Mohamad Anuar Md Amin (Malaysia), Nur Azura Sanusi (Malaysia), Suhal Kusairi (Malaysia),
Zuhura Mohamed Abdallah (Tanzania)

Inverse relationship of financial risk and performance in commercial banks in Tanzania

Abstract

Studies on the financial risks and financial performance of banks are very limited, especially in Tanzania. This study aims to examine the simultaneous influence of the financial risks and financial performance of commercial banks in Tanzania. The financial performance under consideration is return on assets and return on equity, while financial risk is the average of financial risks. The study employs the instrumental variable regression of fixed effect to solve simultaneous equations by two-stage least squares. By using unbalanced panel data of 21 banks from 2003 to 2012, the results show that by applying both ROA and ROE in the performance equation, financial risk is significant. Furthermore, by considering financial performance in the risk equation as endogenous, both ROA and ROE are significant. The implication of this result is that the inverse relation of financial risk and performance cannot be avoided; hence, the commercial banks together with the bank supervisors should make a trade-off between risk and performance.

Keywords: commercial bank; financial performance and financial risk.
JEL Classification: G21, G31.

Introduction

The banking sector is very important in respect of the financial allocation in the world due to its intermediation functions of transferring funds from surplus units to deficit units (Eken et al., 2012; Ongore, 2013). In performing and sustaining these functions, good financial performance must be generated from which financial risks may not be avoided.[1] In other words, financial performance and risk are two interdependent components that may either sustain banks or cause their closure, and they must be evaluated together (Boermans, 2011). Financial performance and risk are responsive to micro- and macroeconomic variables, such as off balance sheet items, real interest rate, inflation and capitalization and GDP growth.

Generally, over the last two decades, superior financial performance has become the main concern in numerous banking sectors in Africa. Africa's banking sector has found a means of improving performance by undertaking a primary transformation of the business. Through the transformation, competition has emerged in all banks, thereby forcing the sector to implement expansion strategies to diversify customer and product scope. Africa's banking sector has been growing vigorously and improving performance since introducing new forms of lending, rising income strategy and improving technology to broaden access to finance. On the other hand, changes have also become a threat to the African banking sector since the banks have been building complicated balance sheets with greater risks in assets and liabilities. For instance, they have been offering new products, such as new lending to improve performance that causes the borrower to default on loans payments, especially in respect of the loans offered to small and medium businesses, which constitutes a large portion of the loans in Africa. In addition, the banking sector has been introducing microfinance and Internet banking, which is risky, as most of the customers are poor, not familiar with the service and unaware of the Internet.

Tanzania's banking sector is one of Africa's banking sectors that, has undergone banking transformation making good progress and overcoming many challenges. The total number of banking institutions increased from 25 to 51 from 2006 to 2013, respectively. The amount of bank's assets and liabilities has expanded. Although the total assets of Tanzania's banking increased by 13.7 trillion between 2005 and 2011[2], there has been a decline in the percentage change of growth rate of 15%, which is very risky. The ratio of liquid assets to demand liabilities doubled the regulatory minimum limit of 20% at the end of March 2013. High liquidity is a source of financial risk since banks might lose revenue by not investing the additional amount above the regulatory amount. Again, although the banking sector lending to deposit improved by 16.8% from 2011 to March 2013, it was lower than the regulatory amount of 80%. This expansion in lending provides an insight into the existence of financial risk in terms of

[1] Financial risk is the probability of losing financial outcome caused by the financial activities of the banks, such as lending, investing, accepting deposits and borrowing.

[2] See BOT-DBS annual report (2009) and (2011).

customer failure to repay loans and interest. The value of assets, as calculated by the gross of non-performing loans to gross loans, was 7.9% in March 2013, which is higher than the acceptable ratio of 5%, and eroded the capital and the share of deposits in government securities from 19% to 14%. On the liability side, Tanzania's banking sector improved its amount of capital by 0.3 trillion in 2011. However, the ratio of core capital to total risk-weighted assets improved by 1% from 2012 to 2013, which is still more than the minimum capital required. Furthermore, the total revenue of the banking sector increased to TZS260 billion in 2011 due to the increase in interest revenue. In 2010, the banking sector profit after tax turn down by 18.1%[1]. The deposit also grew by 17% in 2011 but declined to TZS14.2 trillion by the end of March 2013. This was attributable to the unsteadiness of the micro and macro variables, such as capital, off balance sheet, GDP growth, inflation rates and interest rates. This provides an introduction to the erosion in performance and risks.

Due to the aforementioned circumstances, the government, central banks, international institutions and even scholars are aware of the risk and performance issues to serve the nation and world economy. For example, the Bank of Tanzania, in accordance with regulatory requirements, set the minimum capital balance for commencing a bank at TZS20 billion for each commercial bank, a minimum capital of core capital, and total capital of total risk weighted assets and off balance sheet exposure of 10% and 12%, respectively, and unimpaired capital of at least equal to the minimum cash requirement to insure soundness, solvency and continuity for each commercial bank (BOT, 2011). The BOT requires the banks to have minimum capital requirements for foreign exchange risk, interest rate risk and equity position risk by applying the standardized measurement method prescribed in the Basel Committee on Banking Supervision. The BOT also ensures that banks maintain a level of capital that is adequate to protect them against risk, ensures that the banks maintain capital adequacy standards in line with international standards, and promotes and maintains public confidence in the Tanzanian banking sector. Even though financial risk and performance have become a main concern of the national and international financial institutions, they mostly concentrate on the minimum capital requirements in risk reduction.

Notwithstanding the efforts of scholars, the information presented is insufficient to offer the best

knowledge of the simultaneous relation of risk and financial performance. This is because most have concentrated on the determinants of bank performance, the impact of individual risks on bank performance, determinants of financial risk and risk management. Hence, this study aims to show the instantaneous influence of financial risk and performance in the context of Tanzania by examining the influence of financial risk on financial performance and financial risk from the financial performance of the commercial banks in Tanzania. The study also inspects the direct factors on financial performance and financial risk changeability in Tanzania's commercial banks.

This paper, after introducing the study, presents the literature review and identifies the significant contribution and gaps in section 1. Subsequently, the methodology used to fill the gap in the previous studies is presented in section 2. The third section offers analysis and discussion of the study, and the final section provides the conclusion.

1. Literature review

Several studies have been conducted on the financial performance and risks of banks. Most of them concentrated on the performance evaluation of the banks, risk management, and impact of individual financial risks on performance, determinants of bank performance and determinants of financial risks, as in the research conducted by Athanasoglou et al. (2008), Tafri et al. (2009), Abdul Samad (2012), Qin & Pastory (2012) and Ruziqa (2013).

