Interest Rate Risk Exposure And Financial Performance Of Commercial Banks In Ugnada

Samuel Odeke and James Odongo

1. Arua Campus, Faculty of Commerce, Makerere University Business School, PO box 1337, Kampala, Plot 118 Port Bell road, Uganda
2. P.O. Box 22499, Kampala.

Physical Address: 7th Floor Tweed Towers, Plot 10 Kafu Road, Nakasero, Kampala - Uganda
*E-mail of the corresponding authors:odj2james@gmail.com and soodeke@gmail.com

Abstract

The Ugandan banks still faced with challenges of non-performing assets based on in-accurate information on clients, wrong clients and weak controls within the financial system. Consequently, evidence of weak financial performance of many banks was seen in large provisions for bad loans being made, and subsequent write offs of delinquent loans when they went bad, thus affecting bank efficiency. A cross sectional survey and descriptive research design was used, a sample size of 9 commercial banks was analyzed and interpreted using financial ratios of DuPont analysis of commercial banks. Findings show that a combined variation of maturity gaps, basis risk and assets and liabilities margins for all the commercial banks accounted for up to 14.9% variation in their banks performance. The variation explained 20.19% of the performance of the commercial banks, would predict maturity gaps, basis risk, and assets and liabilities margins. The overall analysis of interest rate risk exposure and bank performance showed generally a positive relationship except basis risk

Keywords: Interest rate risk exposure, financial performance, commercial banks.

1. Introduction

The main focus of prudential Bank regulation in developing countries had traditionally been to manage credit risk. While Commercial Banks and their supervisors had grappled with non-performing loans for several decades, interest rate risk was relatively a new problem (Patnaik and Shah, 2003). Under managed monetary policy regimes, interest rates were administered, and as a result, markets experience negligible or relatively no volatility. Banks were in business to make money using different approaches including maturity transformation, accepting deposits of varying maturities from customers and advancing loans of different maturities to customers, among others. Nonetheless, through maturity transformation, Banks can also transfer their risks to customers by accepting fixed rate deposits and giving floating rate loans. Similarly, they could also accept floating rate deposits and give fixed rate loans. In reality, all these activities result in the concentration of liquidity and interest rate risk in the Banks' books (Bonin, Hasan, and Wachtel, 2004). Nevertheless, although Banks had managed these risks since evolution of Banking, in the recent past, the complexities of liquidity and interest rate risk management had increased considerably following introduction of sophisticated Banking products and volatility in the financial markets. Some of the risks include reprising risks which arise from timing differences in the re-pricing cycles of both fixed and floating Bank assets and liabilities and off-balance sheet positions held. Since liberalization of the financial sector in Uganda over 15 years ago, the industry had experienced reduced interest rates for lending and deposits from as high as 50% and 30% to 20% and 10%, respectively. This period had also seen a stable Banking sector with steadily growing customer confidence (BOU, 2006).

Nevertheless, as Commercial Banks try to grow their activities and improve their performance in a stable market, but they still faced challenges of non-performing assets based on in-accurate information on clients, wrong clients and weak controls within the financial system. Consequently, evidence of weak financial performance of many Banks was seen in large provisions for bad loans being made, and subsequent write offs of delinquent loans when they went bad, thus affecting Bank efficiency (Final Accounts of Banks, 2009, 2010 and 2011). Critical review shows that most of the Government securities were mainly of fixed rate and relatively of higher duration than their credit portfolios; thereby resulting in more investment in such securities, thus facing exposure to duration risk. Otherwise, Banks were attracted to building large investment in security portfolios due to inadequate or poor management of credit portfolios which leads to losses arising from non-performing loans, and thus the overall performance of the Bank. This situation sometimes compels Banks to substitute credit risk with interest rate risk, sometimes without much success (Robinson, 1995). Since previous studies seem not to candidly expound the effect of interest rate risk exposure on financial performance of Commercial Banks, this

study therefore, explores the effect of interest rate risk exposure, through maturity transformation of different classes of assets and liabilities, transfer of risk appetite and basis risk to explain Bank performance.

2.0 The Liberalization of the financial sector in Uganda.

The liberalization of the financial sector in many developing countries during the 1980s and 1990s were specifically designed to shift interest rates to market based interest rates which caused interest rate volatility in most of the developing economies. In Uganda, interest rates were liberalized in 1992 and 1993 and the process was finalized by July, 1994 (SUE, 2000). In accordance with financial sector liberalization objective, the inflation and interest rates declined significantly during this period. For instance, interest rates reduced from as high as 50% and 33% for lending and deposits respectively to 20% and 10%, respectively in 1996. In Uganda, during the period 2000-2005, a lot of restructuring in the Banking sector resulted in introduction of varied consumer products. This same period also saw introduction of primary dealership in government securities in 2003 as well as trading of securities into the Banks' portfolios. Accordingly, the introduction of primary dealership was intended to create liquidity in the secondary securities market and reduce price volatility on Government securities. Consequently, most Banks grew large portfolios of customer advances as well as Government securities (USE, 2005, 2006, 2007), thereby reinforcing their potentially risky exposures by increasing holding of Government securities. For instance, during this period, the Banks' holding of Government securities increased against their deposit liabilities from 31% to 41.5% for the period 2000 to 2001 (BOU, 2002). This was well above the minimum requirement limit by BOU of 20% (FIR, 2005, SI NO.46). When compared to the 1970's and 1980's, the Ugandan financial system has undergone several reforms that have had positive implications for the economy. The chronology of these reforms and the broader Economic Reform Program (ERP) adopted by government in the last two decades since 1987 have been a subject of various papers such as Selassie (2008), Mugume (2008), Kuteesa, Tumusiime-Mutebile, Whitworth, and Williamson (2009), as well as Kihangire (2009). Even though financial deepening measured by the growth of broad money to GDP has taken place, the financial sector has remained relatively shallow (Mugume, 2008). The ratio increased from 11.2 percent in 1995 to 20.7 percent in 2008 (World Development Indicators [WDI] and Global Development Finance [GDF], 2010). Mugume (2008) points out that the system is dominated by the commercial banks while other financial intermediaries are limited in number, small in size, and relatively ineffective. Furthermore, there is only one bank branch per 180,000 people in Uganda compared to an average of 7000 people per branch in the Common Market for East and Southern Africa (COMESA) countries (Kasekende and Opondo, 2003). The authors observe that most of the Ugandan commercial bank branches are concentrated in the urban centres. Prior to the reforms, the banking sector was bedeviled with severe challenges such as negative real saving and lending interest rates, rising non-performing loans, inefficiency in the distribution of credit, and a weak supervision of the sector by the central bank. The reforms were accordingly geared towards promoting efficiency and strengthening of the banking sector. Abuka and Egesa (2010) have argued that regulatory reforms in the financial sector in Uganda lagged behind the liberalization policy as several reforms which included liberalization and privatization were undertaken prior to regulatory reforms in the banking sector. As a result, a number of weak banks that later collapsed were licensed, a development that threatened the stability of the financial system. A counter argument to this is that commercial banks that collapsed during the late 1990s and early 2000s were licensed under reviewed banking sector regulations. It can thus be argued that it was weak oversight on the part of the central bank and not necessarily delayed regulatory reforms that led to bank failures.

