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An empirical analysis of bank specific factors affecting interest rate of Ugandan banking financial institutions

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An empirical analysis of bank specific factors affecting interest rate of Ugandan banking financial institutions

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Abstract

Purpose – The purpose of this paper is to investigate the effect of bank specific factors on interest rate in banking financial institutions (BFIs) of Uganda.
Design/methodology/approach – To analyze the effect, an OLS random effects regression estimate on a data set of 24 banks from 2008 to 2016 from Bank of Uganda Depository Corporation survey was carried out. Studied bank specific factors including liquidity, operational efficiency, credit risk, capitalization and lending ratio are considered.
Findings – The results indicate that liquidity, operational efficiency, capitalization and lending out ratio affect the interest rate while credit risk does not.
Research limitations/implications – The study has confirmed that bank specific factors influence interest rate and other factors such as industry-level and indirect macroeconomic indicators need to be explored. The differences in categories of banks on interest rate would be of importance. Finally, this study concentrated on banks in Uganda, future study would focus on the comparison of Ugandan banks with those of other countries in the East African Region.
Practical implications – Bank managers should invest in up-to-date technology to reduce operational costs and improve efficiency. Managers of bank should take interest on equity mobilization, because it constitutes a cheaper source of capital to finance asset used in operations and long-term needs of borrowers financing. Government should consider a legislation that provides incentives toward savings and reduction in tax for bank inputs.
Originality/value – This is the first study that investigates the effect of bank specific factors on interest rate in Uganda's BFIs.

Keywords Interest rate, Bank specific factors, Banking financial institutions
Paper type Research paper

1. Introduction

For the last two decades, the financial sector in Uganda has experienced high lending rates, mergers and acquisitions, closure and collapse while other new banks enter the market. As a response to the devastating consequences of the continued high lending rates, mergers and acquisitions, closure and collapse of banking financial institutions (BFIs), a considerable effort by the government has been devoted to setting down the remedies aimed at preventing possible reiteration. For example, since 1990s, the Government of Uganda started pursuing several interventions through structural adjustment programs (SAPs) and liberalization with the aim of improving efficiency in the economy including the banking sector. The SAPs

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interventions undertaken included liberalization of the monetary sector to create a sound economic environment and removal of controls on interest rate determination by BFIs (Kuteesa *et al.*, 2010). These interventions have resulted in economic stability, improvement in bank internal operations, increase in banks and their branches and even cheap funds for lending. Despite these positive factors, interest rate has persistently remained high (above 23 percent), continued merger, closure and collapse of banks that operate and benefit from the same liberalized economy with similar economic conditions, operating under the same banking supervision and market infrastructure continue to be evident in Uganda.

Given the high interest rate charged by BFIs which ranges from 20 to 32 percent per annum, such interest rate charged by banks is least expected from an economy that was fully liberalized. High interest rates lead to loss of capital by entrepreneurs who fail to meet their financial obligations, which results in minimal money multiplier from past investment. This is detrimental to return on savings, return on investment to the private sector and individual households, thereby damaging private equity (Almarzoqi and Naceur, 2015; Bategeka and Okumu, 2010). This, notwithstanding the impact of high interest rate to the borrowers, affects the economic visibility in terms of an "equity trap" and creates harmful notion that investment is a high risk business. The factors behind high rates charged by BFIs have remained an unexplained phenomenon which has generated exciting debate among researchers and practitioners.

Though there has been sufficient literature connecting several factors such individual bank-specific, industry and macroeconomic factors (Singh and Sharma, 2016; Almarzoqi and Naceur, 2015) to interest rate margins, these studies have focused on interest rate spread. Studies by Pellegrina (2012) used a single factor of bank capitalization, while Arif and Anees (2012) indicated that there is an ubiquitous view that high interest rate is caused by lack of capital adequacy by banks with the tendency to maximize profits in an oligopolistic market. As part of bank internal factors, Arif and Anees (2012) indicated that contemporary and mitigation of liquidity risk by having sufficient cash resources reduces the liquidity gap, thereby reducing the dependence on repo market which affects interest rate. Mlambo and Ncube (2011) measured efficiency of an unbalanced panel of 26 banks and not individual banks as this paper does. Central to observations of these scholars, the focus of their studies were on country-level comparisons using nationwide data and time series and none has studied bank specific factors in a given country set up. Studies by Coert and Makina (2014) investigated the efficiency of the major banks of South Africa ignoring other bank specific factors. Because of such limitations, their findings cannot be generalized to explain the bank specific factors on interest rate in Uganda due to differences in levels of economic development as majority of the studies were carried out in developed economies.