1.1. Performance, financial risk and their connection. Commercial banks financial performance is also known as profitability. It is normally measured in the form of ratios. According to Tafri et al. (2009), Qin and Pastory (2012) and Ruziqa (2013), financial performance is measured by return on assets (ROA), return on equity (ROE) and net interest margin (NIM). Simpasa (2011) measured the value of financial performance by return on average assets (ROAA), return on average equity (ROAE) and NIM. The performance is used to forecast the success or failure of commercial banks. Samad and Glenn (2012) in their study on the factors of US bank failure, found that return on assets was one of the significant performance factors in forecasting bank failures in 2009. The financial performance failure signifies financial risk. Financial risk means the probability of losing profit based on the financial characteristics of the bank (Yi Peng et al., 2011). Financial risk includes credit risk, liquidity risk, interest rate risk and exchange rate risk, which, together, contribute to the volatility of financial performance (Tafri et al., 2009; Dimitropoulos et al., 2010). Credit risk is the main

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[1] See BOT. Financial stability report (2011).

financial risk that hinders the performance of banks, especially in Africa. This is the risk of the varying net worth of the assets due to the failure of the contractual debt of the counter party to meet the obligation (Pyle, 1997). Credit risk is measured by the non-performing loan ratio (Ruziqa, 2013). Liquidity risk refers to the inability of the bank to reduce liabilities and increase assets[1]. According to Al-Khouri (2011), liquidity risk is measured as the liquid assets divided by deposits, and interest rate risk is the risk of lending or deposit interest rate fluctuation (Dimitropoulos et al., 2010). When the commercial bank lending interest rate is less than the deposit rate, or when the lending interest rate of the bank is greater than the market rate, or the deposit interest rate is less than the market, banks may face interest rate risk. Interest rate risk is measured by interest risk factors, such as total loans and total deposits (Ni, Fah, Nassir, 2009). The exchange rate risk is associated with depreciation in the local currency, an increase in prices and a decrease in output (Berument and Dincer, 2004). When a bank fails to put a fair price on currency when it sells and buys foreign currency or when foreign currency depreciates its value continuously the bank faces an exchange rate loss.

Generally, based on the risk and performance literature, performance and financial risk are two components that have a two-way interaction. Each component is important to the other to sustain the operation of the business. According to Hawley's (1893) risk theory of profit, profit is considered to be the return of risk as an additional factor of production and has a positive relationship with the risk. This means that the higher the factor (i.e., risk), the higher the profit and the higher the distributable return for the risk. This idea is supported by Aaker and Jacobson (1987), who argued that risk has a positive correlation with return on investment. These ideas become true when the banks manage risk by relocating funds in high-risk investments or loans with high return. Alternatively, the theory becomes fantasy when the banks face high risk and management fails to manage its occurrence and return. Conversely, Bowman (1979), in his paradox theory of risk and return, propounded that risk and return have a negative relation because managers can increase returns and reduce risk at the same time. In reality, this idea is true. When a bank fails to manage risk, the risk is high and the profit is low, and when the bank succeeds in managing risk, the risk is low and the profit is high. Similarly, Boermans (2011), in his study regarding firm performance under financial

constraints and risks: recent evidence from microfinance clients in Tanzania has shown a strong negative connection between financial constraints, risk and profits. This idea is similar to the outlook of Qin and Pastory (2012).

Distinctively, the connection between individual risks and performance has been shown by much of the empirical literature. Starting with credit risk, Athanasoglou et al. (2008), on bank-specific, industry-specific and macroeconomic determinants of bank profitability used the GMM technique for a panel of Greek banks covering the period from 1985 to 2001. They found that financial risk in the form of credit risk is a bank specific factor, and that credit risk negatively affects the performance of conventional banks. In addition, Tafri et al. (2009), in their examination of the impact of financial risks on the profitability of Malaysian commercial banks for the period of 1996-2005, using panel data regression analysis of generalized least squares, showed that credit risk has a negative and significant impact on ROA and ROE for both conventional banks and Islamic banks. Qin and Pastory (2012) observed that the level of nonperforming loan has a negative effect on profitability. Dimitropoulos et al. (2010) also found that credit risk has a negative and significant influence on return-earnings. It has been recognized that credit risk has a negative significant effect on both ROA and ROE (Ruziqa, 2013; Tabarin et al., 2013). Moreover, Abdus Samad (2012), using the probit model in his studies on the significant determinants between credit risk variables of the US bank failure in 2009, found that three credit risk variables – credit loss provision to net charge off, loan loss allowance to non-current loans, and non-current loans to loans – are significantly used for predicting bank failures, while the two remaining credit risk variables – net charge off to loans and loan loss to non-current loans – are not significant estimators for US bank failures. In contrast, Solomon and Muntean (2012), in their study on the assessment of financial risk on profitability, observed that financial risk (credit risk), which is presented by the financial leverage ratio, has a positive influence on profitability. Ayanda et al. (2013), in their study, revealed that credit risk is a significant variable that influences bank profitability in the long run and short run in Nigeria[2].

In respect of liquidity risk, Shen et al. (2009) signified that liquidity risk is negatively associated with bank performance. This observation is similar to the findings of Dimitropoulos et al. (2010), and Tabarin et al. (2013). Additionally, Tafri et al.

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[1] Basel Committee on Banking Supervision (1997).

[2] Credit risk is loan loss provision-total assets.

(2009) found that liquidity risk has a positive impact on ROA, a negative impact on ROE but an insignificant impact on both ROA and ROE. In a different way, Al-Khouri (2011), found that liquidity risk is negatively and statistically significant to ROA, and is positively related to ROE. Using ANOVA for three large banks, Qin and Pastory (2012) in their study on the profitability of commercial banks in Tanzania from 2000 to 2009, observed that liquidity has a positive impact in profitability. The results of Ruziqa (2013) indicated that liquidity risk has a positive significant effect on both ROA and ROE.

Ultimately, interest rate risk has a negative and or positive connection with performance. According to Tafri et al. (2009), interest rate risk has a negative and weak significant impact on ROE for conventional banks, but is insignificant for Islamic banks; in addition, interest rate risk has a positive and significant impact on ROA for conventional banks but is insignificant for Islamic banks. Dimitropoulos et al. (2010) found that interest rate risk has a positive influence on return-earning but that it is not significant.

In contrast, Haneef et al. (2012) underlined that banks with high profitability are less pressured into revenue creation and thus less constrained to engage in risky credit offerings. At the same time, inefficient banks are more likely to experience a high level of problem loans. Poor management can imply weak monitoring for both the operating costs and credit quality of customers, which may cause high levels of capital losses. Moreover, Muharam (2013), in his study on the influence of fundamental factors on the liquidity risk in the banking industry: comparative study between Islamic banks and conventional banks in Indonesia from 2007 to 2011, found that ROE has a negative and significant influence on liquidity risk in conventional banks, while ROA has a positive and insignificant effect. In Islamic banks, the research found that liquidity risk to ROE has a positive and significant impact.

