Effects of Monetary Policy Shocks on Domestic and Foreign Banks Lending in Tanzania

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Abstract: *This study investigated the effect of monetary policy shocks on bank loans extended by domestic and foreign banks in Tanzania over the period from 2006 to 2020. It adopted the impulse response functions and the variance decomposition analysis to study the responses of these types of lending to monetary policy shocks. The studyfound out that foreign banks do not react negatively to a monetary policy shock, supporting the view that foreign banks in Tanzania did not abandon the domestic market in times of economic distress. The policy implication was that the foreign banks in Tanzania had been supportive of the domestic economy even in times of economic distress. Empirical evidence provided by this study supported the positive role played by the foreign banks in contributing to the financial and economic stability of the Tanzanian economy. The theoretical contribution of the study is that despite a tight monetary condition, the foreign banks continued to resume lending, implying that the "capital flight" argument did not apply to the foreign banks' operations in Tanzania.*

Keywords*:* Bank lending, domestic banks*;* Foreign banks: Monetary policy: Vector Autoregression Model.

INTRODUCTION

Monetary policy is used by the central banks to influence intermediate targets by using monetary policy tools namely the money supply in most developing countries and interest rates in developed countries to influence production, prices, employment and exchange rates (Shokr & Karim, 2021). Macro-level variables can be influenced by monetary policy through traditional exchange rates, asset price channels and credit (Shokr & Karim, 2021). Monetary policy as an aspect of macroeconomics uses money supply and interest rates to regulate the supply, value and cost of money in the economy in line with the expected economic activities level of a country (Ayodele, 2014). In developing countries such as Tanzania, the objectives of monetary policy include full employment, domestic price stability, adequate economic growth and external sector stability. The supplementary objectives of monetary policy include smoothening of the business cycle, prevention of financial crisis and stabilization of longterm interest rates and real exchange rate (Mishra & Pradhan, 2008: Ayodele, 2014). The purpose of monetary policy is to control the credits conditions and money supply for the aim of achieving diverse macroeconomic objectives. Monetary policy and banking system are inextricable. The assessment of the banking system in the area of loans and advances can be evaluated via the monetary policy tools performance which is classified into the market intervention and portfolio control (Ayodele, 2014). Commercial banks decisions on loans are influenced by various factors such as the volume of deposits, prevailing

interest rates, the level of their domestic and foreign investment and liquidity ratios (Olokoyo, 2011: Ayodele, 2014). Central bank influences the level of reserves of the banks through monetary policy tools. Such tools include; credit market, liquidity ratio and cash reserve requirement. All these activities affect the banks in their operations and thus influence the cost and availability of loanable funds. Thus, monetary policy tools are critical in the demand for and supply of reserves held by depository institutions and consequently on the availability of credit (Ayodele, 2014). The central bank affects the rate of growth of money supply, the level of interest rate, security prices, credit availability and liquidity creation from the commercial bank by manipulating these monetary policy tools. The effect of monetary policy shocks on banks' lending has received enormous attention in macroeconomic theory and among central banks in the world. It is generally argued that the monetary policy affects output and prices by influencing key financial variables such as interest rates, exchange rate and monetary aggregates (Bashagi et al, 2019). Atanda (2012) provides empirical evidence to support the effect of monetary policy changes on loan supply of less liquid banks, deposit base and induce banks' ability to perform their expected roles within the financial system. Ogunyemi (2013) in his study of monetary policy effect in Nigeria reported some monetary policy tools are not in favour of an increase in the volume of loans and advances of commercial banks due to the high cost of operating and poor infrastructural facilities.

For the case of Tanzania, several studies on the monetary policy effects have been conducted and yielded some conflicting views but agreed on the weakness of the monetary policy effect on the banking system such as (Davoodi et al., 2013: Mbowe, 2015 and Montiel at al., 2012). Despite several empirical pieces of evidence that found the efficacy of monetary policy lies on the effectiveness of the real sector; how those monetary policies had influenced the volume of commercial banks loans and advances in Tanzania remains unresolved and demand investigation. This study, therefore empirically evaluated and investigated whether monetary policy affects commercial banks' lending activities in Tanzania. The study examined the effect of monetary policy shocks on bank loans extended by domestic and foreign banks in Tanzania over the period from 2006 to 2020 and verify the validity of the arguments in the context of the Tanzanian experience. In particular, the study examines the reaction of foreign and domestic banks to monetary policy shocks by analysing the behaviour of major balance sheet items, namely; deposits and loans to a positive innovation in interest rates. It used aggregated data to compare the differences in the behaviour between foreign and domestic banks. The investigation of the impact of monetary policy shocks on domestic and foreign banks in Tanzania contributes to the literature in several aspects First, this study provided empirical evidence on whether the presence of foreign banks in Tanzania benefited the domestic banking sector; secondly, the findings of this study provided some policy recommendations to policymakers concerning the liberalization of the banking sector in Tanzania: third, to our knowledge, no studies had been conducted so far in investigating the effect of monetary policy on domestic and foreign banks' lending in Tanzania employing the aggregated data methodology. The rest of the study is organized as follows; a brief theoretical and empirical literature review on monetary policy shock effects which is provided in Section 2. In Section 3 methodology and data were discussed. Section 4 presented the results and findings and Section 5 concluded this study.

