

# Determinants of Bank Lending Interest Rates in Tanzania

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## Abstract

The study seeks to examine the determinants of bank lending interest rates in Tanzania, largely focusing on identifying the key determinants and their relative importance. Techniques employed comprise interest rates decomposition and econometric estimation using banks' annual balance sheet data. Results on interest rates decomposition suggest that, the main drivers of lending rates are operating costs, non-performing loans; and costs of funds (deposits interest rates). The three factors accounted for 70.4 percent of small banks' average lending rates in 2014-17; while for medium and large banks, they constituted about 69.5 percent and 67.4 percent of the lending rates, respectively. Statutory minimum requirement ratio (SMR) appears to play an important role in all banks' lending rates, but its share has been declining overtime consistent with the expansionary monetary policy measures pursued since 2014. With respect to econometric estimations, the findings confirm the role of operating costs, non-performing loans, and cost of funds in explaining bank lending rates dynamics. Operating costs, cost of funds, and inflation have a statistically significant positive effect on bank lending rates, while bank size and level of liquidity have a negative influence. SMR ratio is statistically significant but bears a negative sign except for locally owned banks. In relative importance, the main determinants of bank lending rates could be ranked as follows: inflation with an average positive impact of 0.432 on lending rates for a unit change in inflation, trailed by operating costs (0.261), and cost of funds (0.255). Bank size has the largest negative effect of 0.288 for every unit increase in the variable. The implication of the findings is that effort should be directed at improving operational efficiency aiming at reducing banks operating costs. The key areas of attention are with respect to employees' salaries and benefits, as well as rental and depreciation expenses related to premises and equipment. Banks may consider to take advantage of ICT advancement in the country to cut on costs of "mortal and brick" and employees. Priority could be put on utilizing the growing agent banking framework, and digital

banking technology. Prudent consolidation of small banks could as well help cut on operating costs, improve efficiency, and enhance liquidity levels. Measures need to be taken to reduce non-performing loans including through enhancing borrowers screening mechanisms enabled by credit risk management frameworks at bank level and mandatory use of credit reference system to reduce credit risk. Strengthening of the regulatory and supervisory role is important mostly targeting to ensure adequate liquidity in the banking system for daily needs. It is recommended to cautiously reduce SMR so as to enhance banks' lending capacity.

## Keywords

Lending Interest Rates, Tanzania Banking Sector, Banks Operating Costs, Lending Rates Decomposition, Econometric Estimation

## 1. Introduction

Tanzania embarked on a series of financial reforms in the 1990s with a view to supporting the development of a market-based financial sector (Bank of Tanzania [BoT], 2011)<sup>1</sup>. With the reforms, the ratio of banks credit to the private sector to gross domestic product (GDP) increased from 4.1 percent in 2001 to 16.0 percent in 2016 (Mbowe, 2018). Despite the achievement, the credit level is still far below that of comparable countries in the region. In 2017 for example, the share of credit to GDP for Kenya was 29.3 percent while those of Mozambique, Namibia, and South Africa were 25.64 percent, 63.76 percent and 147.7 percent, respectively. Compared with selected regional averages, the same situation reveals as Sub-Saharan Africa had 48.3 percent. Meanwhile, the lower middle-income group to which Tanzania has graduated and the aspired middle-income group registered 43.7 percent and 99.3 percent of GDP, respectively<sup>2</sup>. Cihak and Podpiera (2005) attribute the limited extent of lending in Tanzania to high intermediation costs including interest rate spreads, which according to Manamba (2014), are significantly higher after the adoption of financial liberalization. As discussed in Section 2, the spreads have been much elevated since 1998 contributed by lending interest rates rigidity especially from 2003.

High interest rate spreads signal banking sector inefficiency and, when that occurs, it hampers not only financial development but also economic growth as credit to productive use is constrained due to high lending rates which are a cost to investors (Nanjunga et al., 2016). Lending interest rate to charge also matters to a commercial bank since profit banks earn—the interest income—makes a significant component of their revenues (Bhattarai, 2015; Nanjunga et al., 2016).

<sup>1</sup>King and Levine (1993a, 1993b), Demirguc-Kunt and Maksimovic (1998), and Levine and Zervos (1998) urge that well-functioning markets not only support economic development, but also enhance the effectiveness of monetary policy since they provide a mechanism for mobilization and allocation of financial resources.

<sup>2</sup>Source: <https://data.worldbank.org/indicator/fs.ast.prvt.gd.zs>, accessed on 23 February 2018.

Profitability notwithstanding, banks are faced with another challenge: pursuit to continue relationship with borrowers; implying that high loan interest rates are less ideal for banks because they discourage borrowing by economic agents.

This study seeks to investigate determinants of bank lending interest rates in Tanzania. Specifically, it: 1) identifies factors which influence bank lending interest rates in the country, and 2) evaluates the relative importance of the factors. The findings contribute in understanding the key factors that influence banks in deciding on loan rates to charge. Such information could inform policy decisions with a view to improving efficiency in the banking sector to spur growth of credit to the private sector. Efficient credit markets are also essential in enhancing the effectiveness of the monetary policy as the country like other East African countries is set to adopt an interest rate targeting framework. The framework makes use of banks short term interest rates as key decision variables.

After the introduction, Section 2 provides a synopsis of banking sector policy and interest rates evolution in Tanzania, lagged in Sections 3 and 4 by the literature on determinants of bank lending interest rates, and methodology, respectively. Estimations and discussion of study findings follow in Section 5. Section 6 concludes the paper.

## **2. Banking Sector Policy and Interest Rates Evolution in Tanzania**

### **2.1. Banking Sector Policy**

Since independence in 1961, the banking sector in Tanzania has undergone profound changes in terms of growth, size and structure. In 1991 when comprehensive financial reforms and liberalization commenced, the banking sector comprised only six banks<sup>3</sup>, with lending largely directed to support socio-economic activities as per the State Credit Plans (BoT, 2016). Due to inefficiencies associated with this system including dismal growth and few financial products offered in the market, comprehensive financial sector reforms commenced in 1991, which allowed entry of private (local and foreign) commercial banks under the supervision and regulation of Bank of Tanzania (BoT). With these, interest rates were subjected to market forces. Other measures that had effect on interest rates are in respect to widening of the central bank's oversight functions to cover community banks in 2003, and deposit-taking microfinance and microcredit institutions and credit reference bureaus in 2006 (BoT, 2016). In addition, since 2007, BoT adopted a more risk-focused approach of supervising banks. A formal mechanism for sharing of credit information and reduce information asymmetry on borrowers through the establishment of a databank and private credit reference bureaus followed in 2012. The main objective was to safeguard the integrity of the banking sector while boosting its growth including credit to the private

<sup>3</sup>These were National Bank of Commerce, the People's Bank of Zanzibar, Postal Office Savings Bank, Tanzania Housing Bank, Tanzania Investment Bank, and Tanzania Rural Development Bank—the state owned banks, all being state owned banks.

sector.

Open market operations (OMO), introduced in 1993/1994, is the main policy instrument that provides mechanism to achieve objects of: anchoring of interest rate determination, liquidity management and financing of fiscal deficits (Mbowe, 2017). The existing auction procedure gives the market more influence in determining the prices and yields, at which Treasury bills are traded.

Banks can access intraday and Lombard facilities and Repurchase agreement (REPO), which were introduced in 2003 and 2007, respectively, to square their daily or short-term liquidity needs. Other developments which may have influenced banks' lending and loan rate setting behavior are in respect to statutory requirements. The statutory minimum reserve (SMR) instrument was actively used, especially, in the second half of 1990s, to control excess liquidity in the economy. Generally, the composition of SMR and the rate have been changing over time, mainly depending on the liquidity condition in the banking system and the need to enhance financial intermediation. At end-December 2019, the SMR was 7 percent, a reduction from 10 percent in 2016 targeted at reversing the general declining trend of the contraction of credit to the private sector, exhibited from 2015. Through the discount window, started in 1994, the monetary authority may as well affect interest rates for monetary policy purposes.

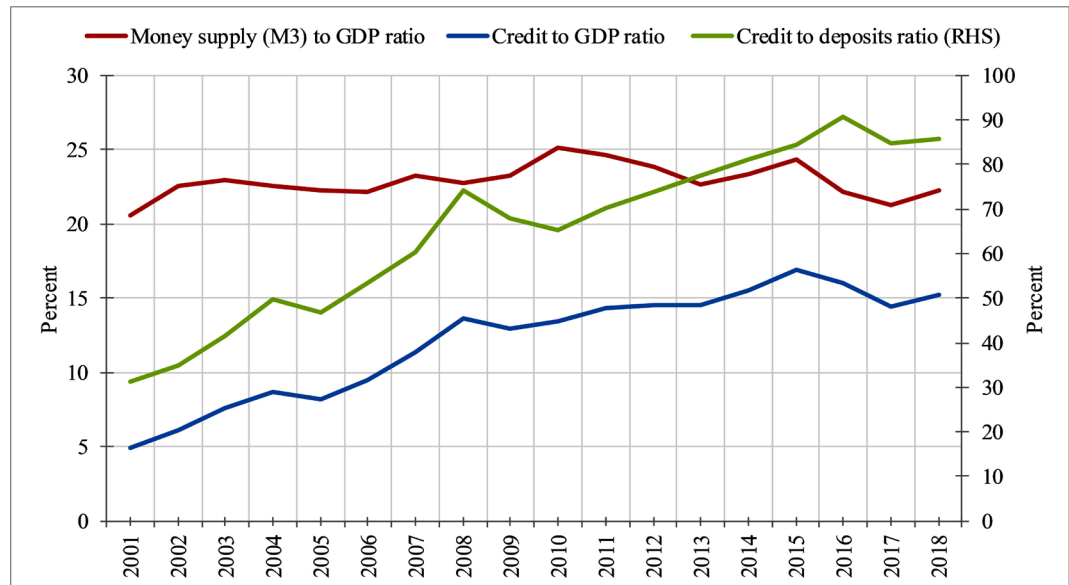
The liberalization and reform efforts contributed significantly to the expansion of the banking sector in the country. At the end of 2018, the banking sector comprised 53 institutions, of which 40 were fully-fledged commercial banks, 6 community banks, 5 microfinance institutions and 2 development finance institutions. The private sector dominates, owning 48 banking institutions, while 5 are publicly owned banks. In terms of foreign and local ownership, 31 banking institutions were majority-foreign owned with about 43 percent of the banking sector assets and 22 were majority-locally owned, with 57 percent of the assets. Meanwhile, commercial banks held 94.3 percent of the total banking sector assets<sup>4</sup> at the end of 2018, and 68.4 percent of the total financial sector assets<sup>5</sup> at the end of June 2017 (BoT, 2018).

