

The Nigerian foreign exchange market: Possibilities for convergence in exchange rates

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The analysis leads to the conclusion that (a) post reform macroeconomic and external shocks exerted downward pressures on supply of forex but in the nominal exchange rate in 1986-1993. The study proposes that reduction in federal deficit and inflationary financing, reduction in external debt service, rise in external revenue (oil and non-oil), reduction in diversion from the federation account and so on, would have negative impact on the nominal exchange rate by increasing the supply of forex.

Finally, the paper concludes that the realism of any forex management policy and any other policies for that matter, must be determined through objective and comprehensive evaluations of their effects on domestic incentive structure, investment, employment, national income, fiscal balance and external balance.

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Abstract

This study evaluated the possibility of exchange rate convergence in Nigeria through the institutional differences that segment the Nigeria forex market. The study extended Peterside's equation of Nigerian multiple exchange rates by (a) adding more institutional costs, (b) deducing the dynamic conditions for exchange rate conversion in Nigeria and (c) estimating some of the institutional costs and the over-valuation factor. The extended model shows that exchange rate convergence is frustrated by (a) institutional barriers and the costs they generate and (b) the monopoly powers of the CBN in the official market and its exercise of such powers in an unpredictable and uncompetitive manner. Consequently, the necessary condition for exchange rate convergence is that *the sum of the institutional costs should approach zero over time* while the sufficient condition is that *the official forex market should approach a competitive market where no participant exerts market powers in unpredictable ways and there is no collusion*.

The results of the study show that there was no tendency towards exchange rate convergence in December 1993. The study concludes that convergence in the future may not be possible unless (a) the institutional barriers segmenting the forex market are removed and (b) the official market operates competitively. The study also analysed the links between the macroeconomic and external environment and exchange rate stability. The analysis leads to the conclusion that (a) post reform macroeconomic and external shocks exerted downward pressures on supply of forex but upward pressures on demand for forex and (b) the differential effects on supply is causal to the monotonic decline in the nominal exchange rate in 1986-1993. The study proposes that reduction in federal deficit and inflationary finance would reduce the pressure on existing supply of foreign exchange and by extension, halt the monotonic fall in the value of the naira. Similarly, reduction in external debt hence, external debt service, rise in external revenue (oil and non-oil), reduction in diversion from the federation account and so on, would have negative impact on the nominal exchange rate by increasing the supply of forex.

Finally, the paper concludes that the realism of any forex management policy, and any other policies for that matter, must be determined through objective and comprehensive evaluations of their effects on domestic incentive structure, investment, employment, national income, fiscal balance and external balance.

- convergence of the multiple exchange rates; and
- exchange rate stability

Table 1: Multiple exchange rates: Before and after 5 March 1992 (average rates)

Year	Official (Naira/US\$)	Parallel (Naira/US\$)	Bureau de Change (Naira/US\$)
December 1986	1.00	1.00	1.00
December 1987	1.413	1.413	1.413
December 1988	2.030	2.030	2.030
August 1989	2.300	2.300	2.300
December 1989	2.500	2.500	2.500
December 1991	8.882	8.882	8.882
December 1992	12.300	12.300	12.300

I. Preamble

The 1986 reform of Nigeria’s exchange rate policy sought to bring about a competitive exchange rate for the naira. In the mainstream economic literature, a competitive exchange rate is assumed to induce a more efficient allocation and use of economic resources in economies. Consequently, the desire to improve the competitiveness of the Nigerian economy in international markets is the immediate cause and the justification for exchange rate reform.

The mainstream literature also suggests that the price of homogeneous products converges if the market is competitive and transport cost is zero. A competitive market should have at least four key attributes. These are perfect flow of information, perfect mobility of products across markets, multiplicity of participants (buyers and sellers) and freedom of exit. When transport costs are non-zero, price differentiation could exist even in an efficient market. If the differentials are fully accounted for by the transport costs, a price convergence rather than unification is achieved. Market imperfections, other things being equal, could lead to differences in prices that exceed differences in transportation costs.

An earlier study (Odubogun, 1992) suggests that despite the Nigerian forex reform of 1986, a multiple exchange rate regime prevails in Nigeria. The multiple exchange rate has two features. First, there is no tendency towards exchange rate convergence across the segments of the forex markets. Second, the naira/other currency exchange has been rising since the reforms began. The persistent rise in exchange rates forced the Central Bank of Nigeria (CBN) on 5 March 1992 to “deregulate” the forex market by merging the official rate with those of the parallel market (PM) and *bureaux de change* (BDC). There were two immediate causes of the action:

- persistent depreciation of the naira; and
- a persistent rise in the gaps between the three exchange rates in the forex market (see Table 1).

With the deregulations of 5 March, the official market was expected to become “an inter-bank market with the CBN as participant, free to buy and sell forex at rates freely negotiated by authorised dealers.” The deregulation had two main objectives:

- convergence of the multiple exchange rates; and
- exchange rate stability.

Table 1: Multiple exchange rates: Before and after 5 March 1993

Day/Month/Year	Official	Parallel	Bureau de change
December 1986	3.3166	n.a.	-
December 1987	4.1413	4.6000	-
December 1988	5.3530	8.3500	-
August 1988	7.300	10.2000	10.2000
December 1989	7.6500	9.6000	9.6500
December 1990	8.7071	10.4100	10.1600
December 1991	9.8662	15.0750	15.6250
3 March 1992	10.5564		
5 March 1992	18.0000	18.0000	18.0000
16 April 1992	18.6000	19.1400	19.3000
8 September 1992	19.4696	21.3500	21.6000
8 December 1992	19.7500	23.4500	23.6000
12 January 1993	20.0000	24.8000	25.0000
18 February 1993	24.9900	27.2500	27.2000
4 March 1993	24.9900	31.0000	30.0000
11 March 1993	24.9900	32.9000	33.3000

Source: *Guardian* newspapers (March 1992 - March 1993) and *Business Times* (March 1992 - March 1993).

Convergence was achieved through the equalization policy on 5 March 1992. The CBN was expected to induce stability of the exchange rate by increasing the supply of forex. The federal government was to complement CBN's efforts by inducing a fall in demand of forex through fiscal and monetary restraints. There have been some developments in policy since 5 March 1992.

Five of the most important developments since 5 March are:

- The introduction of stabilization securities, that is, *compulsory* borrowing instruments from the bank, by the CBN apparently for the federal governments at rates significantly less than the average lending rates. In 1992 alone, ₦26.0 billion was mopped up by the CBN from the banks. By 11 January 1993, and 2 March 1993, ₦13.0 billion had been mopped up.
- The erratic supply of forex by the CBN through the end of 1992, contrary to the expectations generated by 5 March. Between 15 December 1992 and 11 March 1993, the CBN suspended sales three times: 15 December 1992 - 11 January 1993; 26 January 1993 - 18 February 1993; 27 February 1993 - 11 March 1993.
- Re-introduction of the Dutch auction on 18 February 1993 in the official market and the consequent managed depreciation of the exchange rate to ₦24.99/\$1. This closed the gaps in the rates on 18 February 1993, but the rates have since diverged as shown in Table 1. As at 11 March, the difference was ₦7.91/\$1 (31.65%) and ₦8.31/\$1 (33.25%) for parallel and BDC, respectively.
- A budget deficit of ₦43.8 billion in 1992. Table 2 shows the trend of deficits since the commencement of adjustment policies in 1986. It shows that the deficit in 1992 was 1097% greater than in 1986.
- An increasing reliance of banks on the inter-bank money market for 24 - hour

Table 2: Federal government deficits (1986-1993)

Year	Index of deficits (1986 = 100)	Deficits (N billions)	Deficit/GDP (%)
1986	100	3.66	5.0
1987	118	4.328	4.0
1988	333	12.200	8.5
1989	418	15.300	7.9
1990	642	23.500	10.1
1991	964	35.300	12.4
1992	1197	43.800	9.4
1993	2732	100*	

Source: Federal Government of Nigeria, Budget Speeches (1987-1994).

* Federal Minister of Finance.

Table 3: Inter-bank interest rate and interest rates on stabilization securities for selected period

Period	Inter-bank (%)	Stabilization securities (%)
7 December 1992	115	19
15 December 1992	30	19
12 January 1993	55-70	19
19 Jan - 16 Feb 1993	10	19
17 February 1993	45	21.75
2 March 1993	20	21.75
27 March 1993	85	21.75

Source: *Guardian* newspapers (December 1992 - March 1993) and *Punch* newspapers (December 1992 - March 1993).

credit to make their demand for forex in the official market effective. The result is a very volatile cost of funds in the inter-bank market. The rate is not only volatile, but peaked at a high 115% in the first week of December 1992. Table 3 shows that most of the time these rates were in excess of what the CBN pays for the money it mops up.

Table 1 shows that before and after 5 March 1992 the gap between the official and the BDC/PM rates exceeded 5%. Second, it shows that the gap was less than 5% only on 5 March 1992 and 18 February 1993. Third, between 5 March 1992 and March 1993, the naira depreciated; between 5 March and 8 December 1992 (when the sale of forex by the CBN was suspended), the naira depreciated against the dollar by 9.7% at the official market. Note that this was the lowest rate of depreciation in the forex market. Similarly, the gap rose from zero on 5 March to ₦3.7/\$1 (18.7%) and ₦3.85/\$1 (19.49%) for PM and BDC respectively.

