Final report

Exploring the determinants of interest rate spreads in the Uganda banking system

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When citing this paper, please use the title and the following reference number:
S-43434-UGA-1

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Abstract

Interest spreads in Uganda have been persistently high over the last two decades. This paper aims to complement the literature by investigating the determinants of interest rate spreads in Uganda, following the period after the adoption of Inflation Targeting, using three different approaches: first, a cross country comparison with regional peers, second, a decomposition of interest rates spreads in Uganda and third, a panel data analysis using system generalized method of moments (GMM). A consistent result from each of our analytical approaches is that overhead costs are positively and significantly related with bank spreads. Other important variables in explaining bank spreads include the return on assets, Herfindahl index, non-performing loans, economic growth, the exchange rate and the interest rate. The results have important implications for economic policy: singling out the need for a reduction in overhead costs which needs to complemented with increased bank competition. Other policy measures that could facilitate a lowering of spreads include: a reduction in domestic government borrowing and a lowering of the sector's non-performing loans through better credit risk assessment.

JEL Classification: E43; E44; G21

Keywords: Interest rate spread; Lending rates; Banking sector; Bank Profitability; Uganda

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1. Introduction

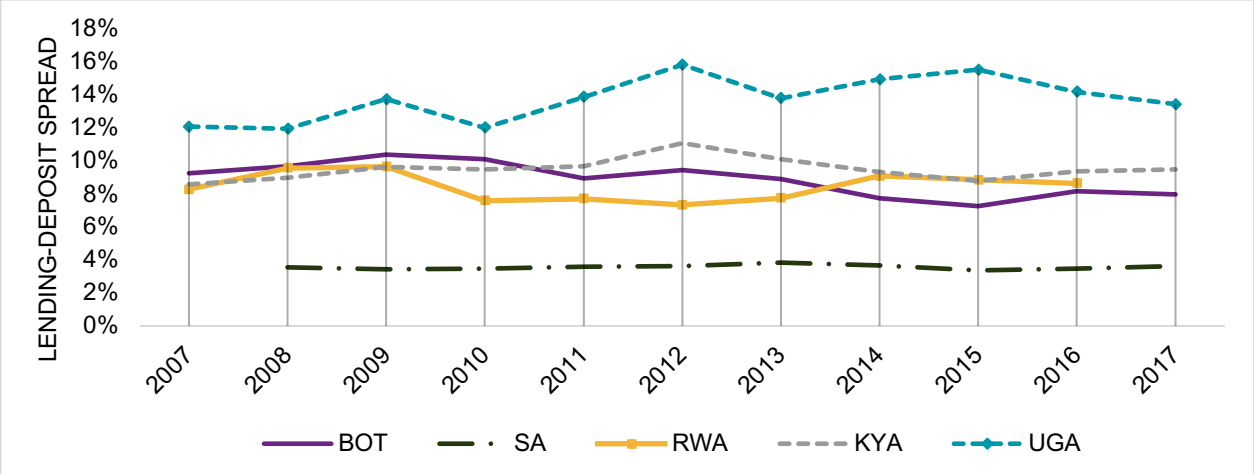
Interest rate spreads are a crucial indicator of financial sector development because they signify the level of efficiency in financial intermediation which is crucial for productive investment and consumption-both of which are key drivers of economic growth. High interest spreads may reflect inefficiencies in the intermediation role played by the banking sector, as the wedge between the interest rate paid to savers and the interest rate charged to borrowers is driven up by market frictions such as transaction costs and information asymmetries or, an uncompetitive market structure. Indeed, the level of commercial bank lending rates has long been of concern in Uganda, and is frequently mentioned as one of the factors holding back investment (particularly private sector-led investment) and economic growth. The Ugandan commercial bank weighted average lending rates have been relatively high at an average of 20 percent in the last two decades while, the weighted average deposit rate rates have on average been 5 percent, resulting into an average of 15 percent per annum of interest rate spreads in the same period. A key policy concern for Uganda is that widening spreads and high lending rates may reflect abnormal profits, perhaps due to limited competition in the sector.

Since the early 1990s the country has undertaken a number of financial sector reforms including liberalization and broadening of the financial sector with one of the key expected outcomes being– increased competition and a narrowing of spreads. Additional measures that have been adopted in the last decade, such as establishment of credit reference bureaus; enforcing disclosure of interest rates and other bank charges; developing financial consumer protection guidelines and holding financial literacy campaigns, have not yielded tangible results yet. Interest rate spreads in Uganda have not changed significantly and remain relatively high in comparison to regional peers *(Figure 1*).

Apart from the financial sector reforms mentioned above, a more recent reform that *ex-ant*e would be expected to have influenced the evolution of lending rates over the last few years, is the Central Bank's move to a price-based monetary policy regime: In July 2011, the Bank of Uganda replaced its '*Monetary Targeting Framework*' (MTF) which had been the basis for conducting monetary policy since the 1990s, with '*Inflation Targeting Lit*e' (ITL). Under the MTF, the bank regulated liquidity of banks and left the market to determine the interest rates. However, under the ITL framework, the bank sets a policy interest rate (the Central Bank Rate – CBR) which is set to

influence the 7-day interbank interest rate, that is, the rate at which commercial banks grant credit to each other which consequently affects liquidity in the banking system. According to Mugume and Namanya (2014) the primary reason for abandoning the MTF was the rise of financial market innovations, which made the relationship between base money (the target) and inflation (the policy goal) unstable and less predictable. In addition, the desire for a more forward-looking policy response, given the long and variable lags between changes in base money and their impact on the policy goal (namely inflation and income), led the BOU to consider an alternative monetary policy framework. The change to inflation targeting would be expected to influence lending rates and interest spreads through various channels of the monetary policy transmission mechanism (e.g. the interest rate channel, bank lending and capital channel, etc.)

Figure 1: Regional Interest Rate Spreads



In spite of the prevailing high interest rate environment and its adverse impact on growth, evidence on the behavior, pricing, and efficiency of banks in Uganda is scanty. The few studies such as such as Hauner and Peiris (2005), Mugume (2007), Nampewo (2012) and (Mugume and Rubatsimbira (2019) that investigate interest rate spreads either considered the period prior to 2006, are largely descriptive or employ only time series methods. Therefore, important information that would have been captured using panel data methods is missed. To the best of our knowledge, Beck and Hesse (2012) is the only study on Uganda that employs panel data methods to investigate why interest rate spreads are high in Uganda. However, their study was undertaken in the pre-inflation targeting era.

Our study complements previous studies by investigating the determinants of Ugandan interest rate spreads after inflation targeting in three ways. First, cross country comparisons of interest rate spreads in the Eastern and Southern Africa are made. Secondly, an analysis on the decomposition of interest rates spreads is employed based on commercial banks' income statements and balance sheets. Lastly, following Beck and Hess (2012) a panel data analysis of the determinants of interest rates is employed using the generalized method of moments (GMM) based on the Arellano-Bover/Blundell-Bond estimator which addresses the problem of endogeneity and uses lagged values as instruments. This study, unlike existing work on Uganda, adds to the literature of interest rates spreads by employing an in depth analysis to the period after Uganda's adoption of the Inflation Targeting Lite framework (2011-2018) and compares the determinants of interest rate spreads in this period to the ones under the Monetary Targeting framework.

The rest of the paper is structured as follows: Section 2 provides an exploratory analysis based on a regional comparison of the likely drivers of spreads in Uganda and other Eastern and Southern Africa countries. Section 3 covers a survey of the existing literature on the determinants of interest spreads, followed thereafter by a decomposition analysis of spreads in Uganda in Section 4. The empirical data and methodology, is outlined in Section 5. Section 6 discusses the empirical results from the econometric model while Section 7 concludes and outlines key policy implications.

2. Cross country comparisons in Eastern and Southern Africa

We start off our study with an analysis of the key variables that are likely to influence interest rates spreads, such as: lending rates, bank profitability, bank capitalization, bank assets, bank operating costs and government bond yields of the Ugandan banking system and a selected number of Southern and Eastern African countries. These include, Uganda (UGA); Kenya (KEN); Tanzania (TZ); Rwanda (RWA); Zambia (ZAM); Botswana (BOT) and South Africa (SA).

Interest rate spreads tend to closely follow the behavior of lending rates, especially in a low deposit-rate environment. Lending rates in Uganda (as measured by the average return on advances) were considerably higher than regional peers during much of the period 2009-18. This contrasts with general global trends of lower interest rates since the global financial crisis, which is apparent in some countries in the sample (notably BOT and SA). Uganda's lending rates have also been consistently high in real terms. Figure 2 depicts the bank lending rates for a number of countries in the region. Another important variable in understanding interest rate spreads is bank

profitability. A key policy concern for Uganda is that widening spreads and high lending rates may reflect abnormal profits, perhaps due to limited competition in the sector. Analyzing the trend of the sector's – return on assets (a key measure of bank profitability1) indicates that over the period 2008-18 Uganda has had the second highest RoA at 3.7%, after Kenya (4.1%).

An alternative measure of profitability is return on equity – RoE, which is more relevant from the perspective of the owners of banks, as it reflects the return that they earn on capital invested. If there is a degree of market (oligopoly) power in the sector, it should show up as a relatively high return on equity. Data for Uganda suggests that in terms of return on equity, profitability in Uganda is not particularly high, and has actually declined over the decade 2008-18 (See Figure 3).

The contrast between the two measures of profitability - high return on assets and low return on equity - implies that capitalization is high. The return generated by banking assets is spread across a relatively high level of capital, hence bringing down the return on equity. Thus, bank capitalization plays a major role in explaining interest rate spreads. Indeed, data for Uganda shows that the level of capital (as a percentage of total liabilities) is amongst the highest of the sampled countries. Bank capital is expensive; providers of capital generally require a higher return than the suppliers of other types of liabilities, such as deposits or loans. A possible explanation for Uganda's persistently high spreads could therefore be the need for banks to provide a return on capital, not because profitability is high, but because the amount of capital utilized is high (Figure 4). It may therefore be that Uganda's banks are over-capitalized. In fact, other data and literature such as Mugume et al. (2009) suggests that the ratio of capital to risk-weighted assets is well above the regulatory minimum. Owing to high capitalization, deposits make up a relatively low proportion of Uganda's banking sector liabilities.

