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Interest Rate Pass-through from Wholesale Rate to Deposit Money Banks Retail Rates in Nigeria: An ARDL Approach

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Abstract
The paper investigates interest rate pass-through from wholesale rate to seven types of Deposit Money Banks (DMBs) retail rates. The justification for the study is to discover what we have learnt about the changes in the interest rate pass-through from the whole sale rate to intermediate rates after the capital reform of 2005. Evidence from the study will also aid monetary policy decisions for macro-economic management in Nigeria. We use monthly data for the period 2006M01-2015M01 based on ARDL approach. Our findings reveal that Interest Rate Pass-through (IRPT) affects DMBs products differently. In the case of deposit rates, pass-through is near complete in the short run for all products except for 12month deposit rate. In case of lending rates, the prime lending rate pass-through was complete while the maximum lending rate was incomplete. The bounds test suggest the existence of a long-run relationship between the variables such that the speed of adjustment takes an average of 16 months for deposit rates and 7months for prime lending rate before they return to their equilibrium positions. Based on the findings that pass-through of wholesale rate to DMBs retail rates is sufficiently high during the month, we conclude that monetary policy is reasonably effective in determining changes in the intermediate target in the short-run in Nigeria
Keywords: pass-through, wholesale rate, deposit rate, lending rate, deposit money banks

1.0 Introduction

The attempt in this paper is to establish if there is Interest Rate Pass-Through (IRPT) in the immediate and or long run, from wholesale rate to commercial banks retail rates and to also confirm whether pass-through issimilar or heterogeneous across banking products in Nigeria after the capital reform of 2005. Understanding the behaviour of IRPT from wholesale rate to bank retail rates in most nations is very essential due to its monetary transmission effects on the retail rates and by extension on household savings and firms' investment decisions (Samba & Yan, 2010). For these reasons the IRPT is a key issue that deserve empirical investigation so as to provide evidence on the relative changes in the retail rates of Deposit Money Banks (DMBs) due to changes in wholesale rates Nigeria.

The DMBs retail rates as intermediate target in the monetary transmission process in Nigeria stand between the operating target rates and the final goal. Does any change in the operating target rates affect the intermediate targets? If it does what is the magnitude of such effects and how long does it take before such effects converge to their long run equilibrium (see; Sheefeni, 2013; Mueller-Spahan, 2008; Sørensen & Werner, 2006).

The effectiveness of IRPT, in the view of Dabla-Norris & Floerkemeier, (2006) depends among other factors on the stage of development and structure of individual nations. Evidence from many studies in different nations since the mid1990s affirms that IRPT is an important feature of the money market in different countries. In the recent time, some studies like that of Tomiyuki, Ichiro & Ikuo, (2015) used a bank based panel data set in Japan to inquire about IRPT and found that banking institutions that have a high percentage of relationship loans seem to experience lower pass-through. In Africa, Melloul, Souar, & Benbouziane, (2014) on a study in Algeria found that pass-through to deposit rate is higher than it is for lending rates in the long-run while in Europe, Karahan, (2014) investigates the rate of interest rates pass-through from policy rates to retail banking rates using monthly data for Turkey. He found that Turkey policy rate causes a change in inter-bank interest rates and later to bank lending rates. Another recent effort, which examines IRPT, was conducted by Paries, Moccero, Krylova & Marchini (2014) at the times of financial fragmentation in the Euro zone. The paper analyses heterogeneous behaviour of retail bank lending rates in the some countries and uncover that some countries in Europe (France, Italy, Spain and Germany) shows that downward adjustment in policy rates and market reference rates causes a concurrent reduction in rates of borrowing

In Nigeria the issue of the interest rate setting by the Central Bank of Nigeria (CBN) for macroeconomic management have gone through fundamental changes after independence. For example in the period 1970 to 1985, interest rate regime was under the direct control of the CBN (Nnanna, 2001). This infers that innovations in the retail rates are dictated by the CBN. Therefore there were no significant IRPT effects during this period. After the adoption of the Structural Adjustment Programme (SAP) in 1986 the CBN migrated and administered market determined interest rates in the financial system (Tella, 2011). After the commencement of SAP, significant IRPT effects presumably started to evolve from the policy rate to the wholesale rate and finally to DMBs retail rates in

Nigeria. The need to support this theoretical position with evidence is imperative.

