

Adusei, Michael

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*Corresponding author: Michael Adusei,
Department of Accounting and Finance,
Kwame Nkrumah University of Science
and Technology, Kumasi, Ghana
E-mail: madusei10@yahoo.com

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Bank profitability: Insights from the rural banking industry in Ghana

Michael Adusei^{1*}

Abstract: This paper analyzes the profitability of 112 rural banks (special unit banks created to promote rural financial intermediation in Ghana). The results generally show that bank size, funding risk, diversification, liquidity risk, and bank stability are significant predictors of rural bank profitability. Whereas an improvement in the funding risk of a rural bank in a particular period portends a drop in its profitability in the future, an improvement in the size, diversification, liquidity risk, and stability of a rural bank signifies an improvement in the future profitability of the bank.

Subjects: Banking; Credit & Credit Institutions; Economics, Finance, Business & Industry; Finance

Keywords: bank profitability; rural bank; Ghana

1. Introduction

In response to many financial and banking crises that have plagued many economies in the world (Caprio & Klingebiel, 1997), there has been an increasing interest in designing macro-prudential indicators framework for monitoring financial vulnerability (Kanas, Vasiliou, & Eriotis, 2012). At the heart of the debate for designing macro-prudential indicators is bank profitability. This is because a sound and profitable banking sector has a greater ability to meet adversities and contribute to the sturdiness of the entire financial system (Athanasoglou, Brissimis, & Delis, 2008). Bank profitability and its determinants are key aspects of the financial system stability (Borio, 2003; Mörttinen, Poloni, Sandars, & Vesala, 2005).

In the light of the above, there is no dispute that uncovering the determinants of bank profitability should be of interest to researchers as well as bank management, bank supervisors, and financial markets. This explains why the banking literature is flooded with empirical analyses of bank profitability (Dietrich &

ABOUT THE AUTHOR

Michael Adusei is a faculty member in the service of Kwame Nkrumah University of Science and Technology, Ghana. His specialization is banking and finance. His research interests include financial intermediation and corporate governance. He has published in international peer-reviewed journals, including *Journal of International Development*; *The International Journal of Business and Finance Research*; and *Journal of Economics and International Finance*.



Michael Adusei

PUBLIC INTEREST STATEMENT

This paper analyzes the profitability of 112 rural banks in Ghana. The study has become necessary because, over the years, attention on bank profitability has been on commercial banks. Thus, knowledge about what accounts for the profitability of special banks like rural banks is sparse and inchoate. The study shows that size, funding risk, liquidity risk, diversification, and stability significantly influence the profitability of rural banks in Ghana.

Wanzenried, 2014; Duygun, Sena, & Shaban, 2013; Flamini, Schumacher, & McDonald, 2009; Mirzaei, Moore, & Liu, 2013; Sufian & Habibullah, 2009; Sufian & Noor Mohamad Noor, 2012). However, these studies have shown that ascertaining the determinants of bank profitability remains inadequately addressed since the statistical significance of the identified variables varies across countries and sample periods (Kanas et al., 2012). What is even more significant to mention is the fact that previous studies on bank profitability have inordinately focused on commercial banks. This paper joins the intellectual conversation on bank profitability with evidence from the rural banking industry in Ghana.

Also called rural and community banks (RCBs), rural banks¹ differ from the regular universal/commercial banks in Ghana in at least four ways. One, they are unit banks, meaning they are not legally mandated to have branches. Two, they have geographically defined areas of operations. Initially, their operational jurisdictions were confined to 20-mile radius but now viability is the basis for obtaining a license to establish a rural bank. Factors such as adequate population, sufficient infrastructure, and vibrant economies are key factors used by the Bank of Ghana to grant a license to set up a rural bank in a rural community. Three, they are owned and managed by people within their catchment areas. Four, they are limited in their scope of operations; for example, they are not mandated to undertake international transactions unless through a universal bank.