While there are sufficient theoretical assertions connecting bank specific factors to interest rate, empirical literature linking the two is scarce. Notwithstanding the question of substance of bank specific factors to interest rate, the individual contribution of bank specific factors (liquidity, operational efficiency, credit risk, capitalization and lending out ratio) to interest rate in the banking industry is limited in the banking literature. Insufficient literature on the above matters, therefore, is a matter of great concern in this study.

This study is expected to enable scholars and practitioners have a more definite and direct understanding of the implication of bank specific factors on interest rate in the industry. This will probably guide the policy makers to optimally manage their internal processes and contain interest rate to its lowest.

The rest of the paper is organized as follows: in the next section we present theoretical and literature review; Section 3 describes the methodology. Results and discussion are presented in Sections 4 and 5, respectively, while Section 6 concludes and provides policy implications and areas for further research.

2. Theoretical and literature review

2.1 Theoretical review

According to Cooray (2003), the interest rate theory provided by Fisher (1930) is a cornerstone of many theoretical models that generate monetary neutrality and is important for understanding interest rates. The theory provides that interest rate in any period is equal to the sum of the real interest rate and the expected inflation. A common linear representation $i = r + \pi$ (where i is interest rate, r is *ex ante* real interest rate and π is expected rate of change in the price level) is determined by real factors in an economy such as productivity of capital, labor and investor time preference. According to Fisher (1930), the theory establishes theoretical and practical connections. For example, if capital worth $100 today will exchange for $105 to be received one year later, the premium on present money in terms of future money is $5 and this, as a percentage of $100 or the rate of interest, is 5 percent. Therefore, it can be said that the price of today's money in terms of next year's money is 5 percent above par. According to Cooray (2003), this is interpreted to mean that interest rate is the deviation from the price of present money in terms of future money due to internal (within a bank) as well as external factors (expected inflation and waiting).

According to Cooray (2003), the theory suggests that the rate of interest is a matter of every individual's degree of waiting demonstrated by risk and also one's investment opportunity rate. Thus, interest rate is nothing else but risk involved as a result of waiting and the appreciation or depreciation of money due to macroeconomic changes in an economy. Fisher (1930) also provided that interest rates vary due to risk, level of efficiency by a bank, length of time the loan has to run and other causes which most economists term as economic friction. Fisher's effect corresponds to the hypothesis that the *ex ante* real rate of interest is non-stationary, so that under rational expectations, variations arising from the internal operations as well as risk and macroeconomic environment play a crucial role. For the purpose of this study, the authors concentrate on individual bank-specific factors and assert that due to similarity in the general macroeconomic environment within a country in which banks operate, such macroeconomic should affect all banks in a similar way and thus what is important is the bank internal factors for efficiency gains.

2.2 Literature review

A number of studies that have examined the determinants of bank interest rate generally used three categories of variables: individual bank-specific factors, factors specific to the industry and macroeconomic indicators. Some studies focus on one category while others consider two or all the three categories of factors in estimating interest rate. This study focuses on one category of factors: bank specific factors of bank in Uganda's BFIs. Macroeconomic factors in this case apply to all banks in the country. As elaborated in the background, the optimal interest rate would arguably depend on several bank internal factors and may not be static over time as compared to the macroeconomic factors which are static to all banks in the same economy.

In line with the recent studies, the measures of bank-specific factors include: liquidity (Singh and Sharma, 2016), operational efficiency (Almarzoqi and Naceur, 2015), credit risk (Poghosyan, 2012), capitalization (Curak *et al.*, 2012) and lending out ratio. The various bank specific factors on interest rate are demonstrated in Figure 1.

2.2.1 Interest rate. According to Crowley (2007), interest rate is a bridge or link between income and capital, the price borrowers pay for the use of money borrowed from a financial institution. According to Al Muharrami (2015), interest rate differentials exist because of several factors, such as variations in transaction costs, risk premia, local liquidity condition, information asymmetry, presence of lottery schemes and regulatory constraints such as limited open foreign exchange position. Thus, interest rate is not static

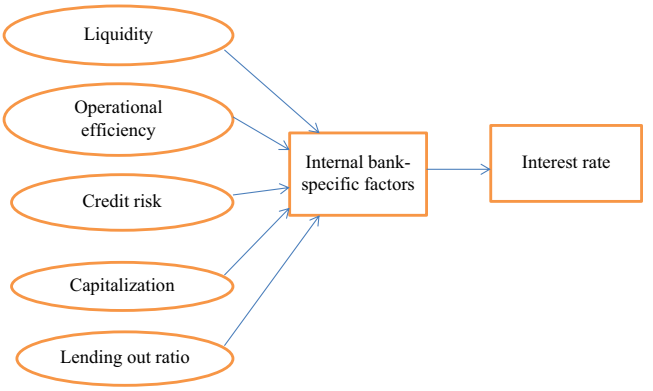

Figure 1.
Bank specific factors

because of the above factors which according to Singh and Sharma (2016) are as a result of market friction in the economic environment in which BFIs operate as well as bank specific factors.