The problem

The choice of liberalization as a strategy for achieving efficiency and the welfare expectations that govern it is anchored on some assumptions. These are that government control is effective and that the removal of controls leads to movements towards competitive ideals where all participants buy and sell at identical prices (Jones *et al.*, 1991).

Odubogun (1992) has shown that before 5 March 1992, the Nigerian forex market deviated from competitive ideals. The multiple exchange rate regime supports the point. The market consists of at least three segments. They are the official, the *bureau de change* and the parallel. Peterside (1993) alludes to this when he emphasizes that "Nigeria has essentially been operating a three-tier exchange rate system". According to him, however, the three rates are:

- the official rate;
- the export proceeds exchange rate; and
- the "free fund" exchange rate, i.e., the BDC/PM rate.

The persistence of a multiple exchange rate regime and increase in the gap between the rates suggests the persistence of deviations from the competitive market models that recommended the reforms. Furthermore, the persistent depreciation of the naira since the reforms in 1986 is a continuing source of concern not only among Nigerian policy makers, but also among Nigerian firms and households. It raises at least two questions. First, is exchange rate convergence possible in Nigeria? Second, given Nigeria's institutional framework of macroeconomic and trade policy, is it possible for the exchange rate to be stabilized? These are the questions that this study addresses.

The objectives

This study has two main objectives. First, it investigates the possibilities of convergence in the rate at which the dollar and other foreign currencies are exchanged for the naira in the Nigerian forex market. This investigation is concerned mainly with a clarification of the nature of the market. It seeks to:

- identify the major institutional factors that aid or frustrate exchange rate convergence;
- quantify their effects; and
- evaluate the possibility of exchange rate convergence in Nigeria.

The study also evaluates the effects of post-reform monetary and fiscal policy on the stability of the exchange rate of the naira.

Justification for the study

The exchange rate is the most important price in the Nigerian economy, particularly since the reform of 1986. The significance of exchange rates to national economic growth, income distribution, price and external stability is established in economic theory. It is also apparent to casual analysts and to Nigerians who directly feel its various effects. Therefore, exchange rate policy is very important.

Exchange rate policy in Nigeria in recent times has been dominated by the argument or premise that a “realistic” exchange rate is not only desirable but attainable. Second, the realistic exchange rate is equated to the parallel market rate. The conclusion of this mode of thought is that the gap between any other rates, especially the official, and the parallel market rate represents over-valuation. Therefore, a realistic exchange rate should be attainable if the gap is closed. It is this mode of thought that produced the forced convergence of 5 March and 18 February. However, Table 1 clearly shows that the gap closures were not permanent. Also, they were unable to check the downward movement of the exchange rate. It would appear that policies such as those of 5 March 1992 and 18 February 1993 did not investigate the possibilities of a market-induced convergence. Moreover, they seem not to have identified the contextual causes of non-convergence that the policies targeted. This study, indirectly addressing the question of possibility, its extent and the conditions for it, could be a useful guide to altering the exchange rate policy in Nigeria. Thus, rather than the apparently fruitless chase for convergence, the study is expected to guide policy towards more fruitful exchange rate policy that meets the needs of the Nigerian economy.

II. Review of related studies

The causes and implications of a co-existence of other foreign exchange markets, such as the parallel market, in simultaneous operations with the official market in developing economies have been the focus of several studies (see Jones and Roemer, 1991). These studies suggest that imperfections such as government interventions and/or supply limitations in the official market lead to the emergence of alternative markets. Puetz and Braun's (1991) survey of parallel markets in the Gambia shows that although transactions in the parallel markets involve additional costs and risks for participants, the market exists and thrives. Bevan *et al.* (1991) link such transaction costs and risks to black markets.

Azam's (1991) is a Nigeria-specific study. The study focuses on the parallel market at two of Nigeria's borders: Nigeria-Niger and Nigeria-Cameroon. It employs "theoretical insights and institutional knowledge" in the conduct of the study. In the study, the market exchange rate for the naira in the two markets were unified by arbitrage, i.e., "the process of taking advantage of the existence of different prices for the same product" (Osei, 1992). Arbitrage and exchange rate unification were possible because there was no central bank intervention in the local sub-markets, nor was there physical movement of bank notes between the borders (Azam, 1991, p. 52-53). Note that these markets service informal trade at these borders. These transactions do not undergo the type of documentation and institutional restrictions that formal trade undergoes. Azam's study suggests that controls or interventions in either or both markets could prevent arbitrage, and exchange rate convergence. Consequently, if forex is immobile, arbitrage and convergence of exchange rates are not possible. Thus, though the scope of Azam's study is very limited, he provides useful insights into possibilities for exchange rate convergence in Nigeria.

The scope of Peterside (1993) is broader than Azam (1991). Peterside's study benefits from *inside knowledge* of the operations of the official forex and the export proceeds markets¹ and from institutional knowledge of the unofficial market. Like Azam, Peterside combined institutional knowledge with theoretical insights. The basic premise of his analysis is that since reform "Nigeria has essentially been operating a three-tier exchange rate system". Thus the two conditions for arbitrage and convergence of the exchange rates identified in Azam are missing in the broad Nigerian forex market. The CBN regulates the official market without extending the same restrictions to the unofficial market. The restrictions on the export proceeds market are fewer than those on the official market, where CBN - supplied forex is traded. Moreover, the regulations restrict the

mobility of CBN and export proceeds forex. These developments in the light of Azam's study may render arbitrage, and exchange rate convergence, impossible. Peterside (op. cit.) was more categorical. He asserts: "There is really no logical or scientific basis for expecting total convergence of [the] three exchange rates unless certain institutional obstacles are removed".

The assertion suggests that the type of convergence achieved on 5 March 1992 and 18 February 1993 was possible only because they were *forced* by non-market forces. This could explain why the convergence was not sustainable. If the explanation is valid, it could imply that market forces may not lead to exchange rate convergence in Nigeria. It could also imply that forced convergence is not sustainable. Table 1 appears to lend empirical weight to the deductions. However, the data in Table 1 are not able to test the possibility of exchange rate convergence. This requires the empirical evaluation of a causal framework or model.

Peterside (1993) evaluated the premise that convergence is not possible by identifying and measuring institutional costs that are peculiar to segments of the market. Of the three segments he considered — official (OM), export proceeds (EM) and parallel (PM) — only the last, which also included *bureaux de change*, is unregulated. The PM thus approximates the markets studied by Azam because like those markets it is unregulated, and forex is mobile within it. Therefore, *partial exchange rate convergence*, that is, convergence within the parallel market, is most probable. Peterside employed the major restrictions in OM and EM to evaluate the possibility of *general* convergence.

Peterside identified four major sources of institutional costs in the official market and two in the export proceeds market. The sources of the costs are:

- extensive and time-consuming documentation
- delay in the satisfaction of bids
- CBN restriction on the transfer of forex purchased in the official market
- CBN allowance of a maximum of 15 days for the use of forex purchased from it, otherwise the forex is forfeited.

These restrictions generate four types of costs. They are documentation cost, late delivery costs, non-transferability costs, time limit costs.² Those who buy forex from the official market incur all four costs because all restrictions apply in the official market. Those who buy export proceeds avoid the last two costs that is, non-transferability and time limit costs. Buyers in export proceeds, like those in official market, undergo extensive documentation and they are also constrained from transferring forex across uses. Consequently, like buyers in the official market, they incur documentation and transferability costs.

The existence of institutional costs in the official and export proceeds market could lead to a difference between the effective exchange rate and the "market exchange rate". The effective exchange rate is the sum of the respective market rate and the opportunity costs of the restrictions, that is, the respective institutional costs. Consequently, demand price in the three segments of the forex market would be different due to differences in obstacles to trade. The demand price in the parallel market would therefore be higher than the demand price for export proceeds and official forex. Similarly, the demand price in the EM would be higher than that in the OM since the former is less restricted

than the latter. The analysis implies an inverse relationship between demand price and institutional costs. These propositions provided a framework for linking the demand price in the three markets in a fundamental equation represented by Equation 1 below.

The analysis assumes that the exchange rate for forex in Nigeria is demand driven. This is a reasonable assumption considering that the reform of the exchange rate management was caused by the persistent excess demand and low supply elasticity for forex after the oil boom ended. The foregoing suggests a distinction between *demand price* and *effective price* of forex.

The institutional costs account for the difference between them. Thus, apart from the parallel market where there are no institutional costs, the demand price differs from the effective price. In all segments of the market, forex is exchanged at the demand price. Based on the premise that differentiation in exchange rates is due to institutional costs, Peterside generated a fundamental price equation. The equation links the effective prices of forex in the three markets.

$$PM_e = EM_e + TC + DCC = OM_e + TC + DCC + LDC + TLC + OVF \quad (1)$$

Where,

PM_e = parallel market exchange rate

EM_e = export proceeds market exchange rate

TC = transferability costs

LDC = late delivery costs

DCC = documentation costs

OM_e = late delivery costs

TLC = time limit costs

OVF = over-valuation factor

The equation implies that if the institutional cost were zero, the demand prices in all segments could be equal. It also implies that the extent of over-valuation would be smaller than the gap between the official and parallel market rates. This proposition could be tested by the estimates of the institutional costs. Peterside estimated the LDC using the last week of January 1993 data for OM_e , PM_e , EM_e , and the interest rate. These were respectively ₦20.75/\$1, ₦24/\$1, ₦23.0. Peterside computed the LDC and the over-valuation factor. The former was computed as ₦0.51/\$1.