The unique features of RCBs in Ghana provide a sound foundation for an empirical investigation into the factors that account for their profitability. Doing this constitutes the focus of the current study. The study acknowledges a similar work done by Afriyie and Akotey (2013) on RCBs in the Brong Ahafo of Ghana which examines the relationship between credit risk management and profitability. However, the current study differs from that of Afriyie and Akotey (2013) in two ways. First, the current study is broader in scope because whereas Afriyie and Akotey (2013) use only 10 RCBs in the Brong Ahafo region, the current study uses 112 RCBs drawn from all regions in Ghana. Second, whereas Afriyie and Akotey (2013) fail to control for variables such as diversification, bank size, and liquidity risk that are known to influence bank profitability, the current study controls for these variables, for which reason its findings should provide a better insight into rural bank profitability in Ghana.

On average, this paper shows that bank size, bank diversification, liquidity risk and bank stability have positively influenced rural bank profitability. On the other hand, a negative statistically significant relationship is observed between bank funding risk, as measured by the funding risk Z-score (a barometer for banks' distance from resorting to equity recapitalization) and bank profitability. The contribution of this paper to knowledge is obvious. The academic debate on the effect of size on bank profitability has remained an outstanding issue to date. This paper contributes to this debate with the evidence that size promotes bank profitability in the rural banking industry in Ghana. Similarly, evidence on the effect of diversification on bank profitability is inconclusive. The contribution of this paper to this simmering debate is that despite their limited scope of operations, RCBs in Ghana can improve their profitability through diversification. The finding that stability promotes profitability in the rural banking industry reinforces the theoretical postulation that there is an inextricable connection between bank stability and bank profitability. Not all, the general postulation of the extant literature is that there is a negative relationship between bank liquidity risk and bank profitability. Contrary to this position, the current study shows that liquidity risk is profit-enhancing. Also, the finding that an improvement in the funding risk of a rural bank implies a deterioration of its profitability constitutes an expansion of the bank profitability literature.

2. Empirical studies on bank profitability

The size-profitability hypothesis predicts that large banks are more able to exploit the advantage of economies of scale in transactions which eventually culminates in higher profits. In addition, large banks may be able to wield market power via stronger brand image or implicit regulatory (too-big-to-fail) protection (Kořak & Čok, 2008). Thus, a positive relationship might be expected between the size of a bank and its profitability (Kosmidou, 2008; Pervan, Pervan, & Guadagnino, 2010). Corroboration of this hypothesis is found in Bertay, Demirgüç-Kunt, and Huizinga (2013), who use international data to prove that larger banks have higher profitability than smaller banks. Flamini et al. (2009), after analyzing a sample

of 389 banks in 41 Sub-Saharan African (SSA) countries, report a positive relationship between bank size and bank returns. de Haan and Poghosyan (2012) also provide evidence in support of the ability of bank size in securing bank returns stability. Employing panel data from the United States of America (USA)'s bank-holding companies and controlling for quality of management, leverage, and diversification, de Haan and Poghosyan (2012) find that bank size reduces returns volatility. However, the effect is non-linear: when bank size exceeds some threshold, size positively impacts returns volatility. On the other hand, it is feasible to record a negative relationship between bank size and bank profitability. This is explained by diseconomies of scale that are associated with larger banks, especially after the periods of accelerated growth (Kořak & Ćok, 2008). The negative relationship between size and profitability could also be attributed to agency costs, the overhead of bureaucratic processes, and other costs related to managing extremely large firms (Pasiouras & Kosmidou, 2007; Stiroh & Rumble, 2006). Sufian and Habibullah (2009) and Ben Naceur and Goaied (2008) have also provided evidence that supports the negative relationship between bank size and bank profitability. Some studies have, however, found no statistically significant relationship between bank size and bank profitability (Athanasoglou et al., 2008; Goddard, Molyneux, & Wilson, 2004). In all, it is not wrong to argue that evidence on the size–profitability connection in the banking industry is inconclusive. In line with the literature, the study measures bank size with the natural logarithm of total assets.

Liquidity risk reflects the probability that a bank will fail to meet its short-term obligations. A bank's exposure to liquidity risk is usually measured as the ratio of loans to deposits (Kosmidou, 2008). To mitigate the incidence of insolvency problems, banks usually maintain higher amounts of liquid assets (lower loan-to-deposit ratio) that can easily be converted into cash (Ćurak, Poposki, & Pepur, 2012). However, liquid assets usually have lower rates of return; therefore, higher liquidity (lower loan-to-deposit ratio) would signal lower profitability and vice versa. Another measure of liquidity risk is cash and due from balances held at other depository institutions to total assets (Rose & Hudgins, 2008). To measure liquidity risk of RCBs, the study adopts the liquidity measure suggested by Rose and Hudgins (2008).

