THRESHOLD EFFECTS OF PARALLEL CURRENCY MARKET PREMIUMS ON INFLATION IN NIGERIAN

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Abstract
*T*his study investigates the threshold level of the Parallel Currency Market Premium (PREM) on inflation in Nigeria. Using data from the World Bank's Development Indicators and the Central Bank of Nigeria's Statistical Bulletin covering the period of 1986 to 2022. The Threshold Model is employed to analyze the relationship between PREM and key macroeconomic factors such as inflation and interest rate. The results obtained reveal threshold values of 41% for inflation rate and 26% for interest rate, beyond which Nigerian inflation and interest rates are adversely affected. The study concludes that gradually liberalising the Nigerian foreign exchange in the official market and unifying the currency exchange rates can mitigate inflationary pressures by eliminating the PREM.

Keywords: PREM, Inflation, Interest Rate, Threshold level, Threshold Model, Exchange Rate, Black Market.

Introduction

In Nigeria, the parallel currency market premium has become a significant factor influencing the country's macroeconomic variables, particularly inflation. The parallel market, also known as the black market, operates outside the official foreign exchange market, and its premiums can have far-reaching implications for the economy. Government engagement in the foreign exchange market, both direct and indirect, is the main cause of these actions. People who require foreign exchange and are unable to get all they need from official sources are compelled to look for an alternative source when access to the

official exchange market is restricted. Since there are different foreign exchange controls on international transactions on goods, services, and assets. People who have extra foreign currency would rather sell it for more than the official rate.

The size of parallel markets varies by country and depends on exchange and trade restrictions. The difference between official and the parallel market rates is known as the Parallel Currency Market Premium (PREM). PREM has a significant impact on macroeconomic indicators like economic growth, inflation, and interest rates. Previous studies such as Barrie et al. (2023) investigated the dual exchange rate system in Sierra Leone, exploring the distinct effects of official and parallel exchange rates (Leone vs. USD) on inflation while Abdulhamid et al. (2022) examined the relationship between inflation and exchange rates in Nigeria. Musa (2021) investigated the impact of exchange rate volatility on inflation in Nigeria, but there is a need for more country-specific research. The paper therefore aims to address the research gap by investigating the PREM threshold level for inflation in Nigeria, a topic that has received little attention in empirical literature.

Nigeria, in particular, has a well-developed parallel market for foreign exchange, which affects domestic prices and official foreign exchange rate. Understanding parallel markets is crucial for policymakers to regulate foreign exchange markets effectively. Parallel currency market premiums can have a positive and significant impact on inflation in Nigeria. When the premium increases, it can lead to higher inflation rates. This is because a high premium can result in increased demand for foreign currency in the parallel market, driving up prices and fueling inflation necessitating the need for more empirical studies to establish the appropriate threshold level for the PREM.

Threshold effects refer to the phenomenon where the relationship between parallel currency market premiums and inflation changes when the premium exceeds a certain threshold. In other words, the impact of the premium on inflation may not be linear, and there may be a point beyond

which the effect becomes more pronounced. Understanding the threshold effects of parallel currency market premiums on inflation is crucial for policymakers to develop targeted strategies to mitigate the adverse effects of parallel market activities on inflation. By identifying the threshold beyond which the premium has a significant impact on inflation, policymakers can implement policies to reduce the premium and keep inflation under control. (Edwards, 1989; Agenor, 1992; Phylaktis, 1996; Akinbobola *et. al.* 2018;).

Since the parallel market for exchange rate is set, the same criteria that determine the official exchange rate must also determine the premium. Certain factors such as regulatory challenges, exchange rates volatility in the parallel market can fluctuate rapidly due to market sentiment, political stability, and economic indicators, the risk of scams and dishonest dealers is significant in the parallel market, with unscrupulous individuals offering unfavourable rates or counterfeit currency which can impact the parallel market's supply side, while others such as limited access to foreign exchange, import demand, travel and remittances, hedging against currency devaluation can affect the demand side. Thus, the interplay of market forces in the parallel foreign exchange market determines the PREM. A growing body of empirical studies indicates that this has significant effects on "the transmission process of short run macroeconomic policies" (Agenor, 1992) as well as overall economic performance because premium fluctuations cause portfolio reallocations (between domestic and foreign assets) and change the incentives for illicit activity (Kiguel and O'Connel, 1995; Ogun, 2015).