Besides the liability structure of bank balance sheets, we also consider the composition of bank assets as a determinant of the high interest spreads in Uganda. The main assets held by banks are advances (loans) and securities (such as government bills and bonds). The choice of assets held by banks depends on risk-adjusted returns, regulatory requirements (such as liquid asset ratios) and prudential needs (also related to liquidity). The data depicted in Figure 5 reveals that, relative to

[1] ROA reflects the return generated from the assets held by the entire banking sector

regional peers, the level of bank advances (as a proportion of assets) for Uganda's banking sector is low while holdings of government securities are high.

High interest spreads could also be driven by high operational and administrative costs. A comparison of cost-to-income ratios across SADC and EAC banks shows that costs for Uganda banks are in the range of 50%-60% of income, which is high, but not out of line with other countries (Figure 6).

Government bond and Treasury bill rates also play a major role in explaining interest rate spreads. Government bonds and bills are risk-free assets, and their interest rates provide a floor for bank lending rates (on riskier advances), independently of the cost of deposits. High government bill/bond rates can therefore lead to high spreads (relative to the cost of deposits) and a preference for government bonds relative to risky lending. As depicted in Figure 7, government bond rates in Uganda are exceptionally high. Whereas real government bond yields in SADC and the EAC tend to cluster in the range of 0-5%, Uganda's real bond yields have exhibited a consistently upward trend and range over 10%, thereby providing a strong incentive for banks to hold government bonds, given their risk-return profiles.

In summary, the explanatory analysis above highlights two key factors that may be driving Uganda's persistently high spreads: first is the overcapitalization of banks, which requires a high return on assets (RoA) in order to generate an adequate return on equity capital (RoE). The second is the level of holdings of high-yielding government securities, which in turn lead to a high benchmark risk-free rate for lending and a low loan-to-deposit ratio. Possible explanations for Uganda's high spreads can therefore be found on both the assets and liabilities side of the banking sector's balance sheet.

Figure 2: Bank lending rates

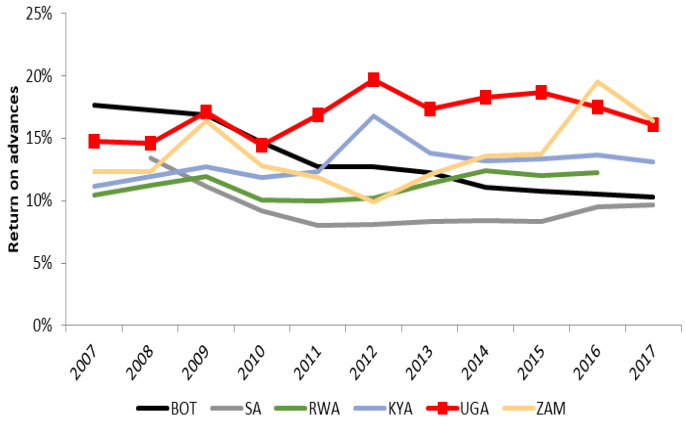


Figure 3: Bank profitability (ROE before tax)

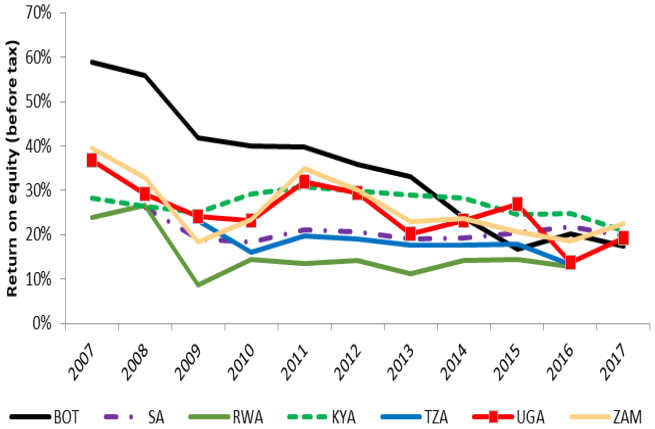


Figure 4: Bank capitalization (capital % of liabilities)

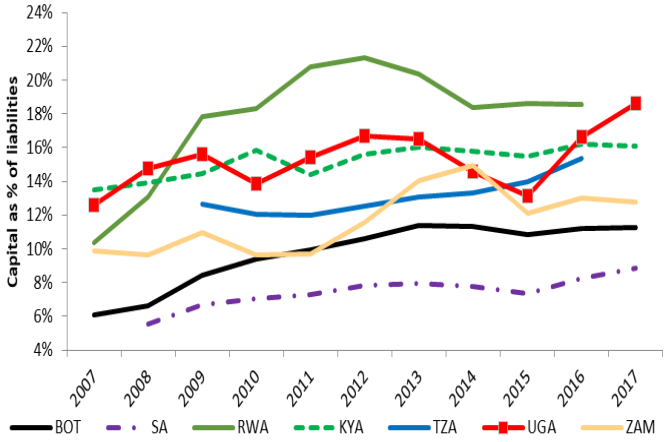


Figure 5: Bank advances (as percent of assets)

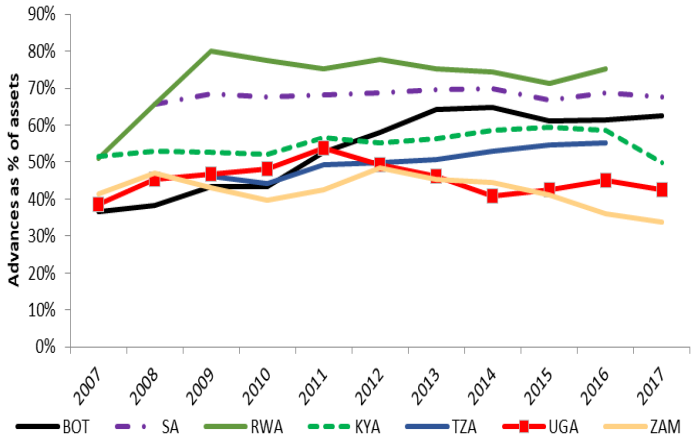


Figure 6: Cost-to-income ratios

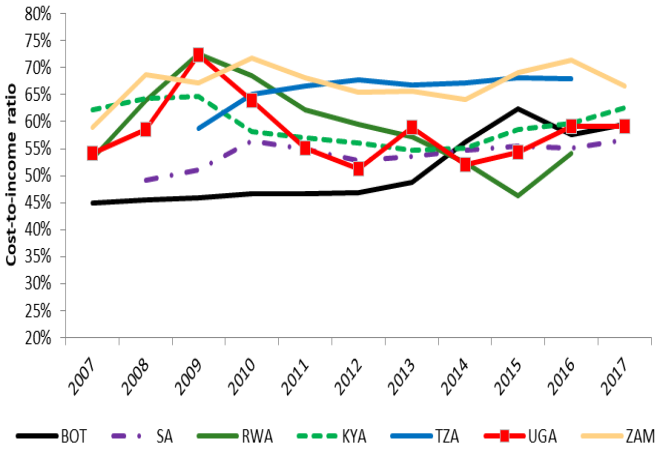
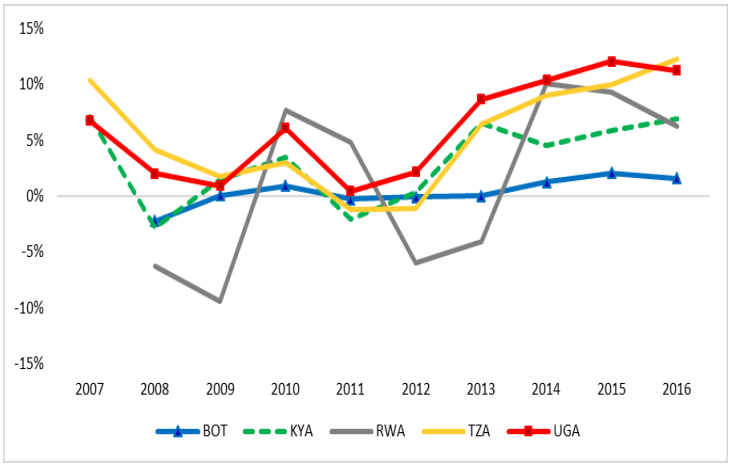


Figure 7: Real government bond yields



3. Literature Review

Interest rate spreads have been researched widely, for example Demirgüç-Kunt and Huizinga (1999) and Garza-García (2010) investigate interest rate spreads in both developing and advanced economies while Ahokpossi (2013) studies bank margins in Sub-Saharan Africa. In addition, there are a number of case studies including Rebei (2014) who studies interest rate spreads in Solomon Islands and Beck and Hesse (2006) who investigates why interest rate spreads are high in Uganda. Indeed, the issue of debate has mainly focused on the reasons as to why interest rate spreads are high. There are several schools of thought, but most studies focus on mainly four categories of the determinants of interest rates spreads. These include Bank-Specific characteristics, macroeconomic variables, regulatory environment and market structure (Ahokpossi, 2013 and Rebei, 2014). However other studies such as Demirgüç-Kunt and Huizinga (1999) include the financial struture and taxation variables.

Bank specific variables likely to influence variation in the level of the interest rate spreads or margins include *overhead costs* which capture the transaction costs incurred by banks in playing their intermediary role between borrowers and savers. These overhead costs contain an important fixed cost element, which as theory suggests can create a significant barrier to entry. A priori, it would be expected that smaller banks, for whom fixed overhead costs are more significant, would have higher spreads, or lower profitability. Another common explanatory variable in the literature is *Loan loss provisions* (or non-performing loans, NPLs) which measures the provisioning for bad debts and would naturally influence the wedge between the lending and deposit rates. Information asymmetries and the inability of banks to fully diversify their risk would create a risk premium, which results in the lending rate being higher than that needed to cover the marginal cost of funds plus the transaction costs (Beck and Hesse, 2006). Consistent with this, some previous authors have found that sectors with a high risk premium (e.g. agriculture), tend to have higher ex-ante interest spreads. Other bank specific variables that have been commonly used to explain the variation in interest spreads and margins include banks' *liquidity ratio or liquidity risk*, defined as a bank's liquid assets relative to short-term liabilities[2] the *return on assets (ROA),* and the ratio of profits to total capital which is used to reflect bank profitability (return on equity).