The reasons for IRPT from wholesale rates or Inter-bank rates to retail rates depends on some factors like information asymmetry in credit rationing (Stiglitz & Weiss 1981; Kapwil & Scharler 2006); the level of development of the financial structure of the economy Cottarelli & Kourelis, (1994); Dabla-Norris & Floerkemeier, (2006), collusive pricing arrangements Hannan & Berger, (1991) and adverse customer reactions Neumark & Sharpe (1992). Adjustment cost was suggested by Hofmann & Mizen (2004). Other reasons advanced by some other scholars are; cost of funds by Hannan & Berger (1991), marginal cost of funds by de-Bondt, Mojon & Valla, (2005) while Allen & Gale (2004) say that long period of business dealing and implicit contract between the banker and its customer may be the reasons for incomplete pass-through of wholesale rate to retail rates. Further to this, banks may wish to protect its customers from the shock of volatile rates arising from endogenous or exogenous factors.

There were also divergent opinions on the magnitude of IRPT to retail rates based on empirical evidence in some country specific studies. Samba and Yan (2010) who investigated pass-through of interest rate in member nations of the Central African Economic and Monetary Community found that IRPT was low and incomplete in the long run from policy rate to deposit rate in these countries. Whereas, Mamingi, Boamah & Jackman, (2008) on Barbados found that from the policy makers policy rate to commercial banks' lending rate pass-through was slow in the short run but complete in the long-run. Mueller-Spahn (2008) on the German economy found that pass-through is incomplete in short and long-run and the effects on retail rates differ from bank to bank. In Namibia, Sheefeni (2013) conducted a study on IRPT from the bank rate to commercial bank retail rates and found that pass-through was incomplete and that it was higher in the short-run than long-run.

In Nigeria studies on IRPT are very few. Among those who conducted studies in this area is Sanusi, (2010). He investigated magnitude and how quick the effects of changes in whole sale rates are felt by the bank rates. He used Structural Vector Auto-Regression (SVAR) for analysis and found that Interest rate pass-through to retail rates in Nigeria is incomplete and quite slow. Ogundipe and Alege (2013) also examine the rate of pass-through and by how much policy rates innovations cause a change in the retail bank rates using a sample of annual data (1970-2011). Based on a VAR approach they found a downward stickiness both in both the short-run and long-run in terms policy shock pass-through to the bank retail rates.

Against this background, and unlike Sanusi (2010); Ogundipe and Alege, (2013), this paper considers a more recent experience of Nigeria on IRPT based on a different econometric approach (ARDL) to investigate the magnitude and speed of interest rate pass-through from the inter-bank rate (wholesale rate) to DMBs rates after the Bank Capital Reform which ended in 2005 using a monthly data. Further, we make use of the Bounds Test framework within the ARDL framework to determine the long-run relationship between deposit money banks interest rates and wholesale rates as well as the short-run adjustment to the long-run equilibrium. We found unlike the two earlier studies that pass-through was near complete from wholesale to retail deposit rates and was full for prime lending rate in the short-run but incomplete in the long-run in Nigeria. The next part of the paper discusses the theoretical review while third part contains data sources, empirical model and estimation procedure. Part four is based on discussion of findings. Section 5 explains the implications of our findings for monetary policy in Nigeria while section 6 concludes the paper with recommendations.

2 Theoretical Reviews

The theoretical justification for price stickiness and how banks set their interest rates can be explained based on some theories such as agency cost, switching costs, risk sharing, adjustment costs, and cost of funds. Agency cost by Stiglitz & Weiss, (1981) posit that banks provide credits to their customer at a cost. The basis of dealing is based on asymmetric information. The interest rate charged by the bank may change due to market forces for example, if the policy rate rises due to policy innovation and pass-through may not be complete especially for lending rates. The reason for this may be due to the level of risks related to each loan facility because high risk loans may be subjected to the payment of maximum lending rate while less risky loans may be asked to pay prime lending rate. The pass-through to these two lending rates may not be equal. In this circumstance, banks are likely to set their interest rate based on the risks related to the portfolio of loans and rationing between high net worth customers' and the others.

