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Monetary Policy Rate Pass-through to Retail Bank Interest Rates in Tanzania

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Abstract

This study employs an error correction model to assess the degree and speed of adjustment of commercial banks' interest rates to monetary policy rate changes with a view to providing insight into the pass-through of the monetary policy rate to the interbank rate and retail bank interest rates in Tanzania. The analysis started with the assessment of long run and causal relationships between interest rates. In error correction model setting and by using monthly data spanning the period March 2003 through December 2012, estimations for the retail lending rate and deposits rate models provided baseline results to help test the maintained hypotheses. Separate estimations were made for the three largest banks and "small" banks to account for concentration effects on the interest rate pass-through. In addition, distinction was made, on one hand, between banks owned privately and publicly, and foreign against domestically owed banks on the other.

The findings lend support to incomplete monetary policy rate pass-through to commercial banks' short-term interest rates both in the short to long term. Although the coefficients of the short term and adjustment bear the expected signs, only the pass-through to the interbank rate and the deposits rate are statistically significant. The policy rate pass-through to the interbank rate is generally complete (i.e. one), but that to the deposits rate is found to be weak —0.033 percent for 1 percent change in the monetary policy rate—and occurs with a lag. The pass-through to the deposits rate is more explained by responses by small banks and foreign banks. By splitting the sample into two, obtained results do not support the view that policy rate pass-through in the country has improved over time.

The implications of these findings are that, the effectiveness of monetary policy transmission to the economy through the interest rate channel may be limited. To the extent that the interest rate operates, aggressive use of the policy rate to achieve monetary policy objectives may adversely affect banks with weak balance sheets given the asymmetric reaction of banks to monetary policy changes. To enhance the effectiveness of the monetary policy, besides focusing on addressing factors that weaken policy rate transmission in the economy, the monetary authority could also adopt forward-looking monetary policy implementation approach with a view to capturing the delayed nature of the pass-through.

1.0 Introduction

Although the neoclassical view of the long-run neutrality of money appears to be widely accepted, monetary policy is thought to influence economic activity in the short to medium term through changes in interest rates or money supply. However, operation of monetary policy transmission channels, which comprise the interest rate, bank lending, balance sheet, asset price, exchange rate and expectation channels, vary across countries due to differences in the extent of financial sector development and competition in the financial markets. A general agreement in the literature is that the interest rate channel is more effective in developed economies where financial sector is well developed and efficient as well as highly competitive. This view notwithstanding, due to difficulties in achieving quantitative monetary targets, some emerging market and developing countries have shifted into or have shown an interest in adopting inflation targeting (Kovanen, 2011). In inflation targeting framework, short-term money market interest rates are used as operating target, changes of which are expected to influence the cost of funding for banks and eventually the level of retail deposits and lending interest rates. Even the countries which are still using monetary targeting frameworks, such as Tanzania, monetary authority's actions are believed to indirectly influence money market interest rates (through the open market operations).

Open market operations (for securities and foreign exchange), which were adopted in 1995, provide mechanism to achieve three main objectives: financing of fiscal deficits, liquidity management and anchor to interest rates determination (BoT, 2011). Following these policy measures together with, among others, the enhancement of regulatory and supervisory role of the Bank of Tanzania the country has recorded significant progress including financial intermediation, as well as financial markets development (**Appendix 1**).

Notwithstanding the progress made in the financial sector, the pass-through of money market interest rates to retail bank interest rates appears to be incomplete and delayed (**Appendices 2** and **3**). In addition, the pass-through of the policy rate shock to bank interest rates could be working differently through the retail deposits and lending rates (**Appendices 4** and **5**). These issues are pursued empirically with a view to assessing the degree and speed of adjustment to equilibrium of retail bank rates over time, as well as investigate whether bank size and ownership structures explain the stickiness of retail interest rates to monetary policy changes. We seek to address the following questions: first, do changes in the monetary policy rate and money market rates affect bank retail interest rates? Second, what could be the magnitude and speed of the pass-through? Third, do banks size and ownership structures contribute to the stickiness of interest rates in the country? A sound understanding of the extent to which changes in the Bank of Tanzania's policy

rate impacts the interbank and banks' retail interest rates is crucial in informing the process towards adopting an interest rate targeting framework in the medium to long term.

After this introduction, section 2 presents a review of the literature on interest rate pass-through, and section 3, the methodology. The discussion of the findings is represented in section 4, while section 5 concludes the paper.

2.0 Literature Review

The literature discusses the connection between short term and long term interest rates within the liquidity preference theory, the segmented markets theory, the expectations hypothesis and the marginal-cost pricing models. Within these frameworks, both theoretical and empirical evidence of lending interest rate stickiness and incomplete pass-through of interest rates from policy rates to retail rates dominate the discussion.