[2] Note that the liquidity ratio or liquidity differs from regulatory liquidity requirement (i.e. the statutory level of liquid assets that banks are required to maintain)

According to Beck and Hesse (2006), the bank-specific characteristics that affect the interest rate spreads or margins in Uganda include overhead costs, market share, foreign ownership, loan portfolio composition, non-performing loans, return on asset, loan loss provisions and the liquidity ratio. Their findings show that overhead costs and the extent of agricultural loan portfolios influence interest spreads with a positive and significant effect. Overhead costs are the main bank-specific characteristic explaining the variation in interest spreads and the larger the share of agricultural loans in total lending, the higher the spreads but the lower the margins. In contrast, the share of loans to government and mining, as well as banks' market shares negatively influence interest rate spreads. When regressed on margins, market share indicates a negative and significant affect. Return on Asset, loan loss provisions and the liquidity ratio are insignificant at 5% level as determinants of both margins and spreads. A study by Bwire (2017) also establishes overheads as a contributing factor to high interest rates while that by Nampewo (2012) indicates that non-performing loans have a positive impact on interest rate spreads and are significant in both the short run and long run.

The aforementioned findings on Uganda, regarding the correlation between bank characteristics and interest rate spreads, are consistent with the literature on other Sub-Saharan African (SSA) countries. Were and Wambua (2014) investigate the determinants of interest spreads in Kenya's banking sector and find that individual bank characteristics explain most of the variation in spreads. Specifically, they ascertain that bank size, credit risk and net interest income are positively related to interest rate spreads. In contrast to Beck and Hesse (2006), where the liquidity ratio and return on assets are found to be insignificant in explaining the variation in Uganda interest rate spreads, Were and Wambua (2014) establish that liquidity ratio is negatively related to interest rate spreads in Kenya while return on assets has a positive effect. These findings are supported by Njeri, Ombui and Kagiri (2015) who using primary data, find that credit risk, liquidity and return on assets significantly influence interest spreads in Kenya. Consistent with the findings on Uganda by Beck and Hesse (2006), Akinlo and Owoyemi (2012) find that in Nigeria, the ratio of staff remuneration, which is a component of overheads, to total assets ratio is positively related to interest rate spreads, and so is the average of loans to total assets ratio. Similarly, in Malawi, Chirwa and Mlachila (2004) determine that provision for doubtful debts to total loans and the ratio of operating costs to total assets lead to higher interest rate spreads while Ahokpossi (2013), using a cross-country sample of 456 banks in 41 sub-Saharan African (SSA) countries, finds that bank-specific factors

such as credit risk, bank equity and bank's liquidity risk (measured as the ratio of liquid assets to total deposits and short-term funding) are important in explaining the variation in interest rate margins.

Beyond Sub Saharan Africa, the relationship between bank characteristics and interest rate spreads is not any different in emerging and advanced countries. Afanasieff et. al (2002) establish that high default levels and high operating costs are the main drivers of interest rates spreads in Brazil. Similarly, a study by Afzal and Mirza (2010) on Pakistan finds operational efficiency, asset quality, liquidity, risk absorption capacity important determinants of banking spreads, while interest rate volatility was insignificant and the loan concentration was found to be irrelevant for the sample period. However, deposit market share exhibited a negative relationship with spreads. Maudos and Fernandez de Guevara (2004) determine that market power, unit operating costs, credit risk, bank's degree of risk aversion, covariance between credit risk and market risk, average size of operations, interest rate risk and opportunity cost of reserves are positive and significant drivers of interest rate margins in Germany, UK, France, Spain and Italy. Saunders and Schumacher (2000) conclude that bank capital asset ratios are highly significant and have a positive impact on interest margins.

The literature also often includes inflation, the exchange rate and a measure of economic activity such as Gross Domestic Product (GDP) as macroeconomic variables in determining interest rate spreads. However, the effect of macroeconomic variables on spreads is mixed. While Folawewo and Tennant (2008) and Afanasieff et al. (2002) conclude that macroeconomic variables are the most relevant for determining interest rate spreads, Were and Wambua (2014) find them to be insignificant. Beck and Hesse (2006) find the nominal exchange rate to be negatively and significantly correlated with interest spreads in Uganda, suggesting a widening spread in times of an appreciating Shilling. Crowley (2007), as well as Folawewo and Tennant (2008), find exchange rate volatility to be positively related with the interest spread, but insignificant at the 5% level in both studies. The more consistent result is the impact of inflation and a number of studies have proved inflation to be significant and positively related to spreads, see: Ahokpossi (2013), Njeri et al. (2015), Sheriff and Amoako (2014) and Chirwa and Mlachila (2004). According to Ahokpossi (2013), high inflation is often associated with higher interest rates spreads because commercial banks experience high bank costs that are passed on to the consumer as lending rates or the cost of borrowing rises.

The structure of the banking market, according to the literature, is also important in understanding interest rate spreads. In the case of Uganda, Hauner et al. (2005) and Demirgüç-Kunt and Huizinga (1999) show that foreign banks are more efficient than domestic banks. Similarly, Beck and Hesse (2006) establish that an increase in the share of foreign owned banks in the lending market and higher loan market concentration is associated with lower spreads, albeit the impact is of a smaller magnitude relative to other categories of the determinants. Furthermore, results by Demirguc-Kunt, Laeven and Levine (2004) show a positive and significant relationship between bank concentration and interest rate margins. However, an examination of literature on other developing countries indicates somewhat similar results. For example, Chirwa and Mlachila (2004), find there is no significant relationship between market concentration and interest rate spreads in Malawi. It is however still worth investigating, particularly for the case of Uganda, given that the lifting of the moratorium in 2007 ushered in new banks- majorly foreign-owned that led to a moderate reduction in market concentration.

The fourth category that is important in explaining interest rate spreads is the regulatory environment. This includes cash reserve requirements, regulatory capital and liquid assets, which are set by the regulatory authority as the required reserves, capital, and liquid assets respectively that banks are required to maintain in relation to a specified variable, such as deposits or risk-weighted assets. These regulatory instruments are expected a prior to have a positive relationship with spreads as they have implications for overall returns. For instance, banks may not earn any interest on cash reserves, or low returns on liquid assets, whereas regulatory capital is expensive. Indeed, Akinlo and Owoyemi (2012) confirm a positive relationship between cash reserve requirement and interest rate spreads in Nigeria while Saunders and Schumacher (2000) determine it for 7 OECD countries. However, according to the best of our knowledge, existing research on Uganda hardly captures this relationship. By including this measure therefore, our study would contribute to the literature on that aspect.

4. Decomposition of Commercial Bank Interest Rate Spreads in Uganda

In order to get a deeper understanding of the factors driving interest rate spreads in Uganda, we apply an accounting framework that decomposes spreads into their sub-components.

Interest rate spreads comprise of two major components: the lending rate and the deposit rate. However, there are other constituents of lending and deposit rates that consequently make up interest rate spreads. To decompose spreads into the various components, we make use of the interest income and expenditure database compiled from the consolidated income statements and balance sheets of commercial banks in Uganda.

We derive an implied/ex-post lending rate as the interest received on loans and advances in the year divided by the stock of outstanding loans and advances at the end of that year. Similarly, the implied/ex-post deposit rate is derived by dividing total interest expenses in the year by the stock of total deposits outstanding at the end of the year. We then take the difference between the ex-post lending and deposit rate as a measure of the realized interest spread.

In addition to the conventional derivation of interest rate spreads, we consider bank characteristics and the regulatory environment that banks operate in. As highlighted in the literature, operating costs, loan loss provisions and profitability are major representatives of internal bank characteristics while statutory reserves are reflective of the regulatory environment. We also consider taxes on intermediation paid by the bank to the Government as a component of the spread.

Operational costs include overheads-personnel and administrative expenses which we derive as costs of salaries, wages, other staff-related expenses, premises, depreciation, transport and other expenses. A significant proportion, but not all, of these costs are associated with deposit mobilization and loan monitoring, evaluation and recovery[3]. We assume that costs associated with financial intermediation are proportional to the ratio of Net Interest Income to Total Income (Net Interest plus Non-interest Income). Loan loss provisions include provisioning for bad debts while taxes include corporation tax on financial intermediation. Likewise, we apply the assumption on overheads to taxes to achieve taxes on account of intermediation. The imputed cost of holding statutory reserves are represented by the opportunity cost, derived as the product of the yield on the 364-day Treasury bill and commercial bank's balances held at the central bank.

Our assumption of applying a ratio that captures intermediation expenses on overheads and taxes each year is guided by the fact that a portion of each of these two items is attributable to non-

[3] Some of the banks' operational expenses are associated with the costs of providing fee-earning services such as foreign exchange and payments and are therefore unrelated to its financial intermediation role.

intermediation operations. A 3-year moving average of the ratio is used. Consequently, net profit after tax is taken as a residual with the decomposition represented as follows:

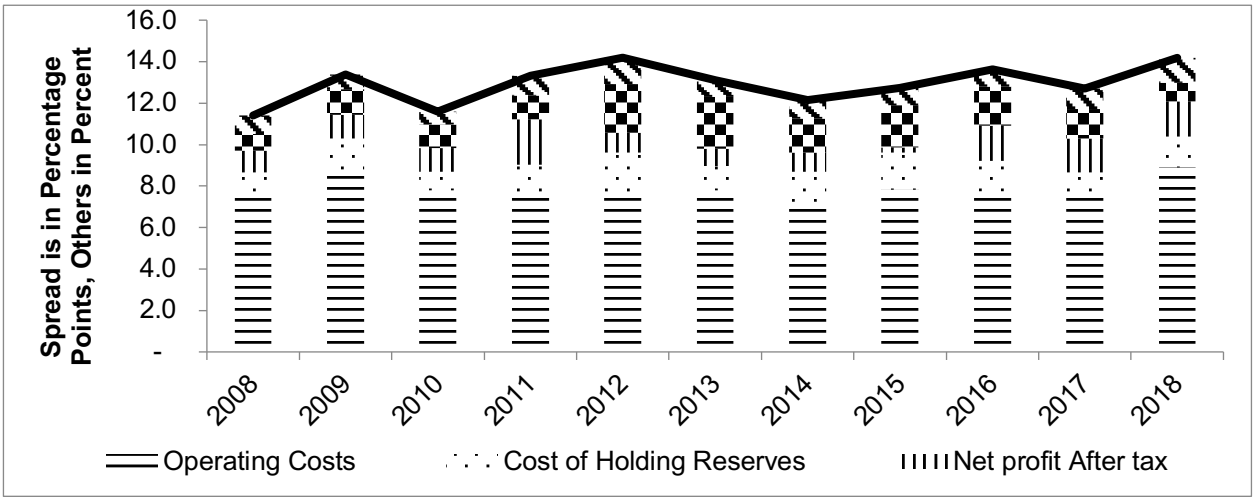
$$Spread\ less\ Operating\ costs\ on\ account\ of\ intermediation\ less\ Provisions\ for\ bad\ loans$$

$$less\ Opportunity\ costs\ of\ reserves\ less\ Corporation\ Tax(share)$$
$$= Net\ Profit\ fter\ Tax\ (NPAT)$$

The decomposition of interest rate spreads presented in *Figure 8* shows that spreads in Uganda have remained at a relatively high rate of over 13 percent per annum over the last decade, and that the composition has remained fairly stable over the same period. Spreads averaged 12.4 percent and 13.2 percent during 2008-2011 and 2012-2018 respectively.