Lowe & Roling, (1992) propounded the switching cost theory. In the banking sector, one customer is not the same as another. In view of this, a bank "all things being equal" is expected to seek patronage with customers with good prospects of high cash flow and low credit default. The marketing efforts of the bank in discovering this type of customer involves some cost. More often these costs are borne by the customer in form of administrative fees. The reasons for switching from one bank to another and the relative cost is an important consideration when a customer intends to switch from one bank to another. If the switching cost is more than the effect of interest rate pass-through the bank may be able to retain the new interest rate and at the same time the patronage of the customer. Risk sharing theory by Fried & Howitt, (1980) explains lending rate stickiness as follows; in a situation where borrowers are risk averse, they may demand for more stable interest payments from their bankers. In compensation

for granting their request, a bank will charge higher administrative fees for a lower interest rate in compensation for the risk involved in such credit facility. Adjustment costs theory by Cottarelli & Kourelis, (1994) support the hypothesis that a bank will not adjust to the new loan rate if the cost of the adjustment is higher than the cost retaining the old credit or bank loan rate. This is especially so if the bank is of the opinion that the changes in the market loan rate is not permanent. The cost of funds approach posits the changes in the lending rates may be due to a change in the policy rate. According to de-Bondt, Mojon & Valla. (2005) changes in the loan rates may be due to changes in deposit rates if the loan risk premium inherent in the loan rate is stable in course of time. However the functional link between policy rate and bank retail rates based on theoretical model of de-Bondt, Mojon & Valla. (2005) can be represented in the form;

$$i^L = \alpha + \beta . i^p \quad \ldots \quad (1)$$

i^L is the loan rate i^p is the monetary policy rate, α is the top up and β is the parameter of the demand elasticity of lending rates with respect to policy rate.

Unlike Cottarelli & Kourelis, 1994; Lowe & Roling; 1992 and Stiglitz & Weiss, 1981 the submission of De-Bondt et al, 2005 is that the parameter β in equation (1) may sum up to 1 under perfect competition and complete information but incomplete if the market is not perfect. Second asymmetric information may cause overshooting in situations where the lending rate charged by the banks is higher by the proportion of change in the policy rate so as to compensate the bank for possibility of higher risks involved in the lending.

Cottarelli and Kourelis (1994) state in a functional form the response of retail rates to a change in policy rates within the same period in equation (2).

$$\Delta r_t = c + \sum_{j=0}^{n} \alpha_j \Delta i_{t-j} + \sum_{k=1}^{m} \beta_k \Delta r_{t-k} + \gamma (r_{t-1} - i_{t-1}) \quad \ldots \quad (2)$$

Where α_j and β_k are the coefficients on the policy rate and the retail rate, respectively, and *n* and *m give* the number of lags chosen when estimating equation (2). Δ denotes the difference operator, i_t is the interest rate targeted by the central bank, r_t is the retail rate of banks. Based on equation (2), a change in the Deposit Money Banks Rates is explained by a change in (wholesale rate) monetary policy rates. The error-correction term that specify the long term relationship between the retail and the policy rate, is also expressed in equation (2). Due to the fact that the researcher attempts to estimate the immediate pass-through, denoted by α_0, its parameter gives the coefficient value of a change in policy rate within the period of the study. The long run multiplier is expressed in equation (3) and λ as defined in the equation indicates the elasticity of the retail rate to the policy rate. This is represented in the form:

$$\lambda = \frac{\sum_{j=0}^{n} \alpha_j}{1 - \sum_{k-1}^{m} \beta_k} \quad \ldots \quad (3)$$

Where α_j, β_k, *n* and *m* are as previously defined. In case λ = 1, pass-through is considered complete in the long-run. In view of this, the response of deposit money banks rates to wholesale rate is fully justified. The next part of the paper discusses the empirical model, which draws from the contributions of Cottarelli & Kourelis, (1994) and De-Bondt et al, (2005).

3 Empirical Models

The sample period of 2006M1- 2015M1 is used so as to specifically evaluate the IRPT after the 2005 capital reform of the Central Bank of Nigeria (CBN). The financial data are from the statistical data base of the CBN representing average monthly retail interest rate of the Deposit Money Banks (DMBs). The inter-bank lending rate being a wholesale rate, serve as proxy for Monetary Policy Rate The retail interest rate of the DMBs are savings rate, 1month and 3month deposit rate (short term maturity) 6month and 12month deposit rate (medium term maturity) and retail lending rates (prime lending rate and maximum lending rate for commercial banks).