Nonetheless, some empirical studies such as Lowe (2019) investigated the relationship between the exchange rate regime and the sources of inflation in Gambia, using a time series dataset covering the period 1978-2016. The study employed the Augmented Dickey-Fuller (ADF) test to examine the stationarity of the data and the Johansen co-integration test to determine if a long-run relationship exists among the variables. The results revealed that there is no long-run relationship

between the exchange rate and inflation, suggesting that other factors may be driving inflation in Gambia. Bui (2018) examined the relationship between official and black-market exchange rates in Vietnam from January 2005 to April 2011 using a Vector-Error-Correction model and Granger tests. The study found a long-run relationship between the official and parallel market rates of the Vietnam Dong against the U.S. dollar.

Additionally, the Granger causality test revealed a unidirectional causality, where the official exchange rate drives the black-market exchange rate, but not the other way around. As a result, the parallel market for foreign exchange has been thoroughly researched and modeled using a variety of methodologies in the corpus of empirical literature that is currently available. The supply and demand method, as proposed by Culbertson (1975) and Sheikh (1976), is one of such perspectives that examines the equilibrium conditions in a foreign exchange market activity that restrict foreign exchange transactions. Blejer (1978) introduced the monetary method, which emphasises the central importance of equilibrium in the money market. Then, with a few changes, Agénor (1991) and Olgun (1984) developed this strategy even further. The portfolio method, first presented by Dornbusch, Dantas, Pechman, de Rezende Rocha, and SimÍes (1983), places significant emphasis on the interplay between stock and flow conditions in the parallel foreign exchange market when calculating the rate of change of the parallel dollar stock as well as the Parallel Currency Market Premium.

Statement of the Research Problem

The exchange rate and inflation are the two main factors used to evaluate a country's macroeconomic success. The primary drivers of variations in economic development are shifts in foreign currency rates and growing prices for goods and services (Abubakar et al, 2022). One of the essential instruments used by the Central Bank of Nigeria to attain monetary and economic stability and manage inflationary pressures is the exchange rate. One of the economic problems that many nations,

including Nigeria, deal with is the parallel (black-market) exchange rate, which is subject to frequent changes due to the fragility of the Nigerian economy, which negatively affects the economy. This issue stems from a number of issues, including economic instability, financial and administrative corruption, an excessive reliance on crude oil, and other elements that contributed to the local currency's loss in value. The official price listed in the nation's budget is still significantly lower than the US dollar exchange rates on the Nigerian black market. notwithstanding the Central Bank's attempts to resolve the issue (AL-Abdullah, et al., 2023).

The parallel currency market premium in Nigeria has significant implications for the country's macroeconomic variables, particularly inflation. Despite various policy interventions, inflation remains a major challenge, and the impact of parallel market activities on inflation dynamics is not well understood. As a developing country with a small, open economy and flexible exchange rates, Nigeria's monetary authorities regulate foreign currency use. Despite being forbidden, a parallel exchange market exists alongside the official market, posing challenges for the Central Bank of Nigeria (CBN). The parallel market has significant social and economic costs, including: inflation, revenue loss, distorted resource allocation, rent-seeking and weakened monetary policy instruments. First off, there is a more developed parallel market for foreign exchange, which is likely a factor in both domestic prices and the nation's official foreign exchange revenues. (Nowak, 1984). The parallel market's fluctuations affect investor decisions, the economy, and international reserves.

Research on Nigeria's parallel market is crucial due to its potential impact on: domestic prices and foreign exchange revenues, Inflation, exacerbated by the naira's depreciation on the black market, macroeconomic variables, which have been understudied in Nigeria. Given the aforementioned, it is essential that policymakers consider the effects of these changes and the Parallel Currency Market Premium (PREM) threshold level for a few chosen macroeconomic variables in Nigeria.

Research on the empirical PREM estimates for small open and developing economies is still lacking.

While there have been some empirical studies on parallel exchange markets in Sub-Saharan Africa (SSA), each country's unique economic environment and challenges make it difficult to draw broad conclusions. The variability in PREM estimates Yiheyis's (1997), as seen in previous studies, highlights the need for more country-specific research. To better understand the issues and develop effective monetary policies, more research is needed on a country-by-country basis. This will help policymakers address the specific challenges and opportunities in each country, rather than relying on generalisations. This paper delves deeper, focusing on the PREM threshold level for inflation, a topic that has received little attention in Nigeria's empirical literature.

Research Objectives

The broad objective of the study is to analyze the threshold effects of parallel currency premium on Nigerian inflation. The specific objectives include:

i. To analyze the threshold level for inflation.
ii. To analyze the threshold level for interest rate.
iii. To recommend the appropriate threshold PREM level for both inflation and interest rate.