Operating costs are by far the largest component of interest spreads - accounting for more than half of the overall spread – with an average contribution of 61 percent during 2008-2018. This is consistent with previous findings (Hauner, David; Peiris, Shanaka J, 2005). In absolute terms, operating costs range from 7.2 percentage points of spread in 2014 to 8.9 in 2018. Following operating costs, provisions for bad debt on average account for 12 percent during 2008-2018, while the average cost of statutory reserves is 11 percent. Taxes on average accounted for 7 percent of the interest rate spread during the period 2008-2018 while profits (NPAT) contributed 10 percent. While operating costs averaged 7.8 percentage points over the period 2008-18, there have been important changes over time. When the overall period is divided into two parts, with the split coinciding with the adoption of the Inflation targeting monetary policy framework, we observe, an increase in provisions for bad debt and the opportunity cost of holding reserves during 2012-18 as compared to 2008-11, which may have negatively affected banks' profitability, as indicated in *Table 1*.

Figure 8: Interest Rate Spreads of Commercial Banks, 2008 – 2018



Source: Commercial Banks' Income Statements, Calculations by Authors

Table 1: Decomposition of interest rate spread, 2008-2018

	2008-18		2008-11		2012-18	
	Percentage points	% Share	Percentage points	% Share	Percentage points	% Share
Tax	0.9	7.1%	0.8	6.5%	1.0	7.4%
Net profit after tax	1.2	9.5%	1.4	11.1%	1.1	8.5%
Loan loss provisions	1.5	11.8%	1.1	8.5%	1.8	13.7%
Operating costs	7.8	60.6%	7.8	63.2%	7.8	59.1%
Cost of reserves	1.4	11.0%	1.3	10.7%	1.5	11.3%
Spread	12.9	100.0%	12.4	100.0%	13.2	100.0%

Source: Calculations by Authors

We take into consideration banks' characteristics by decomposing interest rate spreads by size of bank; specifically, we categorize banks according to their asset size relative to the total assets of the banking industry. For purposes of this research, we categorize large banks as those that have a market share of at least 5 percent and small banks as those with less than 5 percent. The decomposition exercise as illustrated in Figure 9 indicates that banks with large assets charge higher spreads relative to those with smaller assets. While this is out of line with expectations, it could be explained by the composition in the categorization whereby large banks also include domestic/local banks and banks that have a wide rural branch network as well as those that mainly have many clients with small sized loans.

We therefore decompose bank spreads by ownership using the criteria, "domestic banks have more than 51 of shareholding by Ugandans and foreign banks, otherwise". The results as indicated in Figure 10 imply that domestic banks charge much higher spreads relative to their foreign counterparts. This is in line with expectations, as regional and international banks usually have a wider and cheaper pool of resources which they can draw from for onward lending.

We use operating efficiency which we proxy by the ratio of a bank's loans disbursed to the number of accounts it holds to decompose spreads of banks that have a wide branch network as well as those that mainly have many clients. Using a criteria of loan to number of accounts, "banks with small-sized loans are those with a ratio of less than one million Uganda shillings and banks with large sized loans have otherwise". The results in Figure 11 imply that banks with a loan to accounts ratio of less than 1 million charge much higher spreads than their counterparts with a ratio of at least 1 million.

In all the three scenarios described above, operating costs remains a significant proportion of interest rates spreads, accounting for 75 percent in small-asset-sized banks, 70 percent in domestic banks and 73 percent in banks with a loan to accounts ratio < 1 million. This result is in line with Mugume & Rubatsimbira (2019) who established that operating costs for banks with small-sized loans account for 71 percent of the intermediation margin during 2005-2017, much higher than those with big-sized loans, due to high costs of evaluation, monitoring and recovering small-sized loans, often to clients in dispersed areas with poor infrastructure and security conditions. Notably, operating costs for banks with a loan to accounts ratio < 1 million declined to 68.8 percent during 2012-2018, partly on account of shared platforms, although they remain higher than 58.4 percent observed for banks with a ratio > 1 million of during the same period. For the period 2008-2018, operating costs account for 56 percent in big-asset-sized banks, 60 percent in foreign banks and 57 percent in banks with a loan to accounts ratio > 1 million.

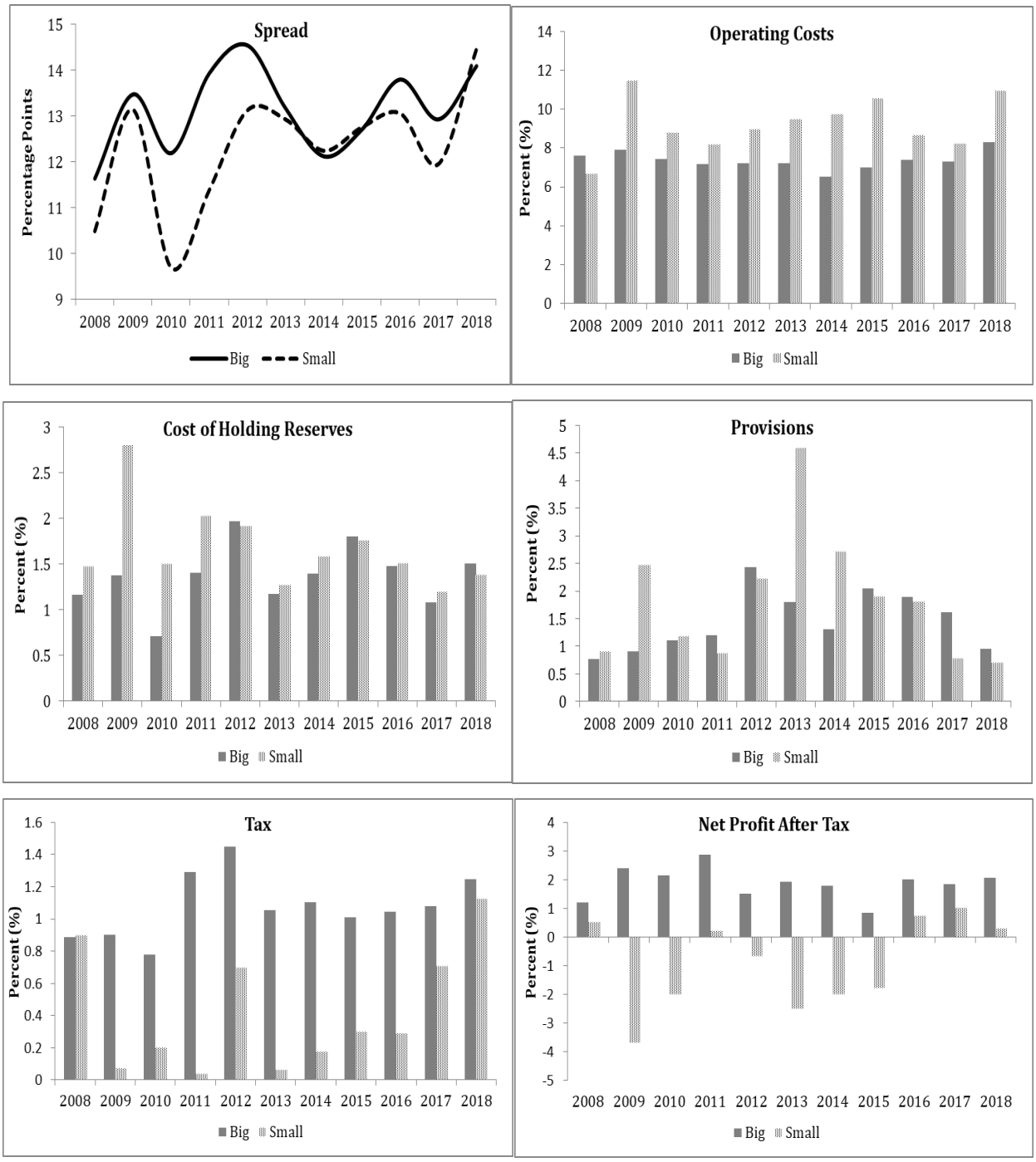
Generally, the contribution of provisions for loan losses to the spread is higher for big banks, foreign banks and banks with higher operation efficiency and is almost uniform across the categories during the last 2-3 years of the analysis period, probably reflecting the implementation of Basel III requirements. Notably, the contribution of provisions is much higher in 2009, 2013 and 2014 for small-asset-sized banks relative to their counter parts. While the cost of holding

reserve balances at the central bank has more or less the same contribution to the spread for small and big asset-sized banks, it is higher for foreign banks and banks with higher operation efficiency.

The results also indicate that big banks, domestic banks and banks with less operation efficiency have a higher contribution of taxes to the interest rate spread. The contribution of NPAT to the spread is higher for domestic banks relative to foreign banks. On the other hand, NPAT contribution is lower for banks with less operation efficiency relative to banks with a higher one. Notably, the contribution of NPAT to the spread has been negative for small-asset-sized banks over the period 2008-2015, for foreign banks in 2015 and for banks with higher operation efficiency in 2009-2010[4]. The negative contribution of NPAT to the spread during these periods despite total bank profits being positive implies that intermediation was not profitable in that year; profits were attributable to other banking activities, which were subsidizing intermediation. While NPAT has historically been a second major driver of interest rates spreads, provisioning for bad debts and cost of holding reserves have surpassed since 2012. This implies a shift in the drivers of spreads at that time from possibly weak competition to relatively higher credit risk and increased regulatory requirements.

[4] Our definition of NPAT is after deduction of the imputed cost of holding reserves, which is not deducted in the standard definition of NPAT; hence our starting point for NPAT is lower than in the normal calculation. Although total NPAT was positive during this time, it was much lower than in the other years, due to very high provisions, which are allocated in full to our NPAT calculation. The combination of the two factors - the cost of holding reserves and high provisions for bad debt - leads to a negative NPAT contribution to the spread.