One of the important risks in banking is credit risk. Usually, most studies have measured this risk by the loanloss provisions. The literature posits that higher loan loss provisions imply lower profitability because higher provisions for loan losses signal higher risk and higher probability of loans becoming non-performing loans (Athanasoglou et al., 2008; Kosmidou, 2008). This has been confirmed by Tan and Floros (2012), who observe that credit risk is negatively and significantly related to bank performance in China. On the flip side, credit risk can be measured by the loans-to-asset ratio. The risk-return hypothesis suggests that higher loan-to-asset ratio means higher credit risk exposure, which requires a commensurate compensation in the form of higher returns and improved overall profitability (Ćurak et al., 2012). Thus, the risk-return hypothesis predicts that there is a positive relationship between credit risk and profitability. Flamini et al. (2009) use a sample of 389 banks in 41 SSA countries to investigate the determinants of bank profitability and observe that credit risk has a positive statistically significant impact on profitability. Sufian and Habibullah (2009) also study the determinants of commercial bank profitability with data from China during the post-reform period 2000–2005 and show a positive relationship between credit risk and profitability. However, it is possible to observe a negative relationship between credit risk (as measured by the loans-to-assets ratio) and profitability since a higher loans-to-asset ratio can also indicate a higher credit risk owing to an increasing number of potentially default borrowers that can eventually undermine profitability (Ćurak et al., 2012). Another hypothesis that explains the negative relationship between credit risk and bank profitability is the skimping hypothesis developed by Berger and DeYoung (1997). The hypothesis argues that a bank that seeks to enhance cost-efficiency as a way of maximizing long-run profits may decide to cut down cost of operations in order to be cost-efficient in the short run by skimping on the resources allocated to loan screening and monitoring (underwriting cost). This may result in adverse selection with dire consequences for credit quality of the bank in the long run. In other words, this strategy may lead to the bank suffering greater loan performance problems in the long run. Another measure of credit risk is non-performing loans. Afriyie and Akotey (2013) use non-performing loans to measure credit risk in their study of RCBs in the Brong Ahafo region of Ghana and find a positive statistically significant relationship between credit risk and bank performance. In line with the literature, the study measures credit risk by the loans-to-total assets ratio.

The rationale behind the concept of diversification which is one of the determinants of bank profitability is risk mitigation. From the perspective of modern portfolio theory, diversification of assets reduces the variance of the returns that accrue to the owners of a bank, thereby reducing the probability of the bank becoming extinct. Agency theory predicts that diversification decreases the agency costs of managerial discretion by reducing cash-flow volatility (Stulz, 1990). Both benefits and costs are associated with diversification. Economies of scope, an improved resource allocation through internal capital markets, and a tax protection because of higher financial leverage are some of the benefits associated with diversification (Kanas et al., 2012). Agency problems (Jensen, 1986), inefficient internal resource allocation due to a malfunctioning of internal capital markets (Lamont, 1997), and increased incentives for rent-seeking behavior by managers are some of the costs identified with diversification (Scharfstein & Stein, 2000). However, evidence is mixed. Elsas, Hackethal, and Holzhäuser (2010) argue that diversification boosts bank profitability. In contrast, Laeven and Levine (2007) provide evidence to the effect that income diversification hurts the market values of financial conglomerates. Lepetit, Nys, Rous, and Tarazi (2008) find that the risk-adjusted performance of small banks in Europe can benefit from non-interest-generating activities. Fiordelisi, Marques-Ibanez, and Molyneux (2011) provide evidence that income diversification has a negative effect on cost-efficiency and risk. Hsieh, Chen, Lee, and Yang (2013) show that bank stability can be enhanced through diversification. Since rural banks are special banks with limited scope of operations, this study focuses on asset diversification by looking at how the banks have diversified their assets in terms of pushing some funds into investment in securities. Consequently, in this study, diversification is measured as short-term investment in securities plus long-term investment in securities divided by total assets.