Based on the traditional Keynesian approach, the monetary transmission mechanism works through the interest rate channel, in that a policy induced change in the short-term interest rate has an impact on short and long nominal, as well as real interest rates, given some degree of price stickiness and in line with the expectations hypothesis of the term structure. In turn, this will affect consumer and investment spending, aggregate demand and output (Mishkin 1996). Transmission of policy rate shocks through the interest rate channel should ideally take place over a relatively short period of time (Goodfriend 1991), as a faster transmission would strengthen the impact of monetary policy on the real economy. Due to a confluence of factors, however, the short-run interest rate pass-through may be less than complete in reality and interest rates may also adjust asymmetrically to rising and falling policy rate.

The sluggishness of pass-through is evident in many studies that have examined the speed of interest rate adjustment. These studies conclude that the rate of adjustment differs across countries, financial institutions and financial products (see for example, Cottarelli and Kourelis (1994), Borio and Fritz (1995), Hofmann and Mizen (2004)). Even in countries with deep and well developed financial markets, such as the U.S. and the European common currency area, the speed and completeness of the interest rate pass-through differ (Kwapil and Scharler, 2010) and Karagiannis et al. (2010). These differences in part reflect the country-specific features of financial markets (for instance, in Europe the banking system plays a more significant role in lending than in the U.S.).

In developing countries, due to the underdevelopment and shallowness of financial markets, the structure of financial markets plays an important role in the transmission process (Mishra, Montiel, and Spilimbergo, 2010). Deficiencies in the financial system and high concentration among banks reduce competitiveness, while large excess reserves make central bank's monetary policy less effective and impair the interest rate channel. This may also contribute to the interest rate channel working differently for deposits and lending interest rates (Sander and Kleimeier, 2006).

While a number of studies in this area have been conducted in developed countries, very few have been carried out on African countries. The studies on Africa point to mixed results (see for example, Kigabo, 2012; Roseline et al, 2011; Bangura, 2011; and Mohsin, 2010). Emerging from these studies is that traditional monetary transmission process working through the interest rate channel and the demand for money may have limited applicability in the Sub-Saharan Africa (SSA) because of the underdeveloped financial systems and weak responsiveness of aggregate spending to interest rate changes, low levels of competition, degree of market segmentation aggravated by the presence of a sizable informal finance, unavailability of alternative financial instruments. Known to the author, there is no empirical study done on Tanzania, the gap this study attempts to fill using bank level panel data.

3.0 Methodology

3.1 Conceptual Framework

The connection between lending interest rate and policy interest rate is normally based on the original Monti-Klein Model of profit maximization theory of the bank. This approach has been adopted directly or with modifications by, for example, Roseline et al. (2011); Iman et al. (2010); and Maudos and Solis (2009). This study follows this approach. The framework assumes that commercial banks have a direct clearing relationship with the central bank. A commercial bank is assumed to maximize profit (π) subject to the commercial bank balance sheet. The balance sheet is, on the assets side, comprised of reserves (R) and Loans (L) and, on the liabilities side, are deposits (D) and settlement balance with the central bank (S), so that:

$$R + L = D + S \tag{1}$$

Assuming the commercial bank makes loans at a rate iL and pays a deposit interest rate at a rate iD . Clearing with other commercial banks is conducted via the central bank and that if a

commercial bank has a negative settlement balance (S) at the central bank, it pays a penalty, ip, which is equivalent to the policy rate.

Also, the bank incurs costs of managing deposits and loans. Assuming the cost function of the commercial bank is given as mL and using the Klein-Monti model which assumes a downward sloping demand function for loans and upward sloping deposit function, the profit function may be expressed as a sum of intermediation margins on loans and deposits net of management costs, as follows:

$$\prod(D,L) = i_L L - i_D(R + L - S) - i_p\sigma(S - R) - mL \quad (2)$$

In view of this, the bank faces two choice variables: the volume of loans granted and the quantity of precautionary reserves they choose to hold. Differentiating equation (2) with respect to L and R yields:

$$i_L - i_D = m, \quad (3)$$

$$i_D = \sigma i_p. \quad (4)$$

When equations (3) and (4) are combined, they yield a linear relationship between lending and policy rates as shown in equation (5).

$$i_L = m + \sigma i_p \quad (5)$$

The first stage of the interest rate pass-through process starts with the influence of the central bank on money market conditions through short-term money market interest rates. Changes in short-run market interest rates, in turn, affect retail bank interest rates, which is the second stage of the interest rate pass-through process.

Under perfect competition and complete information, prices equal marginal costs and the derivative of prices with respect to marginal costs is equal to one. This derivative is less than one if perfect competition and information assumptions are relaxed. In this study, equation (5) is used as the baseline equation in interest rate pass-through analysis to test the hypothesis that there is incomplete interest rate pass-through in Tanzania.