Progress has also been registered in money supply, banks assets, credit to private sector, and deposits mobilization (Figures 1-3). In absolute terms or ratios, an upward trend is evident for extended broad money supply, banks assets, credit to private sector, and deposits. This is an indication of increasing financial intermediation in the country. Credit is fairly distributed across many sectors of the economy, although dominance of personal, trade and manufacturing activities cannot be denied.

The developments have implications on interest rates primarily through the interplay of supply and demand factors. Half of banks' credit was absorbed by

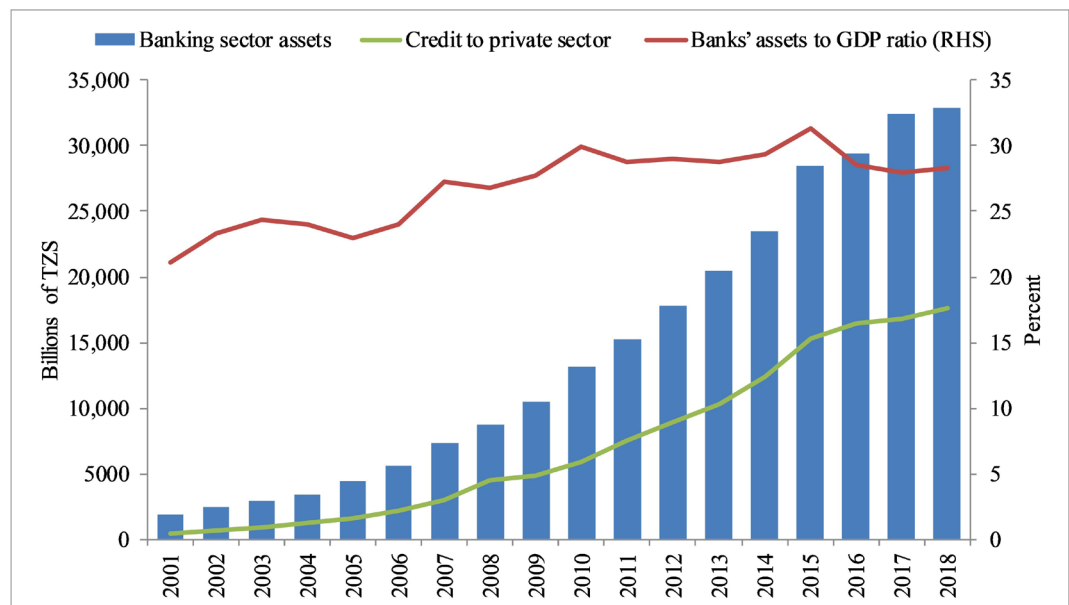
<sup>4</sup>Banks were followed by development financial institutions which held 3.0 percent of the banking sector assets; financial institutions (1.9 percent); microfinance institutions (0.6 percent); and community banks (0.3 percent).

<sup>5</sup>At the same period, pensions held 29.3 percent of the financial sector assets; insurance (1.7 percent) and collective schemes (0.6 percent).



Source: Bank of Tanzania.

**Figure 1.** Financial sector deepening.



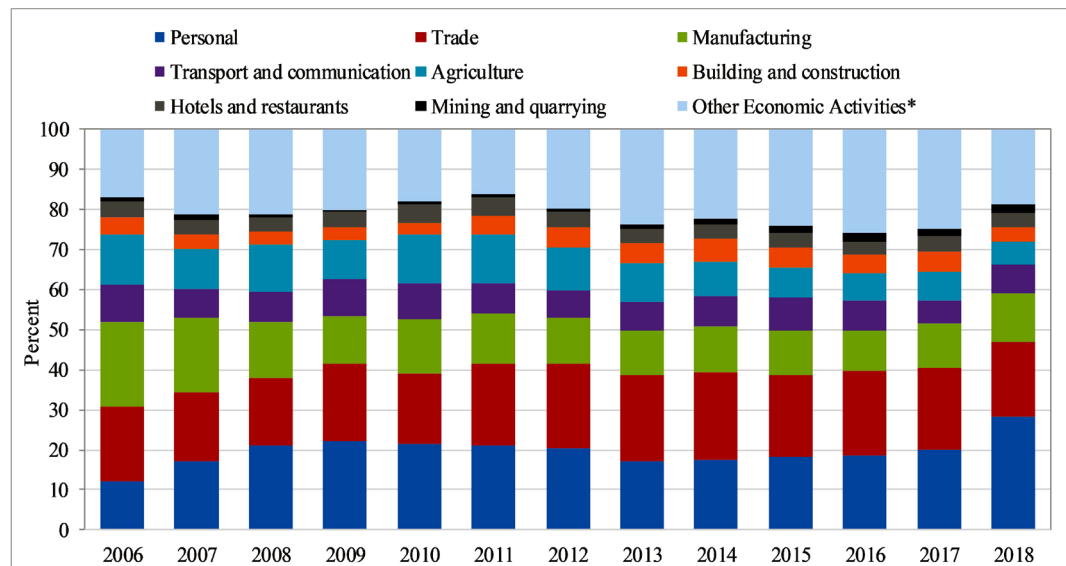
Source: Bank of Tanzania.

**Figure 2.** Development of banking sector assets.

the private sector largely in support of personal, trade and manufacturing activities. However, five large banks contributed nearly 52 of the total banks credit, which together with the banking sector reign, signal considerable concentration in the financial sector that may adversely affect credit supply and delivery of competitive interest rates.

### 2.2. Evolution of Commercial Banks Interest Rates

During the period of State control of the financial sector (1967-1991), credit was



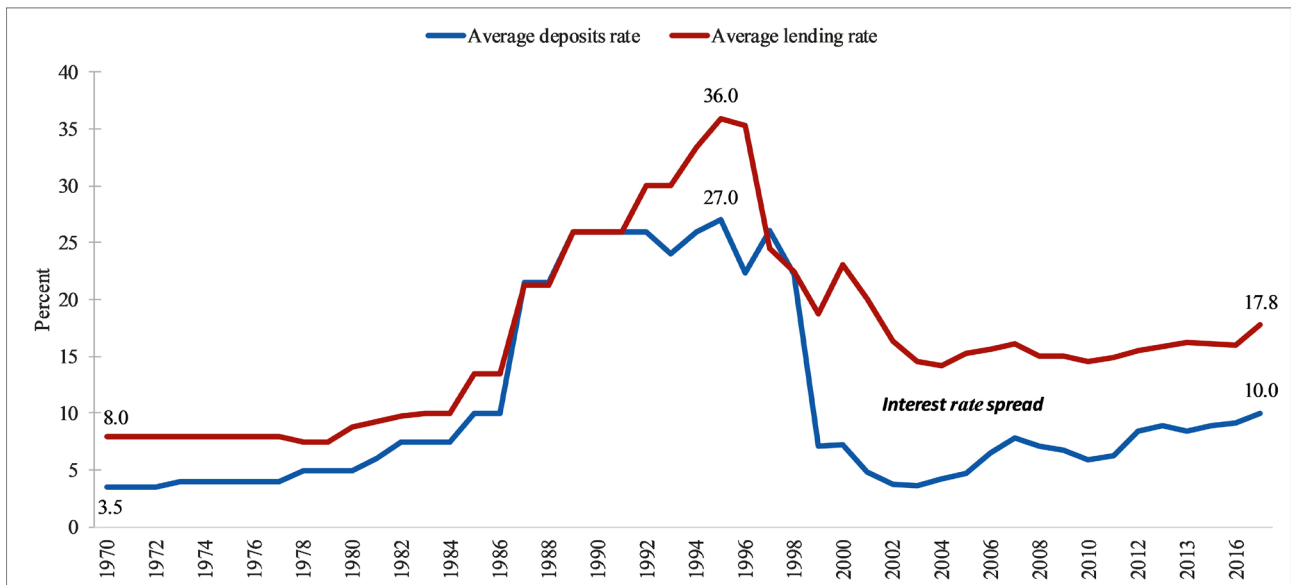
Source: Bank of Tanzania. Note: \*These activities include, financial intermediaries, tourism, electricity, gas, water, mortgage, real estate, leasing, health & education, warehousing & storage, hunting, forest, and fishing.

**Figure 3.** Distribution of banks credit across economic activities.

directly rationed and allocated to specific sectors of the economy at preferential interest rates. Evidently, the adoption of the comprehensive economic reforms in 1986 saw interest rates rising suggesting a carry-on of the negative effects of delays in financial reforms partly related to a sustained pursuit of multiple monetary policy objectives and lack of requisite independence to discharge traditional central banking functions. With the start of comprehensive financial reforms in 1991, interest rates initially increased until when money markets were introduced in 1993/94, during which interest rates were completely liberalized. In 1995, BoT was mandated to carry out the traditional central bank role and functions, refocusing the monetary policy objectives towards the single primary objective of price stability (BoT, 1996). Here, the monetary policy is the main macroeconomic stabilization tool, largely via the money markets.