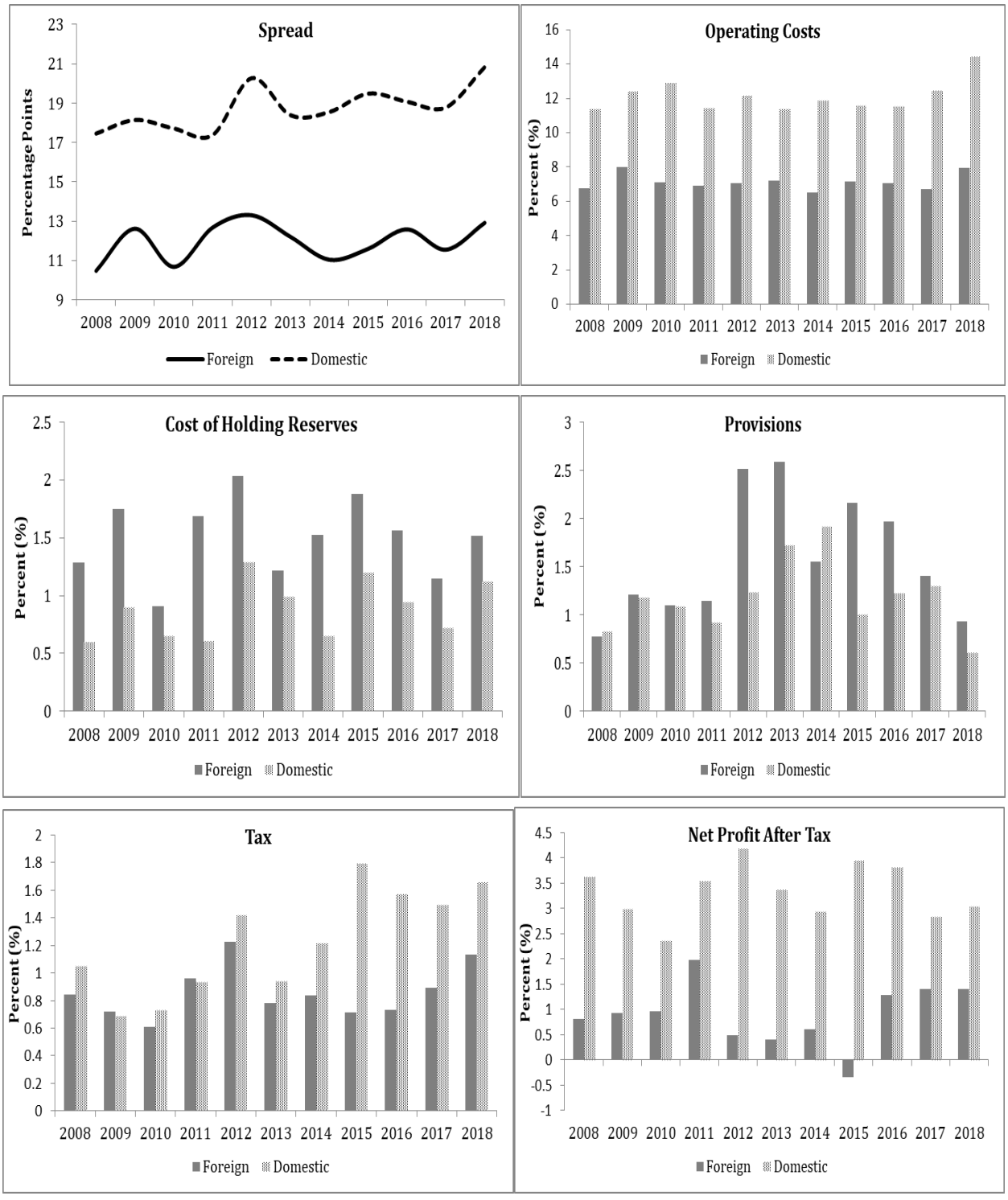
Figure 9: Decomposition of Bank Spreads according to Asset Size[5]



Source: Commercial Banks' Income Statements, Calculations by Authors and related tables are in the appendix

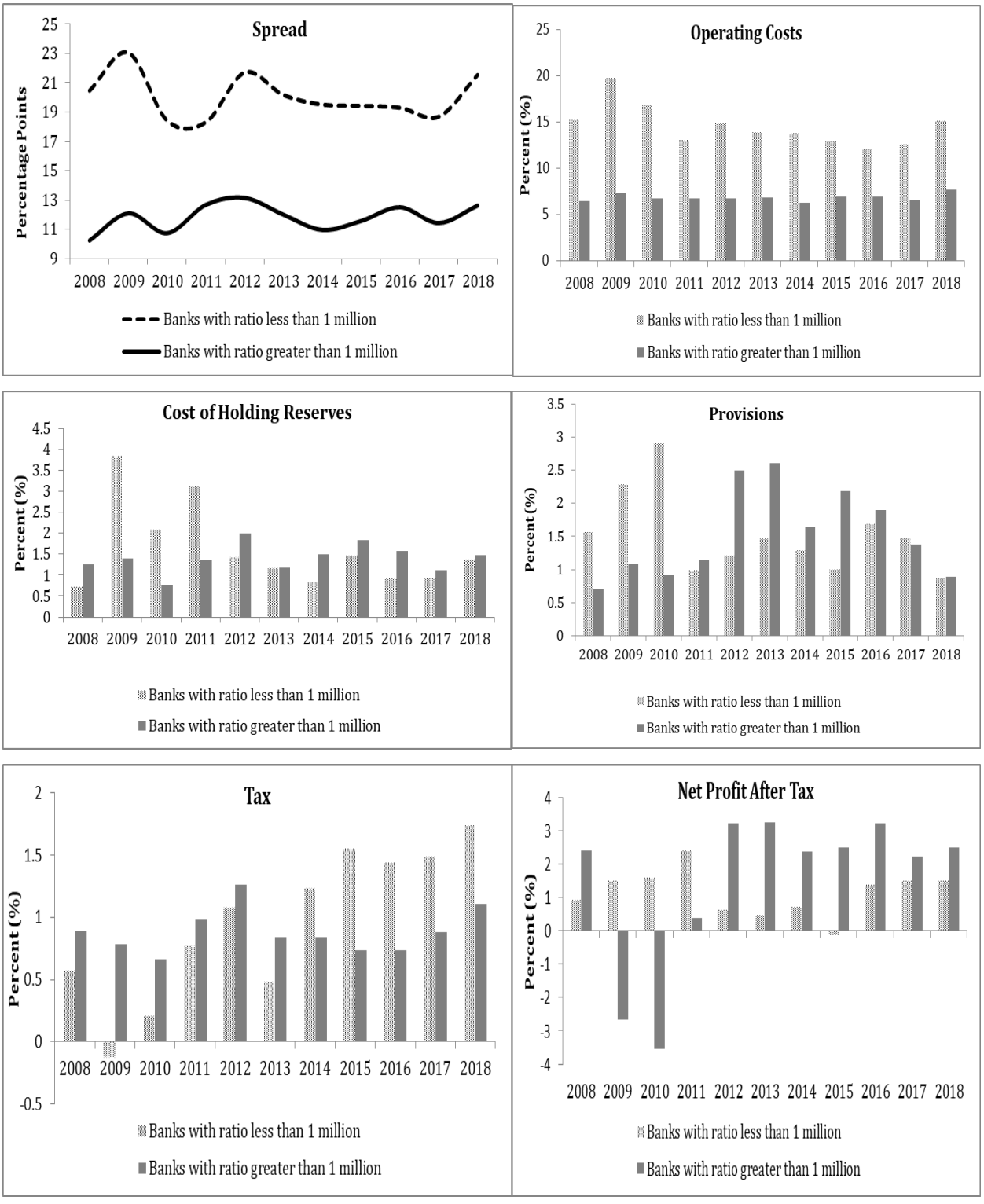
[5] Big refers to banks with a share>5% of total banks assets and small refers to those with an asset share of <5%

Figure 10: Decomposition of Bank Spreads according to Ownership



Source: Commercial Banks' Income Statements, Calculations by Authors and related tables are in the appendix

Figure 11: Decomposition of Bank Spreads according to Operation Efficiency



Source: Commercial Banks' Income Statements, Calculations by Authors and related tables are in the appendix

The decomposition of interest rate spreads of banks in Uganda shows that spreads remain relatively elevated, driven mainly by Operating costs. Profitability, Provisioning for bad debts, Opportunity Cost of holding reserves and Taxes also contribute to the spread albeit to a lesser extent than operating costs. There have been important changes over time, with operating costs accounting for a greater proportion of the spread in 2008-11 as compared to 2012-18. Similarly, the contributions of profits and reserve holding costs have fallen, while that of bad debts has risen. However, there are other factors like the macroeconomic and institutional environment that also affect spreads but cannot be captured by the simple accounting framework used in the decomposition. We therefore employ econometric analysis to the data so as to capture as many determinants of spreads as we possibly can.

5. Data and Methodology

5.1 Data Description

For the econometric analysis, we use annual bank data from balance sheet and income statements of 20 commercial banks in Uganda covering the period 2012 to 2018, provided by the Bank of Uganda. In addition, data on yields on Government securities is from the BOU website while the Consumer Price Index and Real Gross Domestic Product are obtained from the Uganda Bureau of Statistics (UBOS).

The dependent variable is the *spread* which is the difference between ex-ante contracted loan and deposit interest rates. Specifically, it is computed as the difference between the weighted average lending rate and the weighted average deposit rate for each bank per year. The weighted average lending rate for the year is a 12 month's average of a bank's monthly weighted lending rate. The weights for the monthly lending rate are based on new loans disbursed during the month including overdrafts. Similarly, the weighted average deposit rate for the year is a 12 month's average of the weighted deposit rate offered on time deposits per month. The weights of the deposit rate are based on new amounts of time deposits received during the month.

The independent variables include bank-specific characteristics which according to the literature are the main determinants of banks' interest rate spreads. These include operating costs, profitability and credit risk. We use overheads as a proxy for a bank's operating cost which we define as the cost of wages and other staff costs over total assets. Return on Asset (*ROA* defined as

net profits before tax over total assets for profitability and, NPL ratio, non-performing loans over total assets for credit risk. The summary statistics of the variables included in the model are presented in Table 2.