Let, r_b denote the retail bank interest rates (lending and deposits) and r_p policy rate (Treasury bill rate or inter-bank interest rate). Following De Bondt (2005), the estimable equation is specified as:

$$r_{bt} = \alpha_0 + \alpha_1 r_{pt} + \varepsilon \quad (6)$$

The error term is ε and it is independently and identically distributed with zero mean and a constant variance (σ^2). According to Rousseas (1985), the constant, α_0 measures the mark-up and α_1 measures the degree of the pass-through in the long run. α_1 takes a value of 1 if the pass-through is complete—obtainable under perfect competition and complete information–or a value of less than one if the pass-through is incomplete or interest rate is sticky, usually when markets are not fully competitive and where there are high switching costs, menu costs and asymmetric information (Balazs and Macdonald, 2009; and Liu et al., 2008). In certain instances, α_1 takes the value greater than one—that is, over pass-through (Aziakpono and Wilson, 2010; De Bondt, 2005). The overshooting may not necessarily imply banks are rationing credit but being compensated for higher risk (Bangura, 2011). For most advanced countries and emerging economies the pass-through is close to one (i.e. complete).

Equation (6) was estimated using the Engle-Granger 2 step procedure and found that the series are cointegrated, suggesting that there must be a unique cointegrating vector $(1-\alpha_0-\alpha_1)$. With this information and the fact that interest pass-through in Tanzania may be incomplete, a shock on any of the variables, a deviation from this long-run relation will appear and can be written as:

$$\varepsilon = r_{b(t-1)} - \alpha_0 - \alpha_1 r_{p(t-1)} \quad (7)$$

Here, a positive deviation will take place if either r_{bt} goes up or if r_{pt} goes down (or both of them), and negative deviation will come up if either r_{bt} decreases or r_{pt} increases (or both of them). The specification in equations (6) and (7) can only help infer long-run relationships, but the key issue in this study is to: first, assess the immediate (short-term) impact of a policy shock on retail bank interest rates, and second the speed of adjustment back to equilibrium. The Granger Representation Theorem argues that if two variables are cointegrated, then their relationship can be expressed as an error correction model. This approach is adopted by modifying equation (6) to capture both short-term and long-run relationships between retail bank interest rates and policy rate as in (8).

$$\Delta r_{bt} = \beta_0 + \beta_1 \Delta r_{pt} + \beta_2 (r_{b(t-1)} - \alpha_0 - \alpha_1 r_{p(t-1)}) + \in_t \quad (8)$$

Δ is the first difference operator; β_0, a constant and $\in_t$ is an error term. Estimations in an error correction model setting has advantages in that it allows for the case in which both bank and policy rates are cointegrated. In the event that the rates are not co-integrated, the error correction term would be eliminated and the specification of the first difference prevents any risk of a spurious regression. This is the standard procedure used in the empirical literature on pass-through studies (see for example, Bangura, 2011; Roseline et al, 2011; Mojon, 2000; Borio and Fritz, 1995; and Cottarelli and Kourelis, 1994).

Empirical results for this study focus particularly on the degree of pass-through in the short term β_1 or the size of the pass-through on impact or impact multiplier (within a month in this case). The degree of pass-through in the long-run is obtainable from α_1 (in equation 6), and β_2 is the coefficient of the error correction term which measures the speed of short run dynamics to the long run equilibrium relationship. That is, the absolute value of β_2 indicates how fast (or amount of) disequilibrium in the interest rates settings will be removed in each month, and it is expected to be negative for the equilibrium to be restored. A high level of this coefficient indicates a faster market response to the policy rate. If the error term coefficient is statistically significant, it can be deduced that market forces are in operation to restore long-run equilibrium. The average number of months required to reach the long-run value is obtained by calculating the mean adjustment lag (MAL). In line with Doornik and Hendry (1994), the MAL is computed in absolute terms as:

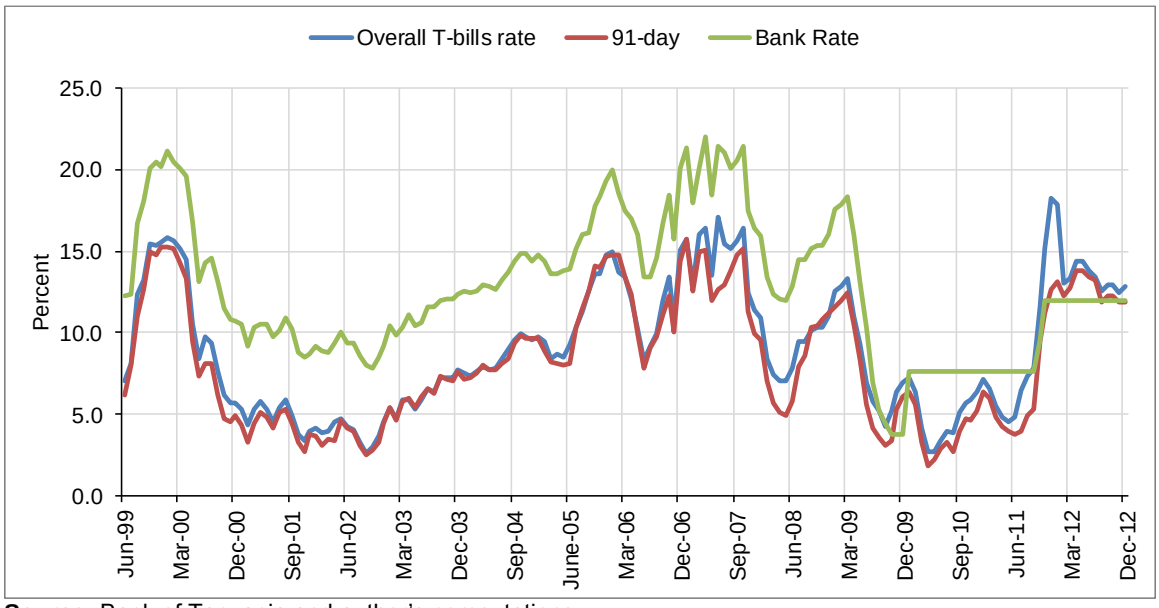
$$MAL = \frac{(1-\beta 1)}{\beta 2} \quad (9)$$