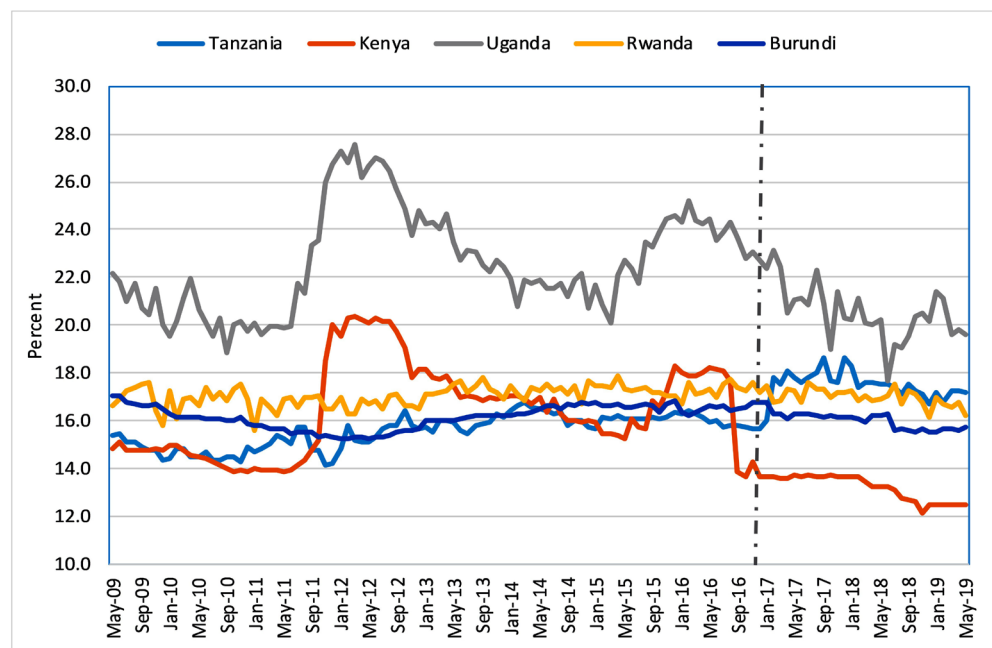
Specifically, banks' lending rates rose initially to an average rate of 36 percent in 1995 before taking a downward trend to about 17.8 percent in 2017, whereas average deposits rates edged upward to 27 percent and declined to about 10 percent in the similar period (Figure 4). The developments notwithstanding, interest rate spreads remained much higher during reform period particularly from 1998 and were associated with high and rigid lending interest rates. Compared with other East African Community (EAC) member countries (Burundi, Kenya, Rwanda and Uganda), bank lending rate in Tanzania over ten years to May 2019 was an average of 16.03 percent, being the second lowest after Kenya's 15.61 percent<sup>6</sup>. However, as portrayed in Figure 5, lending rates in Tanzania exhibited an upward shift starting December 2016, while trending above those of other EAC member countries except Uganda.

<sup>6</sup>In the same period, Uganda registered an average lending rate of 22.14 percent, Rwanda (17.05 percent) and Burundi (16.13 percent).



Source: Bank of Tanzania.

Figure 4. Commercial banks interest rates trends.



Source: EAC central banks.

Figure 5. EAC banks interest rates developments.

What could be explaining the observed tendency in lending interest rates in Tanzania? This is what this study endeavors to answer using banks’ annual balance sheet data. To aid in answering the research questions and objectives, the literature review together with the study approach are taken up first.

### 3. Literature Review

The main theoretical underpinnings which underscore how interest rate is de-

terminated can be grouped under: the classical, loanable, and rational expectations theories. The classical approach stems from the fact that interest is the reward for the productive use of capital. Since physical capital is purchased with monetary funds, the rate of interest is taken to be the annual rate of return over money capital invested in physical capital assets. At this point, the savings investment theory is key, in which the rate of interest is determined by two forces of demand for and supply of capital. Whereas the demand for investable capital draws from investment decisions of the business sector, the supply of capital results from supplies of savings derived mainly from households (Friedman & Kuttner, 1991; Rose, 2003).

Relatedly, loanable funds theory presupposes that interest rates are determined by supply of loanable funds and demand for credit; this is an improvement on the classical theory of interest<sup>7</sup>. This recognizes that money can play a disturbing role in the savings and investment processes and thereby causes variations in the level of income (Peng et al., 2002). The loanable funds theory considers the rate of interest as the function of four variables: savings, investment, the desire to hoard money and supply of money.

As for the rational expectations theory, it is based on the premise that people formulate expectations based on all the information that is available in the market. Thus, the best estimation for future interest rate is the current spot rate and that changes in interest rates are primarily due to unexpected information or changes in economic factors (Irungu, 2003). Rational expectations theory has limiting factors, though: the difficulty in gathering information and understanding how the public uses its information to form expectations (Caplan, 2000).

Two theoretical approaches in modeling determinants of interest rates are worth underscoring: the monopoly model by Klein (1971) and Monti (1972), and Ho and Saunders (1981)'s dealership model. The former approach assumes a profit maximizing firm whose primary business is to offer deposits and loan services. The monopolistic power of the bank in providing credit and deposits services in the market can somehow affect the operation of the businesses. In contrast, the dealership model views a bank not as a firm but as an intermediary between firms and households. The intermediation operations lead to uncertainty in the bank resulting from lack of coordination between the deposits and credit (loans) that leads to interest rate risk. Uncertainty may also arise from default by borrowers. Since, the bank does not have full information about its customers, this increases the likelihood of default that exposes the bank to credit risk. The more the bank faces credit risk, the more it widens its interest rate spread to avoid credit risk partly by increasing the lending rate.

Some other variables have also featured in similar studies that have modeled factors influencing lending interest rates in which deposits interest rate is treated

<sup>7</sup>According to Turnovsky (1985), loanable funds are the sums of money supplied and demanded at any time in the money market, where: funds available for lending are influenced by the savings of the people and the additions to the money supply (normally through credit creation by banks), while demand for loanable funds is determined by the need for investment plus desire for hoarding.



as an independent variable or when the interest rates spread (the difference between lending and deposits interest rates) is instead treated as endogenous to the model. The explanatory factors can be categorized in three categories: 1) individual bank-specific factors, including operating or administrative costs, non-performing loans, return on assets, structure of the balance sheet, non-interest income or non-core revenues, bank size, and bank liquidity; 2) aspects specific to the banking industry comprising the degree of competition or market concentration, regulatory requirements such as statutory reserve requirements or regulated minimum deposit rates and; 3) macroeconomic indicators like growth rate of gross domestic product (GDP), inflation rate and taxes.

While some studies have focused on one category of the factors, others considered two or all the three categories of factors. Differences also exist in type of data and modeling techniques—i.e. time series against panel data approaches. Generally, mixed results are evident, suggesting a wide range of factors in explaining movements in banks' lending interest rates (see for example, Chodechai, 2004; Chirwa & Mlachila, 2004; Cihak, 2004; Grenade, 2007; Gambacorta, 2008; Olokoyo, 2011; Siddique, 2012; Georgievska et al., 2011; Aikael et al., 2011; Were & Wambua, 2013; Mbao et al., 2014; Manamba, 2014; Matemilola et al., 2015).

Using cross section and panel data, for example, studies such as Cihak (2004); Gambacorta (2008); Georgievska et al. (2011); Mbao et al. (2014) underscore the importance of bank size, liquidity, capital adequacy, foreign ownership, market share, non-performing loans, banks' costs, deposit rates, interest rate volatility, bank efficiency, credit and interest risks, and permanent changes in income in explaining lending interest rate variation. As for time series-based studies, Matemilola et al. (2015), used the momentum threshold autoregressive and asymmetric error correction models and found that bank lending rate adjusts to a decrease in the money market rate in South Africa. However, commercial banks adjust their lending rate downward but the lending rate appears rigid upward supporting the customer reaction proposition.

In Tanzania, Manamba (2014) focused on co-integration analysis using macro-level quarterly data covering 1986-2013 period and found that, interest rate spreads are significantly determined by lack of competition among financial institutions; existence of diseconomies of scale in the financial system; and that, as proportion of liquid assets increases the bank liquidity risk decreases, leading to lower interest rate spreads. Aikael et al. (2011) also use quarterly macro-level data and a co-integration and error correction model to establish relative importance of macroeconomic and regulatory factors in explaining persistence of interest rate spreads in Tanzania. The results reveal that interest rate spreads in Tanzania are strongly influenced by net government borrowing from commercial banks, development of the banking sector, statutory minimum reserve requirement and the discount rate.

The current study differs from the previous studies on Tanzania in two ways:

first, it incorporates bank-level information, and considers other relevant factors such as operating costs, bank size and ownership structure, as well as monetary policy effects. Second, it extends data to 2017 making it possible to capture effects of the protracted reforms in the financial sector.

## 4. Methodology

Duo approaches are followed in this study to track the determinants of bank lending interest rates in Tanzania. First, lending interest rates are decomposed to identify contribution of specific accounting factors at the level of peer groups of banks as in Cihak and Podpiera (2005). The second technique involves econometric estimation with the lending interest rates treated as endogenous at bank-by-bank level (see for example, Cihak & Podpiera, 2005; Samahiya & Kaa-kunga, 2011; Ongeri, 2012; Were & Wambua, 2013; Ahokpossi, 2013; and Nan-junga et al., 2016).

### 4.1. Interest Rates Decomposition

Interest rates decomposition is undertaken along two main banking institutions' characteristics or groups: size (small, medium and large) and ownership structure (local and foreign banks). The asset draining components are then analyzed over 2005 to 17 due to data unavailability. The main components considered in this study are operating costs, deposits interest rate (cost of funds), non-performing loans, provision for bad debts and SMR. The variables are derived as explained in Annex 1.

A contribution of a cost component in each category of banks is computed by multiplying the weight of the average value of a component by average lending rate in a specific period as shown in Equation (1). The weight is obtained by dividing the value of the component by the sum of values of all components in a group.

$$cc_{ijt} = w_{ijt} LR_{jt}, \quad (1)$$

where,  $cc_{ijt}$  is contribution of component  $i$  in group  $j$ , period  $t$ ;  $w$ , weight of component  $i$  in group  $j$ , period  $t$ ;  $LR$ , average lending rate in group  $j$ , period  $t$ ; while  $i, j = 1, \dots, 5$  and  $t = 1, \dots, 4$ .

### 4.2. Econometric Model

The starting point for panel data estimators is pooled ordinary least squares (OLS), which assumes away fixed effects or parameters (cross-section specific and time-invariant component) and non-fixed parameters, i.e. indiscriminate drawings from a certain probability distribution (random effects). If the assumption holds that the unobservable individual bank-specific effects are not very different, pooled OLS estimations is the most simple and efficient method for panel data analysis (Onuonga, 2014). This approach has been found to be inadequate, so that further estimations and tests are usually recommended with the view to accounting for fixed and random effects of the data (Greene, 2007; Cottrell & Jack, 2016). The rule of thumb is that, if the panel compares observa-

tions on a fixed and relatively small set of units of interest (say, banks), there is a presumption in favor of fixed effects. If it compares observations on a large number of randomly selected individual units (in this case, banks), there is a presumption in favor of random effects. The advice is followed in this study.