Review of Literature

Theoretical Literature Review

In the literature, the leading theory and the bank lending channel theory are the fundamental theories explaining the effect of monetary policy instruments on commercial banks' lending. The leading theory (Stiglitz & Weiss, 1981) explains the credit markets imperfections and frictions and how they hamper spending within the economy. The theory is based on the understanding that lenders consider the financial fundamentals of borrowers' and their banks' balance sheets before extending credit (Mishi &Tsegaye, 2012). The evidence has shown that credit markets are imperfect, as asymmetric information problems lead to credit rationing. How commercial banks adjust and respond to their internal strategies in the face of monetary policy shocks will determine the impact and success of that policy. The operation of this channel mostly depends on the supply of loans and the factors that determine their course. In particular, a restrictive monetary policy leads to a reduction in bank reserves and deposits and, consequently, to a fall in loan supply (Mishi &Tsegaye, 2012). The bank lending channel theory explains a special role to commercial banks in the monetary transmission mechanism. The theory stipulates that the tightening of the monetary policy can affect not only the demand for loans via the interest rate channel but also the supply of bank loans, which in turn, further influences investment and consumption (Mishi &Tsegaye, 2012). Monetary policy affects not only borrowers but also banks. The role of banks is important as it addresses the problem of information asymmetries in the credit market (Jimborean, 2008: Mishi &Tsegaye, 2012).

Empirical Studies on Impact of Monetary Policy on Banks

The above theoretical literature review assigns an inimitable role to banks in the monetary policy shocks. However, it is necessary to review empirical works on the subject to identify what has been concluded thus far, if any. Several empirical studies on the effect of monetary policy on banks' lending practices and activities have been carried out by different researchers. However, some of the famous studies are the ones that incorporated various monetary instruments in evaluating the effect of macroeconomic stability on banks' lending and activities. Amidu and Wolfe (2008) examined the constrained implication of monetary policy on bank lending in Ghana and found out that banks in Ghana lending behaviour are affected significantly by monetary policy changes. Gambacorta and Iannoti (2005) found out that banks adjust their loan prices at a faster rate during a period of monetary tightening. Ogunyomi (2011) examined the impact of monetary policy instruments on the volume of loans and advances of commercial banks in Nigeria and found out that monetary policy was ineffective for increasing the volume of commercial banks loans and advances in Nigeria. Shokr and Al-Gasaymeh (2018) examined the effect of monetary policy on banks on loans in Egypt and found a negative and significant relationship between monetary policy and bank loans in Egypt. Zulkhibri (2018) examined the impact of monetary policy on Islamic bank financing in Malaysia by using panel regression methodology and found out that there was no significant difference between Islamic Bank financing and conventional bank lending behaviour concerning changes in monetary policy. Shokr et al. (2019) investigated the effect of monetary policy on banks in Egypt and found out that variations in monetary policy tools (interest rate and money supply) had significant relationships with the exchange rate, inflation, and output in Egypt. Auer et al. (2019) studied the effect of monetary policy on banks employing bank-level

data in Canada and Switzerland and found that banks in Canada was affected by domestic monetary policy. Civcir and Varoglu (2019) investigated the effect of monetary policy in the United States and the Euro area and found out that inflation, domestic industrial production interest rates real effective exchange rates respond to change in monetary policy. Shokr (2020) in his study on monetary policy effect confirms a significant impact of real interest rates on bank loan supply in Egypt, which highlights the essence of the bank lending channel in Egypt. Shokr and Karim (2021) examined the impact of international monetary policy shocks on bank loans and other macroeconomic indicators in Egypt and found out that foreign monetary policy shocks significantly affect loans, inflation, interest rates, and output in Egypt. Some empirical studies in Tanzania examine the effect of monetary policy shocks on internal macro-level variables. Montiel et al, (2012) investigated the effect of monetary policy in Tanzania using the VAR model for the period from 2002 – 2010. The findings showed an increase in lending rate and reduction in prices as a result of monetary policy expansion. Balele, et al, (2018) examined the effect of monetary policy in Tanzania and found out that monetary policy seems to influence core inflation. Bashagi et al, (2019) examined the effectiveness of monetary policy transmission channels in Tanzania and found out that monetary policy has a significant contribution in influencing the dynamics supply of credit to private in fostering the growth of the economy. Although there are several previous empirical studies on the effect of monetary policy instruments such as those of Balele, et al, (2018): Bashagi et al, (2019) that were conducted in Tanzania none of the studies mentioned above investigated the effect of monetary policy shocks on banks' lending extended by domestic and foreign banks. Therefore, this study aims to cover that gap in the empirical description of the effect of monetary policy shocks on banks' lending extended by domestic and foreign banks in Tanzania.