2.2.2 Liquidity. According to Delechat *et al.* (2012), liquidity is one of those terms that are widely used in profit-making organization which in recent literature according to Vodova (2013) is the ability of a bank to fund or meet its obligations as and when they fall due without incurring unacceptable losses. The situations where the bank is unable to meet its short-term obligations especially from the depositors when they demand for their deposits and/or borrowers for short-term loans create a liquidity problem and liquidity risk. Liquidity risk arises from the fundamental role of the banks in the maturity transformation of short-term deposits into short- and long-term loans (Delechat *et al.*, 2012). Etienne and Graham (2010) define liquidity based on the transformation gap or "LT gap" as (liquid liabilities-liquid assets)/total assets and consider all loans with maturity of one year or less to be liquid, and they explicitly exclude loan commitments and other off-balance sheet activities because of their contingent nature. Therefore, banks can avoid this crisis by focusing on the ratios like liquid assets to total assets (Goddard *et al.*, 2011).

According to Etienne and Graham (2010), liquidity ratio gives information about the general liquidity shock absorption capacity of a bank. Cash, balances with central banks and other banks, debt securities issued by governments and similar securities or reverse repo trades belong to liquid assets. Although holding liquid assets is an important phenomenon, Vodova (2013) finds otherwise and indicates that liquid assets yield lower income whose creation is a result of high rate especially on deposits which banks transfer to borrowers by way of increasing interest rate. As a result, the more the liquid asset held, the more the liquidity risk a bank bears before the suppliers of that liquidity (depositors and equity holders). On the other hand, however, Etienne and Graham (2010) assert that higher share of liquid assets in total assets increases the capacity of a bank to absorb liquidity shock, given that market liquidity is the same for all banks in the sample. Nevertheless, high value of this ratio may also be interpreted as inefficiency since liquid assets yield lower income, liquidity bears high opportunity costs for the bank.

2.2.3 Operational efficiency. In scholarly journals and business practice, the discussion about productivity and efficiency in banks is mostly based on the cost to income ratio, also known as efficiency ratio. Even though the predication power of the cost to income ratio is not clear, this ratio is widely regarded as a yardstick when comparing efficiency of banks and more so widely used in determination of interest rates (Sherman and Zhu, 2006). The commonly held notion claims that low cost to income ratio is equivalent to high

efficiency and low rate of interest (Almarzoqi and Naceur, 2015). Cok and Kosak (2008) find a negative and highly significant relationship between the two, which is fairly common throughout pre-crisis literature. This is fairly true as higher costs have a negative impact on interest rate. Curak *et al.* (2012) measure operational efficiency as well, and find that operational expense management has the most important effect on the rate charged to a borrower. They conclude that banks should focus on managing expenses as opposed to gaining market share so as to reduce on the rate charged to its clients.

2.2.4 Credit risk. Credit risk, also known as loan-loss provision, is an influencing factor of asset quality and remains a key aspect of financial performance for banks that measures the anticipated credit risk of debt customers (Greenidge and Grosvenor, 2010). When a debt by the borrower is not serviced on time, it is classified as non-performing loan, and when the bank anticipates any loss to arise out of the loaned amount, then a provision against such is made that is called a loan-loss provision. The level of credit risk poses a serious problem affecting the banking sector as huge funds are tied up in nonproductive use. This slowly leads to systemic problems in the banking sector and has a contagion effect on other sectors of the economy (Kasturirangan, 2012).

Based on the literature from several Sub-Saharan African countries, Folawewo and Tennant (2008) attributes credit risk to the strong association between the macroeconomic factors and loan-loss provision to the undiversified nature of some African economies. The result shows that economic growth, real exchange rate appreciation and the real interest rate are significant determinants of non-performing loans and not loan-loss provisions in these countries. According to Parastoo and Housang, other literature also widely accepts that the percentage of non-performing loans and not loan-loss provision is often associated with bank failures and financial crises in the developing and developed countries. However, Singh and Sharma (2016) in India and Almarzoqi and Naceur (2015) in Central Asian countries found out that high loan-loss provision is the major factor in increasing interest rates than non-performing. More so, Were and Wambua (2013) and Collins and Wanjau (2011) in Kenya indicate that the financial intermediation spread is narrower for a risk-averse bank than for a risk-neutral one because risk aversion increases the banks interest rates. High interest rates do not only discourage further borrowing, but also makes it difficult for existing debtors to repay their loans. In this way, a widespread increases non-performing loans and may cause financial instability. Even though banks try to overcome this risk by making provisions to counter non-performing loans, using evidence from Kenya, Waweru and Kalani (2009) argue that such provisions may not be adequate to protect against default risk when non-performing loans are very high.