In equation form, the pooled OLS may be specified as:

$$Y_{it} = X_{it}\beta + u_{it}, \quad (2)$$

with  $Y_{it}$  being the observations on the dependent variable for cross-sectional unit  $i$  in period  $t$ ;  $X_{it}$ , a vector of independent variables; and  $u_{it}$  is an error term specific for each unit over the period. The fixed and random effects models decompose the unitary pooled error term,  $u_{it}$ . For the fixed effects model, decomposition is such that:  $u_{it} = \alpha_i + \varepsilon_{it}$ , where  $\alpha_i$  is unit specific and time-invariant component, and  $\varepsilon_{it}$  is observation specific error term. Unlike the fixed effect model, where  $\alpha_{it}$  are treated as fixed parameters, random effect model treats them as random drawings from a given probability distribution ( $v_i$ ). Therefore, fixed and random models can be written as in Equations (3) and (4):

$$Y_{it} = X_{it}\beta + \alpha_i + \varepsilon_{it}, \quad (3)$$

$$Y_{it} = X_{it}\beta + v_i + \varepsilon_{it}. \quad (4)$$

In modeling, the endogenous variable is bank lending interest rates, while explanatory variables comprise bank characteristics, industry-wide and macroeconomic factors as summarized in **Annex 1**. In answering the research objectives, a factor is considered to be useful in explaining movement in bank lending interest rates if it is statistically significant at the conventional test statistics (i.e. 1% or 5% or 10%) and bears the expected sign. The relative importance is evaluated basing on the magnitude of the factor coefficients or share of the factor for the case of lending rates decomposition.

Bank level annual data are employed spanning the period 2001 to 2017, mainly drawn from annual financial statements of commercial banks, community banks, microfinance institutions and development finance institutions, which were in operation during the study period. This is a population of sixty institutions some of which have information over 17 years. Separate estimations are made to account for differences across ownership structure (local banks vis-à-vis foreign banks); and size (small banks vis-à-vis medium and large banks). Share of assets to the industry's total is used to separate banks across size categories. A large bank is the one with assets market share greater than or equal to 4 percent; a medium size bank, assets share of less than 4 percent but greater than one percent; and a small bank has assets share of less than 1 percent of the industry assets.

## 5. Estimation and Discussion of Study Findings

### 5.1. Diagnostic Tests

#### 5.1.1. Descriptive and Correlation Statistics

**Table 1** summarizes descriptive statistics of the variables of interest spanning the

**Table 1.** Descriptive statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
il	654	15.1	6.4	0.3	61.8
id	631	8.2	3.7	0.6	17.3
ras	674	-0.1	7.0	-63.1	22.3
opcr	540	8.2	6.9	0.3	78.6
nplr	495	10.2	13.0	0.1	100.0
siz	702	2.4	5.4	0.0	73.9
liqr	697	27.5	22.5	1.5	353.2
provr	499	2.1	8.2	-18.1	165.0
smr	1020	9.8	0.6	8.0	10.0
rgdp	1020	6.8	0.6	5.1	7.8
infl	1020	7.4	3.3	4.4	16.0
itbl	1020	10.2	3.7	3.9	16.2
hhi_as	1020	1423.1	1321.7	842.4	5568.3

Source: Authors' computation.

period 2001 to 2017. Banks' lending interest rates (il) range from a minimum rate of 0.3 percent to a maximum rate of 61.0 percent with a relatively high variation from the mean of 6.4 compared to deposits interest rates with a standard deviation of 3.7, while deposits rate (id) ranged from a low rate of 0.6 percent and high rate of 17.3 percent. However, the variation in banks' interest rates is much less compared to those of some decision variables. Variables with high deviation from the mean are ratios of market concentration (hhi\_as), liquid assets (liqr), non-performing loans (nplr), provision for bad loans (provr), operating costs (opcr) and bank size (siz). In contrast, macroeconomic variables (inflation, infl; and real GDP, rgdp); and Treasury bill interest rate (itbl), a proxy of monetary policy rate, have far lower standard deviations pointing to lesser risk. Owing to different standard deviations, the decision (explanatory) variables may have a varying impact on the dependent variable (lending rate).

Further analysis using correlation coefficients, as captured in **Table 2**, suggest a relatively high and positive relationship of bank lending interest rates with operating costs (32.5 percent) and SMR ratio (23 percent), whereas a negative relationship is evident with return on assets (23.3 percent). Correlation with deposits rate, market concentration, policy rate, size and liquidity strength indicators, as well as macroeconomic variables bear the hypothesized signs, but weak. Meanwhile correlation across independent variables is generally low except for operating costs and return on assets which have a correlation coefficient of 0.763. With these mixed descriptive results, further enquiry is made using lending rates decomposition. Panel data econometric estimation approach is also important to determine the causal effect of the explanatory variables on the dependent variable.

**Table 2.** Correlation matrix.

	il	id	ras	opcr	nplr	siz	liqr	provrr	smr	rgdp	infl	itbl	hhi_as
il	1												
id	0.054	1											
ras	-0.233	0.074	1										
opcr	0.325	-0.304	-0.763	1									
nplr	0.057	0.006	-0.369	0.271	1								
siz	-0.093	-0.214	0.292	-0.206	-0.109	1							
liqr	-0.071	-0.144	0.090	-0.037	0.028	0.084	1						
provrr	0.024	0.063	-0.222	0.053	0.081	-0.043	-0.020	1					
smr	-0.230	-0.224	0.142	-0.067	-0.092	0.045	-0.097	-0.145	1				
rgdp	0.094	0.067	-0.004	0.027	0.044	-0.007	0.053	0.055	-0.225	1			
infl	-0.155	-0.157	0.084	-0.081	-0.120	0.028	-0.085	-0.086	0.376	-0.812	1		
itbl	0.091	0.252	-0.102	0.129	0.030	-0.042	-0.037	-0.031	-0.085	0.041	-0.173	1	
hhi_as	-0.092	-0.302	0.227	-0.184	-0.098	0.076	0.064	-0.004	0.379	0.018	0.162	-0.485	1

Source: Authors' computation.

### 5.1.2. Unit Root Tests

Hadri LM test was employed to test for stationarity of all panels, with the null hypothesis (Ho): "All panels are stationary". Since the test requires strongly balanced data only tests for SMR ratio, real GDP, inflation, treasury bill rate, and market concentration indicators are reported. The results are as summarized in **Table 3** and, they indicate that the variables are stationary at 1 percent level. This information together with the fact that the remaining variables are in ratios or rates, suggest that the variables may be considered at their levels or growth rates in econometric estimation.

## 5.2. Estimations and Discussion

### 5.2.1. Decomposition Results

Here, we identify contribution of specific accounting components (factors) at the level of peer groups of banks. **Tables 4-6** summarize results obtained through decomposition of lending rates along banks asset draining components. SMR, operating costs, costs of funds, and non-performing loans (NPLs) appear to account for the largest chunk of the industry lending rates. Provision for bad debts is far less important. This trend carries on with the decomposition of interest rates spread (see, **Annex 2**).

Analysis across ownership structure reveals that lending rates during 2005 to 2017 increased across local and foreign owned banks, with foreign banks exhibiting a faster growth than their counterpart, particularly from the 2009-12 sub-period. Local banks average lending rates rose from 7.4 percent to 10.4 percent in 2014-17 compared to those of foreign banks which increased from an average of 7.4 percent to 15.1 percent. The main driver was small banks whose

**Table 3.** Panel root tests.

	Z-statistic	p-value	Level of significance	Trend
smr	12.724	0.000	1%	Not included
rgdp	2.538	0.006	1%	Included
infl	24.346	0.000	1%	Included
itbl	3.638	0.000	1%	Included
hhi_as	20.542	0.000	1%	Included

Source: Authors' computations.

**Table 4.** Decomposition of industry lending rates.

Category	Contribution in percentage points				Contribution in percent				Average 2005-17
	2005-07	2008-10	2011-13	2014-17	2005-07	2008-10	2011-13	2014-17	
<i>Interest rate spread</i>	15.7	14.9	15.5	16.5					
Operating costs/assets	3.3	3.0	3.9	3.9	21.3	20.5	25.4	23.7	22.7
NPLs/gross loans	2.2	3.4	3.2	3.8	13.9	22.6	20.8	23.2	20.1
Cost of funds (deposits rate)	3.5	3.0	3.5	3.9	22.2	20.4	22.4	23.3	22.1
Provision for bad debts/gross loans	1.0	0.8	0.4	1.1	6.7	5.6	2.8	6.9	5.5
SMR ratio	5.6	4.6	4.4	3.8	35.8	30.8	28.6	23.0	29.6

Source: Authors' computation.

**Table 5.** Decomposition of lending rates by bank ownership category.

Category	Contribution in percentage points				Contribution in percent				Average 2005-17
	2005-07	2008-10	2011-13	2014-17	2005-07	2008-10	2011-13	2014-17	
<b>Local banks</b>									
<i>Lending rate</i>	5.2	7.4	8.9	10.4					
Operating costs/assets	1.4	2.1	2.7	3.1	27.3	28.3	29.8	29.5	28.7
Cost of funds (deposits rate)	0.4	0.7	0.9	1.2	7.4	8.8	10.2	11.8	9.6
NPLs/gross loans	0.9	1.8	2.6	3.5	16.3	24.3	28.5	33.9	25.8
Provision for bad debts/gross loans	0.5	0.4	0.0	0.3	8.7	5.8	0.3	3.2	4.5
SMR ratio	2.1	2.4	2.8	2.2	40.4	32.9	31.1	21.6	31.5
<b>Foreign banks</b>									
<i>Lending rate</i>	7.0	7.4	11.0	15.1					
Operating costs/assets	1.5	1.4	2.9	3.1	22.0	19.1	26.6	20.3	22.0
Cost of funds (deposits rate)	0.9	1.1	2.0	3.2	13.1	14.5	17.8	20.9	16.6
NPLs/gross loans	1.3	1.9	2.2	3.8	17.9	25.7	20.0	24.9	22.1
Provision for bad debts/gross loans	0.5	0.5	0.5	1.4	6.9	6.4	4.4	9.1	6.7
SMR ratio	2.8	2.5	3.4	3.7	40.1	34.2	31.2	24.7	32.6

Source: Authors' computation.