Literature Review

Theoretical Literature

Nigerian Exchange Rate System

Nigeria operates a managed floating exchange rate system, where the Central Bank of Nigeria (CBN) sets a range within which the naira's value is allowed to fluctuate against the US dollar based on market forces. Official Exchange Rate: The CBN sets the official rate, which is determined through the Nigerian Foreign Exchange Market (NFEM). Parallel Market Rate: The parallel market rate operates informally, with rates often higher than the official rate due to dollar supply constraints and strong demand. Exchange Rate Volatility: The naira's value can

fluctuate against the US dollar, with rates influenced by factors like oil prices, foreign exchange reserves, inflation, and global economic conditions. Official Rate: ₦1,467.43 per US dollar (NFEM rate) while the Parallel Market Rate: ₦1,480 - ₦1,500 per US dollar with the Interbank Rate: ₦1,468 - ₦1,475 per US dollar (Central Bank Statistical Bulletin, 2025).

The CBN has implemented reforms to unify the exchange rate system and improve liquidity, including the removal of exchange rate caps and the introduction of a unified exchange rate system through the NFEM. In furtherance of CBN's actions to stabilise the exchange rate, in March 2021, CBN introduced the Naira-4-Dollar scheme. By this scheme, the CBN paid ₦ 5 through the commercial banks for every US$1 received through CBN-licensed IMTOs. This was to encourage diaspora remittances to augment the supply of foreign exchange in the country. Likewise, in February 2022, CBN introduced the Race-To- ₦200 billion in 3-5 years (RT200) programme to drive export trade. The programme incentivised non-oil exporters by paying ₦65 for US$1 repatriated and sold in I&E to ADB for third-party transactions and ₦ 35 for US$1 repatriated and sold in I&E for own use but strictly for eligible transactions Central Bank of Nigeria. (2021). Exchange rate management in Nigeria (pp. 1–34). CBN Report.

CBN was under pressure to unify the multiple exchange rates, and by June 14, 2023, the CBN announced a free-floating exchange rate system and all the other rates were closed for a single market – NAFEM. Upon the unification of all rates and the emergence of NAFEM, approximately US$7 billion in forward sales matured, which CBN had to pay, hence the tension in the system. Many correspondent banks were worried about default as many had trade lines extended to the commercial bank awaiting payment from the Forward sales. To avert a loss of confidence in the system, the CBN had to review the outstanding Forward. Upon review, CBN classified some of the Forwards as invalid Forward and paid part while a substantial sum remained unpaid even though the Naira had been taken from the bid date. This non-payment led to a severe

default, which created panic in the system Central Bank of Nigeria. (2021).

Upon resumption in office by President Bola Ahmed Tinubu, he announced the removal of subsidies and unification of rates. This led to rapid depreciation. Thirty days after the announcement, the rate depreciated from ₦461.60/US$1 on May 30, 2023, to ₦ 770.88/US$1 on June 30, 2023. The rate has consistently depreciated and is now at four digits to a United States Dollar. The Apex Bank introduced other policies to arrest the depreciation of Naira. In October 2023, the 42 items of imports declared non-valid for foreign exchange were restored; as a result, foreign exchange for those items can be sourced from any of the official markets Central Bank of Nigeria. (1982). Review of Nigeria's balance of payments.

CBN introduced different reforms, including removing the cap on the spread of foreign exchange transactions, introducing the willing buyer and willing seller's model, and modifying channels for a payout of PTA and BTA to electronic channels only. This is to curb demand, especially among those who buy PTA/BTA but do not travel or do not need up to the amount purchased. Aside from this, CBN also introduced cash-pooling to international oil companies to support the supply of foreign exchange rather than moving the whole fund to the parent company. Other reforms were abolishing foreign currency-denominated collateral for Naira loans and reversing the Prive Verification System effective July 1, 2024. The policy required 50% cash pooling while the remaining 50% may be repatriated 90 days after receipt of the export proceeds CBN External Sector Division. (2003).

The Apex Bank also introduced a new bidding system, the Electronic Foreign Exchange Matching System (EFEMS), which commenced on December 2, 2024. This system requires all ADBs to conduct all foreign exchange transactions on the platform, and it is expected to enhance governance and transparency, Central Bank of Nigeria. (1982). Review of Nigeria's balance of payments Central Bank of Nigeria Statistical Bullen. (2024).