MAL computed in equation (9) informs the degree of rigidity in retail interest rates. High MAL implies high rigidity (i.e., slow adjustment) of retail interest rates to changes in the policy rates. Conversely, a low MAL indicates low retail interest rate rigidity (fast adjustment).

A version of equation 8 is estimated in a panel data setting, using a vector of interest rates with variables: up to a year weighted average retail lending rate and the weighted average retail time deposits rate (1-12 month durations) being endogenous to the overall Treasury bill rate, a policy rate proxy and overall inter-bank rate.

The weighted average Treasury bill rate is used as a proxy of monetary policy rate in the absence of active Bank rate for the whole study period. This should be acceptable because: first, the Bank of Tanzania has been using the money market rates to signal the stance of the monetary policy, and the discount rate that it imposes on credit extended to the government and banks is linked to the rates. **Figure 1** depicts the 91-day and overall weighted Treasury bill rates and the discount rate (currently known as Bank rate). Second, the three rates are highly correlated. The Bank rate lies above the other two rates by a constant margin before June 2009. Thereafter, there is no clear pattern between the Bank rate and the Treasury bill rates, mainly reflecting Bank's active use of the Bank rate to signal the stance of the monetary policy. Third, the overall weighted Treasury bill rate matches well with up-to-one year maturity period for retail interest rates. One of the disadvantages of using the Treasury bill rate as a proxy of policy rate is that, as shown in **Table 1**, the Bank of Tanzania does not have a direct control of the rate since it also features as a return to banks' assets. This implies that commercial banks may respond to open-market operations by moving between Treasury bills and excess reserves. Partly to take care of this shortcoming, the interbank cash market rate is also used in the analysis because it is relatively more sensitivity to liquidity conditions facing banks.

Figure 1: Developments of Discount and Money Market Interest Rates, 1999-2012



Source: Bank of Tanzania and author's computations

Table 1: Typical Bank Balance Sheet with Key Interest Rates

Assets	Liabilities
Reserves:	Deposits (deposits rate, i_D)
Required	
Excess	Inter-bank liabilities (interbank rate, i_{IB})
Government securities (T-bill rate, i_{TB})	
Loans (lending rate, i_L)	

Source: Author's compilation

Estimations in the retail lending rate and deposits rate models provide baseline results to help test the maintained hypotheses. In addition, separate estimations are done for the 3 largest banks and "small" banks to account for concentration effects on the interest rate pass-through. Also, distinction is made, on one hand, between banks owned privately and publicly, and on the other, foreign and domestically owed banks.

The study employs monthly data spanning the period March 2003 through December 2012—all from the Bank of Tanzania. The choice of the starting period is guided by availability of weighted average interest rates. Also, the period is characterized by considerable financial development, and relatively high reliance on market forces in determining interest rates. The variables are used in their levels and 11 monthly dummy variables were included to control for seasonality effects. Only banks with more than 36 observations in their interest rate series were considered in estimations, and so out of 50 registered banks at the end of 2012, only 39 banks passed the test. The key assumption is that the market responds instantaneously to policy rate changes, while commercial banks respond with a lag to changes in the policy rate and money market rate, mainly due to the undeveloped nature of Tanzania's financial markets, and to allow for adjustment time by banks.

4.0 Regression Results and Discussion

The Existence of the Interest Rate Channel in Tanzania

The findings from the baseline model are presented in **Table 2**. The coefficients of the short-term and adjustment terms bear the expected signs, that is, positive and negative signs respectively. Only the policy rate pass-through to the interbank rate and the deposits rate are statistically

significant. While the pass-through to the interbank rate is complete[1], that to the deposits rate is incomplete at 0.033 for one percent increase in the policy rate. Also, there is a missing link between the interbank rate and the retail bank interest rates[2].