Equity capital is one of the determinants of bank profitability. It has been suggested that the ratio of equity to assets (EA) should be used to proxy capital when return on assets (ROA) is used as the profitability measure. Capital should not be included in the equation in which return on equity (ROE) is used as profitability measure (Athanasoglou et al., 2008). The relationship between profitability and capital is discussed in the context of one-period perfect markets with symmetric information theory. When the assumptions are relaxed, capital is expected to raise expected earnings, in the sense that capital serves as a safety net in case of unfavorable events. On the other hand, the relaxation of the one-period perfect capital markets assumptions would lead to an expectation that profit will increase capital. Again, when the symmetric information assumption of the one-period perfect capital markets is relaxed, it is expected that banks would signal better future profitability through higher capital (Athanasoglou et al., 2008). García-Herrero, Gavilá, and Santabábara (2009), Pasiouras and Kosmidou (2007) and Goddard et al. (2004) provide evidence that banks that maintain higher level of equity relative to assets are best-performing banks because they tend to have lower costs of funding owing to lower bankruptcy costs. Another contention is that a bank with a sound capital position has the capacity to follow business opportunities more effectively and has more time and flexibility to meet problems emanating from unexpected losses, thus achieving increased profitability (Athanasoglou et al., 2008). Recently, Dietrich and Wanzenried (2014) have provided evidence that capital ratio (equity over total assets) has a positive statistically significant effect on bank profitability in high-income countries, but not in low and middle countries. From Tunisia, Ben Naceur and Goaid (2008) report that banks that record higher amount of capital tend to chalk higher profitability. Following the work of Dietrich and Wanzenried (2014), in this study, bank capitalization is measured as equity capital divided by total assets.

Solvency risk is one of the important risks in banking that affect the profitability of a bank. It relates to the capital strength of a bank. Sufficient amount of equity (measured by the ratio of equity to total asset) enables a bank to absorb any shocks that may come its way (Ćurak et al., 2012). Since capital serves as a safety cushion, a bank that maintains higher capitalization is considered to have lower insolvency risk (meaning the bank is safer). In the light of the risk-return hypothesis, such a bank should record a lower profitability. However, creditworthiness of well-capitalized banks boosts the confidence of depositors which reduces interest rates as funding costs and the need for external financing, thereby reducing interest expenses of such banks. Higher equity to asset ratio (lower risk) would imply higher profitability; thus, a positive relationship is expected between solvency risk and bank profitability (Ćurak et al., 2012). One measure of bank solvency risk is Z-score. Also called bank stability Z-score (BSTAB), Z-score comprises

accounting measures of profitability, leverage, and volatility (Demirgüç-Kunt & Huizinga, 2010; Stiroh, 2004a, 2004b). It is computed as:

$$Z\text{-score (BSTAB)}_{i,t} = \left[\frac{ROA_{i,t} + \frac{E_{i,t}}{TA_{i,t}}}{\sigma(ROA_{ip})} \right]$$

where $BSTAB_{it}$ is the stability Z-score of bank i in quarter t , ROA_{it} is the return on assets ratio, E/A is the equity-to-asset ratio of bank i in quarter t and σROA_{ip} is the standard deviation of the ROA of bank i over the whole sample period p (Köhler, 2015). Z-score measures the number of standard deviations by which a bank's ROA has to fall for the bank to become insolvent. Thus, a higher Z-score predicts a lower risk of instability or insolvency. This study adopts the Z-score measure of bank stability or solvency risk.

One risk that is missing from bank profitability analysis is funding risk. Funding risk refers to the possibility of a loss arising from the fall in the deposit mobilization performance of a bank. In this study, the effect of funding risk on bank profitability is explored by constructing a funding risk Z-score defined as the deposits-to-assets ratio plus the equity-to-assets ratio divided by the standard deviation of the deposit-to-assets ratio as follows:

$$Z\text{-score (FUNDRISK)}_{i,t} = \left[\frac{DEP/TA_{i,t} + \frac{E_{i,t}}{TA_{i,t}}}{\sigma(DEP/TA_{ip})} \right]$$

where Z-score (FUNDRISK) $_{i,t}$ is the funding risk Z-score of bank i in time t which measures the number of deviations customer deposits would have to fall to compel the bank to recapitalize; $DEP/TA_{i,t}$ is the deposit-to-total assets ratio of bank i in time t ; $E/TA_{i,t}$ is the equity-to-total assets ratio of bank i in time t ; and $\sigma(DEP/TA_{ip})$ is the standard of the deposit-to-asset ratio. The higher the funding risk Z-score, the more stable the funding sources of the bank. It is, therefore, expected that funding risk will positively impact bank profitability.