From Equation 1:

$$OVF + TLC = EM_e - (OM_e + TLC)$$

Thus, given known values of EM_e , OM_e and his computed value of LDC,

$$OVF + TLP = N23.0 - (N20.75 + N0.51) = ₦1.74/$1$$

This implies that the over-valuation factor as at the last week of January 1993 was

estimated at not more than ₦1.74/\$1. This result led Peterside to conclude that the maximum extent of over-valuation at the end of January 1993, i.e., the over-valuation factor, was probably less than ₦1.74/\$1 or 8% of the official exchange rate (Peterside, 1993, p. 13). The corresponding gap between the official and parallel rates was ₦3.25/\$1 or 15.66% of the official rate.

Overall, the framework used by Peterside provides useful insights into the operation of the Nigerian forex market. It could be used to investigate the possibility of convergence of the three exchange rates. However, it has several weaknesses. First, it is static. For instance, Peterside could only show that as at January 1993, there was no convergence. He did not investigate the possibility of convergence over time. This limitation could be linked to the non-specification of procedures for estimating the institutional costs.³ If the procedures are specified, it could be possible to derive their dynamic time paths. These paths could then be used to evaluate the possibility of convergence over time. Therefore, this study specifies and estimates the institutional costs in evaluating the possibilities of exchange rate convergence in Nigeria.

In computing the LDC, Peterside (1993 note 3) assumed that there is a delay of 18 days before the demand for forex is satisfied at the official market. The assumption was not justified. Similarly, the choice of interest rate was not justified. It is likely that the data reflected the experience of Peterside's bank. Given that there are at least 120 other banks, this may not be a good basis for generalization. The present study relies on a sample survey in generating these and other relevant data.

A pilot survey of 10 banks was conducted in Ibadan, which led to a survey of 20 banks in Lagos. The concentration of forex trade and banks in Lagos justifies its choice. The pilot survey sought to investigate the procedure of transaction in the official market to find out the types of institutional obstacles that buyers confront. The Lagos survey sought to extend the pilot survey by generating data for the export proceeds rates and sampling the opinion of authorized dealers on a wide range of issues such as the exchange rate policy of the 1994 budget and the notion that the parallel market rate is the realistic exchange rate. In the next section we present an overview of the forex market. The presentation focuses on the segments of the market, their respective institutional environments and their effects, procedures of transaction and rate determination. The review draws from the results of the two surveys and Odubogun (1992).

III. An overview of the Nigerian forex market

Odubogun (1992) points to the three segments of the Nigerian forex market. These are the official, the *bureaux de change* and the parallel. The export proceeds segment is distinct. It arose as an incentive to non-oil exporters. It allows non-oil exporters to exchange their foreign earnings at rates that are higher than the official rate. These four are the major segments of the Nigerian forex market. The parallel market and the *bureaux de change* are very similar in terms of the degree of controls, and are as a result treated as one in this study.

Official market

The major participants in the OM are the Federal Ministry of Finance and Economic Development, the Central Bank of Nigeria (CBN), and the authorized dealers (AD) — commercial, merchant and development banks. Other participants include reputable hotels and guest houses. The Federal Ministry of Finance and Economic Development is the approving authority for transactions in the official market. It approves public and private sector transactions and exercises overall control over the official forex market. The CBN, on the other hand, supervises and monitors the official forex market operations. It also issues guidelines that regulate the sales and allocation of official forex. The CBN is also the sole supplier of forex in the official market. In addition, it influences the official market through its control of money supply and through periodic price and non-price regulations. These interventions in the market are documented in Odubogun (1992).

Two major inter-related transactions could be identified in the official market. These are the primary and secondary transactions. The primary transactions are between the CBN (a monopolist) and the ADs (who together form an oligopsony). The ADs are the main “consumers” in the auction. CBN’s rules and regulations are issued to inform, educate and help the ADs and the public to efficiently operate the market. Among other things, through these guidelines or regulations the CBN states when and how available forex is sold, who qualifies to bid for forex, and the documentation to be done by participating ADs. The guidelines are reviewed in line with the prevailing circumstances in the market and the economy. The ADs supply official forex to consumers in the secondary market.

Key provisions of the Exchange Control Act of 1962 still govern the use and the

allocation of forex in the OM. For instance the act clearly specifies the uses of forex allowed by law. It also specifies the procedures for securing an approval for any international transfer of forex. The allocation of forex through the primary and secondary markets rather than through import license is the major change in the reform. The act also specifies those who are authorized to bid for forex through the secondary market. The ADs are intermediators between these final users of forex and the CBN. The survey shows that the ADs receive and process private sector forex applications and make forex allocation to successful customers. Allocation to final users is influenced by CBN's guidelines and the specific guidelines of ADs. The ADs also, within the framework of CBN guidelines, help the successful customers to transfer the funds allocated. The pilot survey confirms that the Exchange Control Act of 1962 is still in force.

CBN reserves the power to approve or not to approve the application to purchase forex. A long and tedious procedure that involves extensive documentation is associated with purchasing forex in this market. The process is made even more tedious for those who require forex through this market because the CBN is the sole supplier of forex sold here and all bids pass through it. The CBN is a peculiar type of monopolist. It controls the price, quantity and use of forex even after it has been allocated. Before the procedures were instituted, potential importers bid through their banks. The potential buyer is expected to deposit the naira cost of the forex demanded for once the application for forex is filed. In the primary market, the ADs bid for CBN supplied forex supposedly on behalf of their respective customers and based on the bids of the customers, Odubogun (1992) highlights the various formulas used to arrive at exchange rates in the OM, i.e., OM_c. The main point to note is that *the exchange between a monopoly CBN and oligopsony ADs is theoretically indeterminate*. The balance of forces is the major factor. Here, the CBN is more favoured. This may explain why several times the CBN has sold foreign exchange at rates it has set unilaterally. This was the case on 5 March 1992 and on 18 February 1993. This was also the case between April and December 1993 when the CBN held the ₦/\$ exchange rate constant at ₦21.996/\$1 (see Table 5) in spite of the persistent excess demand in the market. This could be linked to the rise in the gap between the official market and export proceeds and parallel market rates as shown in Table 4. Table 4 shows that the gap rose from ₦7.78/\$1 in March 1993 to ₦16.664/\$1 in April 1993. Though it declined in May 1993, probably due to the positive "political effects", it rose subsequently to ₦23.004/\$1 in December 1993.

Not only is the exchange rate theoretically indeterminate, so is its allocation. The differences in the size of ADs imply differences in capacities. This appears to have consequences for allocation to ADs. Peterside (1993) referred to this.⁴ According to Peterside, banks or ADs relied on the inter-bank money market in sourcing for the naira cover for their bids. This suggests that some demand for forex in the primary market is speculative. The ADs are required to bid on behalf of their customers whose bids, as a rule, must be effective in the sense of being fully backed by the requisite naira cover. If banks complied strictly with this rule, there would be no need to source funds from the money market to finance bidding. The results of the Lagos study point strongly to the existence of speculative bids.⁵ This suggests that some looseness exists in the links between the primary and secondary markets, which could be the source of *illegal leakages* that

the CBN has complained about but has been unable to prove. Interviews conducted with ADs during the pilot survey revealed that their allocation of forex is usually much less than their customers' requirements. This is ascribed to supply constraints in the official market. Due to these constraints, ADs ration CBN forex to their customers. The two surveys indicate that price is not the only determinant of the allocation of forex in the secondary market. The credit-worthiness of the customers, their importance to the AD (measured by the size of their account), the importance of the use to which the forex will be put and so on significantly influence allocation. These factors allow some degree of arbitrariness in allocation that could encourage corruption in the secondary market.

After reaching decisions, ADs inform individuals of the success (failure) of their bids. Successful importers then proceed to complete Form A (invisible imports) or Form M (visible imports). The survey revealed that the approval and opening of letters of credit take 15-60 days. This suggests that buyers in this market face considerable delay before they can purchase forex to finance their imports. This contrasts with the export proceeds and parallel markets, where forex is traded instantaneously.

Apart from delays, buyers of forex in the official market support their demand with extensive documentation. Besides costs of documentation, importers expend resources on communications, and probably in "settlement".⁶ These costs arise from the need to satisfy the requirements for opening credit lines costs. Communication costs could vary from importer to importer since the distance between an importer and an exporter would vary from other cases. Similarly, the cost is higher for individuals outside Lagos who have to travel to Lagos to collect documents.

The CBN restricts inter-bank transfers of forex. This implies that the user cannot transfer forex purchased from CBN through one bank to another unless approval is sought and granted. Furthermore, users risk the forfeiture of allocated forex. They have 15 days after approval to use the forex. Even if these restrictions are not enforced, their legal foundations generate costs. These costs arise when importers try to avoid them by bribing officials of the enforcing agencies.