Methodology

Model Specification

This study used the Vector Autoregression (VAR) model too examine the effect of monetary policy shocks on domestic and foreign banks' lending. The VAR model is one of the most successful, flexible, and easy to use models for the analysis of multivariate time series. It is a natural extension of the univariate autoregressive model to dynamic multivariate time series. The VAR model has proven to be especially useful for describing the dynamic behaviour of economic and financial time series and for forecasting. It often provides superior forecasts to those from univariate time series models and elaborate theory-based simultaneous equations models (Stock & Watson, 2001). Forecasts from VAR models are quite flexible because they can be made conditional on the potential future paths of specified variables in the model. In addition to data description and forecasting, the VAR model is also used for structural inference and policy analysis. In structural analysis, certain assumptions about the causal structure of the data under investigation are imposed, and the resulting causal impacts of unexpected shocks or innovations to specified variables on the variables in the model are summarized. These causal impacts are usually summarized with impulse response functions and forecast error variance decompositions (Tsay, 2001). The model has been extensively used when assessing the monetary policy transmission mechanism. See example (Bashagi et al, 2019: Pham, 2016: Nguyen, 2014: Davoodi et al, 2013). The model used in this study start by considering a system of simultaneous equation represented in vector form by omitting constant and deterministic terms in the following form

$$Ay_t = B(L)y_t + u_t \quad (3.1)$$

Where y_t is an n x 1 vector of endogenous variables, $B(L)$ is a matrix polynomial in the lag operator L, and u_t is a white noise vector of the disturbance terms for each variable. This disturbance term captures any exogenous factors in the model. The square n x n matrix A, where n is the number of variables, that contains the structural parameters of the contemporaneous endogenous variables. The problem with the representation in (3.1) is that the coefficients in the matrices are unknown and the variables have contemporaneous impacts on each other and it is not possible to uniquely determine the values of the parameters in the model.

Pre-multiplication of (3.1) by A^{-1} transforms (3.1) into a reduced form model is represented in the following equation:

$$y_t = G(L)y_{t-1} + e_t \quad (3.2)$$

Where $G(L)=A^{-1}B(L)$ and $e_t=À_0u_t$. It should be noted that the error term e_t is a linear combination of the structural form errors (u_t). As a result, even though the structural form errors are assumed to be uncorrelated with each other, reduced form errors e_t is correlated in general. The structural form variance-covariance matrix can be expressed as $\Sigma_u=E(u_tu_t') = A_0\Sigma_e\ A_0'$ where Σ_e is the variance-covariance matrix for the reduced form error terms. It can be observed from this decomposition that if one knew the structural form matrix A_0, then it would be possible to solve for the structural form error variances from the reduced form variance-covariance matrix Σ_e. Accordingly, the task of the researcher is to impose identification restrictions on the contemporaneous coefficients' matrix A_0 to recover the structural error series. Once the structural model is identified, interrelationships between the variables can be investigated via impulse response functions and forecast error variance decompositions, which show the evolution of economic shocks through the system. A common practice in identifying the structural system is to assume a lower triangular structure for the A_0 matrix. This type of identification has been extensively employed in the literature ever since it was pioneered by Sims (1980). The decomposition implies that the first variable responds only to its exogenous shocks, the second variable responds to the first variable and the second variable's exogenous shocks and so on. Thus, the results from VARs can be quite sensitive to the ordering imposed. Before the estimation of the model, the study examined the time-series properties of each of the variables in the model, two popular unit root tests were performed on these time series: the augmented Dickey-Fuller (ADF) test, the Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) test. The overall results suggested that most variables under consideration had a unit root in a level form but are stationary in the first-order log-difference form.

Sample and Data

The banking sector in Tanzania is classified into two main groups. The first group comprises domestic and foreign banks and the second group comprises of 10 large banks, 19 medium banks and 9 regional and small banks (EY, 2020). There are 35 banks in the banking sector in Tanzania

in 2021, 11 banks were domestic banks and 24 banks were foreign banks (BoT, 2021). The sample comprises mainly of domestic and foreign banks in Tanzania that operated at any time within 15 years of study covering the period from 2006 to 2020. The sample size comprises of all 10 large commercial banks 6 domestic banks and 4 foreign banks. The reason for selecting all 10 large commercial banks is that they were comprise of more than 75% of the market share of the total assets of the banking sector in Tanzania (EY, 2020) (see Table 3.1). The study used secondary data and a time series analysis covering the period of 2005-2020 which were obtained from the Central Bank of Tanzania and the National Bureau of Statistics (NBS). The financial statements of domestic and foreign banks were collected from the bank's websites. The macroeconomic variables: consumer price index, real exchange rate, interest rate and policy rate are taken from various issues of the Quarterly Statistical Bulletin published by the Central Bank of Tanzania.