3. Brief overview of Ghana's financial system

Ghana's financial system is in three tiers: formal financial institutions, semi-formal financial institutions, and informal financial institutions (Bank of Ghana, 2013; Mann, Tinsey, Tedjo, & Nwadei, 2010; Steel, 2006). Table 1 shows these categories, how they are defined, services they offer, their clients, and their outreach. Out of the financial institutions in the table, RCBs, credit unions, savings and loans companies (S&Ls), Susu institutions and financial Non-governmental Organizations operate in the rural areas of Ghana.

Table 1. Tiers of Ghana's financial system

Tier	Definition	Institutions	Services	Clients	Outreach
Formal	Licensed by central bank	Commercial banks, development banks	Deposits, loans, foreign exchange, cash transfer, insurance	Large businesses, government	Urban
		Rural and community banks	Deposits, loans, money transfer, payments, social investments	SMEs, large enterprises	Rural
Semi-formal	Provisionally licensed as of January 2013	Credit unions	Deposits, loans for members only	Low income, self-employed	Rural
		Savings and loans companies (microfinance institutions), financial NGOs	Deposits, loans,	Microenterprises, entrepreneurial poor	
Informal	Not legally registered at national level	Susu institutions, informal moneylenders	Deposits, loans	Self-employed, poor	Rural

Source: Mann et al. (2010), Steel (2006) and Bank of Ghana (2013).

4. Methodology

4.1. Selection of variables

In this section, the variables used for analyzing bank profitability are presented. A summary of the variables and how they are measured is presented in Table 2.

4.1.1. Dependent variables

Two measures of profitability are used: ROA and ROE. ROA is defined as the ratio of net profits to total assets expressed as a percentage. It reflects the ability of the management of a bank to generate profits from the assets of the bank. It demonstrates the profits generated per GH¢ of assets and indicates how effectively the bank's assets are managed to generate revenues (Dietrich & Wanzenried, 2011). It is the most common measure of bank profitability in the literature (Golin, 2001). ROE is the second measure of bank profitability and is defined as the net profit before interest and tax divided by total equity.

4.1.2. Independent variables

The variables that explain bank profitability are usually categorized into two: internal or micro or bank-specific variables and external or macro variables. The former variables reflect the characteristics of the bank that are as a result of management decisions such as size, capital, and risks. The latter variables do not reflect the features of the bank and are not related to bank management, but reflect the specifics of the industry and macroeconomic environment within which the bank operates (Ćurak et al., 2012). However, due to data constraints in respect of external factors, the scope of the current study is restricted to the bank-specific factors. The following variables are included in the profitability model: size, liquidity risk, credit risk, diversification, funding risk, bank stability, and capitalization.

4.1.3. The model

From the above discussions, a model that views profitability as a function of size, liquidity risk, credit risk, diversification, funding risk, and capitalization is adopted. This is expressed as:

Rural Bank Profitability = f (size, liquidity risk, credit risk, diversification, funding risk, bank stability, and capitalization). Generally, the models to be estimated are:

$$ROA_{it} = \beta_1 + \beta_2 SIZE_{i,t-1} + \beta_3 LRISK_{i,t-1} + \beta_4 CRISK_{i,t-1} + \beta_5 FUNDRIK_{i,t-1} + \beta_6 BSTAB_{i,t-1} + \beta_7 DIV_{i,t-1} + \beta_8 CAP_{i,t-1} + \mu_{it}$$

$$ROE_{it} = \beta_1 + \beta_2 SIZE_{i,t-1} + \beta_3 LRISK_{i,t-1} + \beta_4 CRISK_{i,t-1} + \beta_5 FUNDRIK_{i,t-1} + \beta_6 BSTAB_{i,t-1} + \beta_7 DIV_{i,t-1} + \mu_{it}$$

where ROA is the return on assets; ROE is the return on equity; SIZE is the bank size; LRISK is the liquidity risk; CRISK is the credit risk; FUNDRIK is the funding risk; BSTAB is the bank stability; DIV is the diversification (diversification in the business model; CAP is the capitalization); β and μ are the parameter and stochastic error term, respectively; i , t are the individual bank and time effect, respectively.