Table 2: Pass-through of Policy Rate to Inter-bank Market Rate and Retail Bank Interest Rates

Variables/Coeficients	Constant	Short-run coeficient	Adjustment coeficient	Long-run coeficient	Mean adjusted lag (months)
	β_0	β_1	β_2	β_3	MAL
Lending rates					
Overall T-bill rate	-0.047	0.001	-0.245	-0.009	
	(0.44)	(0.03)	(-5.28)***	(0.37)	4.1
Overall interbank rate	-0.043	0.002	-0.245	0.005	
	(-0.41)	(0.21)	(5.28)***	(0.63)	4.1
Deposit interest rate					
Overall T-bill rate	0.119	0.033	-0.151	0.016	
	(1.32)	(1.72)*	(-4.76)***	(2.19)**	6.4
Overall interbank rate	0.132	0.009	-0.152	0.001	
	(1.29)	(1.22)	(-4.72)***	(0.44)	6.5
Interbank interest rate					
Overall T-bill rate	0.088	1.360	-0.067	1.350	
	(0.09)	(4.81)***	(-0.43)	(4.96)***	5.4

Note: Sample: 2003m01 to 2012m12; In brackets are t-statistics. All variables are differenced once.
Long run coefficients for lending and deposit rates were computed allowing for bank fixed effects.
*(**)*** implies statistically significant at 10%(5%)1% levels respectively.
Cross-section standard errors and covariance were used. One lag is used in all estimations except for the interbank rate model (no lag).
Source: Author's computations

The pass-through to deposits rate may be attributed to small banks as indicated in **Table 3**. This evidence is consistent with the theory and empirical findings that small banks respond differently to monetary policy when compared with larger banks. It is likely that short-term policy rate changes would cause small banks to vary their bank rates because unlike large banks they cannot cushion negative policy effects on their balance sheets. In order to account for further differences, separate models were estimated basing on ownership structures (i.e., domestically owned banks against foreign owned banks and privately owned banks against public owned banks). The findings support that ownership structure (particularly for privately and foreign owned banks) matters in explaining policy rate pass-through to deposits rate. Even then, the pass-through is still incomplete[3]. In the lending rate equations, short-run coefficients are statistically insignificant, except for the public

[1] Wald test (with F-statistic 1.63 and probability 0.2021) fails to reject the null hypothesis that 1.36 is not different from 1, implying a complete pass-through.
[2] Estimations using lags of explanatory variables did not yield qualitatively different results.
[3] An increase in the policy rate by one percent would influence privately owned banks and foreign owned banks to raise their deposits rate by 0.036 percent and 0.058 percent respectively.

owned banks. It appears that one percent increase in the policy rate would puzzlingly be followed by a 0.156 percent decrease in the lending rate by publicly owned banks.

Table 3: Interest Pass-through for Banks of Different Sizes and Ownership Structures

Variables/Coeficients	Constant	Short-run coeficient	Adjustment coeficient	Long-run coeficient	Mean adjusted lag (months)
	β_0	β_1	β_2	β_3	MAL
Lending interest rate					
3 Largest Banks					
Overall T-bill rate	0.078	-0.033	-0.157	-0.042	6.6
	(0.76)	(-0.61)	(-2.05)**	(-0.081)	
Smalll (36) Banks					
Overall T-bill rate	-0.070	0.001	-0.248	0.019	4.0
	(-0.60)	(0.03)	(-5.23)***	(0.71)	
Deposit interest rate					
3 Largest Banks					
Overall T-bill rate	-0.113	0.001	-0.199	-0.018	5.0
	(-0.66)	(0.28)	(-1.49)	(-0.81)	
Smalll (36) Banks					
Overall T-bill rate	0.142	0.036	-0.148	0.019	6.5
	(1.49)	(1.79)*	(-4.47)***	(2.39)**	
Ownership Effect					
Privately owned banks					
Lending rates	-0.075	0.026	-0.272	0.020	3.6
	(-0.75)	(0.72)	(-5.37)***	(0.89)	
Deposit interest rate	0.140	0.036	-0.155	0.016	6.2
	(1.41)	(1.78)*	(-4.49)***	(2.29)**	
Publicly owned banks					
Lending rates	-0.048	-0.156	-0.075	-0.121	15.4
	(-0.20)	(-2.09)**	(1.66)*	(-1.78)*	
Deposit interest rate	-0.044	0.011	-0.116	0.015	8.5
	(-0.33)	(0.38)	(-1.92)*	(0.56)	
Domestically owned banks					
Lending rates	-0.170	-0.059	-0.252	-0.019	4.2
	(-0.89)	(-1.22)	(3.35)***	(-0.77)	
Deposit interest rate	0.045	0.006	-0.168	0.004	5.9
	(0.37)	(0.22)	(-3.35)***	(0.63)	
Foreign owned banks					
Lending rates	0.056	0.053	-0.236	-0.051	4.0
	(0.69)	(1.19)	(-4.90)***	(1.40)	
Deposit interest rate	0.186	0.058	-0.140	0.056	6.7
	(1.96)*	(2.79)***	(4.18)***	(2.72)***	

Note: Sample: 2003m01 to 2012m12; in brackets are t-statistics. All variables are differenced once. Long run coefficients for lending and deposit rates were computed allowing for bank fixed effects. *(**) *** implies statistically significant at 10 percent, 5 percent, 1 percent levels, respectively. Cross-section standard errors and covariance were used. One lag is used in all estimations except for the interbank rate model (no lag).