Empirical Results

Data Preliminary

Table 4.1 summarizes the results of test statistics. It can be observed from the results of the ADF test that fail to reject the null hypothesis of unit root for all variables. However, the first differences of these variables were found to be stationary at a 5% significance level. Contrary to the ADF test, the KPSS test considers the null hypothesis of a stationary series against the alternative of a unit root, thus complementing the ADF test's results. As shown in Table 4.1, the KPSS test statistics confirm the results of the ADF test. Since both the ADF and KPSS tests can very likely be biased in favour of the unit root process (Perron and Vogelsang 1992) in the event of structural breaks. The study used the Zivot and Andrews (1992) test which is employed to test for unit root properties in the event of the presence of a structural break. Having applied this test, the results were found to remain quantitatively unchanged. Both trace and Max-eigen value tests indicated their series set under consideration were cointegrated at the 5% level of significance. When there is evidence of cointegration among the variables of a VAR system, such information can be incorporated into the VAR system. Therefore, a modified version of VAR which is known as the Vector Error Correction (VEC) model can be estimated. In the VEC model, the lagged cointegration vector(s) are added to the list of explanatory terms on the right-hand side of the VAR equations that are specified in the first differences. The cointegration vectors are presumed to be the long-run equilibrium relationships among the variables.

However, the cointegration constraints are not undertaken in the study analysis. The justification attributed to First, the analysis is generally focused on short-run constraints and the short-run dynamic response of the system. When cointegration constraints are excluded, this only implies that the long-run response of some variables is not constrained and might follow a divergent path. However, the short-run analysis is still valid. Second, Sims *et al* (1990) proved that standard asymptotic inference is not affected even when the variables included in the VAR in levels are cointegrated. Finally, although estimates were no longer efficient if cointegration constraints are not included, they remain consistent. Hence, the lower efficiency in the estimates can be justified by the difficulty in the economic interpretation of some of the cointegration constraints showed by the data (De Arcangelis *et al,* 1999). Table 4.2 represents an examination of the residual correlation matrix indicates that the ordering of the variables is important for the model. Since the ordering is

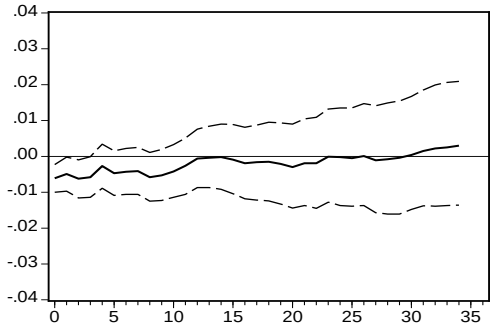
important in the VAR model, the best strategy is to compare the results to the IRF obtained by reversing the ordering. However, the results from different orderings show no significant differences. For this study, the interest rate is ordered first and the exchange rate is ordered last. The rationale for this is that the study aims to analyze the effect of monetary policy shocks on the different loans rather than the reaction of interest rate to change in other variables. Therefore, the study ordered the interest rate in the first position, followed by the domestic loan and deposit, foreign loan and deposit, output, price and exchange rate.

The Effects of Foreign Monetary Policy on Domestic and Foreign Bank's Deposits and Loans

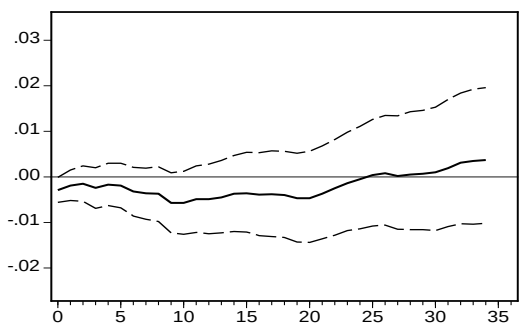
Figure 1 represents the responses of the domestic and foreign banks' deposits and loans, industrial production index, consumer price index and real exchange rate to one-standard-deviation shock in the interest rate. The figure indicates that domestic deposits responded negatively to a one-standard-deviation shock in the policy interest rate, implying that deposits of domestic banks decline due to a tight monetary condition. In contrast, foreign deposits, while initially declined for the first five months, responded positively starting the sixth month until the tenth month. This could be reflective of the withdrawal of deposits from the domestic banks to the foreign banks during times of a high-interest rate environment. This could be explained by the possibility that depositors shift their deposits to foreign banks in which they have more confidence during times of economic distress. Shifting to loans, domestic loans contracted following a positive one-standard deviation interest rate shock, implying that domestic banks curtailed lending during the tight monetary condition. However, as indicated by the error band, the impact of interest rate shock on domestic loans is not significant. Further, foreign loans showed the opposite reaction to interest rate shock. The findings showed that foreign loans responded significantly positive to interest rate shock, implying that the foreign banks resume lending despite the tight monetary condition. The foreign banks have been complementing the role of the domestic banks in providing credit during times of tight monetary conditions.