2.2.5 Capitalization. According to Demirguc-Kunt and Huizinga (1998), well-capitalized banks have higher net interest margins and are more profitable. This is consistent with the view that banks with higher capital ratios tend to face a lower cost of funding due to lower prospective bankruptcy costs. In addition, a bank with higher equity capital simply needs to borrow less in order to support a given level of assets. In addition, Vodova (2013) indicate that availability of high capital increases banks' risk-absorbing capacity and liquidity creation capability. Vodova (2013) further highlighted that the relationship between bank capitals contributes to liquidity creation and increases the lending portfolio of a bank.

Thus, too little or too much of such capital in relation to the minimum required can have implication for a bank's performance outcomes and interest rate. According to Curak *et al.* (2012), banks that have more equity relative to total assets implies that banks face surmountable pressure to pay dividends to shareholders, this may force them to raise interest rate. On the other hand, banks with less equity relative to total assets mean that they will depend on customer deposits and other external sources of funding to meet any demand; and irrespective of their cost, it will impact on interest rate. According to

Growe *et al.* (2014), theoretical expectations, as well as empirical results, for the equity to assets ratio suggest that the ratio has a positive relationship with interest rate and profitability. More capital means less need for external funding and a lower cost of capital when it is sought. Bankruptcy risk costs will be less due to the larger safety net in case of negative developments. Contrarily, when capital levels are high, low levels of leverage and risk are implied. Some scholars have contended that shareholders' profits should be higher when equity level decreases and risk increases Growe *et al.* (2014). However, recent theoretical work indicates that when earnings are mean-reverting, the relationship between leverage and current earnings should be negative.

2.2.6 Lending out ratio. The deposits are the lifeline of the banking business and most of the banking operations are run through deposits (Arif and Anees, 2012). If the depositors start withdrawing their deposits from the bank, it will create a liquidity problem for the bank forcing the bank to borrow funds from the inter-bank market at higher costs. However, when a bank has more deposits such problems are avoided. According to Ho and Saunders (1981), banks are viewed as risk-averse intermediaries between demanders and suppliers of funds. When banks are fixing interest rate, they are faced with an important uncertainty because deposit supply inflows arrive at different moments in time from loan demand outflows. This difference in maturity creates exposure to interest rate risk and such risk will be faced whenever the financial institution has unmatched portfolio of deposits and loans at the end of the decision period and the money market rate changes. Banks tend to transfer these financial costs which arise from the uncertainty in the provision of deposit and loan operations to economic agents; in this case, the borrowers and, consequently, each bank participate in the market by setting a loan and deposit interest rate that depends on the financial costs (Golin and Delhaise, 2013).

Accordingly, Alexiou and Sofoklis (2009) found a significantly negative relationship for Greek banks between supply of deposits and demand for loans. In a Chinese sample, the ratio averaged 198.34 percent and the relationship with profitability was negative due to high costs paid of the lent funds (Lee and Hsieh, 2013).

3. Methodology

3.1 Theoretical framework and model estimation

3.1.1 Theoretical framework. This paper adopts the cost efficiency model as provided by Cobb and Douglas (1928) and the theory of interest rate (Fisher, 1930) with our own modification to guide the choice for the measures for this study. Interest rate of each bank is measured as an output cost, the authors use liquidity, operating efficiency, credit risk, capitalization and lending out ratio as input factors in the estimation process.

Cost efficiency definitions that majorly drive interest rate of a bank correspond to two important economic objectives: first; input cost minimization; second, revenue generation from the loanable fund as output. Cost efficiency is the ratio between the minimum cost at which it is possible to attain a given output and the cost actually incurred. Thus, efficiency arises from expected rate of change in price level determined by input factors such as capital and labor productivity and investment time preference. Efficiency ranges between 0 and 1 interval, and equals 1 for the best-practice bank in the sample. The interest rate charged by a bank depends on the output cost (y), the price of inputs and level of cost inefficiency (w) and a set of random factors (e) which incorporate the effect of errors in the measurement of variables. Thus the interest rate function is simply expressed as follows:

$$IR = C(y, w, \mathrm{e}) \tag{1}$$

In percentage terms, assuming that the efficiency and random error terms are multiplicatively separable from the remaining arguments of the cost function:

$$IR = f(y_i, wi, \beta) + \mathrm{e} \tag{2}$$

where IR is the observed interest rate for the loanable fund; y_i and w_i are the percent of bank variables and input prices; β is a vector of unknown parameters to be established; and e is the random error term.