The definitions of these variables and their expected relationships with the dependent variables are presented in Table 2. All data are log-transformed to deal with skewness. Capitalization has been dropped from the second model in line with the position of the literature that capitalization should be dropped from profitability model when ROE is used as proxy for profitability (Athanasoglou et al., 2008).

4.1.4. Selection of panel estimation technique

It is known that panel regressions are subject to endogeneity problems that can be mitigated by the use of Generalized Method of Moments (GMM) estimation technique with instrument variables. A useful instrument is a variable which is highly correlated with regressors but not with the error terms. By convention, one and two lagged values of regressors and dependent variables are used as instrument variables. However, the use of lagged variables implies loss of degrees of freedom which normally yields poor empirical results (Mirzaei et al., 2013). This problem is usually severe when unbalanced panel data are used for analysis (Mirzaei et al., 2013).

Table 2. Variables, definitions, notations and expected signs

Variable	Definition	Notation	Expected sign
<i>Dependent variable</i>			
Return on assets	Profit before interest and tax divided by total assets (%)	ROA	
Return on equity	Profit before interest and tax divided by total assets (%)	ROE	
<i>Independent variables</i>			
Bank size	Natural logarithm of total assets	BSIZE	?
Liquidity risk	Cash and due from balances held at other depository institutions to total assets	LRISK	–
Credit risk	Total loans divided by total assets	CRISK	+
Funding risk	Z-score = Total deposits to asset ratio + Equity to assets ratio divided by the standard deviation of total deposits to assets ratio	FUNDRISK	+
Bank stability	Profit before interest and tax to assets ratio plus equity to assets ratio divided by the standard deviation of profit before interest and tax to assets ratio	BSTAB	+
Diversification	Total investment in financial securities (short and long-term) divided by total assets	DIV	+
Capitalization	Equity capital divided by total assets	CAP	+

Source: Author's construction (2015).

Considering the fact that the panel data used by this study are unbalanced, GMM estimation technique would not be suitable. To examine the suitable panel model to use, the Hausman test is performed. The test examines the null hypothesis that the difference between the fixed effect (FE) and the random effect (RE) of the model is not systematic. It provides a means of determining whether the fixed or random model is appropriate for analysis. The FE model assumes that each of the banks in the sample is different, therefore, the bank's error term and the constant (which captures individual characteristics) should not be correlated with those of other banks. Thus, if the error terms are correlated, then FE is not suitable since inferences may not be correct. In that case, the RE model is appropriate. The Hausman test is augmented with the redundant FEs tests to further establish the suitability of the FEs estimation technique. Besides, as shown above, the right-hand-side variables are lagged in the equations in order to mitigate the potential endogeneity concerns (Hannan & Prager, 2009).

Apart from the above tests, the Wald test of joint significance of the explanatory variables in explaining the variations in the dependent variable is performed to establish the validity of the panel regression results. The test examines the null hypothesis of joint insignificance of parameters in the chosen model.

4.2. Data sources

One hundred and twelve out of 137 rural banks in Ghana as at January 2013 have been used for the study. The selection of 112 has been dictated by data constraints. Inclusion of a rural bank in the sample has been based on the availability of the complete data needed for the study. Thus, all rural banks with requisite data needed for the study have been included in the sample. Quarterly reports on RCBs compiled by the ARB Apex Bank (the supervisory body of RCBs) covering 2009Q1–2013Q4 have been the sources of data for this study.