**Table 6.** Decomposition of lending rates by bank size category.

Category	Contribution in percentage points				Contribution in percent				Average 2005-17
	2005-07	2008-10	2011-13	2014-17	2005-07	2008-10	2011-13	2014-17	
<b>Large banks</b>									
<i>Lending rate</i>	12.3	13.2	14.8	16.3					
Operating costs/assets	2.3	2.4	2.9	3.4	18.6	17.8	19.3	21.0	19.2
Cost of funds (deposits rate)	2.2	2.6	3.0	3.5	17.9	19.8	20.0	21.2	19.7
NPLs/gross loans	2.3	3.2	3.4	4.1	19.0	23.9	22.8	25.2	22.7
Provision for bad debts/gross loans	0.8	0.4	0.8	0.7	6.6	3.4	5.6	4.3	5.0
SMR ratio	4.7	4.6	4.8	4.6	37.9	35.2	32.2	28.3	33.4
<b>Medium size banks</b>									
<i>Lending rate</i>	10.5	13.2	14.7	16.3					
Operating costs/assets	2.2	2.2	2.4	2.3	20.7	16.5	16.5	14.3	17.0
Cost of funds (deposits rate)	2.1	2.4	3.1	3.8	19.7	18.3	20.8	23.6	20.6
NPLs/gross loans	1.3	3.3	4.3	5.1	12.7	25.0	29.0	31.6	24.6
Provision for bad debts/gross loans	0.5	1.0	0.4	0.9	4.4	7.4	2.8	5.7	5.1
SMR ratio	4.5	4.3	4.6	4.0	42.5	32.8	31.0	24.8	32.8
<b>Small size banks</b>									
<i>Lending rate</i>	3.5	4.3	7.4	10.9					
Operating costs/assets	1.0	1.3	2.7	3.2	28.2	29.7	36.8	29.0	30.9
Cost of funds (deposits rate)	0.2	0.3	0.7	1.4	5.1	7.5	10.1	12.5	8.8
NPLs/gross loans	0.7	1.1	1.5	3.1	19.0	24.6	20.9	28.9	23.3
Provision for bad debts/gross loans	0.4	0.2	0.2	0.9	10.5	5.3	2.0	8.4	6.6
SMR ratio	1.3	1.4	2.2	2.3	37.2	32.9	30.2	21.2	30.4

Source: Authors' computation.

average lending rate rose to 10.9 percent from 3.5 percent in 2005-08 due to operating costs, non-performing loans, and costs of funds measured by deposits rate, which together accounted for 70.4 percent of the lending rates in this category in 2014-17. The three factors also play a great role in other categories contributing on average 69.5 percent and 67.4 percent of the lending rates in medium and large banks sub-groups, respectively. SMR ratio appears to play an important role in lending rates across bank categories, but its share has been declining overtime consistent with the expansionary monetary policy measures pursued since 2014 to spur credit growth in which SMR ratio was reduced for the first time to 7.0 percent from the long prevailing rate of 10.0 percent.

The main reasons behind cost of funds could partly be due to increased banks' competition for deposits partly following tight liquidity conditions experienced by banks especially from 2016, largely due to cumulative impact of substantial decline in net foreign budgetary inflows, transfer of public institutions' deposits from commercial banks to the Bank of Tanzania and heightened expenditure management. This trend prompted for pursuance of accommodative monetary policy with a view to increase banks liquidity and support growth of credit to the private sector. Meanwhile, non-performing loans increased to 10.5 percent in June 2017 from 6.4 percent in June 2008 contributed by a combination of in-

cluding global financial crises; credit screening weaknesses; a decrease in supply of loans partly contributed by factors such as liquidity tightness, and decline of effective demand for loans attributed to domestic fiscal consolidation and discipline enhancement measures; drought that adversely affected agricultural production (especially in 2015 to 2016); capital enhancement measures including adoption of capital charge for operational risk, introduction of capital buffer of 2.5 percent and anticipation of increased provision following due to adoption of IFRS 9.

The high operating costs is largely driven by costs related to employees' salaries and benefits which accounted for an average of 43.7 percent of the banking industry's operating costs in the five years to 2017 and have been increasing overtime (Table 7). Other notable costs components are rental expenses on premises and equipment, depreciation of premises and equipment, and utilities expenses, which together contributed another 16.2 percent in the banking industry operating costs. Employees' salaries and benefits costs are much higher for small banks at 44.4 percent of operating costs compared to 42.5 percent and 43.9 percent for medium size and large banks, respectively (see, Annex 3).

### 5.2.2. Econometric Results

In this sub-section, further enquiry is done covering components used in the interest rates decomposition exercise and other industry-level and macroeconomic variables. Since the decomposition of lending rates and interest rates spread yield qualitatively similar results, econometric estimations are only made with lending rates as an endogenous variable. Table 8 captures general model results

**Table 7.** Percentage shares of drivers of banks operating costs.

Cost component	Percentage Share in Total Operating Costs of Banks												Average 2013-17
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
Employees salaries and benefits	40.0	40.8	41.0	42.8	40.4	41.5	42.2	43.0	43.9	43.4	43.9	44.2	43.7
Rental expenses on premises and equipment	5.0	5.1	5.0	5.6	5.8	6.3	6.2	6.2	6.0	6.6	7.2	7.0	6.6
Depreciation-premises and equipment	6.0	6.1	6.5	7.3	7.4	7.7	8.7	7.3	6.8	5.9	6.2	6.7	6.6
Utilities expenses	3.8	2.8	3.1	4.0	3.1	3.1	3.4	3.3	3.2	2.7	2.8	3.1	3.0
Insurance	2.2	2.3	2.1	2.2	2.3	2.7	2.3	2.4	2.4	2.4	2.4	2.5	2.4
Taxes and license fees	1.8	1.4	1.0	1.2	1.9	1.8	1.9	1.4	2.0	2.3	2.8	2.4	2.2
Other professional fees	1.4	2.3	0.7	0.8	1.2	1.7	1.9	1.3	1.8	1.6	1.6	1.4	1.5
Amortization-leasehold rights and improvements	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.9	1.0	0.9	1.0	1.2	1.0
Supervision and inspection fees/BOT charges/penalties	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Management fees	0.8	1.4	2.1	-0.5	0.6	1.5	1.2	1.3	1.3	1.6	0.0	0.6	1.0
Auditors fees	0.6	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4
Foreclosure and litigation expenses	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.2	0.2
Others	37.5	36.7	37.1	35.2	35.8	32.3	30.7	32.5	30.9	31.9	31.3	30.2	31.4

Source: Authors' computation.

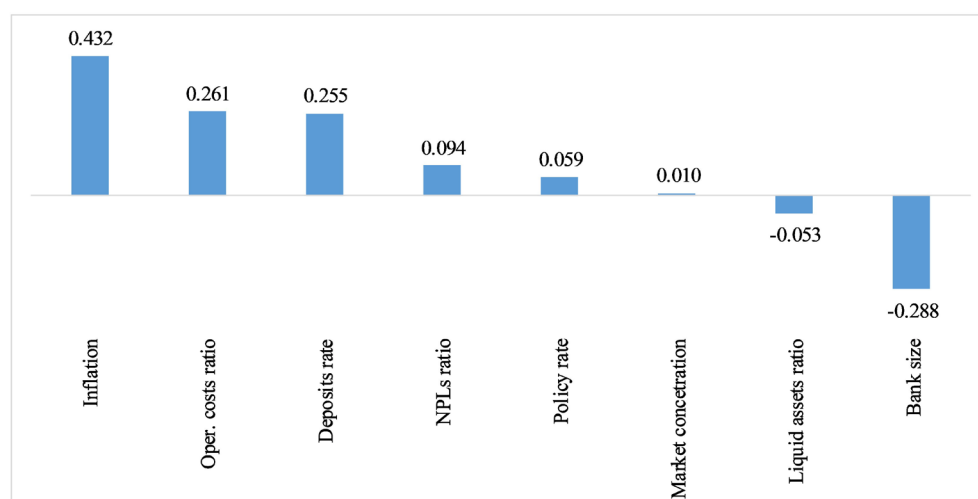


**Table 8.** General model results.

Dependent variable: Lending interest rate							
Independent variable	Model 1: All banks						Average values of significant coefficients
	Weighted Least Squares		Fixed effect		Random effect		
	No Lag	1 Lag	No Lag	1 Lag	No Lag	1 Lag	
const	15.944***	12.505*	22.466**	6.656	17.938**	8.543	
il		-0.077		-0.497*		-0.108	-0.497
id	0.243***	-0.142	0.269*	0.311	0.254**	-0.281	0.255
ras	0.089	0.277***	0.074	0.144	0.109***	0.251	0.109
opcr	0.332***	0.111**	0.334***	0.268*	0.364	0.074	0.261
nplr	0.012	0.094***	-0.022	0.027	-0.021	0.091	0.094
siz	0.023	-0.226***	-0.026	-0.159	0.009	-0.349***	-0.575
liqr	-0.053**	0.021	-0.05	-0.018	-0.041	0.001	-0.053
provrr	-0.026	0.005	-0.027	-0.031	-0.012***	0.005	-0.012
smr	-1.120***	0.148	-1.387**	0.734	-1.560	0.155	-1.254
rgdp	-0.289	0.853	-0.170	1.142	-0.344	1.269	
infl	-0.151	0.372***	-0.122	0.291	-0.129	0.492**	0.432
itbl	0.030	-0.197**	0.040	-0.263	0.059**	-0.217	-0.069
HHI_AS	0.010**	-0.005	0.004	-0.002	0.012	-0.001	0.010
Adj R <sup>2</sup>	0.241	0.207					
F-stastic	10.346***	4.685***	F(12, 59) = 4.252***	F(13, 52) = 2.465**			
Null hypothesis			Groups common intercept: Welch F(59, 91.1) = 0.818; <i>p</i> -value = 0.794	Groups common intercept: Welch F(52, 44.8) = 1.392; <i>p</i> -value = 0.129	1) Breusch-Pagan test: Unit-specific error variance = 0; Chi-square (1) = 0.0002, <i>p</i> -value 0.988. Hausman test: GLS estimates are consistent; Chi-square (12) = 26.99, <i>p</i> -value 0.008	1) Breusch-Pagan test: Unit-specific error variance = 0; Chi-square (1) = 4.277, <i>p</i> -value 0.039. Hausman test: GLS estimates are consistent; Chi-square (13) = 49.958, <i>p</i> -value 0.000	

Source: Authors' computation. Note: \*\*\*(\*\*)\* means significant at 1% (5%) 10%. Robust (HAC) standard errors were used in weighted least squares and fixed effect estimations.

obtained by using three approaches: weighted least squares, fixed effects and random effects, all employing 60 cross-sectional units some of them observed over 17 years to 2017. Estimations allow for a lag to accommodate rigidity in the economy. For the former two approaches, estimation is made in robust (HAC) standard errors setting to take care of possible heteroskedasticity and autocorrelation in the data. The average results across all banks or bank categories are provided in **Figure 6** and **Table 9**, while detailed individual econometric results are provided in **Annex 4**. The dependent variable is weighted average interest



Source: Authors' computation.