The expanded equation of cost efficiency function becomes:

$$IR_{it} = \alpha + \alpha i \sum w_{it} + \sum \beta k y k_{it} + \mathrm{e}_{it} \tag{3}$$

where IR_{it} is the interest rate on the loanable fund charged by bank i in time period t; yk is the kth bank variable for non-interest costs; w_i is the ith bank input price interest costs; e_{it} is the error term for bank i in time period t. The model permits estimations of balanced panels.

3.1.2 Model estimation. Our model supplements Cobb and Douglas and Fisher by adding liquidity and credit risk variables, and is specified as follows:

$$IR_{it} = \beta_0 + \beta_1 liq_{it} + \beta_2 effic_{it} + \beta_3 crisk_{it} + \beta_4 capital_{it} + \beta_5 lendout_{it} + \mathrm{e}_{it} \tag{4}$$

where β_0 is the constant; β_1-β_5 are coefficients of the determinant variables; i represents the respective bank; t is the time period; *liq* is liquidity; *effic* is the operating efficiency; *crisk* is credit risk; *capital* is bank capitalization; *lendout* is lending out ratio; and e is the error term.

3.1.3 Interest rate (IR) in BFIs. Interest rate (*IR*) is the dependent output variable and is defined as the amount charged, expressed as a percentage of the principal, by a lender to a borrower for the use of assets, in this case borrowed funds (Al Muharrami, 2015). We use an *ex post* approach in calculating the interest rate of each bank per year. This approach uses the total interest income received on loans and advances against the average stock of net loans and advances to customers. This is given by:

$$\text{Rate} = \frac{\text{Total interest income received on loans and advances}}{\text{Average stock of net loans and advances to customers}} \times 100$$

$$\text{Average stock of net loans} = \frac{\text{Opening stock of loans} + \text{closing stock of loans and advances}}{2}$$

In order to establish the above effect, a set of covariates were employed that included liquidity, operational efficiency, credit risk, capitalization and lending out ratio.

Liquidity (*liq*). Liquidity is the ability of a bank to meet its short-term obligations as and when they fall due without incurring unacceptable losses (Goodhart, 2008). It is computed in percent as a ratio based on liquid assets to total assets and reflects the overall liquidity position of a bank and also indicates the degree to which a bank is exposed to liquidity risk. According to Vodova (2013), liquid assets yield lower income whose creation is a result of high rate especially on deposits which banks transfer to borrowers by way of increasing interest rate. Thus, one may be inclined to conclude that the cost of liquidity has a positive effect on interest rate.

Operational efficiency (*effic*). Operational efficiency is the management of costs of servicing and monitoring transactions in relation to the revenues generated during the course of operations of a bank. Following the study by Almarzoqi and Naceur (2015), this is computed as a percentage ratio of non-interest costs to net operating income. Proper management of costs indicates how efficiently a bank is being run, that is minimizing costs and increasing revenues. Cok and Kosak (2008) find a negative and highly significant effect

between efficiency and interest rate. Efficient banks experiencing more revenues and managing operating costs tend to require lower lending rates. A negative coefficient on this factor is expected.

Credit risk (*crisk*). Credit risk is a measure of credit quality, computed as loan-loss provisions over total gross loans and presented in percentage. A higher ratio is associated with lower credit quality and high credit risk. Banks are expected to require higher interest rate to compensate for funding riskier projects as well as individuals, and to maintain adequate loan reserves (Poghosyan, 2012). If banks operate in a more risky environment and lack the expertise to control their lending operations, it will probably result in a higher loan-loss provision ratio to cover this risk (Kasturirangan, 2012). Since risk is transferred to customers to compensate for the likely default, the ratio is expected to have a positive effect on interest rate.

Capitalization (*capital*). Capitalization, measured as a percentage of equity to total assets, is the owners' stake in a bank and indicates the bank's creditworthiness and the potentiality to compensate for any type of loss (Curak *et al.*, 2012). Higher equity to total asset means that a bank is well capitalized; a well-capitalized bank has fewer insolvency costs and is able to cover any expected risk. On the other hand, lower equity ratio implies that the bank is less capitalized and more risky. If bank equity and loan rates do not diverge to each other, then a high equity ratio can enhance the bank's efficiency and ability in a productive way. Therefore, a positive effect between capitalization and interest rate is suggested.

Lending out ratio (*lendout*). Lending out ratio measures the level of demand and supply, the proportion of gross loans against customer deposits. According to Golin and Delhaise (2013), more customer deposits are a sign of a stable bank that is capable of meeting any demand as and when it falls due. A figure in the 70-90 percent range is seen as optimal with higher numbers being on the risky side and below this range is conservative. Alexiou and Sofoklis (2009) found a significantly negative relationship for Greek banks and the same is reported by Sohail *et al.* that excess supply of loanable funds in comparison with demand explains why interest rate prices should be low. This suggests that lending out ratio is expected to have a negative effect on interest rate (Table I).