This paper examined the existing research on the threshold effects of parallel currency market premium, providing a comprehensive overview of the literatures that focused on determining the threshold effects of parallel market currency premium and understanding how they relate to macroeconomic factors such as inflation and interest rate. Researchers have developed various models to explain parallel market currency premium on inflation. Diamandis and Drakos (2005) classified models of parallel currency markets into three categories: real-trade Models: these models focus on the demand for foreign currencies for illicit transactions, such as smuggling, under-invoicing exports, and other illegal activities. Monetary Approach Models: these models assume that the official foreign exchange market meets trade-related demands, while the parallel market arises from individuals' and businesses' desire to adjust their portfolios, highlighting the role of monetary factors. Portfolio Balance Models: these models combine elements of both real-trade and monetary approach models, providing a more comprehensive understanding of parallel market dynamics. 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) analysis, 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. Portfolio Balance Models: These models propose that the black-market exchange rate is determined by the interplay between asset markets and current account dynamics. Specifically, they suggest that: Short-term: The black-market rate is influenced by restrictive foreign exchange conditions in asset markets. Current account impact: Both official and black-market exchange rates are affected by the current account. Long-term: the black-market exchange rate depreciates in tandem with the official rate, resulting in a stable black-market premium.

With regard to the determination of the premium, Dornbusch *et al.* (1983) and Phylaktis (1991) 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.

Dornbusch (1976) Rudiger Dornbusch's work on exchange rate dynamics and overshooting models is a classic contribution to stock-flow model. Kouri (1976): Pentti Kouri's work on the portfolio balance approach to exchange rates also laid some groundwork for stock-flow models. This study expands the stock-flow model to account for restrictions on foreign exchange for international trade and capital transactions. The black-market exchange rate is treated as a portfolio asset, influenced by: Interest rates: Fixed local and international rates. Official exchange rate: the official rate set by the authorities. Global transaction restrictions: Limits on international transactions. On-dollar asset values: Local currency value of non-dollar assets.

Changes in financial markets lead to sudden shifts in the premium, followed by adjustments in the stock of dollars and the premium itself. The study applies this framework to the Chilean exchange rate market, using an error correction model to analyze the dynamics. In order to examine the behaviour of the black-market rate in a wide number of countries, a model is formulated, based on Fishelson's (1988) modified Dornbusch model replacing the official rate with the black-market rate; to capture expected devaluation, the change in the black-market rate from the official rate is used. Incorporating the Fisher equation: The domestic interest rate is calculated based on expected inflation, linking it to the black-market rate. According to Fishelson analysis, the results suggest that the black-market premium is negatively affected by the real official rate. A

stronger official rate reduces the premium positively affected by expected profits. Expected gains from long positions in foreign exchange increase the premium. Empirical analysis of 19 economies by Fishelson using the adjusted Dornbusch model (both developed and developing) shows that the black-market exchange rate behaviour is consistent across economies, despite their unique economic, political, and social characteristics.

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 Ghei and Kamin model explore the relationship between official and black-market exchange rates, focusing on the macroeconomic determinants that influence the black-market premium. This model is particularly relevant in understanding the economic dynamics of countries with foreign exchange restrictions or controls. 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, 75% for Venezuela, 53% for Algeria and 40% for Zambia, Parallel exchange rates from International Currency Analysis, Inc. (various years) and Kaufmann & O'Connell (1991). This economic model assumes a small open economy with two produced goods (domestic & foreign) with fixed prices, one non-traded good with fixed output & price, no trade barriers or tariffs, monetary & fiscal policies at long-run equilibrium, overvalued official exchange rate, leading to excess demand for dollars (flow demand > flow supply), Miguel & Stephen (1995).

Empirical Literature

Empirical research on the parallel market for foreign exchange in developing countries of the world has flourished since the 1980s. The relationship between parallel currency market premium and inflation in Nigeria has been a subject of empirical investigation. Studies have shown that a high parallel market premium can lead to inflationary pressures, as it reflects excess demand for foreign currency and potential currency devaluation.

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 Dornbusch *et al.* (1983).

Abdulhamid et al. (2022) examined the relationship between inflation and exchange rates in Nigeria using annual data from 1980 to 2021. Employing Granger causality and ARDL approaches, the study revealed a cointegration relationship between inflation, exchange rates, imports, and GDP. The error correction term was found to be negative and statistically significant, indicating a rapid adjustment from short-run to long-run equilibrium. In the short run, exchange rates have a positive and significant impact on inflation, while in the long run, the relationship becomes negative and significant. Additionally, Granger causality testing showed no causal links between inflation and exchange rates in either direction.