2.1   Research Hypothesis

Focusing on interest rate risk exposure and banks financial performance in Uganda, the study investigates the following research hypothesis:

H1: Maturity/reprising gap and Bank performance are related

H2: Basis risk and Bank performance are related

H3: Asset and liability margins and Bank performance are related

2.2   Conceptual Framework
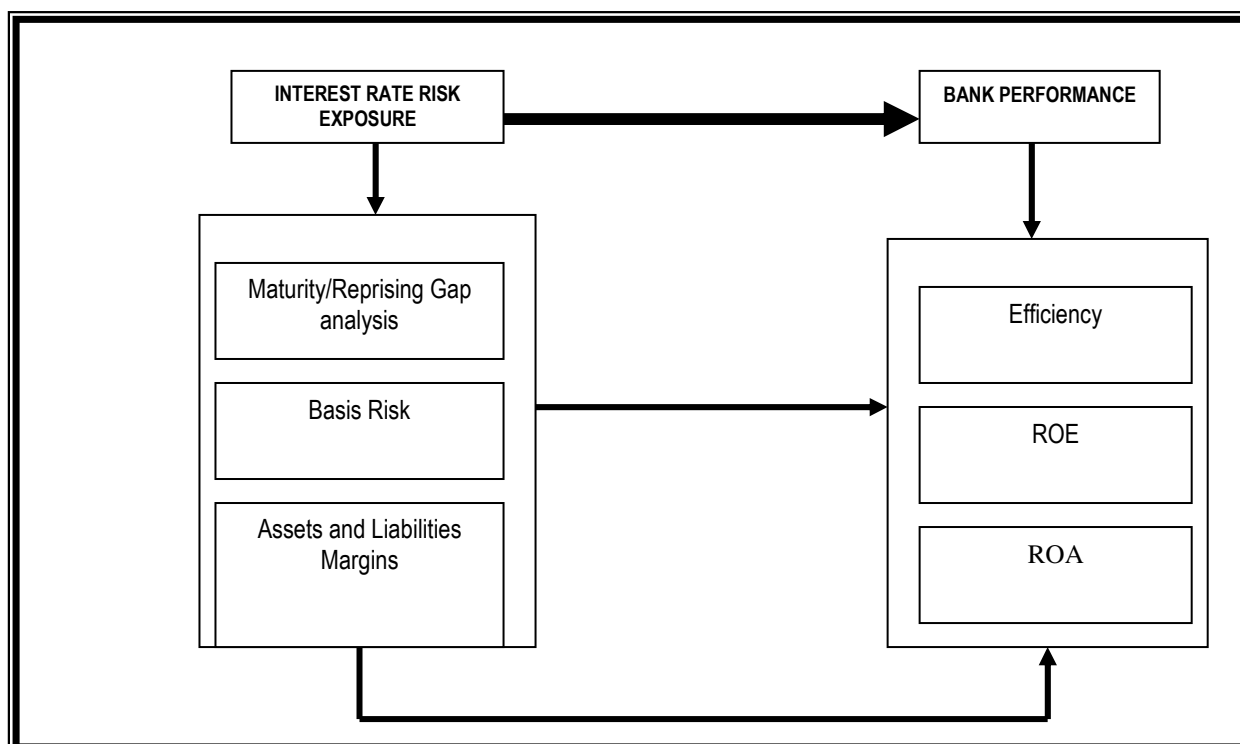
Source: Developed from Literature

3.0   Review of Literature

The interest rate risk exposure and bank financial performance related literature was reviewed, critiqued and the relationship of the two variables

3.1   Interest rate risk exposure

The traditional forms of intermediation were still the most important business types for credit institutions (Doran and Fitzpatrick, 2003), and it was this traditional form of intermediation that leaves Banks open to interest rate risk exposure and to duration or maturity mismatch exposure, which arose when Banks borrow short and lend long. As a result, credit institutions had increasingly used derivatives products as part of their interest rate exposure risk management strategy (Brewer et al., 2001), as well as on a speculative basis in response to the increasing development of Banks" off-balance sheet business through financial innovation and also on behalf of non-Bank customers.

Mata (2007) reported that the study of Maher (1997) asserted the Bank stock returns for the United States for the period from 1976 to 1989 found hardly any significant interest rate sensitivity. His conclusion was that the U.S. Banks must have reduced their risk exposure by successfully employing risk management tools such as futures, option, swaps, etc. The second explanation was that there might not have been a large enough maturity risk premium in the term structure to justify a too high risk exposure. One important conclusion of the study was that the availability of more advanced risk management techniques such as off-balance sheet transactions had resulted in a smaller amount of interest rate sensitivity for Banks. Mata (2007) also indicated that the insights on the relationship between maturity transformation and risk premium as well as between risk exposure and off-balance sheet activities had already been derived and shown much earlier as depicted from the studies of Bessler & Booth (1989) and Bessler, Booth, & Foote (1989). According to Rama (2003) indicated that interest rate risk exposures refers to a risk posed by changing interest rates which had a direct impact on the interest earned on loans and investments and the interest paid on deposits. Interest rate risk exposures was all about managing the net interest margin (interest income minus interest expense) and controlling the risk posed by changing interest rates while trying to take advantage of changing interest rates. He also stated that even when interest rates change a bank can control interest rate risk by matching the reprising maturities of assets and liabilities. If both an asset and a liability were reprised at the same time a Bank would be able to maintain net interest margin as interest cost and interest earnings either go up or down simultaneously. However, the realities of the market might be such that a Bank might not be able to match maturities of assets and liabilities. In a situation where interest rates were falling this would be an advantage to the Banks. Similarly, interest rates rose this would go

against a Bank which was financing long term loans with short term deposits (Mishkin and Eakins, 1998)

Risks of Commercial Banks were hard for outsiders to judge because of the nature of loans they hold and the derivatives they trade in the financial markets (Morgan, 1997). He also asserts that the loan portfolios held by a Bank and the trading of derivatives increased the opaqueness of Banks and made the risk elements more complex to assess. In Van den Heuvel (2002), also concurred that mismatch on Bank's balance sheet gives rise to a Bank's capital channel through which monetary policy affects its lending through its directives on Bank's equity capital level. His study further concluded that lending depends on capital structure of the Bank. Banks which were well capitalized tended to lend more than they would if faced with financial constraints. In trying to maintain liquidity, Banks transform short liabilities into longer assets. Similarly, Schneider (2001) asserts that Banks of different sizes differ in composition of both the asset and liability side of the balance sheet. He also explains that small and rural Banks hold less risky assets and more security as a fraction of total asset than big Banks. He further maintains that small Banks fund their portfolios through core deposits rather than money market funding. In a related study, Estasy, Navasimhan and Tufano (1996) maintain that interest rate movements affect Bank earnings and value. They also concurred that Banks acknowledge this in their asset and liability management process. In addition, interest rate changes affect the value of individual assets and liabilities.