**Figure 6.** Main determinants of lending rates using econometric approach.

**Table 9.** Average values of statistically significant coefficients across bank categories.

Variable	Local	Foreign	Small	Medium	Large
il	0.282			-0.190	0.307
id	-0.249	0.484	0.581	0.467	-0.343
ras		0.232	0.228	0.641	0.641
opcr		0.498	0.312	1.620	0.943
nplr	-0.101	-0.074	0.070		0.232
siz	0.249		-10.574	-0.717	0.223
liqr	0.200	-0.097	-0.239	-0.095	0.117
provr			-1.009		
smr	1.248	-1.850	-1.850	-1.030	-1.002
rgdp			-1.036		-2.171
infl	-0.360		-0.451		-0.364
itbl	0.325			-0.452	-0.257
HHI_AS	0.011	0.020	0.020	0.023	0.009

Source: Authors' computation.

rates on banks loans (il). The explanatory variables are: operating cost/total assets (opcr); deposits interest rates (id), a proxy of cost of funds; return on assets (ras); non-performing loans/total loans (nplr); bank size (siz); liquid assets/total assets (liqr); treasury bill rate, a measure of monetary policy rate (itbl); statutory minimum requirement (smr); assets market concentration index (HHI\_AS); inflation (infl); and growth rates of real gross domestic product (rgdp)<sup>8</sup>.

The findings indicate that operating costs, deposit rates (cost of funds), and inflation have a statistically significant positive effect on banks' lending rates,

<sup>8</sup>See, **Annex 1** for details on expected signs.

while bank size and level of liquidity have a negative influence. Although SMR ratio is statistically significant it puzzlingly bears a negative sign, implying that an increase in SMR ratio could lead to a decline in lending rates. Thought differently, the negative sign on SMR ratio coefficient could be a reflective of lag effect of active use of the instrument particularly in the second half of 1990s to control excess liquidity in the economy partly to reduce credit risk. Looking at the econometric results, this thinking could be more relevant to foreign owned banks than local banks. This is because one percent increases in SMR ratio would be accompanied by a rise in lending rates by an average of 1.248 percent for local banks compared to a decline of 1.85 percent for foreign banks. Noteworthy, the negative effect seems to outweigh the positive effect when banks are grouped along size (**Table 9**).

Basing on the general model results (**Table 8**), and sticking to only variables which are statistically significant and bear the expected signs, the main determinants of lending rates could be ranked as follows: inflation with an average positive impact of 0.432 on lending rates for a unit increase in inflation, followed by operating costs (0.261), and deposits rate (0.255). Other factors with a positive effect are NPLs, policy rate, bank size, and market concentration. Bank size has the largest negative effect of 0.288 on lending rates (**Figure 6**).

The results along banks characteristics suggest that the most important factors for local banks are increase in SMR ratio, policy rate and market concentration, which tend to influence lending rate positively, and inflation that acts in the negative direction. In contrast, foreign banks' lending rates increase with a rise in operating costs, deposits rate (cost of funds), and market concentration, while a rise in banks liquid would lead to a decline in lending rates. A growth in cost of funds, operating costs, non-performing loans and market concentration also tend to lead to increase in lending rates by small banks while improvement in liquid strength and RGDP, as well as inflation would lower the cost of loans. Operating costs, deposits rate, and market concentration likewise matter for medium size banks in lending rate increase, whereas improvement in bank's size and liquid strength tend to influence lending rates negatively. For large banks, lending rates increase by 0.943 percent due to a percent increase in operating costs, while for non-performing loans it rises by 0.232 percent; 0.009 percent (market concentration), while lending rates decrease by 2.171 percent and 0.364 percent due to increases in inflation and RGDP by one percent, respectively.

The results on Tanzania corroborate the situation revealed in some other East African Community member states. According to the study by **National Bank of Rwanda of 2018**, the drivers of lending rates in Rwanda are operating costs, market concentration, provisions for bad debts, and deposits rate. In Kenya, the factors are operating costs, NPLs, inflation, interest caps, and liquidity level (**Central Bank of Kenya, 2018**).

## 6. Conclusion and Policy Implications

This study attempts to investigate the determinants of bank lending interest

rates in Tanzania, largely targeting to ascertain the key determinants together with their relative importance. Both interest rates decomposition and econometric techniques are employed using banks' annual balance sheet data spanning the period 2001 to 2017.

Lending rates decomposition results suggest that the main drivers of bank lending rates are operating costs, non-performing loans; and costs of funds. The three factors accounted for 70.4 percent of small banks' average lending rates in 2014-17, while for medium and large banks; they constituted about 69.5 percent and 67.4 percent of the lending rates, respectively. SMR ratio appears to play an important role in all banks' lending rates, but its share has been declining overtime consistent with the expansionary monetary policy measures pursued since 2014. Econometric results point to a combination of factors that influence banks' lending rates. In particular, operating costs, cost of funds, and inflation have a statistically significant positive effect on bank lending rates, while bank size and level of liquidity have a negative influence. SMR ratio is statistically significant but bears unexpected negative sign except for locally owned banks. The negative sign on SMR ratio coefficient could reflect a lag effect of active use of the instrument particularly, in the second half of 1990s, to control excess liquidity in the economy. In relative importance, the main determinants of lending rates could be ranked as follows: inflation with an average positive impact of 0.432 on lending rates for a unit change in the variable, tailed by operating costs (0.261), and deposits rate (0.255). Other factors with a positive effect on banks lending rates are increase in NPLs, policy rate, and market concentration. Bank size has the largest negative effect of 0.288 for every unit increase in the variable. These factors are also significant but with some variation across bank categories.

The main reasons behind high deposits rates include increased banks' competition for deposits partly following tight liquidity conditions experienced by banks especially from 2016, largely due to cumulative impact of substantial decline in net foreign budgetary inflows, transfer of public institutions' deposits from commercial banks to the Bank of Tanzania and heightened expenditure management. Factors affecting non-performing loans comprise global financial crises; credit screening weaknesses; a decrease in supply of loans partly contributed by factors such as liquidity tightness, and decline of effective demand for loans ascribed to domestic fiscal consolidation and discipline enhancement measures; capital enhancement measures including adoption of capital charge for operational risk, introduction of capital buffer and anticipation of increased provision following due to adoption of IFRS 9. Meanwhile operating costs are largely driven by costs related to employees' salaries and benefits which account for an average of 43.7 percent of the banking industry's operating costs and have been increasing overtime. Other notable costs components are rental expenses on premises and equipment, depreciation of premises and equipment, and utilities expenses. Employees' salaries and benefits costs are much higher for small banks at 44.4 percent of operating costs compared to 42.5 percent and 43.9 percent for medium size and large banks, respectively.

The implications of these findings are that banks should intensify efforts towards improving operational efficiency targeted at reducing banks operating costs particularly employees' salaries and benefits as well as rental and depreciation expenses related on premises and equipment. In this, banks may consider to take advantage of ICT advancement in the country in services provision so as to cut on costs of "mortal and brick" as well as wages. Priority could be put on utilizing the growing agent banking framework, and digital banking technology. Prudent consolidation of small banks could as well help cut on operating costs, improving efficiency, and enhancing liquidity levels.

Meanwhile, measures need to be taken to reduce non-performing loans including through enhancing borrowers screening mechanisms aided by credit management frameworks at bank-level to reduce credit risk. Relatedly, strengthening of the regulatory and supervisory role is important, largely targeting on ensuring adequate liquidity in the banking system to square daily needs. Since SMR is not remunerated and so it is a tax on banks deposits, it is recommended to cautiously (consistent with the economy's absorption capacity) reduce SMR so as to enhance banks' lending ability thus reducing an upward pressure on lending rates. The EAC statutory reserve requirement convergence target is 5 percent by 2021, the target already attained by Burundi with a rate of 3 percent, Rwanda (5.0 percent), and Kenya (5.25 percent). Sustaining the macroeconomic stability through higher and sustainable economic growth and low and stable inflation could as well boost demand for credit and improve loan repayment capabilities, thus reducing credit risk.

This study has contributed to the literature on loanable funds and interest rate determination, largely focusing on determinants of bank lending rates and their relative importance. The study does not however claim to be exhaustive. Further empirical studies can be undertaken to evaluate in detail factors which influence operating costs at bank level, cost of funds (deposits rates), and non-performing loans.

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### **Conflicts of Interest**

The authors declare no conflicts of interest regarding the publication of this paper.

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## Annex 1. Analysis Variables and Expected Signs

Variable	Explanation	Expected sign
<b>Dependent</b>		
Lending rate, (il)	Weighted average interest rate on banks loans. This is a price to a borrower.	
<b>Independent variables</b>		
Operating cost to total assets ratio, opr	Measures the cost of providing a loan unit by a bank and depends on the productivity of staff and other operating costs. This is the key indicator of efficiency of commercial bank so that the lower the ratio, the higher the efficiency of the commercial bank.	Positive
Cost of funds	Deposit interest rate, id is use to capture the cost of funds for a bank computed as weighted average interest rate on retail deposits by each bank.	Positive
Return on assets, ras	Increasing return on assets is likely to enhance bank's ability to cushion its assets against unexpected risks thus reducing lending rates.	Negative
Default risk	It measures the effect on lending of a possibility of default due to a change in the financial health or condition of the borrower following normal or unexpected swings in the overall level of economic activity. Default rate on total loan and advances is proxied by non-performing loans to total loans ratio (nplr).	Positive
Bank size	Computed as a ratio of bank's assets to industry total assets (siz), it captures the effect of bank's size on lending rate. As the size of a bank increases the likely that it will be able to cushion it's assets from falling following unexpected occurrences and can meet its loan obligations with less difficulties. Another candidate variable in this area is liquid assets to total assets (lqr). Liquid assets comprise vault cash, treasury bills and bonds, bills receivable, clearing account balances and claims on banks.	Negative
Bank rate (monetary policy effect)	Proxied by weighted average treasury bills rate (itbl) to capture the influence of monetary policy stance on lending rate. An increase in the central bank rate will signal policy tightening to commercial banks, thus lending rate or interest rate spreads are expected to increase.	Positive
Regulatory constraints	Proxied by statutory minimum requirement (smr) to capture effects of regulatory requirements on lending rate. Another variable that could explain severity of regulation is provision for bad loans as a ratio of total loans (provr).	Positive
Market concentration	Market concentration (comp) approximates the level of competition in an industry, with lower market concentration resulting in higher competition thus pushing down spreads. HHI is used to measure degree of concentration, computed as the sum of squared market shares of all the firms in the market scaled from 0 to 10,000.	Negative
Inflation	Inflation (infl) is used as the cost of doing the business in the economy. High levels of inflation are expected to lead to high lending rates or interest rate spreads as it causes banks to charge a risk premium. Also, when the general prices of goods and services increase these lead to significant reduction in disposable income and the purchasing power of income earners. This ultimately leads to low level of savings and high rate of loan defaults, negatively affecting the financial performance of lenders.	Positive
Real GDP	Growth of economic activity (rgdp) can affect lending rates by: increasing the demand for loans leading to high lending rates; and by making projects more profitable which reduces defaults and increase the deposits that further reduce interest rate spreads.	Positive/Negative

Source: Authors compilation.