3.2 Data and sample

This study considered balanced panel data of 24 BFIs pertaining to the period 2008-2016 representing 216 bank-year observations. The year 2008 was considered an appropriate base year because in 2007, the Government of Uganda lifted the moratorium on new BFIs'

Table I. Summary of the bank specific factors, expected sign and data source

Variables	Description	Expected sign	Data source
Dependent variable			
Int.rate	Interest rate = Total interest income received On loans and advances × 100%/(Average stock of net loans and advances to customers)	−/+	Annual reports
Independent variables			
Bank-specific measures			
Liq	Liquidity = Liquid assets × 100%/(Total assets)	+	Annual reports
Effic	Efficiency = Non-interest expenses × 100%/(Total net interest income)	−	Annual reports
Crisk	Credit risk = Impairment charge × 100%/(Gross Loans and advances to customers)	+	Annual reports
Capital	Capitalization = Total equity × 100%/(Total assets)	+	Annual reports
Lendout	Lending ratio = Gross loans × 100%/(Customer deposits)	−	Annual reports

entry into the market. The aim was to strengthen the banking sector so as to allow competition and improve efficiency of banks. BFIs included in this study are private banks, public banks, large banks; medium and small banks operating in Uganda. Banks with incomplete or inconsistent data were excluded. Data were taken from Bank of Uganda Depository corporation survey (2016).

4. Empirical results

4.1 Descriptive analysis

Aggregate descriptive statistics on bank specific factors and interest rate are provided in Table II. Means, standard deviations, minimums and maximums were generated so as to summarize the observed data. The main purpose of the descriptive analysis was to establish whether the statistical means and standard deviation were a good fit of the observed data.

The results depict that on an average, BFIs charge 24.5 percent interest rate, hold 64.4 percent of liquid buffer and are efficient at 68.4 percent. Also, the level of credit risk is low averaging 1.43 percent, capitalization (equity capital) is less averaging 18.5 percent suggesting that the biggest portion of bank assets are financed by deposits and other borrowings. On average, deposits have also been reported to exceed loan demand represented by 65.7 percent. Generally, because of small standard deviations compared to mean value, with data being close to the means, the calculated means highly represent the observed data and are therefore a good replica of reality.

4.2 Correlation analysis

The correlation analysis was carried out to establish the level of association between the dependent variable and the independent variables. A high collinearity of independent variables especially above 0.8 according to Gujarat (2009) is not acceptable. Moreover, if high correlation is found among variables, such variables are left out of the regression model and considered separate as an individual factor. The results in Table III indicate that there is no multicollinearity.

	Mean	SD	Min.	Max.	*n*	Observations
Interest rate (%)	24.5	4.3	15.8	41.3	24	216
Liquidity (%)	64.4	11.8	35.8	88.4	24	216
Operational efficiency (%)	68.4	12.7	34.0	94.0	24	216
Credit risk (%)	1.4	1.1	0.45	4.1	24	216
Capitalization (%)	18.5	6.4	7.6	37.6	24	216
Lending ratio (%)	65.7	11.1	37.3	87.5	24	216

Source: Panel estimates 2008-2016

Table II. Summary statistics of bank specific factors

	Int.rate	*Liq*	*Effic*	*Crisk*	*Capital*	*Lendout*
Int.rate	1.000					
Liq	0.069	1.000				
Effic	0.174**	−0.047	1.000			
Crisk	0.044	−0.006	0.399***	1.000		
Capital	0.468***	−0.097	0.039	0.107	1.000	
Lendout	−0.308***	−0.009	−0.122*	0.013	−0.229**	1.000

Notes: *,**,***Correlations are significance at the 0.10, 0.05 and 0.01 levels, respectively
Source: Panel estimation (2008-2016)

Table III. Pairwise correlation results

4.3 Pooled OLS regression model

We run the OLS regression model. As the considered model, random effects deny heterogeneity and individuality of data; we also run a fixed effects model that allows heterogeneity or individuality among banks. The Hausman test was carried out to choose the proper specification. The *p*-value being greater than 0.05, the acceptance of the random effect estimates over fixed effect estimates was confirmed. Table IV confirms the results.

4.3.1 Regression analysis (fixed and random effects estimates). The random effect estimates (Table V) indicate that liquidity, operational efficiency, capitalization and lending out ratio significantly affect interest rate. The impact of liquidity and capitalization was positive whereas the impact of operational efficiency and lending out ratio was negative. The results suggest that credit risk insignificantly affect interest rate. Fixed effect estimates provide different results than those of random effect estimates. Fixed effect estimates suggest that credit risk positively affects interest rate whereas operational efficiency and lending out ratio have a negative effect on interest rate. Liquidity and capitalization were found to have insignificant effect on interest rate. Random effect test demonstrated that the R^2 is 0.304 with significant (Prob > χ^2) value of 0.000 which shows model fitness.