Table 2: Summary Statistics

	Count	Mean	Standard deviation	Minimum	Maximum
Dependent Variable					
Spread	131	0.11	0.03	0.10	0.20
Bank-Specific					
Overhead Costs	131	0.09	0.04	0.00	0.20
Return on Asset (ROA)	131	0.01	0.03	-0.10	0.10
Non- Performing Loans	131	2.65	2.03	0.00	10.60
Macro Variables					
Log of Real GDP	133	10.90	0.09	10.80	11.00
Real 91 Treasury Bill rate	133	0.07	0.03	-0.10	0.10
Log of Real Effective Exchange Rate	133	4.61	0.06	4.50	4.70
Market Structure					
Herfindahl_Index	133	8.72	0.72	7.70	9.80
Dummy Variables					
Foreign Bank Dummy	133	0.89	0.31	0.00	1.00

In addition to the bank characteristics, we include variables to control for the macroeconomic, market and institutional environment within which banks operate. We use real GDP, Real 91 Treasury Bill rate and real effective exchange rate as proxies of the economy while the Herfindahl index is used to proxy market structure. We also include a dummy variable to control for bank ownership.

5.2 Model

Following Beck and Hesse (2006), as depicted in Equation (1), we employ annual data and analyze the period after inflation targeting 2012-2018

$$\text{Spread}_{it} = \beta + \delta\text{Spread}_{i,t-1} + \alpha B_{it} + \gamma S_{it} + \theta M_t + \varepsilon_{it} \quad (1)$$

$i = 1,2,\ldots,N, \;\; t = 1,2,\ldots,T$

Where B_{it} represents the vector of bank specific variables including, overheads, return on assets, foreign bank dummy and non-performing loans, S_{it} is the vector of market structure variables such as the Herfindahl index, M_t is the vector of macroeconomic variables that are time variant but do not change across sectors and these include the change in the real GDP, the real effective exchange rate and the real 91 treasury bill rate. The bank of Uganda uses a price-based monetary policy framework – Inflation Targeting (IT) for monetary policy and while the central bank rate (CBR) is the policy rate used to signal to all other rates, the 91 T-bill rate is highly correlated with the CBR and therefore was considered as a proxy for the policy rate in the analysis. β represents the intercept while δ, α, γ and θ are coefficients of the respective variables. ε denotes the error term.

A priori expectations of the signs on the specified independent variables are presented in Table 3:

Table 3: Expected Signs of Explanatory Variables

Variable	Expected Sign	Rationale
Bank-specific variables		
Return on assets	+ ve/- ve	Measure of profitability. Profitable banks may charge lower interest rate spreads (e.g. if they benefit from economies of scale) or they may enjoy higher spreads and margins leading to higher profitability[6].
Overhead costs	+ ve	Higher overhead costs require higher spreads to generate the income to cover those costs
Foreign Bank Dummy	-ve	Foreign banks are more likely to have economies of scale; therefore, they are more likely to have lower lending rates than domestic banks. Therefore, the relationship between the foreign bank dummy and the spread is likely to be negative.
Non-Performing Loans(NPLs)	+ ve	NPLs (NPLs/Total assets) are expected to have a positive relationship with the spread. As non-performing loans increase, banks are more likely to increase the lending rates to protect themselves against defaulters.
Market structure		
Hirschmann-Herfindahl index	+ ve/ -ve	A more concentrated market is less competitive, and so spreads would be higher. However, this could be offset by greater efficiency/economies of scale from larger banks
Macroeconomic variables		

[6] (Beck and Hesse, 2006)

Real GDP growth	-ve/+ve	Higher growth reduces risks (e.g. default risk) and reduce spreads, however, higher growth could increase spreads through higher demand for credit.
Real Effective Exchange	-ve/+ve	A more depreciated real exchange rate could have either a positive or negative impact on the spread, depending on the source of the change. If it is the result of a depreciated nominal exchange rate (NEER), this could lead to a rise in inflation and in the central bank rate, when spreads tend to increase. But if REER depreciation is due to lower domestic inflation with a stable NEER, this would have the opposite impact.
Real 91Treasury Bill	+ve	Provides a benchmark for lending rates (risk-free rate) – opportunity cost of loanable funds

Several methods have been employed in analyzing interest rate spreads. While some literature considers cross country studies, most of the literature analyses country case studies investigating interest rate spreads at commercial bank level. Cross-country panel data studies use several methods in the literature such as the weighted least squares on pooled bank data used by Demirgüç-Kunt and Huizinga (1999), the generalized method of moments (GMM) dynamic panel data employed in Garza-García (2010)'s study and random effects method used by Ahokpossi (2013).

Although these studies all investigate several countries using bank level data, there are a number of country case studies that complement the cross-country studies and also employ several panel data estimation techniques. For example, Beck and Hesse (2006) use both pooled OLS and fixed effects models to analyze interest rates spreads in Uganda while Rebei (2014) investigates interest rate spreads in the Solomon Islands using the pooled estimated generalized least squares model (EGLS). Were and Wambua (2014) employ the fixed effects model when investigating interest rate spreads in Kenya. Similarly, Akinlo and Owoyemi et al (2012) employ a number of panel data methods including fixed effects, pooled OLS and Random effects to investigate interest rate spreads in Nigeria. While most studies in the literature employ panel data techniques to investigate interest rate spreads, there are a few studies such as Sheriff and Amoako (2014) that employ time series econometrics techniques. They investigate the determinants of interest rate spreads in Ghana using time series analysis and the Autoregressive distributed lag model (ARDL).

The Arellano and Bond generalized method of moments procedure has been widely used in studies that use dynamic panels similar to the one used in this analysis to solve the problem of endogeneity that other methods such as random effects, fixed effects methods and pooled OLS could not solve.

The Arellano and Bond estimation uses differencing to transform all regressors and employs the generalized method of moments which addresses the problem of endogeneity and uses lagged values as instruments (Rodman, 2009; Hansen 1982; and Arellano and Bond, 1991). Blundell and Bond(1998) however argued that the Arellano and Bond estimator performed poorely as lagged instruments were weak instruments for first difference variables specifically, those that followed a random walk or those with a short the time period (Jha 2019).

Given the lagged dependent variable, small time series and large cross section, this analysis employs the system generalized method of moments (GMM). The system GMM is based on the Arellano-Bover/Blundell-Bond estimator that enhances the Arellano-Bond estimator by including first differences of instrument variables that are uncorrelated with the fixed effects which improves efficiency by introducing additional instruments. In other words, it uses both the lagged and lagged differences as instruments (Roodman, 2009). This estimation procedure is also susceptible to tests for autocorrelation as lags are used in determining instruments. In addition, it is imperative to check for the validity of the instruments as the GMM assumes the instruments to be exogenous and this is often done using the Sargan/Hansen test where the null states that the instruments are jointly exogenous, or uncorrelated with the error term (Roodman,2009). In other words, the null hypothesis for the Sargan/Hansen test states that all restrictions of over identification are valid.

6. Empirical Results

The empirical results were based on systemGMM[7]. The results in Table 3 depict six equations which all indicate that the instruments are valid with no evidence of autocorrelation as we fail to reject the null for both the sargan test and the Arrelano and Bond AR(2) test for autocorrelation.

[7] Other methods that were employed include the Fixed Effects and Random effects that clearly showed the coefficients were biased due to the lagged dependent variable and the results were not as robust as System GMM.

The results in indicate that the lagged dependent variable, i.e the lagged spread is significant at a 1 percent level and positively related to the spread in all the equations. This result is expected and it conforms that indeed, the previous spread has a positive effect on the current spread.

Consistent with our decomposition analysis, overhead costs are not only positive but also statistically significant at a 1 percent level. This is consistent with our a priori expectations. The magnitude of the coefficient in all the equations could indicate that overhead costs are indeed a key explanatory variable in influencing bank spreads.

The Herfindahl index is positively related to the spread and significant at a 1 percent level, suggesting that market power and concentration have a positive influence on interest spreads in Uganda – consistent with the structure–conduct–performance (SCP) hypothesis. The SCP theory (Bain, 1951) assumes a direct link between industry structure and market performance, with a view that in a concentrated market, banks with market power will earn monopolistic profits by offering lower deposit rates and charging higher loan rates. However, the magnitude is small implying its effect on the spreads is minimal.

Table 4: Determinants of Interest Rate Spreads using System GMM

	(1)	(2)	(3)	(4)	(5)	(6)
Lagged spread	0.609***	0.618***	0.664***	0.692***	0.755***	0.736***
	(0.078)	(0.082)	(0.098)	(0.101)	(0.132)	(0.100)
Overhead Costs	0.210***	0.202***	0.193***	0.239***	0.219***	0.211***
	(0.067)	(0.066)	(0.053)	(0.055)	(0.058)	(0.067)
Herfindahl index	0.011***	0.010***	0.010***	0.010***	0.014**	0.017***
	(0.004)	(0.004)	(0.003)	(0.004)	(0.007)	(0.005)
Real GDP	0.068***	0.069***	0.073***	0.078***	0.040	
	(0.018)	(0.018)	(0.017)	(0.021)	(0.072)	
Real Effective Exchange Rate	-0.158***	-0.159***	-0.154***	-0.163***	-0.160***	-0.153***
	(0.036)	(0.036)	(0.033)	(0.037)	(0.043)	(0.041)
Foreign Bank Dummy		-0.009**	-0.007*			
		(0.003)	(0.004)			
Non-Performing Loans			0.002	0.003*	0.003	0.001
			(0.002)	(0.002)	(0.002)	(0.002)
Return on Assets				0.201**	0.158	0.136*
				(0.090)	(0.120)	(0.080)
91 Real Tbill					0.151	0.272***
					(0.228)	(0.067)
Constant	-0.080	-0.073	-0.146	-0.183	0.168	0.549***
	(0.207)	(0.208)	(0.203)	(0.214)	(0.647)	(0.177)

Hansen test	11.08	11.46	10.24	11.42	12.51	15.09
Arellano-Bond test AR(2)	-1.59	-1.60	-1.58	-1.51	-1.49	-1.51
N	130	130	130	130	130	130
Number of Banks	20	20	20	20	20	20

**p-value<0.10, **p-value<0.05, ***p-value<0.01 (.) represent the standard errors.*

GDP is significant at a 1 percent level and positive in the first four equations, but it becomes insignificant with the inclusion of the real interest rates. Well as, one would expect higher growth rates to reduce default risk therefore reduce spreads, higher growth could also lead to an increase in spreads. Increased economic activity can raise the demand for credit as projects that would otherwise have been unfeasible become profitable – in the presence of an inelastic credit supply, this increased credit demand would translate to higher lending margins.

The return on assets is positive and significant at a 5 percent level in equation 4 and at a 10 percent level in equation 6.[8] This positive relationship between spreads and RoA could signal profit maximizing behavior, whereby more profitable banks –owing to their market power – are benefitting from higher lending rates relative to their customer deposit rates. In addition, the positive impact of RoA lends credence to our initial hypothesis that the banking sector is over capitalized, creating incentive for banks to raise their interest margins/spreads in a bid to offset the high cost of capital.