The amount of forex that may be purchased for invisible imports is also restricted by the CBN. The pilot survey revealed that the limits are as follows:

- Personal travel allowance (PTA) - US\$500.00
- Conference seminars - US\$1,000.00
- Business travel allowance (BTA) - US\$5,000.00
- Personal home remittances - 75% of net income of applicant

This review suggests that the institutional environment discriminates against the official market. Furthermore, users of forex in the OM have to contend with frequent non-market interventions in the market (see Odubogun, 1992) and changes in tariff and other trade and international payments policies of the government. Consequently, the individual demand price in the official market is less than the effective price of forex. Therefore, *the official exchange rate underestimates the real cost of forex in the official market.*⁷

Export proceeds market

The export proceeds market (EM) has not been the subject of much analysis. This market was meant to promote non-oil exports. It allows importers control over the use of their proceeds. Exporters (and other individuals) who bring in their proceeds have four choices. The first option is to sell the proceeds to the CBN. By law, this is what is expected. Most exporters do not do this since it yields the least return. The second option is to use the proceeds to open letters of credit (LC) with their bankers for future business transactions. The third option is to sell the proceeds to importers, and the fourth is to sell to banks who in turn could sell to importers and other individuals. In the second case, the export proceeds are deposited in the exporter's domiciliary account. In future, this could be used to open LCs. Options three and four provide an alternative source of forex to the formal importer. The Lagos survey shows that, on the average, forex from export proceeds accounts for about 15% of forex sold by authorized dealers.

— Unlike in the OM where CBN supplies all the forex, the transaction here is quick, less uncertain and with fewer CBN restrictions. For example, a buyer in this market avoids the CBN regulation that forex must be used within 15 days of purchase. Transaction in this market takes place between an exporter (seller of forex) and an importer (buyer of forex). Both parties' banks are involved, particularly in the transfer of funds from the exporter's account to the importer's.

The provisions of the Exchange Control Act on the procedures for international transfers apply to this market. For example, the importer must seek approval for international transfer through the completion of either Form M or Form A. The documentation involved is similar to that needed in the OM. Similarly, once transfer to the importer's account is made, the forex is not transferable to other accounts.

The rates in this market are negotiated. Considering that the importers by-pass some obstacles in the OM, their demand price for EM forex is most likely to be higher than their demand price for OM forex. The offer price, as a result, is likely to be more than what the offer price would be in the official market. Other things being equal, the offer price in the export proceeds market is less than the offer price in the parallel market. Consequently, the gap between demand price and effective price is likely to be less than that in the parallel market but more than that in the official market. As a result the exchange rate in this market on the average is higher than the official rate, as shown in Table 4.

Table 4: Average exchange rates and differentials in the Nigerian forex market, January - December 1993 (N/\$1)

Month	Export proceeds	EM-OM	Official	PM-EM	Parallel	PM-OM
January	24.4	4.2412	20.1588	0.2	24.6	6.4412
February	26.25	5.6942	20.5579	0.08	26.33	5.7721
March	29.18	4.190	24.99	3.59	32.77	7.78
April	26.7	4.704	21.996	11.96	38.66	16.664
May	26.99	4.994	21.996	6.29	33.28	11.284
June	29.75	7.754	21.996	5.91	35.66	13.664
July	31.12	9.124	21.996	6.08	37.2	15.204
August	31.99	9.994	21.996	6.01	38	16.004
September	32.75	10.754	21.996	6.25	39	17.004
October	34.62	12.624	21.996	6.48	41.1	19.104
November	36.39	14.394	21.996	8.61	45	23.004
December	37.31	15.314	21.996	7.69	45	23.004

Source: (a) Computed from data from the Lagos survey

(b) Computed from data collected from Business Times (January-December 1993).

The parallel market

The parallel market in this study includes the bureaux de change (BDC). Before the 1994 budget, apart from the requirement that BDCs be licensed, BDC operators faced little or no regulation from the government or the CBN. The BDC like the parallel market is an alternative source of forex to consumers who are either rationed out or unable to cope with the tedious process of buying forex in the OM and the EM. The institutional barriers in the official and export proceeds market make it difficult for most small firms and private individuals who require forex for informal trade or activities to source forex from the official or export proceeds market. This category of forex users source forex in the parallel market.

It is reasonable to assert that the existence of the parallel market is a response to government and CBN interventions and the persistent excess demand for forex in Nigeria. Until the 1994 budget, the parallel market was not an illegal market. Operators did not face the risk of being caught. Exchange in all currencies was free and buyers and sellers did not face the uncertainties that operators of illegal activities face. Consequently, they did not bear any costs associated with avoiding detection. What could be considered "official penalty" was their inability to participate in the official market. Thus, the costs arising from the fear of detection as documented in Bevan *et al.* (1991) were zero or neutral. Government expected the deregulation would eliminate the parallel market. On the contrary, the parallel market has prospered. There are at least three reasons why it

thrives. These are the inability of OM and EM to effectively satisfy the demand for forex; trade barriers in OM and EM; and the non-homogeneous institutional environment of the Nigerian foreign exchange market.

Until the 1994 budget, the major regulation governing the operation of BDCs was the requirement that they must be licensed. The attraction of buying and selling in the BDC and PM is the total absence of documentation involved in the transactions. Forex is exchanged without delay and without restrictions. Any buyer may buy forex for any purpose from a willing and able seller. The PM rates are negotiated on the spot, often between seller and buyer. The emerging rates are higher than the OM and EM rates (see Table 4).⁸ Table 3 shows that the BDC and PM rates are quite close.

This high possibility for arbitrage is causal to the closeness in rates. Arbitrage between BDC and PM is facilitated by:

- absence of barriers to trade in each and between them; and
- mobility of forex within and between them.

Thus, the closeness in rates and the existence of conditions for arbitrage imply that the BDC and PM are not effectively segmented. As a result, we treat BDC and PM as one market. The same conditions do not generally apply within the market. The Lagos study revealed that forex did not flow from the parallel market to the export proceeds or official market. None of the ADs admitted to sourcing forex from the parallel market. This is reasonable considering that the buying rate in PM was considerably higher than the selling rate in the OM. The flow of export proceeds or official forex to the parallel market is not documented. If the flow occurs as suggested in Odubogun (1992) and corroborated by the Lagos study, the movement contravenes the provisions of the Exchange Control Act of 1962 and CBN guidelines. In fact, unless there is collaboration between ADs, the CBN and foreign exporters and foreign banks such a flow may not be possible. The immobility of forex across the segments of the Nigerian forex markets forecloses legal arbitrage in the market. This may frustrate convergence in the exchange rates.

Table 4 shows that except on 5 March 1992 and 18 February 1993, the PM rate was significantly higher than the rate in OM. Direct interventions in OM generated the two exceptions. Consequently, a forced equalization rather than convergence was achieved. The equalization has not been sustainable. Similarly, general convergence has not been achieved.

The unsustainability of 5 March and 18 February could be linked to the institutional barriers that effectively segment the Nigerian forex market. Among other things these barriers restrict inter-segment arbitrage. In PM and BDC, intra-segmental convergence is possible because arbitrage is made possible by the mobility of forex within the market. The differential in the exchange rates shown in Table 4 could be linked to the non-homogeneous institutional environments for forex trade in Nigeria. Institutional barriers and the costs they generate are, therefore, very important to general or inter-segmental convergence. In the next section we examine the institutional cost in more detail.

IV. Institutional costs in the forex market

Institutional costs generate from institutional barriers to trade or exchange, which we identified in the preceding section for each segment of the forex market. Each of these barriers generates costs to the forex users. Table 5 shows these costs as they apply to each market. It shows that the OM has five types of costs, the EM has three, while the PM has none. The existence of these costs implies that the real or effective exchange rates are not fully reflected by the exchange rates in the official and export proceeds segments of the forex market. Below, we provide more details of each of these costs.

Table 5: A Taxonomy of institutional costs in the Nigerian forex market

Market Segment	Documentation	Delay	Time limit	Non transfeability	Communication
Official	x	x	x	x	x
Export proceeds	x	0	0	x	x
BDC/parallel	0	0	0	0	0

Key:

0 not applicable

x applicable

Documentation and communication costs

“Applicants” or potential consumers bidding for forex from CBN or potential users of export proceeds forex must fulfil certain procedural requirements that involve extensive documentation. The extent of documentation depends on the categories of uses for which forex is required and the segment of the market from which it is sourced.

In general, there are two broad categories of forex users approved by law. These are importers and non-importers. The non-importers purchase forex for activities such as personal home remittances, students’ allowances and school fees, insurance premiums, medical bills and travels, business travels, seminars and conferences, and examination fees. For both importers and non-importers, only uses allowed by law are entertained through “official”, i.e., OM and EM proceeds. Form M specifies the procedures and the documentation required for international financial transfers. It is important to note that proper and complete documentation as required by CBN Form M or Form A does not

guarantee letters of credit. In other words, the cost (time and money) incurred in fulfilling the requirements for obtaining forex through the official market do not necessarily lead to the satisfaction of demand by applicants. It is therefore rational for buyers to be willing to buy forex in the PM at the higher rate. The higher rate in the PM is balanced by the circumvention of the cost and hassle of excess documentation and other institutional costs in the OM and EM. The process of fulfilling the documentation required for buying and using forex in OM and EP leads to communication expenses.

Late delivery cost

The late delivery cost (LDC) arises from the delay in the procurement of forex sourced from the official market. Therefore, it applies only to CBN supplied forex. The export proceeds are made available to purchasers through their banks once the naira equivalent is received by the seller. This ensures minimum or no delay. Forex is sold in the PM on "cash-and-carry" basis; once a transaction is concluded between the buyer and seller, exchange of currencies is made without delay.