## Annex 2. Industry-Wide Interest Rates Spread Decomposition

Category	Contribution in percentage points				Contribution in percent				Average 2005-17
	2005-07	2008-10	2011-13	2014-17	2005-07	2008-10	2011-13	2014-17	
<i>Interest rate spread</i>	9.3	8.3	7.6	7.4					
Operating costs/assets	2.6	2.1	2.5	2.3	28.0	25.3	32.9	31.1	29.3
NPLs/gross loans	1.5	2.4	2.0	2.2	16.1	28.9	26.3	29.7	25.3
Provision for bad debts/gross loans	0.8	0.6	0.3	0.7	8.6	7.2	3.9	9.5	7.3
SMR ratio	4.3	3.2	2.8	2.2	46.2	38.6	36.8	29.7	37.8

Source: Authors' computation

## Annex 3. Operating Costs by Banks Category

(a) Operating costs for small banks

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Employees salaries and benefits	42.0	39.3	37.9	42.7	41.7	43.2	45.1	43.7	44.2	43.3	45.6	45.4
Rental expense on premises and equipment	8.6	7.8	8.7	6.9	10.4	10.2	10.7	10.2	9.9	9.5	11.1	11.2
Depreciation-premises and equipment	6.1	5.6	6.2	5.3	6.5	7.0	7.7	6.9	6.0	4.5	4.3	4.5
Insurance	3.0	2.7	2.7	3.0	2.9	2.7	2.4	2.4	2.3	2.2	2.3	2.5
Amortization-leasehold rights and improvements	0.3	0.4	1.7	1.4	1.3	1.7	1.3	1.5	2.1	2.0	2.2	2.4
Utilities expenses	4.8	4.6	4.1	5.7	3.8	3.0	2.8	2.8	3.5	2.6	2.7	2.0
Taxes and license fees	0.7	0.2	0.8	0.3	0.3	0.5	0.3	0.5	0.6	0.8	0.8	1.2
Management fees	0.5	0.4	1.4	0.0	0.6	4.4	2.4	4.6	4.2	5.9	1.9	1.2
Other professional fees	0.9	1.5	1.2	1.2	1.3	2.7	2.1	1.6	1.9	2.0	1.9	1.0
Auditors fees	0.8	0.9	0.7	0.8	0.8	0.8	0.7	0.6	0.5	0.6	0.8	0.9
Foreclosure and litigation expenses	0.1	0.2	0.4	0.5	0.1	0.0	0.2	0.1	0.0	0.2	0.4	0.6
Others	32.2	36.4	34.1	32.3	30.3	23.8	24.7	25.1	24.7	26.3	26.0	27.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.3	100.0	100.0	100.0	100.0	100.0

Source: Authors' computation. Note: Small banks category covers all banks with assets share equal to or less than one percent of the banking industry assets.

(b) Operating costs for medium size banks

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Employees salaries and benefits	39.9	41.6	42.8	46.7	44.3	44.2	43.6	42.8	43.7	42.4	41.6	41.8
Rental expense on premises and equipment	5.6	6.1	5.5	7.6	7.4	8.7	8.5	8.8	8.4	9.5	10.3	9.6
Depreciation-premises and equipment	7.0	6.0	6.3	8.5	8.0	7.5	6.8	6.6	5.9	5.6	6.0	6.6
Utilities expenses	4.5	2.3	3.2	3.0	2.3	2.1	2.6	2.6	2.4	2.3	2.9	5.2
Insurance	1.2	1.1	1.0	1.3	1.5	2.0	2.1	2.3	2.6	2.6	2.6	2.3
Taxes and license fees	0.1	0.4	0.0	0.0	0.0	0.6	0.6	0.4	0.9	1.0	1.7	2.1
Other professional fees	1.4	1.2	0.7	1.4	1.4	1.2	1.2	1.5	2.4	1.7	1.7	1.5
Amortization-leasehold rights and improvements	0.1	0.1	0.1	0.3	0.4	0.4	0.6	0.9	1.0	0.9	0.9	1.1
Auditors fees	0.8	0.6	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.5	0.6	0.7

**Continued**

Management fees	0.4	4.9	6.4	-6.7	-1.8	0.6	0.4	0.6	0.4	0.4	0.3	0.4
Foreclosure and litigation expenses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.2
Others	39.2	35.7	33.3	37.1	35.9	32.2	33.2	33.0	31.8	33.0	31.3	28.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors' computation. Note: Medium size banks category includes all banks with assets share greater than one percent but less than four percent of the banking industry assets.

## (c) Operating costs for large banks

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Employees salaries and benefits	39.9	40.7	40.5	41.5	38.9	40.2	41.1	42.9	43.8	43.8	44.3	44.8
Depreciation-premises and equipment	5.7	6.1	6.6	7.1	7.3	7.9	9.6	7.7	7.3	6.4	6.7	7.3
Rental expense on premises and equipment	4.6	4.6	4.5	4.8	4.5	4.9	4.4	4.3	4.3	4.7	5.1	5.0
Taxes and license fees	2.4	1.7	1.4	1.8	2.8	2.4	2.7	1.9	2.8	3.2	3.8	2.8
Utilities expenses	3.6	2.9	3.1	4.1	3.4	3.5	3.9	3.7	3.4	2.8	2.7	2.6
Insurance	2.5	2.5	2.5	2.5	2.5	3.0	2.4	2.4	2.4	2.3	2.4	2.5
Other professional fees	1.4	2.6	0.6	0.6	1.2	1.7	2.2	1.1	1.5	1.5	1.5	1.5
Amortization-leasehold rights and improvements	0.6	0.6	0.6	0.5	0.6	0.7	0.7	0.7	0.7	0.7	0.8	1.0
Management fees	0.9	0.5	0.6	1.5	1.5	1.3	1.3	0.9	0.9	1.0	-0.7	0.6
Auditors fees	0.6	0.4	0.4	0.4	0.5	0.3	0.4	0.3	0.3	0.3	0.3	0.3
Foreclosure and litigation expenses	0.4	0.3	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2
Others	37.4	37.1	38.9	34.9	36.5	33.7	31.0	33.9	32.2	33.0	32.7	31.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors' computation. Note: Large banks category comprises all banks with assets share greater than or equal to four percent of the banking industry assets.

## (d) Operating costs for locally owned banks

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Employees salaries and benefits	42.0	41.1	42.2	43.0	40.6	42.1	42.6	44.2	44.3	44.8	43.5	43.7
Depreciation-premises and equipment	6.5	7.0	7.4	8.2	8.0	7.9	9.7	7.5	7.0	6.4	6.7	7.6
Rental Expense on premises and equipment	3.0	3.2	3.3	3.6	3.9	4.2	3.9	4.1	4.2	4.9	5.2	5.5
Utilities expenses	4.9	3.8	4.1	4.6	4.4	4.6	4.8	4.5	4.0	3.3	3.2	3.1
Insurance	2.1	2.3	2.6	2.7	2.6	2.9	2.7	2.8	2.7	2.6	2.8	2.8
Taxes and license fees	1.2	1.5	0.9	1.4	1.8	1.2	1.3	1.2	2.6	2.7	3.0	2.1
Other professional fees	1.1	1.4	0.8	0.9	1.3	1.9	1.5	1.4	1.5	1.8	1.6	1.6
Amortization-leasehold rights and improvements	1.0	0.9	0.9	0.8	0.9	1.1	1.0	1.1	1.1	1.0	1.2	1.4
Management fees	1.6	0.8	1.0	1.5	1.3	1.4	1.1	0.7	0.7	0.8	0.5	0.3
Auditors fees	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.3	0.3	0.3
Foreclosure and litigation expenses	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.2	0.2	0.1
Supervision and Inspection Fees/BOT Charges/Penalties	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Others	36.1	37.4	36.2	32.8	34.7	32.4	30.9	32.0	31.3	31.2	31.9	31.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors' computation.

(e) Operating costs for foreign owned banks

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Employees salaries and benefits	38.4	40.5	40.0	42.6	40.3	41.0	41.8	41.8	43.5	42.0	44.4	44.9
Rental Expense on premises and equipment	6.6	6.7	6.4	7.3	7.2	8.1	8.3	8.1	7.9	8.3	9.6	8.9
Depreciation-premises and equipment	5.6	5.3	5.8	6.5	6.9	7.5	7.8	7.2	6.5	5.5	5.6	5.6
Utilities expenses	3.0	1.9	2.4	3.5	2.2	1.9	2.2	2.2	2.3	2.1	2.2	3.1
Taxes and license fees	2.3	1.3	1.1	1.1	2.0	2.3	2.5	1.5	1.5	1.9	2.6	2.7
Insurance	2.3	2.2	1.7	1.9	2.1	2.6	2.0	2.0	2.1	2.1	2.1	2.0
Other professional fees	1.7	3.0	0.5	0.8	1.2	1.5	2.3	1.1	2.1	1.4	1.7	1.1
Management fees	0.2	2.0	3.0	-2.1	0.1	1.6	1.2	1.9	1.9	2.5	-0.7	1.1
Amortization-leasehold rights and improvements	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.7	0.9	0.8	0.9	1.0
Auditors fees	0.7	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.7
Foreclosure and litigation expenses	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.2	0.1	0.2	0.3	0.4
Others	38.6	36.1	37.9	37.2	36.7	32.2	30.5	32.9	30.6	32.7	30.7	28.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors' computation