When we control for foreign banks, the foreign bank dummy is negative and significant implying that foreign banks are more likely to have lower bank spreads due to their economies of scale. This is in line with our prior assumptions and consistent with the decomposition results.

The Treasury bill is only significant in equation (6) with the exclusion of GDP and the foreign bank dummy. The magnitude and sign are consistent with the interest spread literature implying that the higher the interest rates, the higher the spreads. In the case of Uganda, lending rates tend to respond faster to higher policy rate than to a lower policy rate.

The real effective exchange rate is expected to have a positive relationship with the spread because depreciation in the nominal exchange rate could pass through to inflation which would lead to a rise in interest rates. However, the results in Table (4) depict that the REER is significant at a 1

[8] The results were similar when we used RoE instead of RoA.

percent level and negatively related to the spread. This result is similar to the result of Beck and Hesse (2006) in respect of the nominal exchange rate. One possible explanation for the negative relationship could be that changes in the REER are driven more by changes in the inflation rate than by changes in the NEER. In this case, lower inflation would lead to REER depreciation (increase) but lower spreads as the general level of interest rates falls, and vice versa.

7. Conclusion and Policy Implications

This paper provides new insights on the key determinants of interest spreads in Uganda's banking sector by investigating the determinants of interest rate spreads, following the recent adoption of Inflation Targeting. The study takes on a three pronged empirical approach: first, we perform an explanatory analysis based on cross-country comparisons of the banking systems in Eastern and Southern Africa. We then supplement this with a decomposition of the interest spread based on bank's income statements and balance sheets and lastly an econometric analysis of banking system data using the system generalized method of moments (GMM).

In general, we see that concerns about relatively high spreads in Uganda are justified as the banking sector is characterized by relatively high lending rates in comparison to its regional peers. Our descriptive analysis also shows that government bond rates in Uganda are exceptionally high and have exhibited a consistent upward trend, incentivizing banks to hold government bonds in favour of riskier assets such as loans. Cross-country comparisons suggest that key contributors to the relatively high spreads in Uganda are (i) return on assets, (ii) the level of capitalization; (iii) overhead costs. This conclusion is based on the finding that for these variables, the values in Uganda are relatively high and there are plausible links to high spreads and lending rates.

The decomposition analysis identifies overheads (operating costs) as by far the largest contributor to the spread, followed by loan loss provisions. The contribution of both of these factors has increased in recent years. Other contributors (in order of importance) include the cost of holding statutory reserves, profits, and taxes.

In line with previous literature, our empirical results show that most of the variation in interest spreads is mainly driven by bank level characteristics including overhead costs and return on assets. However, macroeconomic variables such as the interest rate, exchange rate, and economic growth play a vital role in explaining interest rate spreads.

A consistent result from each of our analytical approaches is that overhead costs are positively and significantly related with bank spreads. Furthermore, our empirical findings show that one of the measures of bank profitability, return on assets (RoA), is a determinant of bank spreads. Amongst other bank-level characteristics, the regression analysis found that foreign-owned banks have lower spreads than domestically-owned ones. Perhaps surprisingly, the level of non-performing loans was only marginally significant in determining spreads.

Our proxy for the market structure of the banking sector (the Herfindahl-Hirschman Index) yields a significant and positive relationship with spreads. These findings indicate that after controlling for bank-specific and macroeconomic variables, a higher market concentration leads to higher spreads.

At the macro-economic level, we find that the impact of monetary policy as captured by the real Treasury Bill rate was positive. The growth of real GDP was also found to be positive and significant, indicating that banks can increase spreads when growth is strong, perhaps due to higher demand for credit. The real exchange rate was negatively related to the spread, perhaps reflecting the impact of lower inflation since the switch to the IT monetary policy regime.

A number of key policy implications flow from the analysis and results above. Firstly, encouraging competition: a more competitive banking sector would help to reduce spreads. This does not necessarily mean more banks – Uganda already has a large number of banks given the size of the economy – but encouraging the growth of smaller/medium sized banks to challenge the dominant, large players. Competition will also help to reduce higher than normal bank profitability. This could be done through encouraging the consolidation of smaller banks by increasing minimum capital requirements.

A second policy implication is that operational or overhead costs – for staff, property, IT, infrastructure etc. – are a major contributor to spreads, signaling operational inefficiency of the sector. This is in part due to duplication of infrastructure, and there should be exploration of ways in which infrastructure can be shared, to benefit from economies of scale. There should also be a transition away from branch-based banking to electronic platforms. The consolidation of smaller banks as suggested above, to encourage competition through the creation of medium-sized banks, would also have the benefit of facilitating economies of scale and reducing the duplication of

infrastructure across many small banks. The importance of overhead costs in determining spreads also suggests that there would be merit in examining whether regulatory requirements add unnecessary costs. For instance, is it cheap and simple to register collateral as security for loans, e.g. land titles, and do legal processes work when that security has to be called against bad debts? Improving legal processes so as to make it easier and quicker for banks to recover some value when loans are collateralized would help. A reduction in overhead costs of banks will help bring down the high lending rates and the spread.

A reduction in NPLs through better credit risk assessment should also narrow the gap between lending and deposit rates. More work is needed to explain the high capitalization rates of Ugandan banks, which is apparent in the comparative analysis, and leads to a high RoA which in turn leads to higher spreads. The BoU could examine its method of evaluating the strength of banks, to see whether it inadvertently cre4ates incentives for levels of capitalization over and above that required to meet normal capital adequacy requirements.

Finally, reducing government borrowing could help to reduce spreads, by leading to lower real government bond and treasury bill rates – and changing the incentive structure for banks to hold high yielding government paper in favor of riskier assets.

Looking further ahead, there could be benefits in encouraging greater competition through regional banking integration, in line with the broader plans of the East African Community (EAC). Full banking integration would allow banks licensed in one EAC member state to do business in another, on the basis of a single banking license; such "passporting" is the basis of regional banking integration in the European Union. While banks are licensed by their home regulator, there could be regionally agreed rules regarding the parameters for bank licensing (e.g. minimum capital requirements). This would be one way to quickly introduce more competition into the Ugandan banking sector, and would also provide growth opportunities (elsewhere in the EAC) for Ugandan banks.

4. Appendices

Appendix Table 1: Decomposition Results for All Banks

Period	Implied	Implied	Interest Rate Margin					
	Lending Rate	Deposit Rate	*Operating costs*	*Provisions*	*Cost of holding*	*Tax*	*Profit after Tax*	*Interest Margin*
2008	14.4	3.0	7.4	0.8	1.2	0.9	1.1	11.4
2009	16.6	3.2	8.6	1.2	1.7	0.7	1.2	13.4
2010	13.9	2.4	7.8	1.1	0.9	0.6	1.2	11.6
2011	16.1	2.8	7.5	1.1	1.6	1.0	2.2	13.3
2012	18.3	4.1	7.7	2.4	2.0	1.3	0.9	14.2
2013	16.5	3.4	7.8	2.5	1.2	0.8	0.8	13.1
2014	15.2	3.1	7.2	1.6	1.4	0.9	0.9	12.1
2015	15.7	3.0	7.8	2.0	1.8	0.9	0.3	12.7
2016	16.6	3.0	7.7	1.9	1.5	0.9	1.7	13.6
2017	15.3	2.6	7.6	1.4	1.1	1.0	1.6	12.7
2018	16.5	2.4	8.9	0.9	1.5	1.2	1.7	14.2

Appendix Table 2: Decomposition Results based on Asset size of Banks

Small-sized banks

Period	Implied Lending Rate	Implied Deposit Rate	Interest Rate Margin					
			Operating costs	*Provisions*	*Cost of holding*	*Tax*	*Profit after Tax*	*Interest Margin*
2008	14.4	3.9	6.7	0.9	1.5	0.9	0.5	10.5
2009	17.2	4.0	11.5	2.5	2.8	0.1	-3.7	13.1
2010	12.8	3.1	8.8	1.2	1.5	0.2	-2.0	9.7
2011	15.4	4.0	8.2	0.9	2.0	0.0	0.2	11.4
2012	18.3	5.2	9.0	2.2	1.9	0.7	-0.7	13.1
2013	17.1	4.2	9.5	4.6	1.3	0.1	-2.5	12.9
2014	15.6	3.3	9.8	2.7	1.6	0.2	-2.0	12.2
2015	15.4	2.6	10.6	1.9	1.8	0.3	-1.8	12.8
2016	15.8	2.7	8.7	1.8	1.5	0.3	0.8	13.1
2017	14.6	2.6	8.2	0.8	1.2	0.7	1.0	12.0
2018	17.1	2.6	10.9	0.7	1.4	1.1	0.3	14.5

Big-sized banks

Period	Implied Lending Rate	Implied Deposit Rate	Interest Rate Margin					
			Operating costs	*Provisions*	*Cost of holding*	*Tax*	*Profit after Tax*	*Interest Margin*
2008	14.3	2.7	7.6	0.8	1.2	0.9	1.2	11.6
2009	16.5	3.0	7.9	0.9	1.4	0.9	2.4	13.5
2010	14.3	2.1	7.4	1.1	0.7	0.8	2.2	12.2
2011	16.4	2.5	7.2	1.2	1.4	1.3	2.9	13.9
2012	18.3	3.7	7.2	2.4	2.0	1.5	1.5	14.5
2013	16.2	3.1	7.2	1.8	1.2	1.1	1.9	13.2
2014	15.1	3.0	6.5	1.3	1.4	1.1	1.8	12.1
2015	15.8	3.1	7.0	2.0	1.8	1.0	0.8	12.7
2016	16.8	3.0	7.4	1.9	1.5	1.0	2.0	13.8
2017	15.6	2.6	7.3	1.6	1.1	1.1	1.8	12.9
2018	16.4	2.3	8.3	1.0	1.5	1.2	2.1	14.1