In the official market, considerable delay is experienced by forex buyers. This delay could be linked to administrative and bureaucratic bottlenecks in the CBN and in the ADs. The bidding process, the transfer of forex from CBN to banks and the transfer from banks to customers lead to delay. Arbitrariness in the process complicates the process. Interviews with the ADs revealed that a minimum of 15 days and a maximum of 60 days is the range of delay between customers' bids for forex and the eventual allocation. The survey shows an element of uncertainty, as most of the interviewed ADs said delay depended largely on availability of forex at the CBN and how much CBN is willing to allocate at a given point. This means that when the CBN suspends sales of forex, as happened three times between mid-December 1992 and 11 March 1993, the delay may even be longer.

Costs of restriction on use of forex

In the OM, two forms of restrictions are imposed by the CBN. First, CBN regulations stipulate that forex purchased from the OM must be used for the declared purpose within a maximum period of 15 working days. Second, CBN foreign currency purchased through one bank by an importer is not freely transferable from one bank to another "unless the importer obtains specific approval to aggregate such funds for an expressed purpose" (Peterside, 1993.).

The second restriction also applies to buyers of forex in EP. These restrictions are not present in the unregulated markets (i.e., the BDC and PM). Forex consumers may therefore be willing to pay more for forex in the EP than in the OM since by so doing they avoid the time limit restrictions. Similarly, they would pay more in PM than in EM because they are free to use the forex purchased for whatever they like as no restrictions are placed on transferring their foreign currency from one venture to another. The buyer is

even free to sell the forex if it is no longer needed. Also, a buyer does not face any restrictions about when to spend the foreign currency purchased. *This freedom is particularly attractive for those who wish to hold forex for speculative rather than exchange purposes.*

Miscellaneous costs

There are at least two other advantages that the PM confers on buyers of forex that buyers in the OM and EP do not benefit from. First, no upper limit is imposed on buyers in PM as in OM or EP for invisible imports. The willingness and ability of the buyer to pay the negotiated rate and the availability of the required foreign currency on the part of the seller influence the size of purchase and sale.

Second, buyers in the PM could exploit the weaknesses in the country's tariff collection process to either avoid or negotiate for lower import duties at the Department of Customs and Excise. The importer using PM forex could also avoid pre-shipment inspection. This makes it easier to doctor import documents to avoid paying appropriate duties. The first advantage compromises national laws. It also exposes the inconsistencies and dualities of the Nigerian economic environment — one policy enforces control and another creates loopholes that weaken the realization of the objectives of regulation. The second advantage also compromises the essence of tariff policy in Nigeria, i.e., the generation of government expenditure, the control of frivolous imports, and the protection of the economy against dumping and harmful products.

The aforementioned costs may not exhaust all the costs arising from institutional differences in the segments of the forex market. For instance, we have not specified the effects of uncertainty and the costs of settlement. In Peterside's equation the over-valuation factor is a residual that plays a role similar to that of the error term in econometric analysis: it accounts for all costs not specified but creates gaps between official and export proceeds rates. Recall that Peterside accounted for four of the costs, i.e., documentation (DCC), late delivery (LDC), non-transferability (TC) and time limit (TLC). To this should be added the costs of communication and the two miscellaneous costs. The miscellaneous costs should be included even though they are speculative; this is because they are likely to be a potential source of significant divergence between the rates in the three segments of the market.

The inclusion of miscellaneous costs could be justified by another reason. It is commonplace in the literature to posit that the parallel market rate is the realistic exchange rate. A serious evaluation of this thesis must take cognisance of the social welfare effects of miscellaneous costs.⁹ This is so because no economic activity is undertaken for its own sake. Therefore, if exchange rate is a means to an end, then it is realistic only if it leads to the improvement of real rather than imagined or hypothetical social welfare. Finally, the inclusion of all components of costs is important if we are to correctly measure the extent of over-valuation and to analyse the possibility of convergence.

The analysis of convergence may also have to take cognisance of the risk that patrons

of PM face about the genuineness of currency. Buyers in the official and export proceeds markets are protected from this problem because transactions are documented. Buyers in the official market could therefore be said to enjoy genuine currency premium (GCP).

non-professional seller of forex could be paid with fake naira. Those who source their forex in the official and/or export proceeds segment do not face this problem. This implies that the institutional costs in the export proceeds and official markets should be adjusted for the genuine currency premium (GCP). This rewrites Equation 2 as:

V. Possibilities of exchange rate convergence

$$EM = OM + TC + DCC + ZC \tag{1}$$

$$PM = OM + TC + DCC + LDC + TLC + ZC + OVF \tag{2}$$

Having presented an overview of the Nigerian forex market and the possible source of rate variation, we now turn to evaluate the possibilities of convergence. First, we present the framework for the analysis, then, the method of empirical evaluation, and finally the presentation of the results and their analysis.

$$ZC = KC - GVF \tag{3}$$

The conditions for equalization of the three exchange rates could easily be derived from Equation 3. The equation is re-written as:

$$PM - (TC + DCC + ZC) = EM = OM + LDC + TLC + OVF \tag{4}$$

Like Azam's (1991) study, this study focuses on the entire Nigerian unified market. Recall that in Azam's study, the exchange rate of the naira at the two borders was unified by arbitrage which was possible because (a) there was the absence of CBN intervention or the exchange rate was not binding on importers and exporters, and (b) bank notes were mobile between the two borders. The movement of bank notes from the official or export proceeds markets to the parallel market is followed by local arbitrage. This study considers Petrosidis' fundamental equation, which takes cognizance of the differences in the institutional arrangements of the three segments of the market as a useful starting point for the analysis of the potentials for convergence in the exchange rates. The equation is written as:

$$TC + DCC + ZC = EM - OM \tag{5}$$

$$PM - OM = EM - OM \tag{6}$$

$$PM = EM + TC + DCC + LDC + TLC + OVF \tag{7}$$

Similarly, if the discussion of institutional costs (importers' and exporters' costs) and communication costs (CC) and miscellaneous costs (MC), should be added to the official and export proceeds rates. These modify Petrosidis' equation to:

$$TC + DCC + ZC + MC + CC = EM - OM \tag{8}$$

The conditions in Equation 5 are static conditions. It is possible to derive the dynamic version of Equation 5 as follows. It is therefore not surprising that the dynamic version of Equation 5 would be more relevant for the analysis of the adjustments in the foreign exchange market. The conditions for exchange rate convergence could also be deduced from Equation 5. Movements in the institutional arrangements could have a significant influence on convergence. The convergence of the three exchange rates does

of PM. In parallel markets, buyers in the official and export proceeds markets are not allowed to buy the parallel market's naira and documentary buyers in the official market should therefore be said to enjoy greater liquidity. This is because the parallel market's naira is not allowed to be used in the official market.

V. Possibilities of exchange rate convergence

There are at least two other advantages that the PM confers on buyers of forex that

Having presented an overview of the Nigerian forex market and the possible source of rate variation, we now turn to evaluate the possibilities of convergence. First, we present the framework for the analysis, then, the method of empirical evaluation, and finally the presentation of the results and their analysis.

Second, buyers in the PM could exploit the weaknesses in the country's tariff collection process to either avoid or negotiate for lower import duties at the Department of Customs and Excise. The PM could also avoid punishment inspection. This makes it easier to doctor import documents to avoid paying appropriate duties. The first advantage compromises national laws. It also exposes the inconsistencies and dualities

Analytical framework

Unlike Azam's (1991) study, this study focuses on the entire Nigerian forex market. Recall that in Azam's study, the exchange rate of the naira at the two borders was unified by arbitrage which was possible because (a) there was the absence of CBN intervention or the exchange act was not binding on buyers and sellers, and (b) bank notes were mobile between the two borders. The movement of bank notes from the official or export proceeds markets to the parallel market is not allowed by law. As a result, legal arbitrage across market segments is foreclosed. This study considers Peterside's fundamental equation, which takes cognisance of the differences in the institutional environments of the three segments of the market as a useful starting point for the analysis of the potentials for convergence in the exchange rate.

Peterside's equation as earlier defined (see Eq.1) is:

$$PM_e = EM_e + TC + DCC = OM_e + TC + DCC + LDC + TLC + OVF$$

The discussion of institutional costs suggests that two additional costs, i.e., communication costs (CC) and miscellaneous costs (MC), should be added to the official and export proceeds rates. These modify Peterside's equations to:

$$\begin{aligned} PM_e &= EM_e + TC + DCC + KC \\ &= OM_e + TC + DCC + LDC + TLC + KC + OVF \end{aligned} \quad (2)$$

where,

$$KC = CC + MC$$

The analysis of convergence may also have to take cognisance of the risk that patterns

