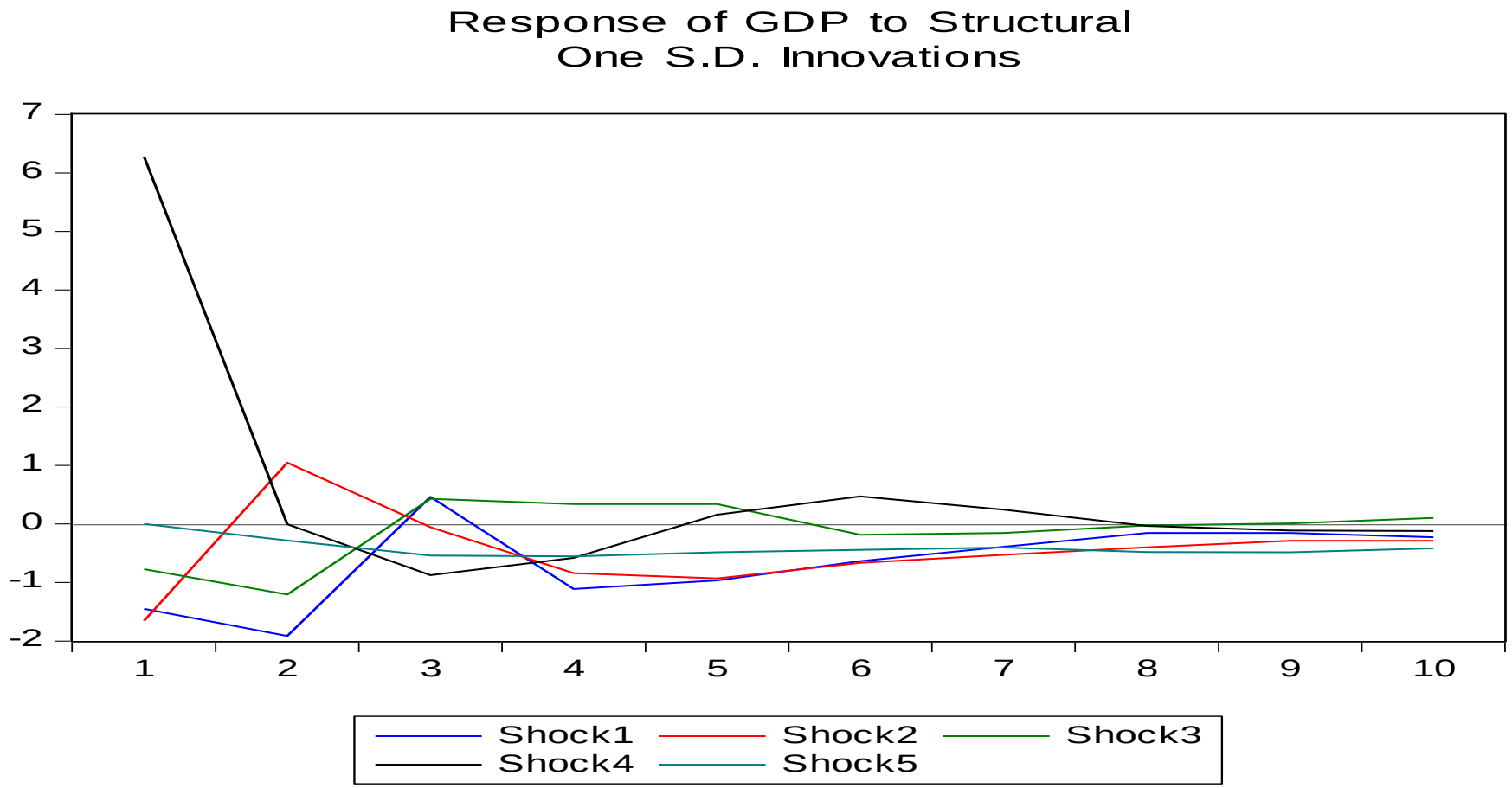
Source: Author's computation based on Eview's estimates



Note: Shock 1 = PCMP, Shock 2 = Inflation, Shock 3 = Interest Rate, Shock 4 = GDP and Shock 5 = Dummy