The lending rates are the consumer credits and firms loan rates of DMBs. Our rates represent the average for the commercial banks and not for a particular DMB. In choosing appropriate reference interest rates the inter-bank rate is mainly used as a proxy for the monetary policy stance, following the work of De-Bondt, (2005). Further to this, the peculiarity of the policy rate that does not change quite often led to the use of inter-bank (wholesale rate) as suggested by (Kwapil & Scharler, 2006).

The econometric model represents a relationship between interbank rate (proxy for monetary policy rate)

and some retail rates (deposit or loans rate) as an ARDL model proposed by Pesaran and Shin, (1999); Mueller-Spahn (2008); Samba and Yan, (2010). This is represented in the form:

$$i_t^R = \alpha_0 + \sum_{J=1}^{P} \alpha_j i_t^R + \sum_{K=0}^{q} \beta_K i_{t-k}^P + \varepsilon_t \quad \ldots \quad (4)$$

Where i_t^R represents retail rate for savings rate, deposit rates and lending rates i_t^P is the interbank rate, t is the time trend and ε_t is a white noise disturbance that is independently and identically distributed (iid) with a mean of 0 and a constant variance σ^2. α_j and β_k are the coefficients of retail rate and policy rate and α_0 measures the mark-up. Equation (4) can be re-written using the lag operator and expressed in the form:

$$A(L) i_t^R = \alpha_0 + \beta(L) i_t^P + \varepsilon_t \quad \ldots \quad (5)$$

Decomposing equation (5) we have:

$$A(L) = 1 - \sum_{j=1}^{P} \alpha_j L^J \; and \;\; B(L) = \beta_0 + \sum_{k=1}^{q} \beta_k L^k \quad \ldots \quad (6)$$

The long-run functional expression suggested by the parameters in (6) is expressed in the form:

$$i^R = \frac{\alpha_0}{A(1)} + \frac{\beta(1)}{A(1)} i^P \quad \ldots \quad (7)$$

And the error correction representation in respect of (3) can be stated in the form:

$$\Delta i_t^R = \delta_0 + \sum_{j=1}^{P-1} \mu_j \Delta i_{t-j}^R + \sum_{K=0}^{q} K_K \Delta i_{t-k}^P + \gamma\left(i_{t-1}^R - \lambda i_{t-1}^P\right) + \varepsilon_t \quad \ldots \quad (8)$$

Equation (8) provides an estimate for the rate of pass-through in the short and long-run. The parameter λ which is β(1)/A(1) expresses the rate of change in the retail rate when the policy rate changes by 1% in the long-run. While in the short-run is indicated by K_0. K_0 is thus a reaction of retail rates to a change in the policy rate in the same time frame. The pass-through is complete in the long run if λ is equal to 1 and γ is the speed of adjustment of the co-integration association or connection as stated in equation (7).

3.1 Estimation Procedure

Pesaran (1997), Pesaran, Shin and Smith (2001), made the ARDL estimator a common use for econometric analysis and that is the approach which this study intends to use. The benefit of the technique is that the estimator can be used even if the study variables are not of the same order of integration i.e I(0) and or I(1). The second benefit is that it is suitable for use when considering a reasonable number of lags from one period to the other from the general to the specific. In case of cointegration among the study variables, the error-correction term will be useful in determining the period when such disequlibrium converges to their long-run position.

The paper's analytical approach starts from the investigation of the unit root tests of the study variables. This entails the use of either or a combination of the following tests devised by Dickey and Fuller, Phillip and Perron (ADF, PP) or Kwialkowski-Phillips-Schmidt-Shin (KPSS) tests. If the test results indicate that the variables are stationary at levels OLS technique will be used to run the regression. In case they are not stationary at 1(0) level but at 1(1) Bounds test was conducted to determine whether the series are cointegrated or otherwise. We interpret the bounds test by comparing the calculated F-statistic with critical values as provided in E-views (2015). This is incorporated in the results of Table 4. The proportion of the shock effects corrected in the short run is also estimated by E-views 9.

4. Discussion of Findings

4.1 Results of Unit Root Test

The paper employs the use of the standard Augmented Dickey Fuller (ADF) test and two others which include the Phillips-Perron (PP) and the Kwiatkowski, Phillips, Schmidt, and Shin (KPSS).