Another modification was suggested by the risks that buyers of forex in the parallel market face. The spontaneity and lack of documentation in the parallel market imply that buyers cannot seek redress if they are sold fake foreign currencies. Similarly, the non-professional seller of forex could be paid with fake naira. Those who source their forex in the official and/or export proceeds segment do not face this problem. This implies that the institutional costs in the export proceeds and official markets should be adjusted for the genuine currency premium (GCP). This converts Equation 2 to:

$$\begin{aligned} PM_e &= EM_e + TC + DCC + ZC \\ &= OM_e + TC + DCC + LDC + TLC + ZC + OVF \end{aligned} \quad (3)$$

where,

$$ZC = KC - GCP$$

The conditions for equalization of the three exchange rates could easily be derived from Equation 3. The equation is re-written as:

$$PM_e - (TC + DCC + ZC) = EM_e = OM_e + LDC + TLC + OVF \quad (4)$$

From Equation 4,

$$PM_e = EM_e = OM_e$$

$$TC + DCC + ZC = 0 \text{ and } LDC + TLC + OVF = 0 \quad (5)$$

In the event that:

$$TC + DCC + ZC = 0 \text{ but } LDC + TLC + OVF \neq 0, \text{ then,} \quad (6)$$

$$PM_e = EM_e = OM_e$$

Similarly, if

$$TC + DCC + ZC \neq 0 \text{ but } LDC + TLC + OVF = 0, \text{ then,} \quad (7)$$

$$PM_e = EM_e = OM_e$$

The conditions in Equation 5 are static conditions for a general equality of exchange rates. It is possible for Equation 5 not to hold at any stationary positions but hold over time. It is therefore not sufficient to draw inferences from any stationary points of Equation 5. The dynamic path of Equation 5 would be more relevant for the analysis of the adjustments in the foreign exchange market. The conditions for exchange rate convergence could also be deduced from Equation 5. Movements in the institutional costs have significant influence on convergence. The convergence of the three exchange rates does

not require strict equalities as in Equation 5, but that the following adjustment processes occur:

$$TC_t + DCC_t + ZC_t = 0 \text{ as } t = \alpha \quad (8)$$

and

$$LDC_t + TLC_t + OVF_t = 0 \text{ as } t = \alpha \quad (9)$$

If Equation 8 holds over time, then

$$EM_{et} = PM_{et}$$

If Equation 9 holds over time, then

$$OM_{et} = EM_{et}$$

If Equation 8 holds but Equation 9 does not, then general convergence is not possible. Similarly, if Equation 9 holds but Equation 8 does not, general convergence is not possible. General convergence is therefore not possible if $LDC_t + TLC_t + OVF_t$ and/or $TC_t + DCC_t + ZC_t$ either remains constant, grows over time, or oscillates over time. These imply that *general convergence is possible if and only if both Equations 8 and 9 hold simultaneously over time*. The analysis implies that if we could show that either Equation 8 or Equation 9 does not hold over time in the Nigerian forex market, then we could show that general convergence is not possible. For analytical simplification we investigate the possibility of Equation 9 holding over time.

If the OVF_t is zero,¹⁰ the condition in Equation 9 is

$$LDC_t + TLC_t = 0 \text{ as } t = \alpha \quad (10)$$

To investigate the possibility of Equation 10 it is necessary to specify estimates of LDC_t and TLC_t . In the next section, therefore, we turn to the specification of the estimates of LDC_t and TLC_t .

The analysis takes as given the rates in the three markets. It also assumes that the rates are demand driven. This assumption is valid considering that excess demand has persisted in the official market (see Odubogun, 1992), which implies that the rates respond to demand changes. The excess demand in the official market influences the parallel and export proceeds rates through the over-valuation factor. *This factor consists of un-specified institutional costs and the changes in the official rate that would have resulted if the CBN did not exercise its monopoly powers*. The excess demand in the official market spills over to the parallel and export proceeds markets. This raises the respective rates. The deliberate control of official rates and forex supply raises the level of spillover and through it raises rates in other segments. Note that the control of supply and rates reflects

dominance. This also implies that if supply is increased, for instance through reduction in the leakages from export revenues, the market rate in the official market would fall.

Other things being equal, the excess demand would fall, the spillover would fall and the pressure on EM and PM would fall. Consequently, the rates in all segments would be lower. The excess demand for forex could be linked to the size of the fiscal deficit of the federal government, its financing of the deficit through the banking system and the inflation that generates from it. It could also be linked to high speculative activities in the private sector. In Section VI we briefly evaluate the possible links among the fiscal deficit, monetary policies and inflation on the over-valuation factor. This is a necessary complement to the analysis of the possibility of exchange rate convergence.

The specification of the estimates of LDC_t and TLC_t

Estimate of LDC_t

The late delivery costs (LDC) arise from delay and the requirement that bids be fully backed by naira cover. As Peterside did, it is reasonable to estimate LDC at time t as interest forgone. The buyer of forex forgoes interest by bidding for forex in the official market. Given the uncertainty that the buyer faces, this is likely to be the least cost. The opportunity cost of institutional constraints is estimated as follows.

Suppose,

$$LDC_{it} = P_i - P_0 \quad (11)$$

Where,

$$P_i = P_0 (1 + rm) \quad (12)$$

$$m = i/365 \quad (13)$$

P_i is deposit (N/\$1) plus interest at time i

P_0 is deposit (N/\$1)

i is delay time

r is interest rate

From equations 10 - 12,

$LDC_{it} = 0$ iff either

(a) $i = 0$,

(b) $r = 0$,

(c) $i = r = 0$.

Thus, $LDC_i \rightarrow 0$ as either $i \rightarrow 0$, $r \rightarrow 0$, or as $i, r \rightarrow 0$. The possibility of $r \rightarrow 0$ is remote. This implies that i is the key determinant of LDC_i turning to zero. In the next section we estimate and analyse the time path of LDC_i using equations 10 - 12.

Estimate of TLC

The time limit costs (TLC) arise from the CBN regulation that its forex must be used within 15 days of accessibility. Compared to LDC, TLC is more difficult to estimate. This is because the loss of forex may have both quantitative and qualitative effects. For example, foreign partners may lose confidence in the importer if goods were supplied on credit. This could have indeterminate long-term effects. The loss of business or other losses in the short term could differ among different agents. Interest foregone is a common loss to all agents. However, this could underestimate TLC. Lacking a better estimate, TLC is estimated as interest foregone. This implies that:

$$TLC_m = P_n - P_0 \quad (14)$$

where,

$$P_n = P_0 (1 + rn) \quad (15)$$

$$n = (i + k)/365 \quad (16)$$

i is delay time

k is days allowed before forex is reclaimed by CBN.

From Equation 14 - 16,

$TLC_m = 0$ iff either,

- (a) $n = 0$ implies either $i = 0$, $k = 0$, or $i, k = 0$
- (b) $r = 0$

The probability of r turning to zero is remote. Therefore, the key determinants of TLC_m turning to zero are i and k . Both are the key institutional barriers. This and the inference from the estimate of LDC_i lead to the conclusion that if both institutional barriers are removed, Equation 8 would be achieved and the official rate would converge to the export proceeds rates. In the next section we shall empirically estimate LDC_i and TLC_m to test the conclusion.

Empirical estimates of LDC_t and TLC_t

Data for the estimations

The data for the study were collected from primary and secondary sources. Two surveys were conducted as described above. The first survey sampled 10 banks located in Ibadan; these banks are authorized dealers. The second sampled 20 banks in Lagos. These surveys among other things generated data on the range of i and the range of EM_e . The value of k is 15 and it was obtained from official CBN documents. The data on r , PM_e , OM_e , fiscal deficits, stabilization securities and so on were collected from CBN publications and business journals.

Estimation results

Table 6 shows the estimates of LDC_{it} and TLC_{mt} . In computing the estimates, we assumed that buyers of forex could have saved the resources in three alternative financial institutions. These are the commercial banks, mortgage banks and finance houses. The saving rate in most commercial banks in 1993 was between 13% and 14%. The interest rates ranged between 16% and 27% in mortgage banks, while in the finance houses it was at least 30%.

The results of the two surveys revealed that it takes 15-60 days to conclude transactions in the official market. Three values of i (delay) were used in the estimates. These are 15 (minimum), 37.5 (average) and 60 (maximum). These generate three corresponding values for n ($i + k$), which are 30, 50 (approximately) and 75, since k was constant at 15.

At least four major inferences could be drawn from Table 6. They are as follows:

- LDC_{it} and TLC_{mt} were non-zero in all cases. As a result, their sum was greater than zero in all cases.
- LDC_{it} and TLC_{mt} rose as r (interest rate) and i (delay) rose.
- The LDC_{it} and TLC_{mt} were constant in all cases (where r and i were held constant) between April and December 1993. This coincided with the period in which the exchange rate was fixed in the official market.
- Since LDC_{it} and TLC_{mt} were non-zero, Equation 9 can hold if and only if the over-valuation factor is equal to the negative of the sum of LDC_{it} and TLC_{mt} .

The over-valuation factor in the least case — that is, the case in which LDC_{it} and TLC_{mt} are highest — is non-negative over the period, as can be seen in Table 7. This implies that the export proceeds rate and the official rates diverged rather than converged.¹² Table 7 suggests that the fixing of the exchange rate increased the divergence between the two rates. This implies that the fixing of the exchange rate in the official market did not lead to a general convergence between January and December 1993. The non-convergence was reinforced by non-decreasing movements in LDC_{it} and TLC_{mt} over the period in which the exchange rate was fixed.