Figure 4.3: Response of Interest Rate to PCMP and other macroeconomic variables (Combine structural standard innovation)

Source: Author's computation based on Eview's estimates



Note: Shock 1 = PCMP, Shock 2 = Inflation, Shock 3 = Interest Rate, Shock 4 = GDP and Shock 5 = Dummy

Figure 4.4: Response of Growth of GDP to PCMP and other macroeconomic variables (Combine structural standard innovation)

Source: Author's computation based on Eview's estimates

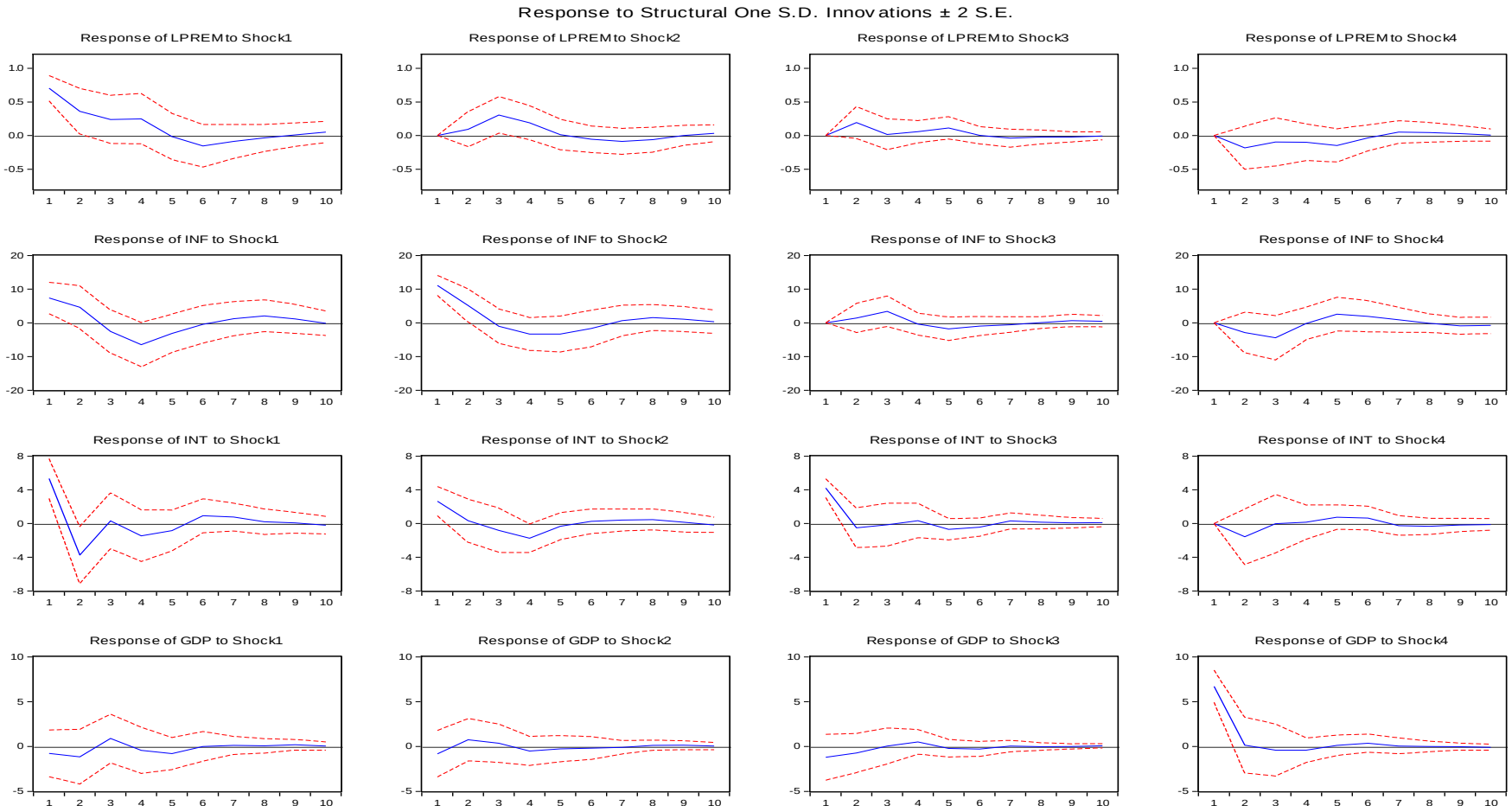


Figure 4.5: Results of Impulse Response Analysis

Source: Author's computation based on Eviews estimate

APPENDIX B

Table 4.3: Variance Decomposition of LPREM					
Period	**S.E.**	**LPREM**	**INF**	**INT**	**GDP**
1	0.70	100.00	0.00	0.00	0.00
2	0.83	88.81	1.26	5.26	4.66
3	0.92	78.89	11.96	4.31	4.81
4	0.98	76.24	14.29	4.17	5.28
5	1.00	73.62	13.82	5.33	7.22
6	1.01	73.91	13.75	5.19	7.13
7	1.02	73.28	14.20	5.24	7.26
8	1.03	72.88	14.44	5.24	7.42
9	1.03	72.78	14.42	5.28	7.50
10	1.03	72.77	14.47	5.26	7.48

Source: Author's computation based on Eviews

Table 4.4: Variance Decomposition of INF					
Period	**S.E.**	**LPREM**	**INF**	**INT**	**GDP**
1	13.33	30.48	69.51	4.89	0.00
2	15.35	31.96	63.66	0.85	3.50
3	16.57	29.83	54.98	4.96	10.2
4	18.12	37.85	49.38	4.20	8.55
5	18.95	37.31	48.24	4.76	9.67
6	19.15	36.58	48.00	4.90	10.4
7	19.23	36.68	47.74	4.95	10.6
8	19.40	37.17	47.52	4.86	10.4
9	19.50	37.15	47.36	4.92	10.5
10	19.52	37.07	47.28	4.96	10.6