3.2. FINANCIAL PERFORMANCE OF BANKS

Bonin, Hasa, and Wachtel (2003) explained that Banks in developing countries had a high percentage of fixed assets compared to their counterparts in developed countries, and thus their performance was lower than the Commercial Banks in developed countries. They also assert that Banks that operated in developing countries but foreign owned perform better than those owned locally. In addition, Hasan and Marton (2003) concurred that efficient Banks create an environment that forces the entire Banking system to become more efficient. Similarly, Beck, Cull and Jerome (2005) examined Bank performance using ROE and ROA and found that most Banks in developing countries had common characteristics, which include; that prior to privatization, they performed poorly as compared to their performance after privatization. Various measures of rates of return were used mainly for performance. Banks agreed with the opinion that "Relying too heavily on just a few indicators of Bank profitability could be misleading. While ROA, ROE, and interest margin (and noninterest expenses) to gross income remains the key measures, they should ideally be supplemented by the analysis of other operating ratios" (Sundararajan, 2002, p.20). In his study, he presented one of the possible approaches to such financial analysis using the modified version of DuPont analysis (see Cole, 1973), which was similar to Dietrich's (1996) approach, and the novel matrix approach which was firstly presented in Vensel, 1997 (see also Vensel, 2001). The profitability and efficiency were the critical management variables in Bank financial management [Sinkey (1989) and Prefontaine & Thiebault (1993). Any Bank which successfully manages these above critical variables was able to achieve success in profitability management which was what Bank financial management was all about. While comparing different Banks on the above facets, it was important to also recognize that there were tradeoffs between the variables. Comparing the profitability management of Banks could to some extent reveal how the trade offs were managed.

3.3   Interest rate risk exposure and Financial Performance of banks
3.3.1 Maturity/reprising gap and Bank performance

Interest rate risk was explained either by reprising risk, yield curve risk or basis risk (Brewer et al., 2001). They also explained that a Bank faces a basis risk if either the average yield on its assets or liabilities was more sensitive to changes in market interest rates. The difference in sensitivity could reflect a number of possible mismatches in characteristics of assets and liabilities. For instance, fixed rate assets and liabilities could have different maturities. Similarly, in English (2002), floating rate assets and liabilities had different reprising periods with base rates that have maturities similar to their respective reprising periods (assets that reprise annually based on one year rate and liabilities that reprise quarterly based on a three-month rate). Floating rate assets and liabilities could have base rates of different maturity rates. English further explained that reprising decision depends on many factors in addition to market interest rates (i.e. behaviour of Bank customers, extent of competition). Floating rate assets and liabilities that reprised at similar maturity still might involve interest rate risk if the instruments had different base rates. The yield of a Bank's floating rate assets could be tied to government security yields, while those on its floating liabilities tied to an inter-Bank rate (**H1**)

3.3.2   Basis risk and Bank performance

Banks reduced interest rate exposure by matching interest rates of liabilities with that of their assets by reducing their cash flows, this resulted in reducing their financial distress; they could also avoid expensive external capital (Faulkender, 2005). He also asserts that a Bank could reduce its cost of capital and thus interest rate exposure

selection was driven down by the movement in interest rates. Tufano (1995) proposed that Banks could reduce their interest costs by actively managing the interest rate exposure. He further explained that as interest rate changes, the yield curve was steep and Banks that selected floating interest rate exposure would have significantly lower interest costs, at least in the short term, than Banks with fixed exposure. Similarly, a Bank that issued fixed rate debt had the same interest rate exposure, and therefore received the same theoretical benefits of smooth cash flows as that which issued floating rate debt and swaps it to a fixed rate. Banks also faced interest rate risk through interest sensitivity of their non-interest income (lower mortgage interest rates). This could lead to prepayments that depleted the pool of mortgages serviced by a Bank, thus trimming its fee income. For large Banks, significant interest rate exposures embedded in their off-balance sheet positions either in a hedge of their on-balance sheet interest rate exposures or through trading activity in derivative markets. Banks generally had a mix of all types of interest rate risk with the effect potentially offsetting or reinforcing one another (**H2**)

3.3.3   Asset and liability margins and Bank performance

In English (2002), interest rate changes and slope of yield curve had significant effect on Bank's net interest earnings. Returns on Bank's liabilities were thought to relatively tie to short term rates and adjust to changes in short term rates quickly. Returns on Bank's assets were seen as more closely tied to longer-term rates and slower to adjust to changes in market rates and interest margins were expected to be higher when the yield curve was steeper for sustained period. It is noted that the most negative factor was the extremely rapid domestic credit expansion during the last years, funded by massive borrowing from abroad due to the sizeable interest rate differential (see, e.g., Krzak, 1998). Allayanis (1993) showed that asset and liability duration declined when embedded options were presented and where liability declined more substantially than asset. In his study, asset and liability duration mismatch and possibly a negative change in equity value when interest rates rose. Options adjusted duration matching strategy eliminates interest rate risk caused by duration mismatch. Similarly, Hull and White (1993) asserts that embedded option required perfect matching of an arbitrary yield curve and deterministic mean reverting feature as well as analytic formula for bond prices and European options. Estasy (1996) asserts that the level of interest rate, its level and trend was critical in influencing capital decision in firms. He further explained that for successful firms, their success depends on their effectiveness in managing the interest rate exposure. Merton (1995) also explained that risk management of financial institutions and the role of capital are attracting attention of both academic and practitioners which consistently helps in answering the challenges of growth. Another critical value of innovation was its ability of driving the global financial system towards greater economic efficiency. It also involved derivatives which expands opportunities for risk sharing, lowering transaction costs and reduced information asymmetry and agency costs (**H3**)

4.0   Research Methodology

This study used a longitudinal approach (secondary data). It covered a period of three years final accounts of Banks (2009, 2010 and 2011). However, the study was done in a single period (cross sectional). The approach was mainly quantitative technique. Long term data was analyzed, presented in descriptive and inferential statistics in order to draw conclusion. The data generated at this point was to examine interest rate risk exposures experienced by Commercial Banks. However, secondary data was collected from Bank records (financial statements, management reports and investment reports) to examine the Bank performance.