Table 6: Estimates of LDC_{tj} and TLC_{tn} (naira)

r = 0.13

Month	LDC _{t15}	LDC _{t37.5}	LDC _{t60}	TLC _{t30}	TLC _{t50}	TLC _{t75}
Jan.	0.11	0.27	0.43	0.22	0.36	0.54
Feb.	0.11	0.27	0.44	0.23	0.37	0.56
Mar.	0.13	0.33	0.53	0.27	0.45	0.67
Apr.	0.12	0.29	0.47	0.24	0.40	0.59
May	0.12	0.29	0.47	0.24	0.40	0.59
June	0.12	0.29	0.47	0.24	0.40	0.59
July	0.12	0.29	0.47	0.24	0.40	0.59
Aug.	0.12	0.29	0.47	0.24	0.40	0.59
Sept.	0.12	0.29	0.47	0.24	0.40	0.59
Oct.	0.12	0.29	0.47	0.24	0.40	0.59
Nov.	0.12	0.29	0.47	0.24	0.40	0.59
Dec.	0.12	0.29	0.47	0.24	0.40	0.59

r = 0.14

Month	LDC _{t15}	LDC _{t37.5}	LDC _{t60}	TLC _{t30}	TLC _{t50}	TLC _{t75}
Jan.	0.12	0.29	0.43	0.24	0.39	0.58
Feb.	0.12	0.30	0.44	0.25	0.39	0.60
Mar.	0.14	0.36	0.53	0.30	0.48	0.72
Apr.	0.13	0.32	0.47	0.26	0.42	0.64
May	0.13	0.32	0.47	0.26	0.42	0.64
June	0.13	0.32	0.47	0.26	0.42	0.64
July	0.13	0.32	0.47	0.26	0.42	0.64
Aug.	0.13	0.32	0.47	0.26	0.42	0.64
Sept.	0.13	0.32	0.47	0.26	0.42	0.64
Oct.	0.13	0.32	0.47	0.26	0.42	0.64
Nov.	0.13	0.32	0.47	0.26	0.42	0.64
Dec.	0.13	0.32	0.47	0.26	0.42	0.64

r = 0.16

Month	LDC _{t15}	LDC _{t37.5}	LDC _{t60}	TLC _{t30}	TLC _{t50}	TLC _{t75}
Jan.	0.13	0.33	0.53	0.27	0.44	0.67
Feb.	0.14	0.33	0.54	0.27	0.45	0.68
Mar.	0.17	0.41	0.66	0.33	0.55	0.82
Apr.	0.15	0.36	0.58	0.29	0.48	0.73
May	0.15	0.36	0.58	0.29	0.48	0.73
June	0.15	0.36	0.58	0.29	0.48	0.73
July	0.15	0.36	0.58	0.29	0.48	0.73
Aug.	0.15	0.36	0.58	0.29	0.48	0.73
Sept.	0.15	0.36	0.58	0.29	0.48	0.73
Oct.	0.15	0.36	0.58	0.29	0.48	0.73
Nov.	0.15	0.36	0.58	0.29	0.48	0.73
Dec.	0.15	0.36	0.58	0.29	0.48	0.73

r = 0.27

Month	LDC _{t37.5}	LDC _{t60}	TLC _{t30}	TLC _{t50}	TLC _{t75}
Jan.	0.56	0.90	0.45	0.75	1.12
Feb.	0.57	0.91	0.46	0.76	1.14
Mar.	0.69	1.11	0.55	0.92	1.39
Apr.	0.61	0.98	0.49	0.81	1.22
May	0.61	0.98	0.49	0.81	1.22
June	0.61	0.98	0.49	0.81	1.22
July	0.61	0.98	0.49	0.81	1.22
Aug.	0.61	0.98	0.49	0.81	1.22
Sept.	0.61	0.98	0.49	0.81	1.22
Oct.	0.61	0.98	0.49	0.81	1.22
Nov.	0.61	0.98	0.49	0.81	1.22
Dec.	0.61	0.98	0.49	0.81	1.22

r = 0.30

Month	LDC _{t37.5}	LDC _{t60}	TLC _{t30}	TLC _{t50}	TLC _{t75}
Jan.	0.62	1.01	0.50	0.83	1.25
Feb.	0.64	1.03	0.51	0.84	1.27
Mar.	0.77	1.25	0.62	1.03	1.55
Apr.	0.68	1.10	0.55	0.90	1.36
May	0.68	1.10	0.55	0.90	1.36
June	0.68	1.10	0.55	0.90	1.36
July	0.68	1.10	0.55	0.90	1.36
Aug.	0.68	1.10	0.55	0.90	1.36
Sept.	0.68	1.10	0.55	0.90	1.36
Oct.	0.68	1.10	0.55	0.90	1.36
Nov.	0.68	1.10	0.55	0.90	1.36
Dec.	0.68	1.10	0.55	0.90	1.36

Source: Author's computations.

Table 7: The over-valuation factor

Month	OVF(N/\$1)	OVF (%)*
Jan.	1.9812	8.17
Feb.	3.3942	16.51
Mar.	1.39	5.56
Apr.	2.244	11.09
May	2.534	11.52
June	5.294	24.07
July	6.664	30.30
Aug.	7.534	34.25
Sept.	8.294	37.71
Oct.	10.164	46.21
Nov.	11.934	54.26
Dec.	12.845	58.40

Source: Computed from Tables 4 and 6. * % of official rate.

VI. Post reform macroeconomic policies and exchange rate stability

This paper assumes that a stable exchange rate is desirable for Nigeria. First, exchange rate stability is a necessary condition for domestic price stability.¹³ Second, a stable exchange rate would have positive effects on:

- household incomes and consumption;
- firms' investment, import and employment decisions;
- government's fiscal, debt and monetary policies and
- external balance.¹⁴

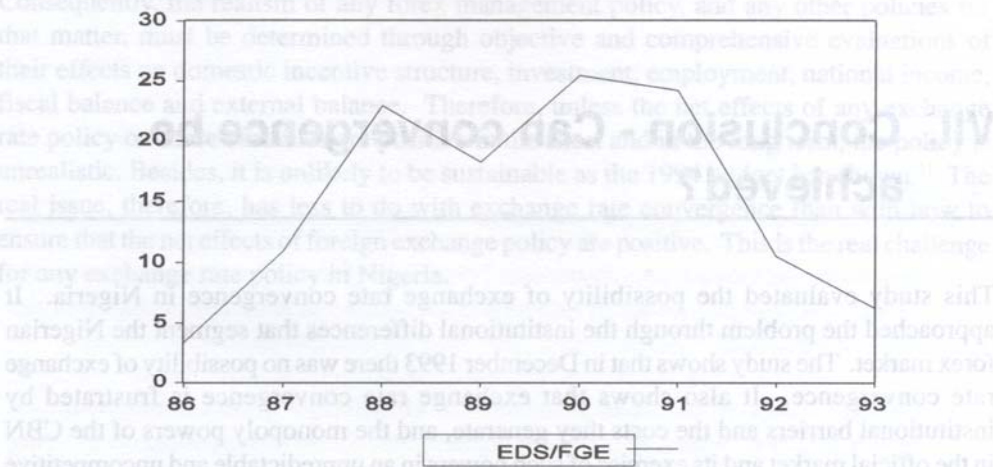
Third, exchange rate stability is likely to discourage capital flight and speculation in the forex market.¹⁵ This implies that an unstable exchange rate may be self-generating given that *capital flight and speculative demand would exert upward pressures on the nominal exchange rate.*

This section deduces the possible links between post reform macroeconomic policy environment and exchange rate stability using the data presented in Table 2. The analysis investigates the effects of policy (and external) shock on exchange rate movements through their effects on the demand and supply of forex. The demand effects could be deduced through analysis of (a) possible links between fiscal deficit, domestic debt and money supply and (b) possible effects of fiscal deficit on aggregate demand. The supply effects could be deduced from analysis of allocation of oil revenue by the federal government, instabilities in the oil market and external debt service.

Table 2 suggests a positive correlation between fiscal deficit, domestic debt and money supply. This suggests that monetary policy accommodates federal deficits through inflationary finance. The Central Bank report of 1994 shows that the index of aggregate consumption expenditure rose from 100 in 1986 to 1090 in 1993 compared to an expansion in fiscal deficit from an index of 100 in 1986 to 2732 in 1993. This shows clearly that the growth of federal deficit has positive effects on aggregate demand. By extension, its effect on demand for foreign exchange is positive because: (a) rise in external debt service is causal to the expansion in the federal fiscal deficit (see Figure 1) and; b) aggregate demand has positive effects on imports.

These relationships lead to the conclusion that expansion in external debt service is causal to the expansion in fiscal deficit, which in turn causes a rise in demand for forex. Inflationary finance made expansion in fiscal deficit possible, hence its effects on demand for forex is positive.¹⁶

The practice of direct use of oil revenue by the federal government through dedication

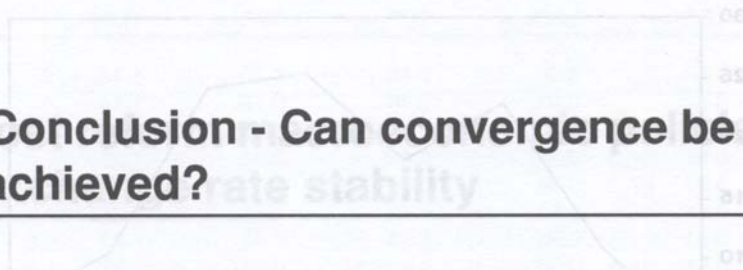
Figure 1: Ratio of external debt service to total expenditure (%)

and special accounts in 1986-1993 and negative oil revenue shocks have negative effects on the supply of forex. Increases in external debt service have negative effects on the supply of forex available for non-debt imports.