Table 4.5: Variance Decomposition of INT					
Period	**S.E.**	**LPREM**	**INF**	**INT**	**GDP**
1	7.29	53.5	13.2	33.16	0.00
2	8.36	60.6	10.2	25.54	3.55
3	8.41	60.1	11.0	25.29	3.51
4	8.72	58.7	14.2	23.67	3.30
5	8.83	58.2	14.0	23.71	3.95
6	8.91	58.1	13.9	23.51	4.38
7	8.96	58.2	13.9	23.39	4.41
8	8.99	58.0	14.1	23.28	4.53
9	8.99	57.9	14.1	23.26	4.57
10	9.00	57.9	14.1	23.25	4.58

Source: Author's computation based on Eviews

Table 4.6: Variance Decomposition of GDP					
Period	**S.E.**	**LPREM**	**INF**	**INT**	**GDP**
1	6.91	1.26	1.37	3.03	94.32
2	7.08	3.81	2.42	3.94	89.80
3	7.16	5.27	2.62	3.86	88.22
4	7.22	5.56	3.04	4.30	87.08
5	7.27	6.67	3.12	4.32	85.87
6	7.29	6.64	3.16	4.44	85.73
7	7.29	6.66	3.18	4.44	85.70
8	7.29	6.67	3.21	4.44	85.66
9	7.29	6.73	3.25	4.43	85.57
10	7.30	6.73	3.25	4.44	85.55
Factorization: Structural					

Table 4.7: Dependent variable: LPREM			
Excluded	**Chi-sq**	**df**	**Prob.**
INF	7.17	2	0.02
INT	2.61	2	0.26
GDP	1.30	2	0.51
All	9.63	6	0.14

Table 4.8:Dependent variable INF			
Excluded	**Chi-sq**	**df**	**Prob.**
LPREM	3.43	2	0.17
INT	1.56	2	0.45
GDP	2.03	2	0.36
All	5.25	6	0.51

Table 4.9:Dependent variable: INT			
Excluded	**Chi-sq**	**df**	**Prob.**
LPREM	5.17	2	0.07
INF	0.33	2	0.84
GDP	1.35	2	0.50
All	10.54	6	0.10

Table 4.10:Dependent variable: GDP			
Excluded	**Chi-sq**	**df**	**Prob.**
LPREM	0.53	2	0.76
INF	0.88	2	0.64
INT	0.47	2	0.78
All	1.93	6	0.92

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