5.0   Results
5.1   Descriptive statistics of the variables

The analysis showed a summary of all commercial banks with the variables indicating marginal increase while others showed a decrease in the three years under investigation implying that deviation and variance of all the commercial banks in the financial sector were not practically able to achieve sound international standards of the camels measures and risk strategies in the economy. This also further suggests that the banking sector is still growing in terms of assets and liabilities and still exposed to various risks and challenges of minimizing costs as a result of competition**.**
[Insert table 1]
5.2   Interest rate risk exposure

1n 2009, the results showed three interest rate risk exposure ratios for the year 2009. Asset interest yield of the nine Banks were varied with Crane Bank having the highest yield at 13.58% and KCB Bank having the lowest at 5.48%. However Crane Bank also had the highest interest expense as shown by the Break Even Yield indicating that it could not take advantage of its high interest earning yield. KCB which had the lowest interest yield also

had the lowest break even yield at 1.80%. In terms of interest rate management, Centenary Bank showed the best performance since it had the best Net Interest Margin, in other words its spread management was the best of the nine Banks in year 2009.

[Insert table 2)

In 2010, the three interest rate risk exposure ratios for year 2010 were shown in the table given above. Interest yield variation in 2010 was quite similar to year 2009. While in year 2009 Inter-Bank variation was almost the same as in the year 2010, the interest variation was slightly above 8% (lowest 5.48% and highest 13.58%). Many of the Banks reported a slight decrease or increase in their interest yields. On the break even yield side (that was interest expense) all the Banks reported a lower level of break-even yield. In particular SCU had lower interest cost of 1.59% followed by Barclays Bank with 1.91% almost one percent lower than the previous year. Centenary Bank showed the best performance in terms of spread management with a Net Interest Margin (NIM) of 11.28%, followed by Crane Bank which reported a NIM of 9.62. All other Banks had a NIM of less than 6-7 %. Interest rate risk management of Centenary Bank and SCU were the best in both the years' in spite of the rapid fluctuations in interest rates in Uganda during these two years. (It was also worth to note that asset interest yield ratio was based on interest revenue which shows interest earnings net of reserved interest. Therefore interest yield also depends on the credit risk management abilities of the Bank and not just on portfolio mix and maturity management.

[Insert table 3]

In 2011, the three interest rate risk exposure ratios for year 2011 were shown in the table given above. Interest yield variation was high in year 2011 compared to year 2010. The interest variation increased by 2% for some Banks while for others, by less than 1% indicating that all Banks had changed their interest yield strategies while many of them reported a better improved interest yield of between 3-4%. On the break even yield, all the Banks reported a slightly high level of break even yield. In particular Crane Bank increased its interest cost to 4.86% followed by BOA with 4.28% almost above one percent higher than the previous year. Centenary Bank continued to show the best performance in terms of spread management with a Net Interest Margin (NIM) of 13.22%, followed by Crane Bank which reported a NIM of 10.38%. All other Banks had their NIM improved slightly by almost one percent. Interest rate risk management of Centenary Bank, Crane Bank, Barclays Bank and SCU were the best in the three years' period in spite of the rapid external shocks in the market.

[Insert table 4]

This explains the One Year Interest Rate Sensitivity Gap or cumulative gap for different Commercial Banks and the size of the gap in relation to assets. KCB Bank was maintaining the lowest Gap/Assets ratio at 1% in 2010 while Baroda Bank had the highest negative Gap/Assets at 17% in 2011. As discussed earlier if interest rates increased by 1% Baroda Bank would stand to lose while if interest rates decreased by 1% the Bank would stand to gain in net interest income. Compared to the norm, that gap should not exceed 10% of assets and all the Banks in Uganda had varying gaps. Such a gap was not necessarily risky. Gap figures reported by the nine Banks showed that the Gap/Assets ratio had increased further as compared to year 2010. On the other hand DFCU Bank had reduced the gap significantly to 4% in 2010 but rose to 8% in 2011, which was below the 10% norm. Barclays Bank and KCB Bank gap percentages were quite high at 15% in the positive side and (20%) in the negative side respectively. One of the advantages with maintaining such a high positive gap was that the Bank might be able to reverse the gap very quickly in case it expects a decrease in interest rates during the coming year. In the earlier discussion on interest rate risk management using NIM ratio (net interest margin) the researcher concluded that Centenary Bank, Crane Bank, Barclays Bank and SCU were the best as they had managed to improve their NIM during a period of fluctuating interest rates. However in terms of interest rate risk management as measured by Gap/ Assets ratio both Banks were not necessarily open to risk.

[Insert table 5]

5.2 Financial performance of banks

The financial performance of Commercial Banks were rated using profitability ratios for example ROA and ROE while Efficiency Ratios were given by ratio of Interest Revenue to Assets, and similarly to Customer Loans and Advances to analyze the performance of each individual Commercial Bank. The profitability ratios were used to analyze the financial performance of Commercial Banks as discussed below.

Profit margins (PM) of Commercial Banks had tended to vary from one Bank to the other. For example in year 2009, Bank of Baroda reported a PM as high as 54% while in the same year Barclays Bank reported a PM of only -4%. An analysis of profit margin ratios of various Banks over the period 2009 to 2011 showed that DFCU, Crane, Baroda and SCU had been successful in profit margin management which also indicated that these Banks probably had been able to control their non-interest costs and loan losses as well.

Asset yields of Commercial Banks during the period 2009 to 2011 had been varying in the range of -2% to 3%.

Analysis of asset yields of various Commercial Banks over the period 2009 to 2011 shows that some Banks had consistently been able to earn higher asset yields. Specifically the study found that Crane and Centenary Banks had higher asset yields of more than 14-18% in most of the three years for which the data was analyzed. Good interest rate risk management practices and asset mix decisions might be the reasons for these Banks ability to generate higher asset yields.