At this juncture, it can be concluded that the foreign banks do not abandon the domestic market as being shown by the significantly positive impulse response function of the foreign loans to the interest rate shock. As for the rest of the variables, their responses to interest rate shocks are as predicted and consistent with the traditional Keynesian macroeconomic framework. A monetary policy shock leads to output contraction in the short run but leaves no significant impact in the long run. Meanwhile, price decreases initially but increase later following an interest rate hike. A lower domestic price induced by a negative monetary policy shock causes the real exchange rate to depreciate promoting the country's exports and decreasing its imports and thereby improving the trade balance followed by an appreciation of the real exchange rate. The findings are consistent with previous studies by (Amidu & Wolfe (2008: Shokr & Al-Gasaymeh, 2018: Shokr et al. 2019: Shokr, 2020) who found out a significant relationship between monetary policy and banks' lending. However, the findings of the study are contrary to Ogunyomi (2011) who found out that monetary policy was ineffective for increasing the volume loans and advances.

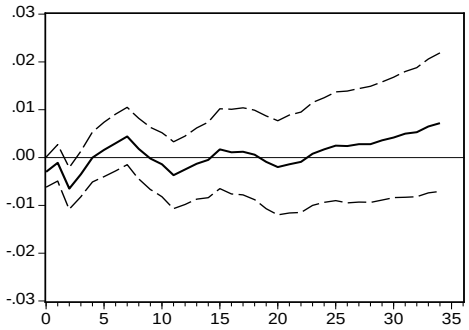
Response of Domestic Deposit to Rate



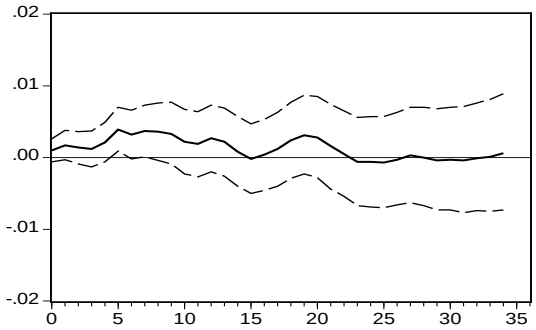
Response of Domestic Loan to Rate



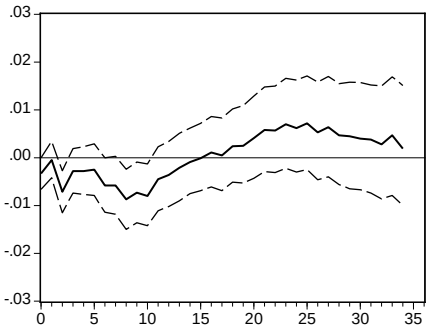
Response of Foreign Deposit to Rate



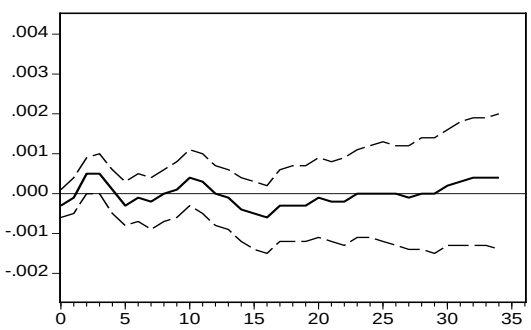
Respose of Foreign Loan to Rate



Response of Industrial Production to Rate



Response of CPI to Rate



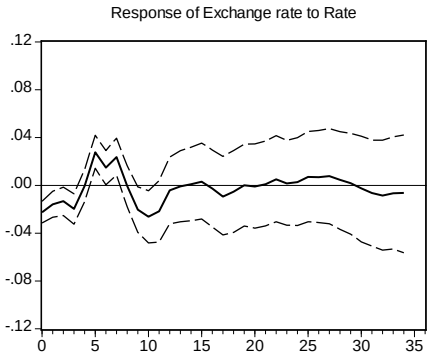


Figure 1: Impulse Response Functions of the Variables to One Standard Deviation of Interest Rate Shock

Note: The horizontal axis in the graphs represents the time horizon, extending from three months to thirty-six months

Results based on the Variance Decompositions

Table 4.3 shows the effects of the structural shocks on the macroeconomic variables which are analysed by measuring the variance decompositions of the forecast errors based on the VAR. The findings showed that most variations in the domestic deposit were caused by its innovation in the first 10 months but from then on, the innovation in domestic loans started to be significant, accounting for about 35 per cent and followed by industrial output at around 30 per cent. While it is unclear how a decline in domestic loans contributes to the variations in the domestic deposits, a decline in output is affecting the deposits of the domestic banks through the liquidity effects. Variations in foreign deposits are widely explained by the innovations in industrial production and domestic loans contributing around 17 per cent in the longer-term horizon. As in the case of the domestic deposits, the contribution of the innovations in industrial output in explaining the variations in foreign deposits is rather clear, that is, higher economic output means that the economy is booming, thus more deposits into the banking system.