Mohammed and Bashir (2018) examined the exchange rate pass-through (ERPT) to import and consumer prices in Nigeria, using quarterly time series data from 2000 Q1 to 2021 Q4. They employed autoregressive distributed lag and nonlinear ARDL techniques to analyze the data. The ISSN NUMBER: 1116-249X

24 Yunusa et al. JRSS-NIG. Group Vol. 2(1), 2025, pg. 20 - 38 study revealed an asymmetric and incomplete ERPT to Nigerian import and consumer prices, with a direct link between exchange rate appreciation and increases in consumer and import prices. Additionally, the analysis showed that previous quarter's import price significantly impacts inflation in Nigeria, and that GDP has an inverse relationship with inflation, with a greater impact on consumer prices than the exchange rate.

Barrie et al. (2023) investigated the dual exchange rate system in Sierra Leone, exploring the distinct effects of official and parallel exchange rates (Leone vs. USD) on inflation. Using ISSN NUMBER: 1116-249X 21 Yunusa et al. JRSS-NIG. Group Vol. 2(1), 2025, pg. 20 - 38 Autoregressive Distributed Lag (ARDL) analysis and annual time series data from 1980 to 2020, the study found that Leone depreciation significantly drives inflation. Notably, the parallel exchange rate has a more pronounced impact, with a 1% depreciation leading to a 1.26% increase in inflation, gradually decreasing to 0.92% over two years. In contrast, official exchange rate depreciation results in a 0.43% increase in inflation, which rises to 0.52% in the second year

Ebaidalla (2019) investigated the factors influencing parallel exchange rate premiums in Sudan between 1979 and 2014, as well as their impact on economic performance, specifically focusing on economic growth, inflation, and exports. The empirical analysis revealed that parallel exchange rate premiums are significantly affected by policy variables such as real exchange rates, trade openness, and money supply. Additionally, the results identified GDP growth, expected rate of devaluation, budget deficit, and foreign aid as the most significant factors influencing parallel ISSN NUMBER: 1116-249X 23 Yunusa et al. JRSS-NIG. Group Vol. 2(1), 2025, pg. 20 - 38 exchange rate premiums. Furthermore, the study found that parallel premiums have a detrimental impact on economic growth and export performance, while also showing a positive association with inflation rates.

Şen et al. (2020) investigated the long-term relationships between interest rates, inflation, and exchange rates in five fragile emerging market economies (Brazil, India, Indonesia, South Africa, and Turkey). Using Autoregressive Distributed Lag analysis, the study examined monthly time series data from January 2013 to December 2018 to test for threshold cointegration. The findings revealed a long-run positive relationship between inflation rates and nominal interest rates, supporting the ex-post Fisher hypothesis in all sample countries. Additionally, the study found that exchange rates and inflation rates co-move in the long run, indicating that currency depreciation leads to inflation through higher import prices in all the examined countries. 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.

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.

Chhibber and Shafi's 1990 study on Ghana's economy revealed some fascinating insights. They found that when there's a thriving parallel market, official devaluation doesn't lead to inflation. This is because prices have already adjusted to the parallel exchange rate. In Ghana's case, inflation was mainly driven by monetary factors and a weak financial system, rather than structural issues. The study also showed that official devaluation had a positive impact on Ghana's budget, thanks to increased grant aid, reduced subsidies, and higher export taxes. Interestingly, the official devaluation didn't lead to higher budget deficits or demand pressure on the parallel market. Instead, the exchange premium decreased significantly. The study attributed the success of this programme to sufficient foreign financing and coherent fiscal policies. Chhibber and Shafik argued that while structural factors contributed to inflation in the past, recent accelerations are primarily due to monetary phenomena and weaknesses in the financial system. These issues must be addressed to sustain economic 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 liberalisation 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.

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, liberalising 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 corroborates 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 liberalised 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. A study by Lawal and Abdulkadir (2010) examined the impact of black-market operations on foreign exchange controls in Nigeria. Using statistical analysis, they found that:

a. There's no need for a black market for foreign exchange in Nigeria.
b. Most users prefer the black market over the official market for foreign exchange.
c. Black market operations harm foreign exchange controls in Nigeria.

Based on these findings, the study suggests that the government and Central Bank of Nigeria should ensure a steady supply of foreign exchange and simplify the process of obtaining foreign exchange in the official market. By doing so, Nigeria can reduce its reliance on the black market and improve its foreign exchange controls.

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 behaviour, 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) and Fatai (2020) respectively examined the relationships between exchange rates, inflation, and economic growth in Nigeria: Onuoha (2014) found that exchange rate changes and inflation affect Nigeria's economic growth. The results showed that:

a. Export and import have a positive but insignificant relationship.
b. Exchange rates have a positive and significant relationship with inflation.

c. Economic growth has a negative relationship with the other variables.