5. Discussion

In this paper, the authors have analyzed the effect of bank specific factors (liquidity, operational efficiency, credit risk, capitalization and lending out ratio) on interest rate using the random effects regression which was confirmed by the Hausman test. The results indicate that liquidity, operational efficiency, capitalization and lending out ratio significantly affect interest rate while credit risk does not.

Table IV. Hausman test summary

Test summary	χ^2 statistics	χ^2 df	Prob
Cross-section random	3.74	5	0.588

Source: Panel data estimates (2008-2016)

Table V. Regression analysis

Variable	Fixed effects model			Random effects model		
Cost of credit	Coef.	SE	*p*-value	Coeff.	SE	*p*-value
Liquidity (*liq*)	0.050	0.032	0.120	0.036**	0.031	0.024
Efficiency (*effic*)	−0.031**	0.032	0.035	−0.063**	−0.029	0.027
Credit risk (*Crisk*)	0.531**	0.260	0.043	0.369	0.259	0.156
Capitalization (*capital*)	0.076	0.061	0.218	0.157***	0.056	0.005
Lending out (*lendout*)	−0.062**	0.029	0.035	−0.072***	0.028	0.009
Constant	24.711	4.091	0.000	23.049***	3.668	0.000
No. of observations.		216			216	
Banks		24			24	
R^2		0.122			0.304	
F-stat (5,149)		2.78			Wald χ^2 (5) = 18.62	
Prob > *F*		0.019			Prob > χ^2 = 0.000	
Sigma_u		4.167			3.342	
Sigma_e		3.243			3.249	
ρ		0.622			0.514	

Note: **,***Correlations are significance at 0.05 and 0.01 levels, respectively

Source: Panel estimation (2008-2016)

Empirical findings highlight that at the 5 percent significance level, liquidity has a positive effect on interest rate, implying that increase in liquidity by 1 percent increases interest rate by about 0.036 percent holding other factors constant. Banks create liquidity when they transform liquid liabilities such as deposits to finance the demanders' request. The rate offered to suppliers of liquidity (depositors) is factored in the lending rate paid by the borrowers. From the descriptive, it was observed that whenever deposits increased, liquidity also increased; a fact that deposits play a crucial role in liquidity creation. This finding is consistent with Vodova (2013), Delechat *et al.* (2012) and Etienne and Graham (2010) who indicate that the marginal cost of holding liquid assets is a cost to a bank; if the return on liquid assets for demand and time deposits is high, the rate of interest will be high too. They also indicate that small banks are required to hold more liquidity due to limited external sources of funding. In support of this, our results indicate that majority of banks are small and medium (18 of the 24 banks studied) and are not listed on the stock exchange market. They therefore require external funds such as deposits to finance their liquidity needs, which in most cases is expensive.

Operational efficiency showed a negative effect on interest rate such that an increase in operational efficiency by 1 percent should lead to a reduction in interest rate by 0.063 percent holding other factors constant. This result implies that non-interest costs such as operational and employee costs, which are most controllable and responsive to management action, play a significant role in interest rate determination. The result suggest that efficient banks should reduce the rate of interest. For example, use of standardized systems and improved technology (internet banking, use of automated teller machines) increases efficiency and reduces employee and operational costs as well. Reduction in costs is also affected by the nature of competition; our results as presented in the descriptive demonstrate the level of competition. Thus, competitive banks in Uganda should pass on lower administrative and operational costs to their customers to enable enterprise growth. The findings are consistent with Almarzoqi and Naceur (2015). They indicate that reducing operating costs and lending rates is achieved by enhancing banking sector competition and consolidation and adopting the best banking technologies to reduce the need for a large payroll numbers. In addition, Curak *et al.* (2012) stressed that improving staff training and management practices, strengthening bank corporate governance, introducing organizational changes (such as outsourcing), opening the market for foreign banks and building a consumer credit database improve efficiency of a bank.

Consistent with the original hypothesis, the results reveals that an increase in capitalization by 1 percent should cause a 0.157 percent that has a positive effect on interest rate holding all other factors constant. Holding equity capital at a bank is remunerated at a cost (cost of capital) to compensate the shareholders for the use of their money, waiting as well as time preference. Similar results were reported by Singh and Sharma (2016) and Curak *et al.* (2012). According to Singh and Sharma (2016), high levels of capital permit more liquidity creation to fund the demanders of credit. Also, it is obligatory to hold liquidity because if a situation of unprecedented customer demand rises, banks use shareholders capital to finance their requests. Moreover, Curak *et al.* (2012) indicated that well-capitalized banks are too big to fall, absorb any risk arising and provide financing for development and non-developmental ventures at a cheap cost compared to deposits. However, the cheap rate that share capital may require is a burden to the borrower.