The fluctuation of domestic loans is mainly attributed to its innovation in the first one and half years but from then on, the innovations in industrial production attributed to about 30 per cent of the fluctuation of domestic loans. This indicated that the economic situation had a significant impact on the loans being extended by the domestic banks. In comparison to the foreign loans, the contribution of industrial production in explaining the forecast error variance of foreign loans was smaller at around 20 per cent. This could mean that foreign loan was more stable compared to domestic loans when there was output fluctuation. Interestingly, innovations in foreign deposits are also significant in explaining the variations in foreign loans, contributing to around 30 per cent at the longer time horizon. This could explain the reason why foreign loans continued to expand despite the tight liquidity condition. The variance decomposition analysis on the IPI shows that

the variations in IPI were mainly due to its innovations and the domestic loans and deposits together, contributing around 30 per cent of the variations in IPI. In comparison, innovations in foreign loans and deposits together contributed less than 20 per cent to the variation in the economic output. This implies that innovations in domestic loans and deposits have more impact on domestic economic activities compared to foreign loans and deposits. Even though the innovation in itself plays a major role in the short run, the shock in domestic loans and output tends to play a major role in the fluctuation of price. In the short run, the innovation in exchange rate explains most of its fluctuations and followed by monetary policy and foreign loans, but in the long run domestic deposits and foreign loans explain about 50 per cent while the price and domestic deposit accounts for about 32 per cent of the fluctuations of the real exchange rate. The findings were consistent with (Auer et al. 2019: Civcir & Varoglu, 2019).

Conclusion

This study examined the effect of monetary policy shocks on bank loans extended by domestic banks and foreign banks in Tanzania over the period from 2006 to 2020. In doing so, it analysed the responses of major balance sheet items of the foreign and domestic banks to monetary policy shocks using the impulse response functions based on the VECM. It also used the variance decomposition analysis to further substantiate the results of the impulse response functions. The novelty of this studystudy was that it used aggregated data over a longer period to capture a more general view of the subject matter. The study findings showed that foreign banks did not react negatively to a monetary policy shock, supporting the view that foreign banks in Tanzania did not abandon the domestic market in times of economic distress. Several implications can be derived from this study. Among others, the domestic banks could learn the best risk management practices from the foreign banks that would have enabled them to not be adversely affected by the tight liquidity condition. Adopting best banking practices such as continuously being prudent in lending and continuous monitoring of existing accounts to enable "early-warning" problem recognition proved to ensure that foreign banks were more resilient to weather shocks in times of tight liquidity conditions. From the policy implementation point of view, the study showed that the effect of monetary policy shocks was uneven across the banking industry with the domestic banking institutions being more adversely affected by the tight monetary policy.

More importantly, the study had shown that the fluctuations of the domestic banking institutions had a substantial impact on the economic output. In this regard, it is crucial to ensure the health and stability of the domestic banking industry due to its significant influence on the domestic economy. Despite this, further investigation could shed greater details on the findings of the study. In particular, while it is clear that the aggregated foreign loans increase following the interest rate shocks, it is important to analyze the components of the loans being extended. It could be possible that the increase in foreign lending is not due to continuous lending to the retail businesses and consumers, but due to higher interbank loans to the domestic banking institutions which are grappling for liquidity in times of economic distress. The theoretical contribution of the study was that despite a tight monetary condition, the foreign banks continued to resume lending, implying that the "capital flight" argument did not apply to the foreign banks' operations in Tanzania. To a large extent the findings of the study provided several interesting results. Importantly, it made a significant contribution to the limited literature on the effect of monetary policy on Tanzanian

banks' lending. However, it should be noted that this study like any other empirical study had some limitations. First, the dataset was limited to only 10 large banks due to the difficulties in obtaining data of other banks. Second, a longer timeframe if applied to this study would have better revealed any noticeable trends over the financial sector reforms. This would have disclosed a more comprehensive analysis of monetary policy effects on banks' lending. Despite the existence of the limitations, the findings are to be interpreted with the understanding of the context of the study. Future research can be undertaken for the effect of international monetary policy shocks on Tanzanian banks' loans.

References

Atanda, A. (2012). Monetary policy and bank performance in Nigeria: A two-step cointegration approach. *African Journal of Scientific Research,* 9(1), 462–476.

Auer, S., Friedrich, C., Ganarin, M., Paligorova, T., & Towbin, P. (2019). International monetary policy transmission through banks in small open economies. *Journal of International Money and Finance*. 90(3), 34-53.

Ayodele, J (2014). Effects of Monetary Policy on the Commercial Banks Lending in Nigeria. *Review of Public Administration and Management*. 3 (5) 134-146.

Balele T (2018). Financial Sector Reforms and Innovations and their Implications on Monetary Policy Transmission in Tanzania, *Bank of Tanzania, Dar es salaam.*

Bank of Tanzania (2020). Monetary Policy Statement 209/20. Dar es salaam. Tanzania.

Bashagi, A, Kimolo, D. & Sanga, M (2019). Assessment of Monetary Policy Transmission Mechanism in Tanzania. Bank of Tanzania WP No. 19: 2019

Civcir, I., & Varoglu, D. E. (2019). International transmission of monetary and global commodity price shocks Turkey. *Journal of Policy Modelling*, 41(4). 1-28

Davoodi, H., R., Dixit, S., and Pinter, G. (2013). "Monetary Transmission Mechanism in the East African Community: An Empirical Investigation", IMF Working Paper 13/39.