Financial leverage in the nine Commercial Banks during the period 2009 to 2011 had been in the range of 9.47 times (BOA in year 2011) to 6.71 times (Barclays in year 2010). BOA in general had been following a practice of maintaining a high leverage of around 9 (assets were 9 times the equity) while SCU and DFCU had been following a policy of low leverage of around 7 to 9. Obviously BOA would therefore be able to generate a higher ROE compared to the other Banks for the same level of operational profitability – ROA. For example in year 2010, Crane Bank which had an ROA of 7.0% reported a ROE of 36% while SCU which had an ROA of 5% reported an ROE of only 32%. If the study agreed that shareholders and investors were ultimately interested in ROE then Crane and SCU Bank's performance was better. Crane and SCU Banks had been able to achieve this result because it had leverage ratio of 5.5 and 7.8 in that year

Analysis of ROE trends in the nine Commercial Banks over the period 2009 to 2011 indicated that year 2011 was a good year for Banks in general. Further the ratios reported above also showed that the good performance in 2011 was mainly due to good profit margins generated by Banks in that year. Similarly year 2009 and year 2010 ratios showed that poor profit margins had a significant impact on return on equity in these years. Asset Yield and leverage variations from year to year had been less important. The conclusion therefore was that Commercial Banks should focus on factors influencing profit margins like cost management and credit risk management practices.

[Insert table 6]

BANK EFFICIENCY

The results indicate that centenary Bank had utilized its assets by 16% both in 2009 and 2011 while KCB had the lowest utilization of the assets by 5% in 2010. On the average the Commercial Banks had a good utilization level of their assets between 10% - 14% showing a moderate utilization of the assets to generate more interest revenue. The turnovers of Commercial Banks had tended to vary from one Bank to the other. For example in year 2009 one Bank reported a turnover as high as 122 days in a year while in 2011 another Bank reported a turnover of only 52 days. The Banks were on average having a turnover of 70 days on loan and advances recovery from the customers. However, Banks with high turnover days probably meant that their customers had contracted longer term loans over the period under review.

5.3 The relationship of the variables

Correlation analysis of the variables

H1: Maturity/reprising gaps and Bank performance

The Basis risk, assets and liabilities margins, ROE, ROA and efficiency was positively correlated with maturity/reprising gaps ($r=.348$, $r=.285$, $r=.259$, $r=.531$, $r=.444$, $p<.01$). The findings showed that Commercial Banks that had wide gaps had better maturity/reprising gap management strategies.

H2: Basis risk and Bank performance

The Assets and liabilities margins, ROE, ROA and efficiency was positively correlated with basis risk ($r=.354$, $r=.266$, $r=.351$, $r=.578$, $p<.01$ and $p<05$). This implies that the basis risk was fairly managed by Commercial Banks using robust risk management strategies to overcome shocks.

H3: Assets and liabilities margins and Bank performance

The ROE, ROA and efficiency were positively correlated with assets and liabilities margins ($r=.584$, $r=.725$, $r=.840$, $p<05$). This implies that Commercial Banks that had moderate margins that would most likely be more profitable and less risky. Further on that, ROE had a strong positive relationship ROA and efficiency ($r=.903$, $r=.429$, $p<01$ and $p<05$) While ROA had also a strong positive relationship with Efficiency ($r=.618$, $p<05$). This also suggests that on the dependent variable ROA showed a strong influence than efficiency.

The regression model of the variables

The regression model below indicated that maturity gaps had a significant relative positive effect on the Banks performance (beta = .149, $p<.137$). This implied that maturity gaps by Commercial Banks were managed prudently well and less exposure to external shocks. It also further revealed that basis risk did not have a significant effect on Bank performance (beta = .279, $p>.010$), implying that the basis risk of the Commercial Banks was not a good predictor of financial performance. While Assets and liabilities margins also had a strong positive effect on the performance of Commercial Banks (beta = .701, $p<.000$) indicating that the margins were better maintained by the Banks. In addition, a combined variation of maturity gaps, basis risk and assets and

liabilities margins for all the Commercial Banks accounted for up to 79.4% (Adjusted R square = .794) variation in their Banks performance. The model also explained the variation of 34.468% (F=34.468, p<.01), implying that the performance of the Commercial Banks would predict maturity gaps, basis risk, and assets and liabilities margins.

6.0   Discussion

On Interest rate risk exposure, asset interest yields of the nine Banks were varied with Crane Bank having the highest yield at 13.58% and KCB Bank having the lowest at 5.48%. However Crane Bank also had the highest interest expense as shown by the Break Even Yield indicating that it could not take advantage of its high interest earning yields. KCB which had the lowest interest yield also had the lowest break even yield at 1.80%. Interest yield variation was quite similar in year 2009 compared to year 2010. While in year 2009 Inter-Bank variation was almost the same as in the year 2010 where interest variation was almost above 8% (lowest 5.48% and highest 13.58%). All Banks managed to maintain the interest yields while many of them reported a slight decrease or increase in interest yield. On the break even yield side (that was interest expense) all the Banks reported a lower level of break-even yield. The findings above concurred with the studies of Mata (2007), who reported that the study of Maher (1997) asserted the Bank stock returns for the United States for the period from 1976 to 1989 found hardly any significant interest rate sensitivity. He also further concluded that the U.S. Banks must have reduced their risk exposure by successfully employing risk management tools such as futures, option, swaps, etc. The second explanation was that there might not have been a large enough maturity risk premium in the term structure to justify a too high risk exposure. The findings also revealed interest yield variation was high in year 2010 compared to year 2011. The interest variation increased by 2% for some Banks while others less than 1% indicating that all Banks had changed their interest yield strategies while many of them reported a better improved interest yield of more than 3-4%. On the break even yield, all the Banks reported a slight high level of break-even yield. This was supported by the studies of Rama (2003) who stated that even when interest rates change a Bank can control interest rate risk by matching the reprising maturities of assets and liabilities. He also added that if both an asset and a liability were reprised at the same time a Bank would be able to maintain net interest margin as interest cost and interest earnings either go up or down simultaneously. However, he further indicated that the realities of the market might be such that a Bank might not be able to match maturities of assets and liabilities. Contrary to the above authors, Mishkin and Eakins (1998) asserted that in a situation where interest rates were falling this would be an advantage to the Banks. However if interest rates rose this would go against a Bank which was financing long term loans with short term deposits.

The findings also indicated that all the Banks had a positive gap. However there were wide variations in the size of the gap. KCB Bank was maintaining the lowest Gap/Assets at 3.78% while Baroda Bank had the highest Gap/Assets ratio at 19.32% in 2009. Compared to the norm that gap should not exceed 10% of assets and all the Banks in Uganda had a low gap. Such a gap was not necessarily risky. Schneider (2001) asserts that Banks of different sizes differ in composition of both the asset and liability side of the balance sheet. He also explains that small and rural Banks hold less risky assets and more security as a fraction of total assets than big Banks. He further maintains that small banks fund their portfolios through core deposits rather than money market funding. The findings also revealed that gap figures reported by the nine Banks showed that the Gap/Assets ratio had increased further as compared to year 2010. However in terms of interest rate risk management as measured by Gap/ Assets ratio, the Banks were not necessarily open to risk. Estasy, Navasimhan and Tufano (1996) maintained that interest rate movements affect Bank earnings and value. They supported that Banks acknowledge this in their asset and liability management process.