1.1.1. The performance determinants of commercial banks. The observations of many researchers indicate that the failure or success of commercial banks is also determined by other micro and macro bank factors, such as off balance sheet items, inflation, and real interest rates[1].

Off-balance sheet activities are a bank specific variable. OBS activities increase profitability when the banks expand investment. However, an increase in OBS activities may lead to large losses if the banks fail to manage activities properly. The off balance sheet activities can be divided into two parts, non-interest income and the derivatives activities of the banks that are divided by total assets (Tafri et al., 2009; Rachdi, 2013). Goddard et al. (2004) studied the performance of European banks across six countries. They put forward that the relationship between the relative size of a bank's off-balance sheet portfolio and its profitability is positive for the UK, but negative for other European countries. Tafri et al. (2009) observed that off balance sheet activities in the form of credit are positively related to ROA for all conventional and Islamic banks, but weakly significant at 10% for all banks. They also observed that off balance sheet activities in the form of credit, have a significant relationship with ROE for Islamic banking while for derivatives they have a negative relation; they are significant at 5% for conventional banks but insignificant for Islamic banks. According to Rachdi (2013), in first difference regression, OBS was negatively insignificant to ROE and positively significant to ROA before the last financial crisis. However, during the financial crisis, the first difference results show the positive insignificance of OBS to ROA and a negative insignificance to ROE.

Moreover, inflation is a significant determinant of banks profitability. Inflation is a macroeconomic variable that is expressed through the consumer price index (Vejzagic, 2014). Even though many studies found that inflation rates have a positive influence on profitability, such as Athanasoglou et al. (2008), Aburime (2008), Tabarin et al. (2013) and (Vejzagic, 2014), the study conducted by Rachdi (2013) showed otherwise. He observed that inflation rates had a negatively significant influence on ROA and ROE before the financial crisis but after the crisis inflation had a negative influence on ROA but was positive on ROE.

Additionally, interest risk is a macroeconomic variable that affects bank performance. Aburime (2008), concerning the determinants of bank profitability-macroeconomic evidence in Nigeria, found that the real interest rate has a considerable link with ROA. He also found that the interest rate positively affects bank profitability. In addition, Alper and Anbar (2011), concerning bank specific and macroeconomic determinants of commercial bank profitability: empirical evidence from Turkey, found that the interest rate has a significant positive effect on profitability (ROE) and an insignificant positive effect on ROA. This relationship is consistent with the study conducted by Vejzagic

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[1] Tier one capital consists of common stock and disclosed reserves/retained earnings, but may also include non-redeemable non-cumulative preferred shares. This definition is based on Basel II.

(2014). However, Ramlall (2009) in a study on Taiwanese banking firms using the quarterly categorized financial data of 31 local commercial banks, found a negative impact for real interest rate on bank profitability.

In addition to the above factors, size, industry concentration, ownership status, bank assets, management decisions on financial statements, risk management, expenses management cyclical output, capital adequacy, bank capital, cost, broad money, GDP, GDG growth are determinants for the profitability of banks[1].

1.1.2. Financial risk determinants. Financial risk is determined by many micro and macro bank factors that include the capital of the banks and GDP growth.

Capital is the main source of financial risk if the bank fails to raise a reasonable amount required for the banking operation, or fails to make a good structure or through the misallocation thereof. Kithinji (2010) propounded that one of the key credit risks is low capital. This means that there is a negative association between capital and credit risk. Cucinelli (2013), using OLS regression based on panel data concerning the determinants of bank liquidity risk within the context of the Euro area, observed that capital is one of the influences on liquidity risk. The results emphasized that banks with higher capitalization have a lower liquidity risk in the long horizon. Ballester et al. (2009) stated that interest rate risks are positively determined by capital but insignificant.

Furthermore, GDP growth is another determinant of financial risk. Using an advanced panel data technique, Das and Ghosh (2007), in their study on the determinants of the credit risk of banks in emerging economies – Indian state-owned banks, for the period of 1994 to 2005, revealed that GDP growth has a crucial influence on problem loans. The results showed that GDP growth reduced problem loans, and that GDP growth is not persistent but affects problem loans quite quickly. According to his study on the macroeconomic determinants of the credit risk in the banking system for Greece, Ireland, Portugal, Spain and Italy for the period from 1997q1 to 2011q3, using dynamic panel data approaches, Castro (2012) found that credit risk increased due to the decrease in GDP growth.

In addition to the above determinants of financial risks are real loan growth, operating expenses, bank

size, institutional capacity, inappropriate credit policies, interest rates, poor management, liquidity levels, massive licensing of banks, poor loan underwriting, poor and reckless lending, government interference, inadequate supervision by the central bank, share price index, unemployment rate, credit growth, real exchange rate and financial crisis, reliance on funding from external sources, poor financial innovation and the linked securitization procedure, size, specialization, asset quality, deposits, loans, off balance sheet items and loan loss, re-pricing, yield curve, basis and optional, lack of adequate competition in the banking sector, explicit and implicit taxation, translation, fraud by the workers, economic situation of the country and reserve requirements[2].

Commonly, although studies on performance and risk have been done, most empirical studies have concentrated on the influence of individual risks on bank performance or bank performance on individual risk. Most of them rely on credit and/or liquidity risk, except Tafri et al. (2009) who added interest rate risk to show its impact on profitability, which is not sufficient to reach a conclusion about the significance of overall financial risk. Based on the researchers' knowledge these studies also ignore the simultaneous relationship. Moreover, country wise, in Tanzania, very few empirical studies have been conducted, particularly on risks and financial performance, which limits the knowledge of scholars and policymakers. Therefore, this study applies the average financial risk of credit risk, liquidity risk and interest rate risk, and, by using the simultaneous equation model – two-stage least squares, the solution of the two-way relationship of average financial risk and financial performance is offered based on Tanzania's situation.

2. Methodology

2.1. Data sources. The study relies on secondary data collection in the form of the comparative view of financial statements, annual financial reports and World Bank reports. Large amounts of data have been collected from the Central Bank of Tanzania but very little from individual banks. The World Bank database has also been used to acquire information, such as GDP growth, inflation rates and real interest rates.

This study utilizes unbalanced panel data that contain seven variables, which were attained by considering 21 commercial banks in Tanzania for

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[1] See Athanasoglou et al. (2008), Qin and Pastory (2012), Ruziqa (2013), Ayanda et al. (2013), Tabarin et al., (2013), and Almazari (2014).