Table 1: Results of Unit Roots Tests: 1(0) and 1(1)

Variable	Model Specification	ADF	PP	KPSS	ADF	PP	KPSS
	Order of intergration	1(0)	1(0)	1(0)	1(1)	1(1)	1(1)
interbank	Intercept	-2.74*	-7.35**	0.26**	-10.94**	-19.58**	0.14**
	Slope/intercept	-3.05	-7.96**	0.07**	-10.85**	-19.27**	0.09**
savings	Intercept	-2.51	-2.64	0.39**	-14.32**	-13.61**	0.32**
	Sope/intercept	-0.75	-2.17	0.22	-14.39**	-13.71**	0.05**
1mth dep	Intercept	-1.76	-1.51	0.37**	-4.63**	-11.45**	0.10**
	Slope/intercept	-1.86	-2.06	0.11**	-4.60**	-11.34**	0.10**
3mth dep	Intercept	-1.75	-1.39	0.37**	-5.67**	-11.34**	0.09**
	Slope/intercept	-1.88	-1.84	0.12**	-5.64**	-11.40**	0.08**
6mth dep	Intercept	-1.73	-1.74	0.30**	-11.02**	-11.02**	0.11**
	Slope/intercept	-1.8	-1.82	0.13**	-10.97**	-10.97**	0.10**
12mth dep	Intercept	-1.57	-2.37	0.30**	-17.20**	-17.54**	0.09**
	Slope/intercept	-1.56	-2.65	0.12**	-17.13**	-16.72**	0.09**
Plend	Intercept	-2.43	-2.32	0.08**	-7.96**	-7.96**	0.05**
	Slope/intercept	-2.43	-2.43	0.07**	-7.91**	-7.93**	0.05**
mlend	Intercept	-0.81	-0.79	1.08	-13.95**	-14.09**	0.05**
	Slope/intercept	-2.54	-3.38	0.07**	-13.88**	-14.29**	0.05**

Source: Authors' 2015

Notes: ADF and PP at 5% critical values for intercept -2.88, trend and intercept -3.45
KPSS at 5% the critical values for intercept 0.4630, trend and intercept 0.1460
**significance level which rejects the null hypothesis at 5%

The results of unit root tests in Table 1infer that apart from the interbank rate, all other variables are not stationary at 1(0) for both ADF and PP. In respect of KPSS all the study variables are stationary at 1(0) using either intercept or trend and intercept at 5% level of significance, except the savings rate. After differencing, the unit roots test show that series became stationary which, implies that the series are integrated of order1 at both intercept and trend and intercept for the three methods employed. Our results for unit root test indicate a mixture of 1(0) and 1(1) across the methods. This evidence justifies the use of the ARDL technique for analysis.

4.2 Regression Results

4.2.1 ARDL Results Based on Pass-through from inter-bank (wholesale) to Retail Rates

The estimate of the coefficient values of variables in equation (3) is reported in Table 2 along with the goodness of fit of the specification. Adjusted R^2 values show that the models have high goodness of fit. Hence the independent variables explained the respective values of adjusted R^2 in the total variations of the dependent variables. The Durbin-Watson (DW) test tends to suggest that the models have no positive or negative serial autocorrelation.

Table 2: Immediate Interest Rate Pass-through DMBs Retail Rates in Nigeria

Variable	Coefficient	Std Error	Goodness of Fit/ Model Criteria
Savings (-1)	0.7869***	0.0983	Rsq 0.92; Adj RSq 0.91; DW 2.00
Savings (-2)	0.3142***	0.1147	..
1mth dep (-1)	0.7978***	0.0953	Rsq 0.94; Adj Rsq 0.93; DW 2.07
1mth dep (-3)	0.3593***	0.1156	..
3mtm dep (-1)	0.8090***	0.0974	Rsq 0.94; Adj Rsq 0.93; DW 2.00
3mtm dep (-2)	0.3750***	0.1235	..
6mth dep (-1)	0.9387***	0.0318	Rsq 0.90; Adj Rsq 0.89 DW 2.20
12mth dep (-1)	0.3767***	0.0976	Rsq 0.83; Adj Rsq 0.82; DW 2.01
12mth dep (-2)	0.3747***	0.0974	..
12mth dep (-3)	0.1727*	0.0976	..
Plend rate (-1)	1.1081***	0.1030	Rsq 0.92; Adj Rsq0.90; DW 1.91
Plend rate (-3)	-0.3154**	0.1498	..
Plend rate (-4)	0.2823*	0.1523	..
Plend rate (-5)	-0.2360**	0.1058	..
Mlend rate (-1)	0.5960***	0.0954	Rsq 0.96; Adj Rsq 0.95 DW 2.02
Mlend rate (-3)	0.2168**	0.0949	..