Fatai (2020) discovered threshold levels for the Parallel Currency Market Premium (PREM) in Nigeria:

a. PREM threshold value for inflation rate: 35%
b. PREM threshold value for interest rate: 23%
c. Exceeding these thresholds will negatively impact inflation and interest rates in Nigeria.

While high inflation and unstable exchange rates harm economic growth, moderate and stable inflation rates can enhance investment and economic growth. Additionally, exceeding certain PREM threshold levels can negatively affect inflation and interest rates in Nigeria.

Method of Data Collection and Analysis

Theoretical Framework

This section describes the method through which the objective of the paper was achieved. This comprises of the theoretical framework, model specifications, important econometric issues, estimation techniques, measurement of variables, data description and sources. The data for this study was generated from:

a. Exogenous Price Determination: Prices of traded goods are determined outside the economy.
b. Non-Traded Goods Sector: There is a sector that produces goods not traded internationally.
c. Full Employment and Monetary Disequilibrium: The economy operates at full employment, and monetary imbalances don't affect real income growth.

The paper uses the monetary approach to the Parallel Foreign Exchange Market (PFEM), first introduced by Blejer (1978) and later modified by Agenor (1991). This approach focuses on money market disequilibrium to explain changes in:

a. Output

b. Prices
c. Parallel Market Exchange Rate (PMER)
d. Foreign assets.

The Parallel Market Exchange Rate

The demand for Foreign Exchange (*d*FE) is derived from the demand for Current Account Transaction (*dCAT)*, and the demand for Foreign Exchange as an Asset *(dFEA)*

$dFE = dCAT + dFEA$……..…….…..….. (1)

The demand for FEA is commonly found in Nigeria mainly in the parallel market due to the type of foreign exchange policy operated by the CBN. The demand for this purpose depends solely on the expectation of depreciation in the parallel market, bl^*. Hence,

$dFEA = \delta + \delta_1 bl^*$……. (2)

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

$bl^* = DPL/ fp^r bl$ + II……. (3)

The demand for CAT 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.

$dCAT = g + g_1 Y + g_2(DPL/bl)$…….. (4)

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

$Sy = r + r_1(bl/e)$ ……..……. (5)

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

$Sy = D_d$……. (6)

Getting the equilibrium exchange rate in the parallel foreign exchange, equation (3) is substituted into equation (2), and then equation (4) and equation (2) are substituted into equation (1).

Using supply for foreign exchange in equation (5) and the market equilibrium condition in equation (6), the parallel market rate is expressed in the form of equation as follows:

$bl_e = w + w_1 Y + w_2(DPL/) + w_3 i^* + w_4 e$

…… (7)

Substitute the domestic inflation equation in (3.9) into equation (7) to eliminate p would yield the final monetary equation for the black-market exchange rate as follow:

$bl_e = \xi + \xi_1 + \xi_2 y + \xi_3 i^* + \xi_4 e + \xi_5(D_d - rm_d)$ ……..(8)

In equation (8), 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.

Model Specifications

Researchers have used various econometric techniques to study the Parallel Currency Market Premium (PREM). Some of these techniques include:

a. Single-equation econometric methods
b. Stock-Flow model
c. Pinto Model
d. Granger-Causality model
e. Logit and Probit Models
f Anticipated and unanticipated models

This paper used a Threshold model to examine the impact of PREM on inflation (Consumer Price Index) in Nigeria. Specifically, it aims to identify the level at which PREM affects inflation and other macroeconomic variables like interest rates and economic growth. The Threshold model is chosen for its simplicity and clear economic implications.

Following Hansen's (1999) work, this paper uses a modified model to examine the relationship between PREM and macroeconomic variables as implicitly specified as follows:

Where X_t is the vector of Inflation (INF), Interest Rate and Economic Growth which is measured by the growth rate of GDP, Y_t is the vector of PREM and other determinants, Y* is

the vector of the threshold level of PREM (that is, the value of each PREM at which structural break occurs). u_t is the random error term, which represents measurements error in the explanatory variables. The dummy variable D is defined in the following way:

D = 1 if Y_t>Y* and D = 0 if Y_t d" Y*; I, is the indicator variable.

The coefficients of the dummy variable measure the effects of PREM on inflation and other macroeconomic variables when it is greater than the assumed structure break level (i.e high level) and if opposite is the case.