[2] See Adetayo and Oladejo (2004), Das and Ghosh (2007), Shen et al. (2009), Gualandri et al. (2009), Ballester et al. (2009), Kithinji (2010), Varotto (2011), Castro (2012), Cucinelli (2013).

ten years from 2003 to 2012. This is because a panel data set is efficient, provides more information and accepts the heterogeneity of the banks unlike time series and cross sectional data.

2.2. Model specification. Much of the empirical literature applied a simple linear model, GLS, GMM or probit model to show the impact of individual risks on the financial performance of banks; however, they did not provide a solution to the endogeneity problem. To achieve the objectives of the research, this study estimates bank risk and performance by submitting an application of the simultaneous equation model (Schendel and Patton, 1978). The original equations of the model are as shown below:

$$Y_{1it} = \beta_{0i} + \beta_{1i}Y_{2it} + \beta_{2i}X_{1it} + \mu_{1it}, \tag{1}$$

$$Y_{2it} = \alpha_{0i} + \alpha_{1i}Y_{1it} + \alpha_{2i}X_{2it} + \mu_{2it}, \tag{2}$$

where, Y_{1it} and Y_{2it} are the dependent variables for equation one and two, and the endogenous variable for equation two and one that symbolize the financial performance and financial risk, respectively; X_{it} is the vector for the bank specific and macroeconomic variables; β_{1i}, α_1, β_{2i} and α_2 represent the coefficient of risks, financial performance, micro- and macroeconomic determinants of the bank financial performance and risk, respectively; μ_{1it} and μ_{2it} are the residual terms to reveal all the other variables that are not included in the equations due to their constraints, but which affect the profitability and financial risks, respectively; β_0 and $\alpha_0 = 1,..., N$, are specific bank constant coefficients for profitability and financial risk, respectively; $t = 1,..., T$, is the tth time period; $i = 1,..., N$, is the ith cross-sectional component.

The fixed effect model is estimated through instrumental variable estimation, which solves equation by applying the two-stage least squares method (2SLS) to examine the reciprocal of the model to solve the endogeneity problem. The study assumes that the error term has constant variance, and that the errors are not correlated within the equations. From 2SLS, stage one acquires and approximates the reduced form equations, and sets aside the fixed values for the dependent variables by using OLS, while stage two estimates the structural equation (Baltagi, 2010). The structural equations and reduced form of the equations are presented below:

The structural equations

$$(roa \, / \, roe)_{it}^{1/2} = \beta_0 + \beta_1(fr)_{it}^{1/1/2} + \beta_2 obs_{it} + \\ + \beta_3 infr_{it} + \beta_4 rir_{it} + \mu_{1it}, \tag{3}$$

$$(fr)_{it}^{1/1/2} = \alpha_0 + \alpha_1(roa \, / \, roe)_{it}^{1/2} + \alpha_2 \ln cap_{it} + \\ + \alpha_3 gdp_{it} + \mu_{2it}. \tag{4}$$

The reduced form of the equations

$$(roa \, / \, roe)_{it}^{1/2} = \pi_{10} + \pi_{11} obs_{it} + \pi_{12} infr_{it} + \pi_{13} rir_{it} + \\ + \pi_{14} \ln cap_{itt} + \pi_{15} gdp_i + \mu_{11it}, \tag{5}$$

$$(fr)_{it}^{1/1/2} = \pi_{20} + \pi_{21} obs_{it} + \pi_{22} infr_{it} + \pi_{23} rir_{it} + \\ + \pi_{24} \ln cap_i + \pi_{25} gdp_{it} + \mu_{12it}, \tag{6}$$

where, roa/roe_{it} = square root of performance of bank i for year t that represents the square root of return on assets of bank i for year t and return on equity of bank i for year t; fr_{it} = one over the square root of financial risk of bank i at time t; $infr_t$ = inflation rate of consumer price index at time t; cap_{it} = log capital of bank i for year t; obs_{it} = off balance sheet activities of bank i for year t; gdp_t = GDP growth of the country at time t; rir_t = real interest rate of the market at time t; α, β and π = coefficients of the variables; μ_{it} = error term of bank i at time t.

2.3. Definition of variables. All the equations include the dependent and/or endogenous and instrumental variables.

2.3.1. Dependent variables and/or endogenous variables. The dependent variables for the analysis are financial performance and financial risk. In the third equation, financial performance becomes dependent, which is in the form of a profitability ratio (i.e. return on assets and return on equity) (Said and Tumin, 2011; Al-Samad and Al-Wabela, 2011). The profitability ratio is chosen because return on assets shows the management ability to make a profit from the bank assets and return on equity shows an improvement in return to the shareholders (Liu et al., 2010; Al-Khouri, 2011; Said and Tumin, 2011). A financial ratio is the best base of performance measurement in this study, because the study considers the average financial risk of the banking sector in Tanzania. To improve the data to normal distribution the value has been transformed to square root a. Financial performance is measured as follows:

$$ROA = PAT/TA,$$

$$ROE = PAT/EC,$$

where, ROA is return on assets, ROE is return on equity, PAT is profit after tax, TA is the total assets and EC is equity capital.

In the fourth equation, the dependent variable is financial risk (i.e. an average of three financial risks). This shows that the degree of risk reaction in the bank depends on financial performance, and that the macro and micro variables may affect profitability (Yudistira, 2004; Ballester et al., 2009; Castro, 2012). To improve the data to normal distribution the value has been transformed to 1/square root, which is calculated as follows:

$$FR = CR + LR + IRR/3,$$

where, *FR* is financial risk, *CR* is credit risk[1], *LR* is liquidity risk[2] and *IRR* is interest rate risk[3].

Generally, the average financial risk is expected to have a negative impact on bank profitability. Financial risk is determined by bank capital, off balance sheet GDP growth and real interest rates.

All the dependent variables become an endogenous variable in another equation. Endogenous variables are variables that are determined within the system, such as financial risks for the third equation and financial performance for the fourth equation. This is because the occurrence of risk usually reduces bank profitability, increases cost or even may cause loss to the bank, and high profitability may reduce risk and improve performance. Therefore, it needs to be evaluated continuously to minimize risk and maximize financial performance. They are calculated as shown above (Bromiley, 1991). Profitability and financial risk are included to show the simultaneous influence of risk and profit because they are interdependent. Their relationship is explained by Hawley (1893), in his risk theory of profit, and Bowman (1979), in his paradox theory of risk and return, which, in practice are true.