Appendix Table 3: Decomposition Results based on Bank Ownership

Foreign-Banks

Period	Implied Lending Rate	Implied Deposit Rate	Interest Rate Margin					
			Operating costs	*Provisions*	*Cost of holding*	*Tax*	*Profit after Tax*	*Interest Margin*
2008	13.5	3.0	6.8	0.8	1.3	0.8	0.8	10.5
2009	15.9	3.2	8.0	1.2	1.7	0.7	0.9	12.6
2010	13.0	2.3	7.1	1.1	0.9	0.6	1.0	10.7
2011	15.5	2.8	6.9	1.1	1.7	1.0	2.0	12.7
2012	17.5	4.2	7.1	2.5	2.0	1.2	0.5	13.3
2013	15.7	3.5	7.2	2.6	1.2	0.8	0.4	12.2
2014	14.2	3.2	6.5	1.5	1.5	0.8	0.6	11.0
2015	14.7	3.1	7.2	2.2	1.9	0.7	-0.3	11.6
2016	15.6	3.0	7.0	2.0	1.6	0.7	1.3	12.6
2017	14.2	2.7	6.7	1.4	1.1	0.9	1.4	11.5
2018	15.3	2.3	7.9	0.9	1.5	1.1	1.4	12.9

Domestic Banks

Period	Implied Lending Rate	Implied Deposit Rate	Interest Rate Margin					
			Operating costs	*Provisions*	*Cost of holding*	*Tax*	*Profit after Tax*	*Interest Margin*
2008	19.7	2.3	11.4	0.8	0.6	1.1	3.6	17.5
2009	21.2	3.1	12.4	1.2	0.9	0.7	3.0	18.1
2010	20.4	2.7	12.9	1.1	0.7	0.7	2.4	17.7
2011	20.3	2.9	11.4	0.9	0.6	0.9	3.5	17.4
2012	23.4	3.1	12.1	1.2	1.3	1.4	4.2	20.3
2013	21.0	2.6	11.4	1.7	1.0	0.9	3.4	18.4
2014	20.8	2.3	11.8	1.9	0.7	1.2	2.9	18.5
2015	21.7	2.2	11.5	1.0	1.2	1.8	4.0	19.5
2016	21.6	2.5	11.5	1.2	0.9	1.6	3.8	19.1
2017	21.1	2.3	12.4	1.3	0.7	1.5	2.8	18.8
2018	23.3	2.5	14.4	0.6	1.1	1.7	3.0	20.8

Appendix Table 4: Decomposition Results based on operation efficiency of Banks

Higher Loan-Accounts Ratio

Period	Implied Lending Rate	Implied Deposit Rate	Interest Rate Margin					
			Operating costs	*Provisions*	*Cost of holding*	*Tax*	*Profit after Tax*	*Interest Margin*
2008	13.3	3.0	6.5	0.7	1.2	0.9	0.9	10.2
2009	15.3	3.2	7.3	1.1	1.4	0.8	1.5	12.1
2010	13.0	2.3	6.8	0.9	0.8	0.7	1.6	10.7
2011	15.5	2.8	6.8	1.1	1.4	1.0	2.4	12.7
2012	17.3	4.2	6.7	2.5	2.0	1.3	0.6	13.1
2013	15.4	3.4	6.9	2.6	1.2	0.8	0.5	12.0
2014	14.1	3.2	6.3	1.6	1.5	0.8	0.7	11.0
2015	14.7	3.1	6.9	2.2	1.8	0.7	-0.1	11.6
2016	15.6	3.1	6.9	1.9	1.6	0.7	1.4	12.5
2017	14.2	2.8	6.6	1.4	1.1	0.9	1.5	11.4
2018	15.0	2.3	7.7	0.9	1.5	1.1	1.5	12.6

Lower Loan-Accounts Ratio

Period	Implied Lending Rate	Implied Deposit Rate	Interest Rate Margin					
			Operating costs	*Provisions*	*Cost of holding*	*Tax*	*Profit after Tax*	*Interest Margin*
2008	22.6	2.1	15.2	1.6	0.7	0.6	2.4	20.5
2009	26.5	3.4	19.7	2.3	3.8	-0.1	-2.7	23.1
2010	21.4	3.0	16.8	2.9	2.1	0.2	-3.5	18.4
2011	21.4	3.1	13.0	1.0	3.1	0.8	0.4	18.3
2012	25.1	3.4	14.8	1.2	1.4	1.1	3.2	21.7
2013	23.1	2.9	13.8	1.5	1.2	0.5	3.2	20.2
2014	22.0	2.5	13.8	1.3	0.8	1.2	2.4	19.5
2015	21.5	2.1	12.9	1.0	1.5	1.6	2.5	19.4
2016	21.4	2.1	12.0	1.7	0.9	1.4	3.2	19.3
2017	20.7	2.1	12.6	1.5	0.9	1.5	2.2	18.7
2018	24.0	2.4	15.1	0.9	1.4	1.7	2.5	21.5

5. References

Afanasieff, Tarsila Segalla, Priscilla M Lhacer, and Marcio I Nakane. "The determinants of bank interest spread in Brazil." *Money affairs* 15, no. 2 (2002): 183-207.

Afzal, Ayesha, and Nawazish Mirza. *The Determinants of Interest Rate Spreads in Pakistan's Commercial Banking Sector.* Centre for Research in Economics and Business, 2010.

Ahokpossi, Calixte. "Determinants of Bank Interest Margins in Sub-Saharan Africa." *IMF Working Paper*, January 2013.

Akinlo, Anthony, E, and Babatunde, Olanrewaju Owoyemi. "The Determinants of Interest Rate Spreads in Nigeria:An Empirical Investigation." *Modern Economy* 3 (2012): 837-845.

Arellano, Manuel, and Stephen Bond. "Some Tests of Specification for Panel Data: MonteCarlo Evidence and An Application to Employment Equations." *Review of Economic Studies* 58, no. 2 (1991): 227-297.

Asteriou, Dimitrios, and Stephen, G Hall. *Applied Econometrics: A modern Approach using Eviews and Microfit Revised Edition.* New York: Palgrave Macmillan, 2007.

Bain, Joe S. "The Relation of profit Rate to Industry Concentration: American Manufacturing, 1936-1940." *Quarterly Journal of Economics* Volume 65, no. Issue 3 (August 1951): 293–324.

Beck, Thorsten, and Heiko Hesse. "Bank Efficiency, Ownership and Market Structure Why Are Interest Spreads So High in Uganda?" *World Bank Policy Research Working Paper 4027*, October 2006.

Blundell, Richard, and Stephen Bond. "Initial conditions and moment restrictions in dynamic panel data models." *Journal of Econometrics* 87 (1998): 115–143.

Bwire, Thomas. "Investment financing and interest rates in Uganda." *Development Finance Agenda (DEFA)* (Chartered Institute of Development Finance (CIDEF)) 3, no. 4 (2017): 18-19.

Chirwa, Ephraim W, and Montfort Mlachila. "Financial reforms and interest rate spreads in the commercial banking system in Malawi." *IMF Staff papers* (Springer) 51, no. 1 (2004): 96-122.

Dabla-Norris, Era, Era; Floerkemeier, Holger;. "Bank Efficiency and Market Structure: What Determines Banking Spreads in Armenia?" *International Monetary Fund (IMF), Working Paper* , 2007: No. 07/134.

Demirgüç-Kunt, Ash, and Harry Huizinga. "Determinants of commercial bank interest margins and profitability:some international evidence." *The World Bank Economic Review* 13, no. 2 (May 1999): 379–408.

Folawewo, Abiodun.O., and David Tennant. "Determinants of interest rate spreads in Sub-Saharan African countries: A dynamic panel analysis." In *A paper prepared for the 13th Annual African Econometrics Society Conference*, by Citeseer, 9-11. 2008.

Garza-García, Jesús, Gustavo. "What influences net interest rate margins? Developed versus developing countries." *Banks and Bank Systems* 5, no. 4 (2010).

Hansen, L,P. "Large Sample Properties of Generalised method of moments estimators." *Econometrica* 50 (1982): 1029-1054.

Hauner, David; Peiris, Shanaka J. "Bank Efficiency and Competition in Low-Income Countries: The Case of Uganda." 2005: 5-240.

Jha, Chandan, Kumar. "Financial reforms and corruption: Evidence using GMM estimation." *International Review of Economics & Finance* 62 (2019): 66-78.

Konar, Yakup, and O.G De Jonghe. *Factors explaining net interest margins and spreads in Turkish banking sector: Evidence from 2002-2013.* Msc. Finance Thesis, Tillburg University, Tillburg University, 2014.

Maudos, Joaquin, and Juan Fernandez de Guevara. "Factors explaining the interest margin in the banking sectors of the European Union." *Journal of Banking \& Finance* (Elsevier) 28, no. 9 (2004): 2259-2281.

Mugume , Adam; Apaa, Jimmy ; Ojwiya, Charles . "Interest rate spreads in Uganda: Bank specific characteristics or policy changes?" *The Bank of Uganda Staff Papers*, 2009.

Mugume, Adam. "Market structure and performance in Uganda's banking industry." *Paper presented to the African Econometrics Society.* Cape Town, 2007.

Nampewo, Dorothy. "What drives interest rate spreads in Uganda's banking sector?" 2012.

Njeri, Boniface Kimondo, Kepha Ombui, and Assumptah W Kagiri. "Determinants of Interest Rate Spread of Commercial Banks in Kenya." *International Journal of Science and Research (IJSR* 4, no. 11 (2015): 617-620.

Pesaran, M, Hashem, and Ron Smith. "Estimating long-run relationships from dynamic heterogeneous panels." *Journal of Econometrics* , 1995: 79-113.

Pesaran, M, Hashem, and Yongcheol, Smith, Ron, P Shin. "Pooled Mean Group Estimation of Dynamic Heterogeneous Panels." *Journal of the American Statistical Association* 94, no. 446 (1999): 621-634.

Rebei, Nooman. "Determinants of Interest Rate Spreads in Solomon Islands." *IMF Working Paper*, June 2014.

Roodman, David. "How to do Xtabond2: An introduction to difference and system GMM in stata." *The Stata Journal* 9, no. 1 (2009): 86-136.

Roudet, Stéphane, Magnus Saxegaard, and Charalambos, Tsangarides. "Estimation of Equilibrium Exchange Rates in the WAEMU: A Robustness Analysis." *IMF Working Paper*, 2007: 1-54.

Saunders, Anthony, and Liliana Schumacher. "The determinants of bank interest rate margins: an international study." *Journal of international Money and Finance* (Elsevier) 19, no. 6 (2000): 813-832.

Sheriff, Ibrahim, M, and Gilbert, K Amoako. "Macroeconomic Determinants of Interest rate Spread in Ghana: Evidence from ARDL Modelling Approach." *Journal of Finance and Bank Management* 2, no. 2 (June 2014): 115-132.

Were, Maureen, and Joseph Wambua. "What factors drive interest rate spread of commercial banks? Empirical evidence from Kenya." *Review of Development Finance* 4 (2014): 73–82.

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