EY (2020). Tanzania Banking Sector Overview. A review of the 2020 calendar year

Gambacorta, L & Iannoti, S (2005). Are there asymmetries in the response of bank interest rates monetary shocks? *Applied Economics.* 39(19). 7-33

Mbowe, W.E.N. (2015b). "The Bank Lending Channel of Monetary Policy Transmission: Estimation using Bank-Level Panel Data on Tanzania

Mishi, S & Tsegaye, A. (2012). The Role of Banks in Monetary Policy Transmission in South Africa. *Economic Research of South Africa*. WEorking Paper, 295.

Nguyen, H. T. (2014). 'Monetary transmission mechanism analysis in a small, open economy: The case of Vietnam.' PhD thesis, University of Wollongong.

Ogunyomi, O. (2011). The Impact of Monetary Policy on Commercial Banks Loans and Advances in Nigeria: an empirical investigation (1975–2009). 1–23https://ssrn .com/ abstract =1 73 8683

Olokoyo, F.O. (2011). Determinants of Commercial Banks' Lending Behaviour in Nigeria. *International Journal of Financial Research*, 2(2): 66-72

Pham, T. A. (2016). 'Monetary policies and the macroeconomic performance of Vietnam.' PhD Thesis. The Queensland University of Technology.

Shokr, M&Karim, Z (2021). The Impact of International Monetary Policy Shocks on Bank Loans in Egypt: A Non-Recursive SVAR Analysis. *Southeast Asian Journal of Economics,* 9(1), pp. 69-102

Shokr, M. & Al-Gasaymeh, A. (2018). Bank lending channel and banking sector efficiency: Panel data of Egypt. *International Journal of Emerging Markets*, 13(5), 1291-1310.

Shokr, M. (2020). Real interest rate, income and bank loans: Panel evidence from Egypt. *Journal of Financial Economics,* 12(2), 227-243.

Shokr, M. A., Abdul Karim, Z., & Zaidi, M. A. (2019). Monetary policy and macroeconomic responses: Non-recursive SVAR study of Egypt. *Journal of Financial Economic Policy*, 11(3), 319-337.

Stiglitz, J. & Weiss, A. (1981) Credit Rationing in Markets with Imperfect Information. *The American Economic Review,* 71. (?) 393-410.

Stock, J. H. and M. W. Watson (2001). "Vector Autoregressions," *Journal of Economic Perspectives*, 15, 101-115.

Tsay, R. (2001). Analysis of Financial Time Series. John Wiley & Sons: New York.

Zulkhibri, M (2018). The impact of monetary policy on Islamic bank financing: bank-level evidence from Malaysia. *Journal of Economics, Finance and Administrative Science*, 23 (46) 306-322

Appendix

Table 3.1: List of Domestic Banks Involved in the Study

Domestic Banks	1	Azania Bank LTD
	2	CRDB Bank PLC
	3	EXIM Bank Tanzania LTD
	4	National Microfinance Bank PLC
	5	National Bank of Commerce Limited
	6	Tanzania Commercial Bank PLC
Foreign Banks	1	Citibank Tanzania LTD
	2	Stanbic Bank Tanzania LTD
	3	Standard Chartered Bank Tanzania LTD
	4	Diamond Trust Bank Tanzania LTD

Source: EY (2020)

Table 4.1: ADF and KPSS Unit Root Tests Results: 1978Q1:1-2003Q4

Time series	**ADF**		**KPSS**	
	Level	First Difference	Level	First Difference
DD	-1.38	-12.64***	0.2321	0.1463
DL	-1.16	-9.68***	0.2568	0.1668
FD	-1.62	-12.58***	0.3464	0.0764
FL	-1.36	-14.26***	0.3262	0.0834
IPI	-1.61	-7.38***	0.2460	0.0622
CPI	-1.82	-14.24**	0.3824	0.1323
RER	-1.62	-12.36***	0.1664	0.1428
Rate	-1.82	-22.44**	0.1148	0.0588

Notes: ***, and ** denotes significant at 5%, and 1%

Table 4.2: Residual Cross-Correlation Matrix

	Interest Rate	**Domestic Deposit**	**Foreign Deposit**	**Domestic Loan**	**Foreign Loan**	**Industrial Production**	**Price Index**
Interest Rate	1.000						
Domestic Deposit	-0.186	1.000					
Foreign Deposit	-0.224	0.286	1.000				
Domestic Loan	-0.123	0.256	-0.084	1.000			
Foreign Loan	-0.064	0.133	0.027	0.316	1.000	0.054	
Industrial Production	-0.068	0.124	0.0896	0.076	0.045	1.000	
Price Index	0.128	0.076	0.086	-0.088	-0.124	-0.048	1.000
Real Exchange Rate	-0.266	-0.072	0.278	0.044	0.184	-0.034	-0.142