Measurement of variables and Data Sources

This paper used annual data time series spanning 1986 to 2022 in order to estimate the relevant models and assess the statistical significance of the factors related to the parallel premium for foreign exchange.

Data on the parallel rate are 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 Bulletins (various issues). 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.

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

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 E-views estimation.

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

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.
Discussion of Results

Test for Stationarity
Formal testing for stationarity and the order of integration of each variable is 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 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 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.

Threshold level of PREM for Inflation, Interest Rate: PREM Threshold Point Estimate
The results in Table 4.3 reveal the threshold effects of parallel currency market premium (PREM) on inflation in Nigeria. Let's break down the findings:

Threshold Test:

The threshold test examines whether there is a significant threshold effect in the relationship between PREM and inflation.

The test involves comparing the F-statistic to a critical value.

Results:

0 vs. 1: The F-statistic (15.58) is greater than the critical value (8.58), indicating a significant threshold effect at the 1% level. This suggests that the relationship between PREM and inflation changes significantly when the PREM exceeds a certain threshold.

1 vs. 2: The F-statistic (0.69) is less than the critical value (10.13), indicating no significant threshold effect beyond the first threshold.

Threshold Values:

The threshold values are estimated using sequential repartition methods. The results indicate a single threshold value:

Threshold value: 0.41 (or 41%)

Interpretation:

Threshold effect: The relationship between PREM and inflation is nonlinear, with a significant threshold effect at a PREM value of 41%. When the PREM exceeds this threshold, the impact of PREM on inflation changes significantly.

Implications: Policymakers should be cautious when the PREM exceeds 41%, as it may lead to increased inflationary pressures.

Policy Implications:

Exchange rate management: The CBN should monitor the PREM closely and intervene when it exceeds the threshold value to mitigate potential inflationary pressures.

Monetary policy: Policymakers should consider the nonlinear relationship between PREM and inflation when setting monetary policy instruments.

Overall, the results suggest that the relationship between parallel currency market premium and inflation in Nigeria is nonlinear, with a significant threshold effect at a PREM value of 41%.

The results in Table 4.6 reveal the threshold effects of parallel currency market premium (PREM) on interest rates in Nigeria. Let's break down the findings:

Threshold Test:

The threshold test examines whether there is a significant threshold effect in the relationship between PREM and interest rates. The test involves comparing the F-statistic to a critical value.

Results:

0 vs. 1: The F-statistic (81.53) is greater than the critical value (8.57), indicating a significant threshold effect at the 1% level.

1 vs. 2: The F-statistic (12.70) is greater than the critical value (10.13), indicating another significant threshold effect.

2 vs. 3: The F-statistic (11.28) is greater than the critical value (11.14), indicating a third significant threshold effect.

3 vs. 4: The F-statistic (1.30) is less than the critical value (11.82), indicating no significant threshold effect beyond the third threshold.

Threshold Values:

The threshold values are estimated using sequential repartition methods. The results indicate three threshold values:

Threshold 1: 0.23

Threshold 2: 0.61

Threshold 3: 2.66

Interpretation:

Multiple thresholds: The relationship between PREM and interest rates is nonlinear, with three significant threshold effects. This suggests that the impact of PREM on interest rates changes significantly at different threshold levels.

Regime-dependent relationship: The findings imply a regime-dependent relationship between PREM and interest rates, with different effects in each regime.

Implications:

Monetary policy: Central banks should consider the nonlinear relationship between PREM and interest rates when setting monetary policy instruments.

Interest rate management: Policymakers should be aware of the threshold effects and adjust interest rates accordingly to mitigate potential economic impacts.

Policy Response:

Threshold 1 (0.23): Initial response to changes in PREM.

Threshold 2 (0.61): Moderate response to increasing PREM.

Threshold 3 (2.66): Aggressive response to high PREM levels.

Overall, the results suggest a complex, nonlinear relationship between parallel currency market premium and interest rates in Nigeria, with multiple threshold effects.

The threshold specification test results are shown in Tables 4.3 and 4.6. Based on the Bai-Perron critical values:

a. For inflation, the test indicates a statistically significant threshold value of 41% for PREM. This means that when PREM exceeds 41%, it has a significant impact on inflation.

b. For interest rates, the test identifies four regimes, with the first one being the most significant. The results show that a PREM threshold value of 26% is statistically significant, indicating that PREM has a significant impact on interest rates when it exceeds this level.

The test results provide evidence of threshold effects in the relationship between PREM and macroeconomic variables (inflation and interest rates). The findings suggest that PREM has a significant impact on these variables when it exceeds certain threshold values (41% for inflation and 26% for interest rates).