In summary, the macroeconomic policy and external environment that confronted Nigeria in 1986-1993 are conducive to persistent decline in the value of the naira against major currencies whether or not exchange rate is sold in a market environment. This is because they tend to foster excess demand for forex. Under these market conditions, the exercise of market power by the central bank through price control as it did in January to December 1993 only compounds the problem of instability in the exchange rate. This is because the disequilibrium that develops as a result induces the rates in the non-official market to rise as demand rationed out of the formal market shift to these markets. In addition, the uncertainty fostered by the disequilibrium and by the high possibility that rationing mechanisms are not transparent encourages speculative demand for forex in all segments of the market. This leads to persistent rise in the over-valuation factor as revealed by Table 7 above.

The 1994 budget, the frequent changes in pricing rules in the official market and the evidently fruitless attempts at equalization all indicate that the domestic policy is a source of instability in the economy. For instance, Table 2 shows that the domestic price level followed the expansionary path of fiscal deficit, domestic debt and money supply. Instability in macroeconomic policies has been a major source of instability in the forex market and in exchange rates. Over 71% of the respondents of the Lagos study consider the foreign exchange policy of the 1994 budget retrogressive. The policy is symptomatic of the wild swings between extremes that have characterised government policies in Nigeria.¹⁷ The swings betray the weak analytical foundations of macroeconomic policies and point to a macroeconomic environment that is more likely to lead to instability than to convergence and stability in the forex market. The weak macroeconomic environment appears to complement the institutional factors in frustrating exchange rate convergence and stability.

Figure 1: Ratio of external debt service to total expenditure (%)



VII. Conclusion - Can convergence be achieved?

This study evaluated the possibility of exchange rate convergence in Nigeria. It approached the problem through the institutional differences that segment the Nigerian forex market. The study shows that in December 1993 there was no possibility of exchange rate convergence. It also shows that exchange rate convergence is frustrated by institutional barriers and the costs they generate, and the monopoly powers of the CBN in the official market and its exercise of such powers in an unpredictable and uncompetitive manner. The analysis leads to the conclusion that convergence in the future may not be possible unless the institutional barriers segmenting the forex market are removed, and the official market operates competitively.^{18,19}

The study also analysed the links between the macroeconomic environment and exchange rate convergence and stability. The analysis leads to the conclusion that post reform macroeconomic and external shocks exerted downward pressures on supply of forex but upward pressures on demand for forex, and that the differential effects on supply cause the monotonic decline in the nominal exchange rate observed in Table 2. The study proposed that reduction in Federal deficit and inflationary finance would reduce the pressure on existing supply of foreign exchange and by extension, halt the monotonic fall in the value of the naira. Similarly, reduction in external debt, hence external debt service, rise in external revenue (oil and non-oil), reduction in diversion from the federation account and so on, would have negative impact on the nominal exchange rate by increasing the supply of forex.

Though changes in the institutional environment of the forex market could help to bring about a convergence of the exchange rates, it is important to investigate and measure the social costs of removing institutional barriers. This is so because some of the institutional barriers are linked to specific national objectives,²⁰ which implies that removal of the institutional barriers is not costless. However, the institutional barriers may themselves not be the most effective means for attaining the objectives. What this mean is that more rigorous analysis of the social costs of institutional barriers is necessary before they are removed.

The study recommends that exchange rate policy analysis should deal with the question: Are foreign exchange and the exchange rate an end or a means to an end? If foreign exchange and exchange rates are ends, it would not matter what effects an exchange rate policy has on domestic incentive structure, investment, employment, national income, fiscal balance and external balance. The exchange rate policy would not be evaluated by its effect on these macroeconomic aggregates either. However, to the extent that forex

and the exchange rates are means to ends, the effects of exchange rate policy matter. Consequently, the realism of any forex management policy, and any other policies for that matter, must be determined through objective and comprehensive evaluations of their effects on domestic incentive structure, investment, employment, national income, fiscal balance and external balance. Therefore, unless the net effects of any exchange rate policy on these variables are positive in the short and in the long term, the policy is unrealistic. Besides, it is unlikely to be sustainable as the 1994 budget has shown.²¹ The real issue, therefore, has less to do with exchange rate convergence than with how to ensure that the net effects of foreign exchange policy are positive. This is the real challenge for any exchange rate policy in Nigeria.

activities such as the parallel rate cannot be realistic. The parallel rate is a significant proportion of domestic assets held by the private sector. However, the parallel rate could not be realistic because of the high cost of borrowing. However, the parallel rate is not realistic because of the high cost of borrowing. However, the parallel rate is not realistic because of the high cost of borrowing.

The OVP is treated as a residual in this analysis because it is considered as the residual in the OVP. The OVP is treated as a residual in this analysis because it is considered as the residual in the OVP.

This coincides with the period of the parallel rate. The period of the parallel rate is 1976-1982. The period of the parallel rate is 1976-1982.

Official valuation is measured as the period of the parallel rate. The period of the parallel rate is 1976-1982. The period of the parallel rate is 1976-1982.

Domestic price level is a positive function of the nominal exchange rate. The domestic price level is a positive function of the nominal exchange rate.

The collapse of the Mexican peso in the first quarter of 1995 is a significant event. The collapse of the Mexican peso in the first quarter of 1995 is a significant event.

About 6% of the respondents acknowledged the existence of arbitrage in the official market. Some of the respondents link the high demand in the official market to the high demand in the official market.

This is a popular phrase for corrupt inducements to facilitate the achievement of objectives. Cases of settlement are usually hard to document because of its illegality.

Notes

1. Peterside is the managing director of Investment Banking and Trust Company (IBTC) Ltd., Lagos, which is one of the authorized dealers and a player in the inter-bank market.
2. Peterside refers to these costs as premiums. However, they are costs to the buyer. Buyers in the parallel market could interpret them as benefit or premium considering that they do not confront the obstacles that generate them. However, these benefits are not free: they are paid for through higher offer prices by buyers in the parallel market.
3. It is possible to deduce how he computed TLC. The computation appears to have been based on the following formula:

$$LDC = OM_{et} - OM_{e0}$$

where,

$$OM_{et} = OM_{e0} (1 + rm)$$

$$m = t/365$$

OM_{et} = value of OM_e at time t

OM_{e0} = # deposit for \$1

r = interest rate

t = delay (number of days).

Note that r and t are the critical variables. He assumed that $r = 0.5$ and $t = 18$. The basis of these assumptions was not justified. Considering their importance, this is a significant omission.

4. Peterside complained that a few banks dominate the money market where banks source the required naira cover for their bids.
5. About 64% of the respondents acknowledge the existence of sharp practices in the official market. Some of the respondents link the high demand in the official market to these practices.
6. This is a popular phrase for corrupt inducements to facilitate the achievement of objectives. Cases of settlement are usually hard to document because of its illegality.

- However, some ADs reveal that the speculation of this existence in the official forex market has foundation.
7. Real cost refers to the opportunity costs of buying forex in the official market.
 8. Note that the maximum rates in the export proceeds market are not directly comparable to the average parallel exchange rate.
 9. Interestingly, about 64.29% of respondents in the Lagos study do not agree that the parallel market rate is realistic. Some respondents argue that an exchange rate that discourages investment in productive activities in favour of speculative activities such as the parallel rate cannot be realistic. They argue further that a significant proportion of the persistent excess demand for forex is accounted for by speculative demand. Therefore, it would be erroneous to interpret all the demand as transaction demand. Considering the monotonic depreciation of the naira and the high inflation in the economy, it is possible that a significant proportion of the speculative demand reflects the demand for a store of value.
 10. The OVF is treated as a residual in this analysis because it is conceptualized as the difference between EM_c and OM_c that exceeds the difference accounted for by the institutional cost in Equation 9. This treatment underscores the institutional context of this study.
 11. This coincided with the period which the exchange rate was fixed in the official market.
 12. Official over-valuation is measured as the parallel exchange rate less the official rate.
 13. Domestic price is a positive function of the nominal exchange rate because Nigeria imports most of its raw materials and capital goods so that a mark-up pricing regime operates for most processed or manufactured commodities and to a lesser degree for agricultural commodities.
 14. The collapse of the Mexican peso in the first quarter of 1995 demonstrates the desirability of a stable currency for internal and external balances. The bail-out program of the Clinton administration and its positive effects on expectations of domestic and international private investors support the proposition that exchange rate stability is desirable in real economies.
 15. This implies that an unstable exchange rate may be self-generating. This is because capital flight and speculative demands would exert upward pressures on the nominal exchange rate.

16. Similarly, the use of stabilization securities by the CBN (in 1989-1993) would have positive impacts on money supply, aggregate demand, demand for forex and on the nominal exchange rate if the resource so mopped-up is used to finance federal government deficits.
17. Pre-1986 policy emphasized development planning and big government which the 1986-1993 policy reversed. The 1986-1993 policy was in turn reversed by the 1994 budget only for aspects of it to be reversed by the 1995 budget.
18. That is, (a) authorized dealers do not collude and (b) the CBN does not possess or use monopoly powers indiscriminately.
19. The decision of the 1995 budget to abolish most of the institutional barriers has led to convergence of the autonomous market and the parallel market. However, the market remains segmented by a policy of over-valued exchange rate for official transactions and restricting official inflows into the autonomous market. Once these potentially rent creating and appropriating tools are removed, general convergence will be attained.
20. For instance, documentation is designed to frustrate capital flight, dumping, over-invoicing, etc., and increase government revenue through custom duties.
21. However, the policy in the budget misses the mark. It appreciates neither the institutional factors nor the adverse effects of the macroeconomic policies which have consistently disrupted forex demand, forex supply and forex rates.

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