Source: Authors' 2015

The asterisked coefficient value (*) (**) and (***) indicate significance level @ [10%], [5%] and [1%].

The results in Table 2 indicate that IRPT from wholesale to deposit money banks rates are not full. The immediate pass-through of DMBs rates from the results suggest that at 1% level of significance pass through in

the first month ranges 60%-80% except the prime lending rate whose pass-through is full in the first month. The results imply that banks don't fully adjust their retail rates when wholesale rates change except for the case of prime lending rate

Incomplete pass-through of the wholesale rate to deposit money banks rates in Nigeria is similar to what Kapwil & Scharler (2006) found in the Euro Area and the USA and while that of Sheefeni, (2013) for Namibia differs in the sense that the lending rate in Namibia has a relatively high effect that is higher than unity (overshooting) when compared to the Nigerian case.

4.2.2 Results: Cointegration Equation and Error Correction Term

Table 3: Error Correction Term Results

Variable	ECT coefficient	t . statistic
Savings Rate	-0.3000	-0.9718
1mth dep rate	-0.0481*	-1.7981
3mth dep rate	-0.0646**	-2.4379
6mth dep rate	-0.0613*	-1.9286
12mth dep rate	-0.0760*	-0.0881
Plend rate	-0.1498***	-3.4052
Mlend rate	-0.0301	-1.4034

Source: Authors; 2015

The asterisked coefficient value (*) (**) and (***) indicate significance level @ [10%] [5%] and [1%].

The error correction term (ECT) coefficients and the relative level of significance are listed in Table 3. The error correction term coefficients are all negative as required but the proportion corrected in cases of disequilibrium within one period (one month) differs. Apart from savings rate and maximum lending rate, all the other variables are significant in explaining how soon any disequilibrium between the retail rates and wholesale rate would converge to long-run effect. The statistical significance of the ECT is assumed to signify short-run causality between the wholesale rate and the asterisked variables in Table 3. Considering the 1 month DBMs rate, the magnitude of the coefficient value infers that nearly 5% of any disequilibrium between interbank and the rate would converge to long-run within one month. But the proportion of disequilibrium corrected in cases of interbank and 6month deposit rate and 12month deposit rate are 6% and 8% respectively. The disequilibrium between inter-bank rate and prime lending rate indicates that 15% of such disequilibrium would converge within one month. The speed of adjustment across the variables also differs. The prime lending rate adjustment rate is 6.68months while that of 1month DMBs rate, 3month DMBs rate, 6month DMBs rate and 12 month DMBs rate are 20.79, 15.48, 16.31, and 13.16 months respectively.

4.2.3 Discussion of Bounds Test Results

Table 4: ARDL Bounds Test Results

Variable	F. Statistic	Cointegration
Savings Rate	1.5224	No cointegration
1mth dep rate	5.0899	inconclusive
3mth dep rate	6.0778**	cointegrated
6mth dep rate	3.0086	No cointegration
12mth dep rate	5.1460	inconclisive
Plend rate	6.4721**	cointegrated
Mlend rate	1.9357	No cointegration
Critical Value	Lower Bound	Upper Bound
1%	6.84	7.84
5%	4.94	5.73
10%	4.04	4.78

Source: Authors; 2015

The asterisked coefficient value (**) indicate significance level @ [5%].

Bounds test results in Table 4 indicate the presence of long-run relationship between the interbank rate, 3mth DMBs rate and DBMs prime lending rate. The empirical results from the Table 4 provide statistically significant evidence to suggest that long-run relationship exists between the DBMs rates and the wholesale rate in Nigeria.

The estimated long run coefficient for the only variable that has long run relationship with the interbank rate is as indicated on Table 5.

Table 5 Results: ARDL Long-Run Coefficients values of DMBs Rates

Variable	Coefficient	t. Statistics
Savings Rate	0.1129	0.4608
1mth dep rate	1.3617	1.6537
3mth dep rate	0.8788**	2.0801
6mth dep rate	0.5899	1.4095
12mth dep rate	1.2089	1.5477
Plend rate	- 0.0103	-0.1186
Mlend rate	1.1171	1.3960

Source: Authors; 2015

The asterisked coefficient value (**) indicate significance level @ (5%).