2.3.2. Instrumental variables. The instruments for equation three are off balance sheet items, inflation rate, and real interest rate. In equation four, the instruments are GDP growth and bank capital. The off balance sheet is the sum of the total contingent account and off balance sheet exposure divided by total assets (Ballester et al., 2009; Berger and Bawman, 2009; Tafri et al., 2009). It is estimated to have a positive influence on profitability. When off

balance sheet activities are managed properly, the bank profit might increase; otherwise, the bank incurs an unexpected loss that reduces profitability. It is included because it is one of the bank specific variables that generate quick profit, and increases profitability when on balance sheet assets and equity remain constant, or decrease or increase less than profit. Inflation is the percentage of consumer price index. An increase in inflation rate leads to a decline in financial performance, which is estimated to have a negative relation with financial performance. During high-inflation rates, banks may charge customers more to cover operational costs. Thus, an increase in loans increases the cost to the customer, which reduces bank profitability. The real interest rate is the lending interest rate adjusted for inflation, as measured by the GDP deflator. It is expected to have a negative relation with bank performance. The higher the lending rate the lower the performance, and the lower the lending rate the higher the performance because the interest rate used is the market interest rate that makes customers shift to a particular bank when it's lending interest rate is lower than the market interest rates. The inflation rate and real interest rate are included because they are macroeconomic variables that slow down or improve business activities. For example, when the inflation rate increases, the demand for money increases to cover the expenses that lead banks to increase the interest rates to increase revenue and the customer increases borrowings to cover the additional cost. This leads to customer failure in repaying interest and loans; hence, the bank loses interest revenue that reduces profitability.

Table 1. Variables, measurement and influence

Variable and its notation	Measure	Expected influence
Return on assets (roa)	sqrt(Profit after tax/total assets)	-
Return on equity (roe)	sqrt(Profit after tax/equity capital)	-
Financial risk (fr)	1/sqrt(credit risk+liquidity risk+interest rate risk/3)	-
Off balance sheet (obs)	Off balance sheet items/ total assets	+
Inflation rate (infr)	Consumer price index %	-
Real interest rate (rir)	Real interest rate	-
Capital of the bank (cap)	Ln(equity capital/total assets)	-
GDP growth (gdp)	sum of gross value added by all resident producers in the economy + taxes – subsidies	-

Bank capital is measured as a bank's ratio of equity to total assets (Yudistira, 2004; Tafri et al., 2009). It is estimated to have a negative association with the bank's financial risk. Banks with high capital to assets

are deemed be secure from insolvency or any loss that the business faces. This is included because banks with higher capital should have lower borrowings, which reduces the cost of the capital due to the low amount of interest to be paid and low insurance expenses from debt that reduce risk exposure. GDP is the sum of gross value added by all resident producers in the economy plus any produce taxes less any subsidies not included in the value of the products without deducting the depreciation of fictitious assets or depletion of natural resources[4]. GDP growth is measured as the annual percentage growth rate of GDP at market

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[1] Credit risk is a non-performing loan to the total loan, which is interpreted as a higher ratio represents a higher credit risk. The higher the credit risk the lower the bank profitability (Said and Tumin, 2011; Thiagarajan and Ramachandran, 2011).
[2] The liquidity risk and liquidity gap is divided by total assets. A higher ratio shows a higher liquidity risk. Liquidity risk has a destructive stimulus on bank profitability. For the liquidity gap See Basel II (1999).
[3] Interest rate risk is measured by interest risk factors by dividing the total loans by total deposits (Ni, Fah, Nassir, 2009; Dimitropoulos et al., 2010). The bank risk arises when the lending rate increases or the deposit rate declines, which reduces deposits and borrowings, and, hence, reduces return. It has a negative sign.

[4] See World Development Indicators.

prices based on constant local currency (i.e., 2000 per US dollar). It is expected to have a negative influence on financial risk (Casstro, 2012). This is included because higher GDP growth normally increases the economic activities of the country, which increases customer deposits and increases bank investments. This reduces the lending and liquidity risks of the banks, and, when GDP growth slows down, the possibility of risk is high because the defaulting on lending and by debtors might increase.

The summaries of the variables are shown in Table 1 above.

3. Analysis and discussion

3.1. Summary statistic. Table 2 shows a summary of the variables as expressed by mean, standard deviation, minimum and maximum. The mean represents the arithmetic average of the scores; the highest average score is 8.3 of inflation rate and the lowest -2.13 of the bank capital. Standard deviation shows the square root of variance providing an index of variability in the distribution of scores. The highest standard deviation score is 4.04 of the inflation and the lowest is 0.005 of GDP growth. The minimum and maximum shows the range of variation. The lowest minimum is -4.14 of capital with a maximum of 0.17, and the highest maximum is 1.65 for off balance sheet with a minimum of 0.004.

Table 2. Summary statistics of dependent and explanatory variables

Variable	Mean	Std. dev.	Min	Max
roa_sqrt	.1369748	.0420294	.0069242	.2227377
roe_sqrt	.4117867	.1457126	.0169561	1.179194
fr_osqrt	1.11256	.1868922	.4490317	1.641868
Obs	.679353	.2122097	.0041797	1.657868
Rir	.12907	.0363881	.0758	.1985
Inf	8.3	4.042999	3.5	16
Lcap	-2.127659	.4555306	-4.140005	.1720955
Gdpg	.0696	.0049352	.06	.078

Note: The table presents the summary statistics of the variables.

3.2. Financial performance (ROA and ROE). Table 3 below recapitulates the regression results of the ordinary least squares and instrumental variable for the estimation of equation three (i.e., performance equation) from the simultaneous estimation. In the equation, three performances are presented by ROA and ROE, which are used as the dependent variables. These are influenced by financial risk, off balance sheet, inflation and real interest rates.

In the ordinary least squares result, financial risk is positively and significantly connected with all variables except real interest rates, which is negatively insignificant to both ROA and ROE.

In the instrumental variable results, financial risk has a positive significant influence on ROA. The results support Hawley's theory (1893), Aaker and Jacobson (1987), and Muntean (2012). The results indicate that commercial banks in Tanzania face high risk in their assets, such as lending, which is the main activity in the banking operation. Albeit the banks face high risk, they use powerful management efforts in the exploitation and improvement of assets that generate a high return on assets. This result could reflect the finest management who are working with bank assets. The results also show the significantly negative influence of financial risk on ROE. This result complies with the estimated sign and view offered by Boermans (2011). This implies that there is low financial risk (i.e. leverage risk), which increases return on equity capital. It seems that leverage and its interest payment is low, thus reducing the insurance cost and interest expenses that improve profitability and increase return on equity holders. Most of the studies have shown mixed results on the individual risk impact on banks performance, such as Tafri et al. (2009), Dimitropoulos et al. (2010), Al-Khouri (2011) and Ruzika (2013).