On Financial performance of Commercial Banks, the study findings indicated that profit margins of Commercial Banks had tended to vary from one Bank to the other. Asset yields of Commercial Banks during the period 2009 to 2011 had been varying in the range of -2% to 3%. Further analysis of asset yields of various Commercial Banks over the period 2009 to 2011 shows that some Banks had consistently been able to earn higher asset yields. Financial leverage in the nine Commercial Banks during the period 2009 to 2011 had been in the range of 9.47 times (BOA in year 2011) to 6.71 times (Barclays in year 2010). The above findings were in disagreement with the studies of Bonin, Hasa, and Wachtel (2003) who had explained that Banks in developing countries had a high percentage of fixed assets compared to their counterparts in developed countries, and thus their performance was lower than the Commercial Banks in developed countries. In addition, Hasan and Marton (2003) concurred with the findings that the efficient Banks create an environment that forces the entire Banking system to become more efficient. Similarly, Beck, Cull and Jerome (2005) who had also examined Bank performance using ROE and ROA and found that most Banks in developing countries had common characteristics, which include; that prior to privatization, they performed poorly as compared to their performance after privatization

Analysis of ROE trends in the nine Commercial Banks over the period 2009 to 2011 indicated that year 2011 was a good year for Banks in general. Further on that the ratios reported above also showed that the good performance in 2011 was mainly due to good profit margins generated by Banks in that year. Similarly year 2009 and year 2010 ratios showed that poor profit margins had a significant impact on return on equity in these years. Asset Yield and leverage variations from year to year had been less important. On the average the Commercial Banks had a good utilization level of their assets between 10% - 14% showing a moderate utilization of the assets to generate more interest revenue. The turnovers of Commercial Banks had tended to vary from one Bank to the other. The studies of (Sinkey (1989) and Prefontaine & Thiebault (1993) also concurred with the findings that profitability and efficiency were the critical management variables in Bank financial management in order to be able to achieve success in profitability management and they also recognized that there were trade-offs between the variables.

The study examined the relationship between interest rate risk exposure and financial performance of Commercial Banks and the findings indicated that that maturity gaps had a significant positive correlation with Banks performance (beta = .149, p<.137). This was in agreement with English (2002) who asserted that floating rate assets and liabilities had different reprising periods with base rates that have maturities similar to their respective reprising periods (assets that reprise annually based on one year rate and liabilities that reprise quarterly based on a three-month rate).

The findings continued further to indicate that basis risk did not have a significant effect on Bank performance (beta = .279, p>.010),. This was in disagreement with the studies of Faulkender 92005) who asserted that a Bank could reduce its cost of capital and thus interest rate exposure selection was driven down by the movement in interest rates. Tufano (1995) had also proposed that Banks could reduce their interest costs by actively managing the interest rate exposure. He further explained that as interest rate changes, and if the yield curve was steep, Banks that selected floating interest rate exposure would have significantly lower interest costs, at least in the short term, than Banks with fixed exposure. The assets and liabilities margins also had a positive effect on the Banks performance of Commercial Banks (beta = .701, p<.000) indicating that the margins were better maintained by the Banks. This was in agreement with English (2002) who stated that interest rate changes and slope of yield curve had significant effect on Bank's net interest earnings. Krzak (1998) and Allayanis (1993) concurred that asset and liability duration declined when embedded options were presented and where liability duration declined more substantially than asset. He further concluded that asset and liability duration mismatch and possibly a negative change in equity value would arise when interest rates rose. While Hull and White (1993) asserted that embedded options required perfect matching of an arbitrary yield curve and deterministic mean reverting feature as well as analytical formula for bond prices and options

7.0 Summary and Conclusion

The overall analysis of interest rate risk exposure and Bank performance showed generally a positive relationship except basis risk. The variance in the financial performance of the Commercial Banks was inclined to variance in maturity gaps and assets and liabilities margins. On the relationship, it indicated that maturity gaps contributed more to Bank performance, followed by assets and liabilities margins and basis risk with low influence in Bank financial performance.

8.0 Recommendations

In order to ensure sustainable financial performance, Commercial Banks need to develop policies and resources tended to manage asset and liability duration mismatches effectively. Basis risk may not have manifested its influence in Banks' financial performance because of the markets insensitivity to interest rate changes on both interest earning assets and liabilities, which gives Banks ability to hedge and neutralize its effects on Net Interest Margins. However, as the market's sensitivity to interest rate develops, this risk needs to be properly attended to. Variation of Net interest Margins which has a direct relationship to Banks' financial performance should be effectively monitored by Commercial Banks to manage earnings volatility, so as to achieve profitability goals and increase value of the organization.

References

ACCA (2007). Strategic financial management. Foulklinch

Altman, E., I., & Saunders, A. (1998). Credit risk measurements: development over the last 20 years. Vol. 21, pp. 1721- 1741

Bank of Uganda (BOU: 2002) Quarterly Economic Report; March 2002, vol.01/2002 Appendix 26

Berkowitz, J. (2002). Testing the distributional assumptions embedded in risk models. University of California, Jan, 14th , 2002

Bliss, R. R. (1997). Movements in the term structure of interest rates. Federal reserve Bank of Atlanta. Economic review 4th quarter, 1997

Brewer, E., Jackson, E. W. & Moser, J. T. (2001). The value of using interest rate Derivatives to manage risks at US Banking Organizations

Brewer, E., Jackson, E. W., & Moser, J.T. (2001). The value of using interest rate derivatives to manage risks at US Banking organizations. Federal Reserve Banks of Chicago. 3rd quarter, 2001

Cummins, J., D., Harrington, E.S., & Klein, R. (1995). Insolvency experience, risk based capital and prompt corrective action in property liability insurance. Financial institutions center, Wharton school, Pennsylvania

English, W. (2002). Interest rate risk and Bank net interest margin, BIS Quarterly Review, Dec. 2002

Estasy, B., Narasimbham, B., & Tufano, P. (1996). Interest rate exposure and Bank mergers. Financial institutions centres. Wharton school, Pennsylvania

Estasy, B., Narasimbhan, B., & Tufano, P. (1996). Interest rate exposure and Bank mergers.