Table 4.3: Variance Decomposition Analysis

Variable / Horizon	Rate	DD	DL	FD	FL	IPI	CPI	RER
Variance decomposition of DD								
3	4.84	86.48	1.26	0.04	6.28	0.86	1.25	0.68
6	5.84	76.43	0.81	0.28	9.42	3.08	3.42	1.83
9	6.18	68.59	1.88	0.67	11.31	2.88	4.49	4.08
12	6.27	56.07	10.02	0.90	9.22	8.27	3.71	5.66
18	3.62	32.06	23.41	0.86	5.68	26.21	3.15	5.42
24	2.43	19.98	35.56	2.11	5.49	27.82	3.05	3.97
30	1.93	15.71	37.21	3.24	6.68	29.44	2.65	3.48
36	2.44	14.97	34.89	3.58	7.72	31.73	2.46	3.47
Variance decomposition of DL								
3	1.49	16.95	78.97	0.91	0.15	1.13	0.02	0.34
6	1.53	24.37	64.40	7.56	0.18	1.21	0.27	0.87
9	2.04	22.60	55.04	14.96	0.14	3.21	1.60	0.62
12	3.11	21.23	50.63	14.56	0.11	8.27	1.37	0.73
18	3.01	16.73	44.78	14.40	0.08	17.69	1.11	2.21
24	2.59	13.20	44.66	11.21	0.37	23.67	0.98	3.33
30	2.21	10.67	42.46	8.52	1.60	28.39	2.04	4.11
36	2.73	11.57	37.49	6.88	3.90	30.01	3.84	3.88
Variance decomposition of FD								
3	3.42	10.11	1.31	82.88	1.63	0.09	0.33	0.36
6	4.48	6.23	1.41	83.30	1.34	0.34	0.89	2.02
9	4.15	6.32	1.41	77.96	1.99	1.45	0.84	6.90
12	3.44	5.65	2.65	68.32	1.79	11.80	0.76	7.60
18	2.44	3.80	9.16	39.96	1.71	33.93	2.51	6.48
24	1.76	2.76	16.91	29.60	4.88	36.30	2.91	4.77
30	1.78	2.46	17.00	30.76	7.85	33.32	2.71	4.13
36	3.17	3.45	15.72	32.06	9.63	30.29	2.87	3.80
Variance decomposition of FL								
3	1.86	3.42	4.58	0.28	74.80	9.34	5.64	1.80
6	2.34	2.21	3.62	6.90	58.29	11.77	11.89	3.26
9	4.85	1.95	3.74	23.72	36.29	11.72	15.41	2.48
12	4.72	1.53	3.04	39.11	26.12	10.78	13.22	1.62
18	3.91	1.69	3.16	43.07	24.86	13.53	9.65	2.24
24	3.99	3.27	6.82	39.89	20.72	15.62	7.48	2.61
30	3.51	3.19	10.66	36.25	19.05	18.12	6.80	2.72
36	2.96	4.25	14.93	30.59	16.41	19.93	7.67	3.58

Table 4.3: (continued) Variance Decomposition Analysis

Variable / Horizon	Rate	DD	DL	FD	FL	IPI	CPI	RER
Variance decomposition of IPI								
3	1.29	2.28	3.72	0.35	0.11	86.05	0.64	5.55
6	4.17	3.90	5.21	2.52	0.36	75.01	0.61	8.22
9	5.23	5.76	8.17	6.33	0.74	64.43	0.76	8.57
12	8.85	7.19	11.93	7.85	0.86	54.63	0.74	7.95
18	8.17	7.65	14.63	8.12	2.41	48.85	2.68	7.48
24	9.11	15.41	12.07	7.21	7.33	38.39	4.27	6.22
30	12.00	19.30	10.53	7.46	9.89	31.01	4.11	5.72
36	12.35	19.22	13.23	7.79	9.78	28.33	3.81	5.49
Variance decomposition of CPI								
3	0.89	1.78	5.86	2.41	2.05	0.98	85.78	0.26
6	2.88	3.98	8.25	4.90	1.71	1.77	75.51	1.01
9	2.61	6.92	10.95	8.08	6.17	3.24	60.63	1.41
12	2.49	5.21	24.69	9.66	6.47	3.66	46.67	1.15
18	3.51	16.48	25.78	8.64	5.33	5.66	33.66	0.95
24	3.02	16.36	24.59	6.84	3.93	17.08	24.95	3.23
30	1.94	11.10	23.25	4.45	3.75	34.81	16.38	4.32
36	1.60	8.20	24.98	3.66	5.44	39.87	12.08	4.17
Variance decomposition of RER								
3	12.38	4.38	0.32	8.63	16.52	0.85	0.24	59.99

6	12.18	5.26	4.94	7.65	22.49	0.92	2.20	45.68
9	15.84	7.38	11.76	7.80	14.62	2.84	8.28	33.13
12	11.18	12.68	16.41	6.88	8.54	3.03	20.57	19.40
18	6.87	18.84	25.32	10.09	6.26	3.22	22.36	8.93
24	5.26	15.43	28.26	14.64	6.64	3.09	21.12	7.61
30	5.88	16.46	24.87	18.84	5.47	3.04	19.73	7.20
36	4.22	13.33	35.77	24.65	5.20	3.11	17.39	6.73