The Nigeria's Parallel Currency Market Premium (PREM) has a significant impact on inflation. The results showed that when PREM is below 41%, inflation remains stable. However, when PREM exceeds this threshold, it has a negative effect on inflation. Interestingly, the study found that an annual PREM rate of 11.2% with a threshold value of 41% is the optimal level for Nigeria. This means that when PREM rates are higher than 41%, Nigeria's annual inflation rate is hindered by 11.2%. This finding supports previous research by Khan and Senhadji (2013), which found that the optimal PREM level for developing countries is around 11%.

Table 4.3: PREM Threshold Point Estimate for Inflation

Threshold Specification			
Threshold Test	**F-statistic**	**Scaled F-statistic**	**Critical Value**
0 vs. 1 *	15.58	15.58	8.58
1 vs. 2	0.69	0.69	10.13
Threshold values:			
	Sequential	Repartition	
1	0.41	0.41	

Table 4.4: PREM Threshold Point Estimate for Inflation

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
1st Regime LPREM < 0.41 -- 18 obs				
C	11.25	3.67	3.059	0.00
2nd Regime 0.418221 <= LPREM -- 12 obs				
C	34.20	4.50	7.59	2.84

Note: Note: *, ** and * implies 1%, 5% and 10% level of significance respectively.**
Dependent Variable: INF
Threshold variable: LPREM
Threshold value used: 0.41
Source: Author's computation based on E-Views

A study analyzed the effect of Parallel Exchange Market Premium (PREM) on interest rates in Nigeria from 1986 to 2022. The results showed that three out of four regimes identified were statistically significant. Notably, a PREM threshold level of 26% was found to be the break-even point, beyond which PREM has a negative impact on Nigeria's interest rate.

The study concluded that the ideal PREM level for Nigeria is a threshold value of 26% with an annual coefficient of 11%. This suggests that keeping PREM below this threshold can help maintain a stable interest rate environment in Nigeria.

Table 4.6: PREM Threshold Point Estimate for Interest Rate

Threshold Specification			
Threshold Test	**F-statistic**	**Scaled F-statistic**	**Critical Value****
0 vs. 1 *	81.53	81.53	8.57
1 vs. 2 *	12.70	12.70	10.13
2 vs. 3 *	11.28	11.28	11.14
3 vs. 4	1.30	1.30	11.82
Threshold values:			
	Sequential	**Repartition**	
1	0.61	0.23	
2	2.66	0.61	
3	0.23	2.66	

*** Significant at the 0.05 level.**
**** Bai-Perron (Econometric Journal, 2003) critical values.**
Source: Author's computation based on E-View.

Table 4.7: PREM Threshold Point Estimate for Interest Rate

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
1st Regime LPREM < 0.26 - 16 obs				
C	11.11	1.16	9.57	5.22
Regime 2nd 0.26 <= LPREM < 0.61- 4 obs				
C	19.83	2.32	8.54	5.06
3rd Regime 0.61 <= LPREM < 2.66 -- 4 obs				
C	43.12	2.32	18.56	1.59
4th Regime 2.66 <= LPREM -- 6 obs				
C	30.56	1.89	16.11	4.72

Note: Note: *, ** and * implies 1%, 5% and 10% level of significance respectively.**
Dependent Variable: INT
Threshold variable: LPREM
Threshold value used: 2.666991
Source: Author's computation based on E-Views.

Conclusion

This paper aimed to analyze recent theoretical and empirical advances in the examination of the Parallel Currency Market Premium (PREM) and its consequences on inflation in developed, emerging, and Nigerian contexts in a coherent and understandable framework. The research on "Threshold Effects of Parallel Currency Market Premium on Inflation in Nigeria" reveals significant nonlinear relationships between the parallel currency market premium (PREM) and inflation. The findings indicate that: threshold effects exist: PREM has a nonlinear impact on inflation, with significant threshold effects observed at specific levels of PREM. regime-dependent relationship: The relationship between PREM and inflation changes significantly when PREM exceeds certain threshold values. Inflationary pressures: high levels of PREM are associated with increased inflationary pressures.

Recommendation

1. Monetary policy: The Central Bank of Nigeria should consider the nonlinear relationship between PREM and inflation when setting monetary policy instruments.
2. Exchange rate management: Policymakers should monitor PREM closely and intervene when it exceeds threshold values to mitigate potential inflationary pressures.
3. Inflation targeting: The findings support the need for inflation targeting strategies that account for the nonlinear relationship between PREM and inflation.

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