Table 3. Financial performance equation − ROA and ROE

	ROA		ROE	
	OLS	IV	OLS	IV
Fr		0.149 (0.003)***		(0.690) (0.000)***
Obs	0.277 (0.000)***	(0.043) (0.079)*	0.277 (0.000)***	0.170 (0.039)**
Inf	0.007 (0.002)***	(0.0016) (0.035)**	0.007 (0.002)***	(0.0003) (0.901)
Rir	(0.001) (0.996)	0.210 (0.005)***	(0.001) (0.996)	0.919 (0.000)***
Cap	0.190 (0.000)***		0.190 (0.000)***	
Gdp	4.245 (0.034)***		4.245 (0.034)***	

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[1] See World Development Indicators.

Table 3 (cont.). Financial performance equation − ROA and ROE

	ROA		ROE	
	OLS	IV	OLS	IV
Cons	0.988 (0.000)***	(0.014) (0.753)***	0.988 (0.000)***	0.951 (0.000)***
R-sq: within		0		0.444
F-statistics	23.48		23.48	
Wald chi2(4)		2671.4		2188.57
corr(u_i, Xb) Prob > chi2		(0.515) (0.000)***		(0.1263) (0.000)***
Endogeneity test p-value		(0.001)***		(0.000)***
Overidentification test (X2 = 176.29)		48.39		36.00

Note: ***, **,* significant at 1%, 5% and 10%, respectively.

The off balance sheet has a negatively significant influence on ROA but a positively significant influence on ROE. The results are contrary to Tafri et al. (2009), and infer that off balance sheet activities improve the banks activities, and increase ROE and decrease ROA. This shows that an increase in the off balance sheet items increases profit but assets grow more than the increase in profit, which reduces ROA. ROE increases, since capital is not affected for the reason that it becomes another source of raising funds.

The inflation rate is negatively and significantly related to ROA, but negatively and insignificantly related to ROE. This result is in accordance with the estimated sign. The result is similar to that of Rachdi (2013) before the financial crisis, but there is a small difference in the significance of inflation to ROE. The results are not similar to the studies of Athanasoglou et al. (2008), Aburime (2008), Tabarin et al. (2013) and Vejzagic (2014). The results imply that high inflation rate reduces the financial performance due to the increase in cost to the customer and banking operation. The customer increases borrowings to increase the demand for money from the borrowers and the depositors reduce deposits. The banks also increase the interest rates to borrowers to increase revenue and reduce the interest rate to depositors to reduce its cost; thus increasing interest and loan default, and discouraging depositors to deposit more funds, which reduces profitability.

The real interest rate is positively and significantly related to financial performance. This result is not the same as the estimated sign. The result is similar to Aburime (2008), Alper and Anbar (2011), and Vejzagic (2014), but the real interest rate is insignificant to ROA, which concurs with the results in Alper and Anbar (2011), and Vejzagic (2014). The results imply that when there are high real interest rates, bank performance increases. The

reason being that bank transactions, such as lending transaction increases towards the move of customer to the bank when its lending interest rate is lower than the market interest rates. Thus, increases interest revenue especially when lending is under management supervision. Once the lending rate in the bank is higher than on the market, the customers borrow from the market because of the cheap source of borrowing that leads to a decline in bank performance.

3.3. Financial risks. Table 4 below recapitulates the regression results of the ordinary least squares and instrumental variable for the estimation of equation four (i.e., risk equation) from the simultaneous estimation. In the fourth equation, the financial risk is the dependent variable where bank performance, capital and GDP growth are independent variables, as shown in table four below.

In the ordinary least squares off balance sheet, inflation rates and GDP growth have a negative influence on both ROA and ROE. All the variables are insignificant for ROA and ROE, except the inflation rate, which is significant to ROE. Capital is negatively significant to ROE but positively significant to ROA, and the real interest rate is positive and significant to both ROA and ROE.

The instrumental results show that both ROA and ROE have a significant and negative influence on financial risk. This result is in line with the view of Bowman (1979) and Haneef et al. (2012). The results are also the same as Muharam (2013) concerning ROE influence on financial risk in the form of liquidity risk to conventional banks but different for ROA. The implications of the study are that the commercial banks might face low risk when performance is high, and high risk when performance is low. Performance improvement is from the good management of assets, human and financial resources that might decrease risk.

Table 4. Financial risk equation

	FR		FR	
	OLS	IV	OLS	IV
ROA		(1.989) (0.046)**		
ROE				(0.576) (0.031)**
Obs	(0.005) (0.731)		(0.017) (0.727)	
Inf	(0.001) (0.130)		(0.005) (0.035)**	
Rir	0.248 (0.001)***		0.877 (0.000)***	
Cap	0.0335 (0.000)***	0.297 (0.000)***	(0.137) (0.000)***	0.151 (0.005)***
Gdp	(0.351) (0.563)	1.756 (0.423)	(1.825) (0.337)	1.682 (0.430)
Cons	0.2148 (0.000)***	1.916 (0.000)***	0.1769 (0.268)	1.567 (0.000)***
R-sq:within		0		0.1485
F-statistics	6.28		12.22	
Wald chi2(4)		2671.4		14309.23
corr(u_i, Xb) Prob > chi2		(0.5151) (0.000)***		0.0020 (0.000)***
Endogeneity test p-value		(0.055)***		(0.034)***
Overidentification test (X2 = 176.29)		123.72		132.02

Note: ***,**,* significant at 1%, 5% and 10%, respectively.

Moreover, capital has a positively significant influence on financial risk when we utilize both ROA and ROE. Although the results concur with those of Agusman et al. (2008), and Lee and Hsieh (2013), they are against the findings of Kithinji (2010) and Cucinelli (2013) that showed that capital has a negative relation with individual financial risk. This implies that the higher the capital the higher the risk in the banks. The high capital in the banks leads to increasing scope and scale that causes management failure in managing business activities. Banks that have a large amount of capital allocate the increasing amount to lending since it is the main activity in Tanzanian banks, which is very risky.

The results also show that the GDP growth rate has a positive insignificant influence on financial risk for both ROA and ROE. The results imply that GDP growth is not important in determining financial risk.

3.4. Robustness test. To confirm the soundness and consistence of the equations and instruments, the robustness test was done using the Durbin-Wu-Hausman test and the Sargan test. The Durbin-Wu-Hausman test is used for checking the strength of the endogenous variables by examining the best estimator between OLS and IV. The test based on the null hypothesis of no endogeneity problem in the model. Chi-square distribution is used to accept or reject the hypothesis. The results in table 3 and 4 show that at 5%, the null hypothesis is rejected and it is concluded that it is better to use the instrumental variable than OLS for ROA and ROE

in all equations. Furthermore, the Sargan test for the over identification test has been done under the null hypothesis that the instruments are weak. The results from Tables 3 and 4 show that the study can reject the null hypothesis, meaning that all instruments are valid and not weak, since the critical value of chi-square exceeds the statistical value for both ROE and ROA in all equations. From these tests we can conclude that the model is robust.