Interesting evidence confirms that lending out ratio has a negative effect on interest rate. This suggests that an increase in lending out ratio by 1 percent leads to a reduction in interest rate by about 0.072 percent holding all other factors constant. This implies that the ability of a bank to attract more deposits and create liquidity to finance demand (gross loans) should reduce interest rate. Indeed, as more deposits arrive in a bank, banks will have enough liquidity to offer the demanders of credit; excess liquidity created against a

certain level of demand, which will never exceed supply should be lent out at a low rate. This result is consistent with Golin and Delhaise (2013) and Arif and Anees (2012) that demand for loans and supply of deposits arrive at different moments in time. This creates exposure to interest rate risk especially for time deposits which stay longer compared to demand for term loans. As a result, banks would cut the cost of lending to overcome this exposure to interest rate risk and offset the huge time deposits which have an interest rate laden on them.

Contrary to the original thinking, the result indicates that credit risk does not affect interest rate. The lower ratio found is associated with higher credit quality and low risk. In Uganda, 75 percent of the borrowers borrow for consumption and are categorized as less risky, for example, government, employees of government and other corporation. Government uses tax payers' money to pay back the borrowed funds with easy. Employees of government and large corporations who borrow are guaranteed of monthly salary through which banks directly deduct the installments. A few other borrowers, who are risky such as entrepreneurs, are subjected to high-level creditworthiness using the 7Cs in addition to providing collateral that is twice as much of what is borrowed that in case of failure to pay, bank auction the collateral to recover the money. Because of such nature of borrowers together with stringent measures, good loan quality is experienced, thus, credit risk is found to have no causal effect on interest rate. However, this finding contradicts the findings of Almarzoqi and Naceur (2015). They found a positive significant effect between credit risk and interest rate and concluded that the level of loan-loss provision poses a serious problem affecting the banking sector as huge funds are tied up in nonproductive use. This slowly leads to systemic problems in the banking sector and has a contagion effect on other sectors of the economy. Similarly Collins and Wanjau (2011) indicated that the strong association between credit risk and interest rate is influenced by the costs incurred in assessing risk profile of borrowers, monitoring of the various projects for which the loan has been advanced and reaching out to as many borrowers and geographical areas as possible through branch expansion. Contrary to these scholars, we state that the costs of monitoring and assessing the borrower's creditworthiness is part of the operating costs covered in operational efficiency.

6. Conclusions, policy implications and areas for further research

6.1 Conclusions

This study uses random effects regression model to investigate the impact of bank specific factors on interest rate and established that liquidity, operational efficiency, capitalization and lending out ratio play a crucial role in the determination of interest rate in BFIs of Uganda. Credit risk does not influence interest rate. Thus, knowing the weight of bank specific factors toward interest rate can direct the effort of management and regulators to put attention to those specific factors, and lower interest rate for the benefit of individual borrowers, entrepreneurs and the economy.

6.2 Study implications

This study has the following significant implications for bankers, policy makers and consumers:

- Bank managers should aim at investing in technology in order to reduce on operational as well as employee costs. This improves efficiency and lowers interest rate in addition to reducing the turnaround time of serving a customer.
- Managers of BFIs need to take passionate interest on equity mobilization because it constitutes a cheaper source of liquidity to meet short-, medium- and long-term financing needs of the borrowers. This creates high liquidity that gives the bank a competitive advantage and improved interest rate especially if it is sourced at a cheap rate.

- Government should consider legislation that provides incentives toward savings. This may require legislators to consider introducing a tax incentive to encourage the culture of long-term savings. For example, people's incomes should not be taxed when they earn it.
- Reduction on taxation of bank inputs such as on technology and other taxable items used by banks. This would reduce costs of operations and interest rate as well.

6.3 Limitations and areas for further research

In the final analysis, this study opens up areas for further research:

- The study has confirmed that bank specific factors impact on interest rate. It would be interesting to analyze this issue further by taking into account other factors such as industry-level and indirect macroeconomic indicators in interest rate determination.
- This study did not take into account the differences among categories of banks and how these would impact on interest rate. Future research needs to look into this.
- Finally, this study concentrated on banks in Uganda. Future study would focus on how bank internal factors on interest rate would compare with those of other banks in the region.

Despite the limitations of using quantitative secondary data, the results of the present study provide valuable insight into the effect of bank specific factors on interest rate of BFIs.

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Further reading

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