## Annex 4. Econometric Results across Different Categories of Banks

(a) Local banks

Dependent variable: Lending interest rate							Average values of significant coefficients
Model 2: Local banks							
Independent variable	Weighted Least Squares		Fixed effect		Random effect		
	No Lag	1 Lag	No Lag	1 Lag	No Lag	1 Lag	
const	17.871**	-17.650	24.892**	-88.087*	20.458*	-35.670	
il		0.282***		-0.202		0.262	0.282
id	-0.089	0.042	-0.249**	0.303	-0.199	0.279	-0.249
ras	-0.057	0.159	0.109	0.006	-0.042	-0.064	
opcr	0.059	-0.020	0.143	0.102	0.065	-0.076	
nplr	-0.035	0.008	-0.107*	0.116	-0.094***	-0.023	-0.101
siz	-0.018	0.151**	-0.066	0.405***	-0.054	0.192*	0.249
liqr	0.035	0.169***	0.020	0.129	0.038	0.231**	0.200
prov	-0.110	0.165	0.043	0.382	-0.017	0.159	
smr	-0.815*	1.306***	-0.751	2.304**	-0.686	2.197***	1.248
rgdp	-0.043	0.702	-1.007	3.685	-0.461	2.013	
infl	-0.038	0.053	-0.360**	0.360	-0.163	0.146	-0.360
itbl	-0.063	0.325**	-0.099	0.093	-0.026	0.117	0.325
HHI_AS	0.007	0.004	0.011*	0.052	0.008	0.004	0.011
Adj R <sup>2</sup>	0.068	0.727					

Continued

F-stastic	1.723*	11.263***	F(12, 28) = 3.865***	F(13, 52) = 2.465**		
Null hypothesis			Groups common intercept: Welch F(28, 27.1) = 10.6; <i>p</i> -value = 0.000	Groups common intercept: Welch F(27, 20.7) = 4.978; <i>p</i> -value = 0.000	1) Breusch-Pagan test: Unit-specific error variance = 0; Chi-square (1) = 0.0549. Hausman test: GLS estimates are consistent; Chi-square(12) = 28.16, <i>p</i> -value 0.005	1) Breusch-Pagan test: Unit-specific error variance = 0; Chi-square (1) = 0.358; <i>p</i> -value 0.0549. Hausman test: GLS estimates are consistent; Chi-square(13) = 25.239, <i>p</i> -value 0.021

Source: Authors' computation. Note: \*\*\*(\*\*)\* means significant at 1% (5%) 10%. Robust (HAC) standard errors were used in weighted least squares and fixed effect estimations.

(b) Foreign banks

Dependent variable: Lending interest rate								Average values of significant coefficients
Independent variable	Model 3: Foreign banks							
	Weighted Least Squares		Fixed effect		Random effect			
	No Lag	1 Lag	No Lag	1 Lag	No Lag	1 Lag		
const	8.048	-4.211	13.095	-5.519	14.033	-0.330		
il		-0.013		-0.038		-0.010		
id	0.534***	0.256*	0.583***	0.203	0.564***	0.124	0.484	
ras	0.220**	0.084	0.233	0.106	0.244**	0.124	0.232	
opcr	0.652***	0.292***	0.746***	0.262**	0.760***	0.275**	0.498	
nplr	0.034	-0.078**	0.042	-0.046	0.041	-0.070*	-0.074	
siz	0.007	-0.095	-0.028	-0.159	-0.025	-0.151		
liqr	-0.083***	-0.051	-0.105***	-0.048	-0.104***	-0.052	-0.097	
provr	-0.050**	-0.078***	-0.056***	-0.068***	-0.053*	-0.070***		
smr	-1.608***	-0.028	-1.956***	-0.033	-1.987***	0.039	-1.850	
rgdp	0.035	-0.493	-0.202	-0.476	-0.173	-0.663		
infl	-0.134	-0.225	-0.167	-0.238	-0.155	-0.242		
itbl	0.096	-0.185	0.113	-0.060	0.103	-0.171		
HHI_AS	0.015***	0.026***	0.014**	0.027***	0.013**	0.024***	0.020	
Adj R <sup>2</sup>	0.387	0.284						
F-stastic	13.420***	5.214***	F(12, 29) = 10.222***	F(13, 29) = 5.213***				
Null hypothesis			Groups common intercept: Welch F(29, 27.2) = 0.556; <i>p</i> -value = 0.959	Groups common intercept: Welch F(29, 33.2) = 0.909; <i>p</i> -value = 0.599	1) Breusch-Pagan test: Unit-specific error variance = 0; Chi-square (1) = 2.146, <i>p</i> -value 0.142. Hausman test: GLS estimates are consistent; Chi-square (12) = 1.408, <i>p</i> -value 0.999	1) Breusch-Pagan test: Unit-specific error variance = 0; Chi-square (1) = 1.580; <i>p</i> -value 0.0208; Hausman test: GLS estimates are consistent; Chi-square (13) = 12.898, <i>p</i> -value 0.455		

Source: Authors' computation. Note: \*\*\*(\*\*)\* means significant at 1% (5%) 10%. Robust (HAC) standard errors were used in weighted least squares and fixed effect estimations.

## (c) Small banks

Dependent variable: Lending interest rate

Independent variable	Model 4: Small banks						Average values of significant coefficients
	Weighted Least Squares		Fixed effect		Random effect		
	No Lag	1 Lag	No Lag	1 Lag	No Lag	1 Lag	
const	20.127**	30.094*	42.013**	-40.791	29.771*	9.514	
il		0.099		0.138		0.154	
id	0.019	0.581**	-0.233	-0.444	0.021	0.732	0.581
ras	0.123	-0.428	0.073	-1.228**	0.181	-0.716	0.228
opcr	0.315***	-0.360**	0.237*	-0.297	0.335***	-0.353	0.312
nplr	-0.081***	0.064	-0.137***	0.445*	-0.109**	0.184	0.070
siz	-0.931	-11.400***	0.067	2.384	-1.778	-9.747*	
liqr	-0.035	-0.239***	-0.058	-0.211	-0.040	-0.248*	-0.239
provrr	-0.032	-0.420**	-0.030	-2.020**	-0.024	-0.588*	-1.009
smr	-1.220***	1.273	-1.832*	1.704	-2.015***	3.018	-1.850
rgdp	0.541	-1.036*	-1.187	4.168	-0.175	-0.707	-1.036
infl	-0.164	0.099	-0.451*	0.718	-0.175	0.226	-0.451
itbl	0.100	-0.111	0.080	-0.118	0.090	0.111	
HHI_AS	0.003	-0.009	0.005	0.020	0.007	-0.014	0.020
Adj R <sup>2</sup>	0.309	0.473					
F-stastic	6.749***	5.628***	F(12, 39) = 2.764***	F(13, 37) = 6.082***			
Null hypothesis			Groups common intercept: Welch F(39, 33.4) = 0.794; <i>p</i> -value = 0.756	Groups common intercept: Welch F(37, 24.8) = 1.125; <i>p</i> -value = 0.384	1) Breusch-Pagan test: Unit-specific error variance = 0; Chi-square (1) = 0.083, <i>p</i> -value 0.772. Hausman test: GLS estimates are consistent; Chi-square (12) = 26.392, <i>p</i> -value 0.009	1) Breusch-Pagan test: Unit-specific error variance = 0; Chi-square (1) = 1.383 <i>p</i> -value 0.239; Hausman test: GLS estimates are consistent; Chi-square (13) = 58.712, <i>p</i> -value 0.000	

Source: Authors' computation. Note: \*\*\*(\*\*)\* means significant at 1% (5%) 10%. Robust (HAC) standard errors were used in weighted least squares and fixed effect estimations.

## (d) Medium size banks

Dependent variable: Lending interest rate

Independent variable	Model 5: Medium size banks				Average values of significant coefficients
	Weighted Least Squares		Fixed effect		
	No Lag	1 Lag	No Lag	1 Lag	
const	-11.5933	37.418***	-4.7781	35.098*	
il		-0.190*		-0.181	-0.190
id	0.434***	0.350	0.528**	0.438*	0.467
ras	0.641***	0.157	0.801	0.116	0.641
opcr	1.651***	-0.548	1.588***	-0.522	1.620

**Continued**

nplr	0.054	-0.031	0.061	-0.036	
siz	2.378***	-3.410***	2.016*	-3.851*	-0.717
liqr	-0.024	-0.095*	-0.076	-0.097	-0.095
provr	0.301*	0.027	0.331	-0.024	
smr	-0.830*	0.056	-1.229**	-0.303	-1.030
rgdp	-0.645	-0.505	-0.543	-0.298	
infl	-0.147	-0.239	-0.139	-0.106	
itbl	-0.015	-0.483***	-0.056	-0.421***	-0.452
HHI_AS	0.024***	-0.002	0.021**	0.001	0.023
Adj R <sup>2</sup>	0.307	0.143			
F-stastic	4.930***	2.005**	F(12, 11) = 1.789***		
Null hypothesis			Groups common intercept: Welch F(11, 36.8) = 0.574; p-value = 0.836	Groups common intercept: Welch F(11, 24.8) = 0.796; p-value = 0.641	

Source: Authors' computation. Note: \*\*\*(\*\*)\* means significant at 1% (5%) 10%. Robust (HAC) standard errors were used in weighted least squares and fixed effect estimations.

(e) Large banks

**Dependent variable: Lending interest rate**

Independent variable	Model 6: Large banks				Average values of significant coefficients
	Weighted Least Squares		Fixed effect		
	No Lag	1 Lag	No Lag	1 Lag	
const	-8.176	37.394***	-7.120	44.615***	
il		0.277**		0.336**	0.307
id	0.220	-0.578***	0.214**	-0.664***	-0.343
ras	-0.404	0.353	-0.348	0.151	0.641
opcr	0.923***	-0.206	0.963***	-0.458	0.943
nplr	0.123	0.156	0.145	0.232**	0.232
siz	0.222**	-0.015	0.223***	0.009	0.223
liqr	0.117***	-0.069	0.117***	-0.065	0.117
provr	-0.049	0.024	-0.101	-0.164	
smr	-1.010*	0.680	-0.993*	0.837	-1.002
rgdp	-0.082	-1.895*	-0.174	-2.447***	-2.171
infl	0.028	-0.335	0.033	-0.364**	-0.364
itbl	0.091	-0.257*	0.086	-0.246	-0.257
HHI_AS	0.020***	-0.010	0.019*	-0.013**	0.009
Adj R <sup>2</sup>	0.419	0.188			
F-stastic	6.535***	2.496***			
Null hypothesis			Groups common intercept: Welch F(7, 36.0) = 0.309; p-value = 0.944	Groups common intercept: Welch F(7, 32.5) = 0.796; p-value = 0.680	

Source: Authors' computation. Note: \*\*\*(\*\*)\* means significant at 1% (5%) 10%. Robust (HAC) standard errors were used in weighted least squares and fixed effect estimations.