Fen, W., G., Post, M. & Sharpe, A., S. (1996). Debt maturity and the use of interest rate derivatives by non-financial firms.Financial institution centre, working paper 96-45

Financial Institutions Regulation (FIR) 2005 – Statutory Instrument 2005, No 26.

FSR-2005 – Financial Stability Review 2005 - of the Belgian Banks

Jackson, P. & Perrandin, W. (2000). Regulatory implications of credit risk modelling. Journal of Banking and finance, vol. 24, pp. 1- 14

Kimball, R.C. (2000). Failures in risk management. New England economic review. Jan/feb, 2000

Knauber, P. (2001). Software product lines: economic architectures, & implications. Intellectual conference on software engineering, Toronto, Ontario

Koch, Timothy W and MacDonald, Scott S, 2000: "Bank Management" 4th Ed, Chap. 9.

Merton, C., R. (1995). Financial innovation and the management and regulation of financial institution, journal of Banking and finance, vol.19, pp.461-481

Merton, C. R. (1995). Financial innovation and the management and regulation of financial institutions. Journal of Banking and finance, vol. 19, pp. 461- 481

Neftci, N. S. (2000). Value at risk calculations, extreme events, and tail estimation. Journal of derivatives, vol. 1, pp. 1- 15

Patnaik, I. & Shah, A. (2003). Interest rate risk in the Indian Banking system; http:/www.mayin.org/~ajayshah

Patro, K., Wald, J.K. & Yangru, Wu (2002). Explaining exchange rate risk in world stock markets: panel approach, vol. 26, pp. 1951- 1972

Reinhart, V. & Sack, B. (2001). The changing information content of market interest rates BIS papers vol. 12 pp. 340- 357

Robinson, Kenneth J 1995, "*Interesting Times for Banks Since Basel*". Federal Reserve Bank of Dallas Financial Industry Studies, pp. 9-15

SUE 2000: State of Uganda's Economy – September 1st 2000. pp 18.

Samuel Odeke obtained a B.Com (Hons) degree majoring in Finance from Makerere University, Kampala, Uganda in 1988 and a Master of Science degree in Accounting and Finance from Makerere University, Kampala, Uganda in 2014. Currently, he is the Chief Executive Officer, at Commercial Bank of Africa (Uganda) Ltd. Previously worked with Barclays Bank of Uganda, Bank of Africa, United Bank of Africa and Orient Bank mainly in Corporate Treasury.

James Odongo obtained a BBA (Hons) degree in Business Administration from Makererere University, Kampala, Uganda in 2005 and a Masters degree in Science of Accounting and Finance from the Makerere University, Kampala, Uganda in 2013. Currently, He is the Part-Time Lecturer at Makerere University Business School, Arua Campus and working as a Country project manager for African Children and Families Support in

Bid proposal writing, Research, Monitoring and Evaluation. Previously worked in the Research Directorate of the Parliament of Uganda as a Research officer (Graduate Intern), Finance and Administration Manager in International Lifeline Fund, Part-Time Lecturer in All Saints University, Lango, and Financial consultant in I-Come International Development Associates.

Appendices

Table 1: Descriptive statistics of the variables

Year		2009			2010			2011		
Descriptives	N	Mean	Std. Deviation	Variance	Mean	Std. Deviation	Variance	Mean	Std. Deviation	Variance
Asset interest yield	9	9.732222	2.606827	6.795544	9.732222	2.606827	6.795544	11.21889	2.859604	8.177336
Break even yield	9	3.197778	1.654674	2.737944	2.798889	0.830714	0.690086	3.341111	0.991709	0.983486
Net interest margin	9	7.115556	3.78744	14.3447	6.931111	2.387569	5.700486	7.877778	2.704777	7.315819
Relative gap/cummulative gap	9	8.297778	5.890959	34.70339	10.55556	4.503085	20.27778	12.55556	5.897269	34.77778
Financial leverage	9	6.556667	2.967271	8.8047	8.444444	2.640867	6.974178	7.066667	1.828668	3.344025
Assets yield	9	0.104444	0.051017	0.002603	0.102222	0.027739	0.000769	0.115556	0.030867	0.000953
Profit margins	9	0.206667	0.194422	0.0378	0.161111	0.435013	0.189236	0.322222	0.131793	0.017369
ROE	9	0.157778	0.125676	0.015794	0.104444	0.370071	0.136953	0.243333	0.085586	0.007325
ROA	9	0.023333	0.020616	0.000425	0.022222	0.035978	0.001294	0.036667	0.019365	0.000375
Int. revenue to assets	9	0.103333	0.046368	0.00215	0.097778	0.028626	0.000819	0.112222	0.029059	0.000844
Debtors turns	9	73.46667	35.19912	1238.978	73.55556	16.37919	268.2778	77.88889	18.31287	335.3611

Table 2: Interest rate risk exposure ratios of Commercial Banks, Year 2009

INTEREST RATE RISK EXPONSURE RATIOS OF COMMERCIAL BANKS			
YEAR 2009			
	Asset Interest Yield (%) (interest revenue)	Break Even Yield (%) (interest expense)	Net Interest Margin (%) (spread)
Baroda	9.03	3.57	6.06
Barclays	8.80	3.23	6.96
SCU	8.36	0.00	0.00
Centenary	13.55	2.27	14.20
Crane	13.58	5.56	9.58
DFCU	11.03	4.40	8.49
Diamond Trust	8.37	3.48	5.16
BOA	9.39	4.47	6.16
KCB	5.48	1.80	7.43

Source: Financial statements of Commercial Banks in Uganda, 2009

Table 3: Interest rate risk exposure ratios of Commercial Banks, Year 2010

INTEREST RATE RISK EXPONSURE RATIOS OF COMMERCIAL BANKS			
YEAR 2010			
	Asset Interest Yield (%) (interest revenue)	Break Even Yield (%) (interest expense)	Net Interest Margin (%) (spread)
Baroda	9.03	3.15	5.88
Barclays	8.80	1.91	6.88
SCU	8.36	1.59	6.76
Centenary	13.55	2.27	11.28
Crane	13.58	3.96	9.62
DFCU	11.03	3.52	7.51
Diamond Trust	8.37	2.67	5.70
BOA	9.39	3.71	5.68
KCB	5.48	2.41	3.07