Source: Author's computations

Speed of Policy Rate Pass-through to Deposits Rate

In order to measure the speed of pass-through effect, the mean adjustment lag was computed for the deposit rate models, which were found to be statistically significant. The results indicate that, on average, the market takes approximately 5 months to 9 months for the banks to completely adjust their deposits interest rate.

Effectiveness of the Interest Rate Channel Overtime

Meanwhile, there is no evidence to suggest that the interest rate pass-through has improved over time. As depicted in **Table 4**, coefficients of the policy rate in both lending and deposits rates (estimated for the two separate periods: 2003m03-2007m12 and 2008m01-2012m12) appear to be very low and statistically insignificant. This situation reinforces the earlier conclusion of incomplete or non-operation of the interest rate channel in Tanzania.

Table 4: Pass-through of Policy rate to Inter-bank Market Rate and Retail Rates Overtime

Variables/Coeficients	Constant	Short-run coeficient	Adjustment coeficient	Long-run coeficient	Mean adjusted lag (months)
	β_0	β_1	β_2	β_3	MAL
Pass through of T-bill rate					
Sample 2003:03 to 2007:12					
Banks lending interest rates	-0.020	-0.021	-0.251	0.012	4.1
	(-0.14)	(-0.34)	(-4.89)***	(-0.65)	
Banks deposit interest rate	0.068	0.019	-0.187	0.012	5.2
	(0.41)	(1.25)	(-5.48)***	(1.40)	
Sample 2008:01 to 2012:12					
Lending rates	-0.069	0.047	-0.304	0.006	3.1
	(-0.39)	(1.19)	(-3.33)***	(0.27)	
Deposit interest rate	0.153	0.029	-0.167	0.010	5.8
	(0.96)	(0.81)	(-3.36)***	(2.17)**	

Note: In brackets are t-statistics. All variables are differenced once.
Long run coefficients for lending and deposit rates were computed allowing for bank fixed effects.
*(**)*** implies statistically significant at 10%(5%)1% levels respectively.
Cross-section standard errors and covariance were used. One lag is used in all estimations except for the interbank rate model (no lag).
Source: Author's computations

Comparison with Similar Studies in Other African Countries

The results in this study confirm results obtained on other African countries on the operation of the interest rate channel. The main contribution of the current study is to show the role of bank size, ownership structure in explaining interest rate rigidity. As shown in **Table 5**, the hypothesis of incomplete interest pass-through in Africa may not be rejected. The immediate policy rate pass-

through to retail lending rate is the lowest in East African countries when compared with West African countries. The pass-through is relatively high in Nigeria due to its relatively more developed financial sector.

Table 5: Interest Pass-through in African Countries

	Immediate pass-through (%)	Policy rate
Lending rate (Dependent variable)		
Tanzania	0.1	Overall T-bill rate
Kenya	7.0	91 T-bill rate
Rwanda	3.0	T-bill rate
Nigeria	66.0	Discount rate
Sierra Leone	30.0	T-bill rate
Gambia	26.0	Discount rate
Deposit rate (Dependent variable)		
Tanzania	3.3	Overall T-bill rate
Kenya	14.0	91-day T-bill rate
Rwanda	3.0	T-bill rate
Nigeria	47.0	T-bill rate
Sierra Leone	13.0	T-bill rate
Gambia	29.0	Discount rate

Source: Results on Kenya and Rwanda were obtained from Roseline et al (2011) and Kigabo (2012) respectively, and the rest are from Bangura (2011).

5.0 Conclusion and Policy Implications

The influence of monetary policy on the economy depends on the degree and speed to which changes in the central bank policy signals are transmitted to retail bank interest rates. This study sought to provide insight into the relationship between the monetary policy rate and commercial banks' interest rates in Tanzania. The analysis started with the assessment of long run and causal relationships between interest rates. It is shown that high synchronization exists between the policy rate and money market interest rates and moderately with the retail bank deposits rate. To the extent that the interest rate channel exists, the causality would be running, and much stronger, from the money market rates to the retail deposits rates than to the lending rates. In the error correction model, the short-term and adjustment coefficients bear the right signs, but only the coefficients of the policy rate pass-through to the interbank rate and the deposits rate are statistically significant.

Specifically, the study concludes that there is incomplete monetary policy rate pass-through to commercial banks' short-term interest rates both in the short to long-term. Although the coefficients of the short-term and adjustment terms bear the expected signs, only the pass-through to the interbank rate and the deposits rate are statistically significant. The policy rate pass-through to the interbank rate is generally complete (i.e. one), while that to the deposit rate is incomplete (at 0.033 percent for one percent change in the monetary policy rate) and occurs with a lag. The pass-through to the deposits rate is attributed to small banks and foreign banks. By splitting the sample into two obtained results do not support the view that policy rate pass-through in the country has improved over time.