The results of the long-run coefficient for this variable in Table 5 indicate that a change of 1unit in the price of interbank rate (whole sale) will result in a long run change of 0.88 units in the 3month deposit rate. The results also suggests that IRPT is incomplete in the long-run but near complete at approximately 0.9.

5. Implications for Monetary Policy in Nigeria

Bernanke and Gertler (1995), in the discussion of "credit channel" posit that monetary innovations affect money market rates, which is the intermediate target of the Central Bank of Nigeria (CBN) in the monetary policy transmission process. Evidence from this study suggest that IRPT to DMBs rate in Nigeria is near complete in the short-run but complete for the prime lending rate within the first month. The results infer that the interest rate channel and the bank credit channel is a veritable channel of monetary transmission mechanism in Nigeria.

The magnitude of IRPT and the time frame also suggest that monetary policy through the interest rate and bank lending channels can be used to influence intermediate target and subsequently the final goal (output and price stability) of monetary policy in Nigeria. Other findings tend to conform to the fact that pass through to DMBs rate is immediate for Nigeria but the adjustment period for savings and deposit rates is an average of 16months while that of lending rate is relatively shorter indicating a period of 7months. The DMBs lending rate converge to its long-run equilibrium at a faster speed compared to the deposit rates. The lag influence of monetary policy is therefore shorter for prime lending rate. This implies that the monetary authorities through the interest rate and bank lending channel can influence firm's investment decisions and household savings versus consumption pattern in the short-run.

In case of a policy shock DMBs would prefer to return their rates to equilibrium so as to reduce costs. Although the degree of competition amongst the banks is an important factor that affects the IRPT and the adjustment speed. For example, a bank that holds a high level of loan risk may respond faster to the wholesale rate and alternately in a period of credit rationing a bank would prefer to lend to less risky clients rather than adjusting its rate. The latter action slows down the speed of adjustment. The speedier pass-through of lending rate compared to deposit rates in the Nigerian case may be as a result of presumably, granting long period loans and accepting short-term money for safe keeping by the DMBs.

One of the major sources of cost by firms is the is the cost of external funding and the DMBs. Lending rate is a good indicator of marginal cost of short-term external funding in any nation (Borio & Fritz, 1995). Investment and consumption decisions of firms and individuals are often funded through borrowing in cases of lack of internal funding by these economic units. The cost of borrowing by these economic units is one of the determinants of level of output and the domestic price stability in many nations. This argument emplaces the fact that for the CBN to succeed in curtailing inflation and encourage investment expenditure, knowledge of IRPT and its review become essential for macroeconomic management. It important to stress that evidence from the study infers that the CBN through monetary policy can influence the cost of short-term external fund sources by individual and firms in Nigeria.

All the DMBs retail rates promptly responded to the wholesale rate in the short run but it is not all of the retail rates of commercial banks that promptly respond to a change in the money-market rate in the long run. This infers that DMBs services are majorly short term in nature either for deposit taking or loans and advances. This may be a plausible reason for absence of long-run relationship between most of the DMBs retail rates and the wholesale rate in Nigeria.

6. Conclusion and Recommendation

This paper analyses the IRPT from inter-bank rate (wholesale rate) to DMBs retail rates, based on the ARDL approach. The results suggest that IRPT from wholesale rate to DMBs is near complete in the short-run. The inference from the results is that a change in the policy rate or the wholesale rate being the proxy for policy rate affects the intermediate target. Interest rates that are comprised in the intermediate target include the DMBs retail rates for both deposit and lending rates. Second, the immediate pass-through of the whole sale rate to DMBs rates though incomplete for DMBs deposit rates is complete for the DMBs prime lending rate.

It is therefore suggestive from the results that monetary policy is fairly effective in Nigeria at least in the short run. Due to the effects of a change in wholesale sale on DMBs retail rates monetary policy can also be used to influence savings versus consumption pattern of households as well as short-term funding of firms in Nigeria. In Nigeria, many indigenous firms find it difficult to scale the process to access capital market funds due to the stiff standard. A considerable number of local firms depend on the DMBs for financial assistance and consequently most of the banks ration credit to less risky clients. This may be among other factors why IRPT is complete for the prime lending rate. It is important to note that this work can be further extended by investigating the magnitude of retail rate pass-through to real variables as well as the factors responsible for heterogenity of retail rate behaviour in Nigeria. Based on these findings, we recommend the continued use of the interest rate rather than the monetary aggregate as a major instrument of monetary policy in Nigeria.

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