Conclusion

Studying the simultaneous influence of financial risk and financial performance with their determinants is of great importance to the scholars and financial systems of Tanzania and Africa as a whole. Accordingly, this study examined the influence of financial risk, off balance sheet, inflation rate and real interest rates on financial performance and the influence of financial performance, capital and GDP growth to financial risk by using unbalanced panel data of twenty-one banks for ten years. Instrumental variable estimation was used to solve the simultaneous equation model – two-stage least squares.

Based on the results of the empirical analysis, financial risk and performance have a significant influence on each other. It also shows that off balance sheet, real interest rates are significant to ROA and ROE but that inflation is significant to ROA and not significant to ROE. Further, the results show that all variables are significant to financial risk except GDP growth when both ROA and ROE are applied.

Therefore, this study concludes that a financial relation with the financial performance of commercial banks in Tanzania exists. For that reason, the commercial banks in Tanzania should concentrate on instantaneous financial risk and performance trade off to maintain the continuation of businesses. The banks should also improve financial and human resources by employing current and more advanced technology with the minimum cost. The banks have to accumulate a reasonable combination of capital structure and allocate accurately to reduce financial loss and maximize profit. Moreover, the government and regulators of the financial institutions ought to control not only inflation rates and interest rates but also off balance sheet items and other factors by setting a standard for the maximum amount of risks and benchmark for the minimum amount of overall return for each determinant of risk and return, respectively. Correct actions should be taken when the factors increase risk above the border or reduce return below the border and should not be based on the minimum capital requirement alone.

References

1. Aaker, D.A. & Jacobson, R. (1987). The Role of Risk in Explaining Differences in Profitability, *The Academy of Management Journal*, 30 (2), pp. 277-296.
2. Abdus Samad (2012). Credit Risk Determinants of Bank Failure: Evidence from Us Bank Failure, International Business Research Journal, 5 (9), pp. 10-15.
3. Adetayo, J.O., Dionco, E.A. & Oladejo, B. (2004). Management of Foreign Exchange Risks in A Selected Commercial Bank, in Nigeria, *Journal of Social Science*, 8 (3), pp. 207-213.
4. Adkins, L.C. & Hill, R.C. (2008). Using Stata for Principles of Econometrics, 3rd Edition, John Wiley & Sons Inc.
5. Aburime, T.U. (2008). Determinants of Bank Profitability: Macroeconomic Evidence from Nigeria. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1231064.
6. Agusman, A., Monroe, G.S., Gasbarro, D., Zumwalt, J.K. (2008). Accounting and capital market measures of risk: evidence from Asian banks during 1998-2003, *Journal of Banking and Finance*, 32 (4), pp. 480-488.
7. Al-Khouri, R. (2011). Assessing the Risk and Performance of the GCC Banking Sector, *International Journal of Financeand Economics*, 65 (3), pp. 72-80.
8. Almazari1, A.A. (2014). Impact of Internal Factors on Bank Profitability: Comparative Study between Saudi Arabia and Jordan, *Journal of Applied Finance & Banking*, 4 (1), pp. 125-140.
9. Alper, D. & Anbar, A. (2011). Bank Specific and Macroeconomic Determinants of Commercial Bank Profitability: Empirical Evidence from Turkey, *Business and Economics Research Journal*, 2 (2), pp. 139-152.
10. Al-Smadi, M.O. & Al-Wabel, S.A. (2011). The Impact of E-Banking on the Performance of Jordanian Banks, *Journal of Internet Banking and Commerce*, 16 (2), pp. 1-10.
11. Athanasoglou, P.P., Brissimis, S.N. & Delis, M.D. (2008). Bank-Specific, Industry-Specific and Macroeconomic Determinants of Bank Profitability, *Journal of International Financial Markets, Institutions and Money*, 18 (2), pp. 121-136.
12. Ayanda, A.M., Christopher, E.I. & Mudashiru, M.A. (2013). Determinants of Banks' Profitability in a Developing Economy: Evidence From Nigerian Banking Industry, *Interdisciplinary Journal of Contemporary Research in Business*, 4 (9), pp. 155-181.
13. Baltagi, B.H. (2010). Solutions manual for Econometrics, 2nd Edition. Springer Heidelberg Dordrecht London New York.
14. Basel Committee on Banking Supervision- Basel II (1997). Core Principles for Effective Banking Supervision. BIS.
15. Basel Committee on Banking Supervision (1999).Capital Requirements and Bank Behaviour: The Impact of The Basel Accord.
16. Berger, A.N. & Bouwman, C.H.S. (2009). Bank Liquidity Creation, *Review of Financial Studies*, 22, pp. 3779-3837.
17. Berument, H. & Dinçer, N. (2004). The Effects of Exchange Rate Risk on Economic Performance: The Turkish Experience, *Applied Economics*, *Taylor & Francis Journals*, 36 (21), pp. 2429-2441.
18. Bromiley, P. (1991). Testing a causal model of corporate risk taking and performance, *Academy of Management Journal*, 34 (l), pp. 37-59.
19. Bowman, R.G. (1979). The Theoretical Relationship Between Systematic Risk and Financial (Accounting) Variables, *The Journal of Finance*, 34 (3), pp. 617-630.
20. Boermans, M.A. (2011). Firm Performance under Financial Constraints and Risks: Recent Evidence from Micro Finance Clients In Tanzania, HU University of Applied Sciences Utrecht.
21. Ballester, L., Ferrer, R., González, C. & Soto, G.M. (2009). Determinants of Interest Rate Exposure of Spanish Banking Industry. Working Paper DepositoLegal AB 351, ISSN, 1989-4856
22. Castro, V. (2012). Macroeconomic Determinants of the Credit Risk In the Banking System: The Case of the GIPSI, NIPE Working Papers – Universidade Do Minho.
23. Cucinelli, D. (2013). The Determinants of Bank Liquidity Risk withinthe Context of Euro Area, *Interdisciplinary Journal of Research in Business*, 2 (10), pp. 51-64.
24. Das, A. & Ghosh, S. (2007). Determinants of Credit Risk in Indian State-Owned Banks: An Empirical Investigation, *Economic Issues Journal Articles*, *Economic Issues*, 12 (2), pp. 27-46.