The implications of these findings are that, the effectiveness of monetary policy transmission to the economy through the interest rate channel may be limited. To the extent that the interest rate operates, aggressive use of the policy rate to achieve monetary policy objectives may adversely affect banks with weak balance sheets given the asymmetric reaction of banks to monetary policy changes. To enhance the effectiveness of the monetary policy, besides focusing on addressing factors that weaken policy rate transmission in the economy, the Bank could also adopt forward-looking monetary policy implementation approach with a view to capturing the delayed nature of the pass-through.

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Appendices

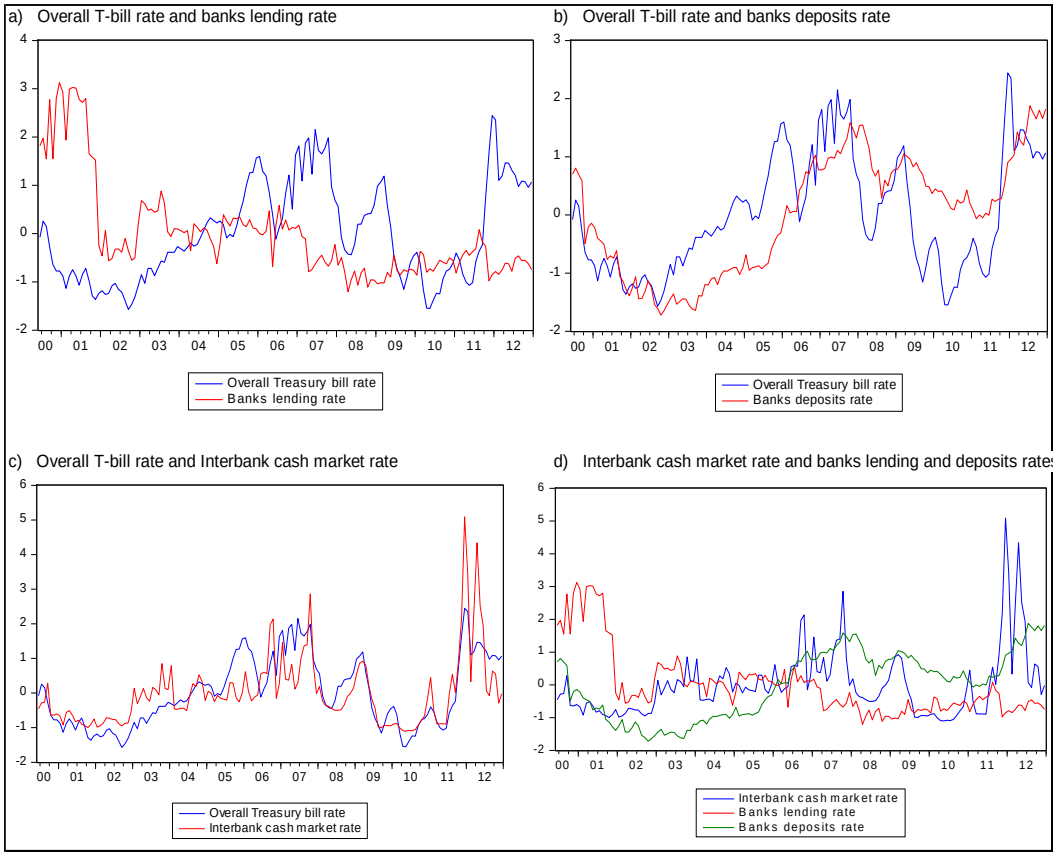
Appendix 1: Selected Financial Development Indicators

Percent

Period	M3/GDP	CC/M3	Private sector deposits/GDP	Excess Reserves/Private sector deposits	Credit to private/GDP	FCC/Credit to private sector	Securities/ Assets	Credit to private sector/Assets
2001	20.6	21.0	13.5	10.6	4.4	35.6	22.1	20.6
2002	22.6	21.1	14.8	7.8	5.4	31.0	25.0	23.2
2003	23.0	20.3	15.3	7.8	6.6	30.9	20.6	27.2
2004	22.6	22.0	14.8	8.5	7.6	36.0	20.1	31.6
2005	26.6	20.9	17.8	6.3	8.8	37.4	26.5	32.1
2006	28.8	20.0	19.7	8.8	11.7	34.8	21.3	37.4
2007	29.7	18.7	31.8	5.5	14.2	32.1	22.9	40.8
2008	30.1	19.3	27.5	5.5	17.7	32.8	17.5	49.9
2009	31.1	17.8	29.9	7.0	17.0	29.0	16.6	46.0
2010	34.1	17.2	33.0	6.5	18.0	32.0	18.4	44.1
2011	34.7	17.2	28.7	8.2	19.7	33.1	15.9	48.7
2012	32.9	16.4	33.4	5.3	20.0	32.5	16.2	50.3
Average: 2001-12	**28.1**	**19.3**	**23.4**	**7.3**	**12.6**	**33.1**	**20.3**	**37.6**