Source: Financial statements of Commercial Banks in Uganda, 2010

Table 4: Interest rate risk exposure ratios of Commercial Banks, Year 2011

INTEREST RATE RISK EXPONSURE RATIOS OF COMMERCIAL BANKS			
YEAR 2011			
	Asset Interest Yield (%) (interest revenue)	Break Even Yield (%) (interest expense)	Net Interest Margin (%) (spread)
Baroda	**11.69**	**4.08**	**7.62**
Barclays	**9.08**	**1.94**	**7.14**
SCU	**11.07**	**2.79**	**8.29**
Centenary	**15.58**	**2.36**	**13.22**
Crane	**15.25**	**4.86**	**10.38**
DFCU	**12.43**	**3.97**	**8.46**
Diamond Trust	**9.53**	**3.13**	**6.40**
BOA	**9.27**	**4.28**	**4.98**
KCB	**7.07**	**2.66**	**4.41**

Source: Financial statements of Commercial Banks in Uganda, 2011

Table 5: Cumulative gap of Commercial Banks, Year 2009, 2010 and 2011

INTEREST RATE RISK EXPOSURE RATIOS					
Year 2009		**Year 2010**		**Year 2011**	
	Cumulative Gap (0 – 12 months) RSA – RSL (in millions)	Cum Gap/ Assets (%)	Cumulative Gap (0 – 12 months) RSA – RSL (in millions)	Cum Gap/ Assets (%)	Cumulative Gap (0–12 months) RSA – RSL (in millions)	Cum Gap/Assets (%)
Baroda	(40,859,866)	(0.11)	(60,884,289)	(0.13)	(90,517,343)	(0.17)
Barclays	47,711,000	0.06	103,454,000	0.10	168,402,000	0.15
SCU	Nil	Nil	NIL	NIL	NIL	NIL
Centenary	350,779,397	0.16	(17,968,426)	(0.02)	82,983,734	0.42
Crane	17,778,031	0.04	36,319,681	0.05	93,467,616	0.10
DFCU	34,505,000	0.06	29,275,000	0.04	69,661,000	0.08
Diamond Trust	Missing information	Missing information	Missing information	Missing information	Missing information	Missing information
BOA	(10,554,000)	(0.05)	(27,022,000)	(0.10)	(98,239,000)	(0.24)
KCB	Missing information	missing information	1,257,792	0.01	(53,512,224)	(0.20)

Source: Financial statements of Commercial Banks in Uganda (2009, 2010, 2011)

Table 6: Profitability ratios of Commercial Banks, Year 2009, 2010 and 2011

	DUPONT MODEL			
	PROFITABILITY RATIO ANALYSIS			
	Ratios	2009	2010	2011
Baroda	ROE	24%	25%	26%
	Profit margins	54%	54%	51%
	Assets yield	8%	8%	10%
	Leverage	5.49	5.82	5.32
	ROA	4%	4%	5%
Barclays	ROE	-3%	6%	12%
	Profit margins	-4%	8%	15%
	Assets yield	12%	11%	12%
	Leverage	6.08	6.71	6.65
	ROA	0%	1%	2%
SCU	ROE	0%	32%	36%
	Profit margins	0%	39%	40%
	Assets yield	0%	10%	13%
	Leverage	0.00	7.87	7.23
	ROA	0%	4%	5%
Centenary	ROE	26%	26%	30%
	Profit margins	21%	23%	29%
	Assets yield	19%	16%	18%
	Leverage	6.47	6.98	5.99
	ROA	4%	4%	5%
Crane	ROE	33%	36%	34%
	Profit margins	44%	50%	51%
	Assets yield	14%	13%	14%
	Leverage	5.44	5.51	4.88
	ROA	6%	7%	7%
DFCU	ROE	25%	25%	27%
	Profit margins	31%	31%	32%
	Assets yield	10%	9%	10%
	Leverage	7.99	8.86	8.34
	ROA	3%	3%	3%
Diamond Trust	ROE	6%	19%	23%
	Profit margins	7%	18%	23%
	Assets yield	9%	9%	10%
	Leverage	10.37	11.76	9.97
	ROA	1%	2%	2%
BOA	ROE	13%	11%	14%
	Profit margins	15%	14%	17%
	Assets yield	10%	9%	8%
	Leverage	8.54	9.25	9.47
	ROA	1%	1%	1%
KCB	ROE	18%	-85%	17%
	Profit margins	18%	-92%	32%
	Assets yield	12%	7%	9%
	Leverage	8.63	13.24	5.75
	ROA	2%	-6%	3%

Source: Financial statements of Commercial Banks in Uganda, 2009, 2010 and 2011

Table 7: Efficiency ratios of Commercial Banks, Year 2009, 2010 and 2011

	Ratios	2009	2010	2011
DUPONT MODEL				
EFFICIENCY RATIO ANALYSIS				
Baroda	Int. Revenue to Assets	10%	9%	12%
	Banks advances and loans	91 days	72 days	81 days
Barclays	Int. Revenue to Assets	10%	9%	9%
	Banks advances and loans	76 days	74 days	82 days
SCU	Int. Revenue to Assets	0%	8%	11%
	Banks advances and loans	0 days	64 days	72 days
Centenary	Int. Revenue to Assets	16%	14%	16%
	Banks advances and loans	102 days	101 days	104 days
Crane	Int. Revenue to Assets	15%	14%	15%
	Banks advances and loans	122 days	95 days	102 days
DFCU	Int. Revenue to Assets	13%	11%	12%
	Banks advances and loans	88 days	81 days	87 days
Diamond Trust	Int. Revenue to Assets	9%	9%	10%
	Banks advances and loans	53 days	55 days	52 days
BOA	Int. Revenue to Assets	11%	9%	9%
	Banks advances and loans	75 days	66 days	60 days
KCB	Int. Revenue to Assets	9%	5%	7%
	Banks advances and loans	53 days	54 days	61 days

Source: Financial statements of Commercial Banks in Uganda, 2009, 2010 and 2011

Table 8: Correlation analysis of the variables

	1	2	3	4	5	6
Maturity/reprising gaps (1)	1					
Basis risk (2)	.348	1				
Assets & liabilities margins (3)	.285	.354	1			
ROE (4)	.259	.266	.584**	1		
ROA (5)	.531**	.351	.725**	.903**	1	
Efficiency (6)	.444*	.578**	.840**	.429*	.618**	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 9: Regression model of the variables

	Unstandardized Coefficients		*Standardized Coefficients*		
	B	Std. Error	Beta	T	Sig.
(Constant)	-4.564	8.163		-.559	.582
Maturity/reprising gaps	.644	.419	.149	-1.539	.137
Basis risk	.564	2.002	.279	2.820	.010
Assets and liabilities margins	6.331	.874	.701	7.247	.000
Dependent Variable: Bank performance					
R Square		.818	F Statistic		34.468
Adjusted R Square		.794	Sig (F Statistic)		.000