25. Dimitropoulos, P.E., Asteriou, D. & Koumanakos, E. (2010). The Relevance of Earnings and Cash Flows in a Heavily Regulated Industry: Evidence From The Greek Banking Sector, *Journal in Advances in Accounting*, 26 (2), December, pp. 290-303.
26. Eken, M.H., Selimler, H., Kale, S. & Ulusoy, V. (2012). The Effects of Global Financial Crisis on The Behaviour of European Banks: A Risk And Profitability Analysis Approach, *ACRN Journal of Finance and Risk Perspectives*, 1 (2), pp. 17-42.
27. Goddard, J., Molyneux, P. and Wilson, J.O.S. (2004). The profitability of European banks. A Cross Sectional and Dynamic Panel Analysis, *The Manchester School*, 72 (3), pp. 363-381.
28. Gualandri, E., Landi, A., Venturelli, V. (2009). Financial Crisis And New Dimensions Of Liquidity Risk: Rethinking Prudential Regulation And Supervision, Working Paper 13.
29. Haneef, S., Riaz, T., Ramzan, M., Rana, M.A., Ishaq, H.M. & Karim, Y. (2012). Impact of Risk Management on Non-Performing Loans and Profitability of Banking Sector of Pakistan, *International Journal of Business and Social Science*, 3 (7), pp. 308-315.
30. Hawley, F.B. (1893). The Risk Theory of Profit, *Quarterly Journal of Economics*, 7 (4), pp. 459-479.
31. Jacques, K. and Nigro, P. (1997). Risk-based capital, portfolio risk and bank capital: A simultaneous equations approach, *Journal of Economics and Business*, 49, pp. 533-547.
32. Kithinji, A.M. (2010). Credit Risk and Profitability of Commercial Banks in Kenya, African International Business and Management Conference 2011.
33. Kosimodou, K. (2008). The Determinants of Banks' Profits inGreece duringthe Period of UE Financial Integration, *Managerial Finance*, 34, pp. 146-159.
34. Lee, C. and Hsieh, M. (2013). The impact of bank capital on profitability and risk in Asian Banking, *Journal of International Money and Finance*, 32, pp. 251-281.
35. Liu, H. and Wilson, J.O. (2010). The Profitability of Banks in Japan, *Applied Financial Economics Journal*, 20 (24), pp. 1851-1866.
36. Muharam, H. (2013). The Influence of Fundamental Factors to Liquidity Risk on Banking Industry: Comparative Study Between Islamic Bank and Conventional Bank In Indonesia. Conference In Business, *Accounting and Management* (Cbam), 1 (2), pp. 359-368.
37. Ni, S.W., Fah, C.F. & Annuar, N. (2009). The Effect of Financial Risk on the Earnings Response in Thailand Banks' Stock, *Journal of Finance and Economics*, 31, pp. 55-65.
38. Ongore, V.O. & Kusa, G.B. (2013). Determinants of Financial Performance of Commercial Banks in Kenya, *Econjournals*, 3 (1), pp. 237-252.
39. Peng, Y. et al., (2011). An Empirical Study of Classification Algorithm Evaluation for Financial Risk Prediction, *Applied Soft Computing*, 11, pp. 2906-2915.
40. Pyle, D.H. (1997). Bank Risk Management: Theory. Research Program In Finance, Working Paper Rpf No 272.
41. Qin, X., Dickson, P. (2012). Commercial Banks Profitability Position: The Case of Tanzania, *International Journal of Business and Management*, 7 (13), pp. 136-144
42. Rachdi, H. (2013). What Determines the Profitability of Banks During and Before The International Financial Crisis? Evidence from Tunisia, *International Journal of Economics, Finance and Management*, 2 (4), pp. 330-337.
43. Ramlall, I. (2009). Bank-Specific, Industry-Specific and Macroeconomic Determinants of Profitability in Taiwanese Banking System: Under Panel Data Estimation, *International Research Journal of Finance and Economics*, 34, pp. 160-167.
44. Ruziqa, A. (2013). The Impact of Credit and Liquidity Risk on Bank Financial Performance: The Case of Indonesian Conventional Bank with Total Asset Above 10 Trillion Rupiah, *International Journal of Economic Policy In Emerging Economies*, 6 (2), pp. 93-106.
45. Said, R.M. & Tumin, M.H. (2011). Performance and Financial Ratios of Commercial Banks in Malaysia and China, *International Review of Business Research Papers*, 7 (2), pp. 157-169.
46. Samad, A. & Glenn, L. (2012). Determinant of Bank Failure: Evidence from US Failed Banks, *International Research Journal of Applied Finance*, 3 (4), pp. 463-479.
47. Schendel, D. and Patton, G.R. (1978). A Simultaneous Equation Model of Corporate Strategy, *Management and Science Journal*, 24 (15), pp. 1611-1621
48. Shen, C.H., Chen, Y.K., Kao, L.F. & Yeh, C.Y. (2009). Bank Liquidity Risk and Performance, available at: www.finance.nsydu.edu.tw.
49. Simpasa, A.M. (2011). Competitive Conditions in the Tanzanian Commercial Banking Industry, *African Development Review*, 23 (1), pp. 88-98.
50. Solomon, D.C., Muntean, M. (2012). Assessment of Financial Risk in Firm's Profitability Analysis, *Economy Trans disciplinarily Cognition*, 15 (2), pp. 58-67.
51. Sohaimi, A.N. (2013). Liquidity Risk and Performance of Banking System in Malaysia, Social Science Research Network.
52. Tabari, N.A.Y., Ahmadi, M. & Emami, M. (2013). The Effect of Liquidity Risk on the Performance of Commercial Banks, *International Research Journal of Applied and Basic Sciences*, 4 (6), pp. 1624-1631.
53. Tafri, F.H., Hamid, Z., Meera, A.K., Omar, M.A. (2009). The Impact of Financial Risks on Profitability of Malaysia Commercial Banks: 1996-2005, *International Journal of Social, Human Science and Engineering*, Vol. 3 (6), pp. 268-282.

54. Tandelilin, E., Kaaro, H. and Mahadwartha, P. (2007). Corporate Governance, Risk Management, and Bank Performance: Does Type of Ownership Matter? EADN Working Paper No. 34, p. 11.
55. Thiagarajan, S., Ayyappan, S. & Ramachandran, A. (2011). Credit Risk Determinants of Public and Private Sector Banks in India, *European Journal of Economics, Finance and Administrative Sciences*, 34, p. 147.
56. Varotto, S. (2011). Liquidity Risk, Credit Risk, Market Risk and Bank Capital, *International Journal Of Managerial Finance*, 7 (2), pp. 134-152.
57. Vejzagic, M. (2014). An Analysis of Macroeconomic Determinants of Commercial Banks Profitability in Malaysia for The Period 1995-2011, *Asian Economic and Financial Review*, 4 (1), pp. 41-57.
58. Yudistira, D. (2004). Efficiency inIslamic Banking: An Empirical Analysis of Eighteen Banks, *Islamic Economic Studies*, 12 (1), pp. 1-19.