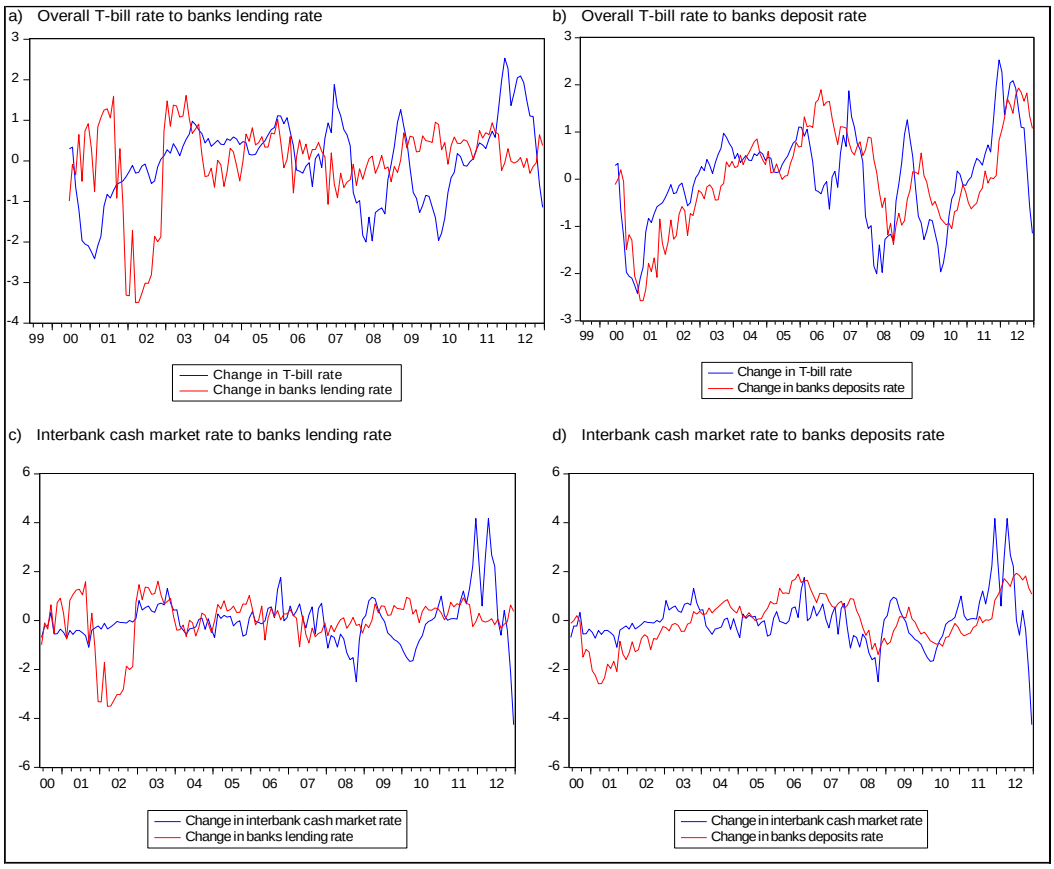
Source: Bank of Tanzania and author's computations

Appendix 2: Relationship between Money Market and Bank Interest Rates



Source: Bank of Tanzania and author's computation

Appendix 3: Policy Rate Pass-through to Retail Bank Retail Rates



Source: Bank of Tanzania and author's computation

Appendix 4: Correlation Coefficients of the Policy Rate and Bank Retail Rates

	In level				In 1st difference			
	T-bill rate	Interbank rate	lending rate	deposits rate	T-bill rate	Interbank rate	lending rate	deposits rate
T-bill rate	1				1			
Inter-bank rate	0.75	1			0.68	1		
Banks' lending rate	-0.28	-0.22	1		0.00	0.07	1	
Banks' deposits rate	0.59	0.4	-0.36	1	0.58	0.34	0.11	1

Note: Computation covers the period June 2000 through December 2012.
Source: Author's computations

Appendix 5: Granger Causality Test Results between Money Market Rates and Retail Bank Rates

Null Hypothesis	F-Statistic	Probability
DIL does not Granger Cause DITBL	0.54	0.58
DITBL does not Granger Cause DIL	0.12	0.89
DITD does not Granger Cause DITBL	1.27	0.28
DITBL does not Granger Cause DITD	22.37	0.00***
DICM does not Granger Cause DITBL	1.37	0.26
DITBL does not Granger Cause DICM	5.17	0.01***
DIL does not Granger Cause DICM	2.29	0.10
DICM does not Granger Cause DIL	0.11	0.89
DITD does not Granger Cause DICM	0.57	0.57
DICM does not Granger Cause DITD	6.84	0.00***
DIL does not Granger Cause DITD	5.30	0.01***
DITD does not Granger Cause DIL	0.05	0.95

Note: *(**)*** implies statistically significant at 10(5)1 percent levels.
IL, ITBL, ITD, ICM, denote retail lending rate, T-bill rate, time deposits rate, Interbank cash market rate; and the first letter 'D' denotes year-on-year changes.
Computation covers the period June 2000 through December 2012.
Source: Author's computations