5. Empirical results

The descriptive statistics are presented in Table 3. The total number of observations is 2,200. The average ROA is approximately 2.26%, meaning an average rural bank in the sample has been able to achieve an average return of 2.26% on its assets in the period under investigation. This is below the 2.35% mean ROA reported by Flamini et al. (2009) from their analysis of 389 banks in 41 SSA countries. However, whilst

the maximum ROA of the 389 banks in SSA countries is 16.03% and the minimum -11.57%, Table 3 shows that the maximum and minimum ROA are 69.41 and -26.97%, respectively. The average ROE is approximately 85.43%, meaning an average rural bank has been able to achieve about 85.43% return on its equity.

Mirzaei et al. (2013) report from their study from emerging economies that the mean ROA and ROE are 1.43 and 13.38%, respectively, for commercial banks and 1.52 and 12.78%, respectively, for non-commercial banks. However, in advanced economies, they find 0.6 and 9.16% as mean ROA and ROE, respectively, for commercial banks and 0.34 and 5.43%, respectively, for non-commercial banks. Compared to the mean ROA and ROE reported in Table 3, it can be observed that RCBs are chalking higher returns which reinforces the position of the extant literature that bank profitability in Africa is high (Flamini et al., 2009).

There are two contrasting views on high profitability in a banking industry. High profitability in a banking industry undermines financial intermediation if the high returns mean that interest rates on loans charged by the banks in the industry are higher than those charged by banks on similar loans in other parts of the world (Flamini et al., 2009). Thus, high profitability in the rural banking industry can undermine rural financial intermediation if the high returns mean that interest rates on loans charged by RCBs are higher than those charged by banks on similar loans in other parts of the world. More importantly, if the high returns are attributable to the market power of RCBs, the implication is that some degree of inefficiency exists in the provision of the rural financial intermediation which should prompt policy-makers to reduce the market power of RCBs through, for example, removal of entry barriers to the industry.

On the other hand, high profitability in a banking industry may imply high financial stability if profits are not given out as dividends but are ploughed back into the banks as part of equity. This is because if profits are reinvested, the capital base of the banks improves that promotes their stability (Flamini et al., 2009). Thus, high profitability in the rural banking industry could mean high financial stability if the profits are not given out as dividends but are ploughed back into the banks as additional capital. Indeed, the mean score reported in Table 3 alludes to higher financial stability of RCBs compared to commercial and noncommercial banks in emerging and advanced economies. Whereas Mirzaei et al. (2013) report 1.91 and 2.06 as mean bank stability Z-score for commercial and non-commercial banks, respectively, in emerging economies, and 1.09 and 0.99 for commercial and non-commercial banks, respectively, in advanced economies, Table 3 shows that the mean bank stability Z-score is 2.29, indicating that RCBs are relatively more stable compared to commercial and non-commercial banks in other parts of the world.

Table 3. Descriptive statistics

	ROA (%)	ROE (%)	FUNDRISK	BSIZE (Ghana cedis)	LRISK	CRISK	DIV	BSTAB	CAP
Mean	2.26	85.43	1.64	9,131,214.	16.38	45.12	0.29	2.29	0.04
Median	2.06	62.42	1.47	6,179,371.	14.23	41.14	0.28	2.09	0.03
Maximum	69.41	4,721.77	6.44	1.54E+08	2,664.49	4,973.99	0.86	69.41	0.56
Minimum	-26.97	-663.84	0.09	285,670.6	-1.66	0.000	0.00	-26.97	0.00
Std. Dev.	2.85	141.66	0.73	93,32450.	56.87	142.96	0.14	2.84	0.04
Observations	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200

Notes: ROA is the return on assets, ROE is the return on equity, FUNDRISK is the funding risk, BSIZE is the bank size, LRISK is the liquidity risk, CRISK is the credit risk, DIV is the diversification in the business model, BSTAB is the bank stability and CAP is the bank capital.

Source: Author's construction (2015).

Table 4. Pearson correlation matrix

	BSIZE	LRISK	CRISK	FUNDRISK	BSTAB	DIV	CAP
BSIZE	1						
LRISK	-0.2025	1					
CRISK	0.1535	-0.1499	1				
FUNDRISK	-0.1279	0.1542	0.0922	1			
BSTAB	0.1712	-0.0500	0.0793	0.1127	1		
DIV	0.0244	0.0657	-0.4271	0.1805	0.1212	1	
CAP	-0.5306	0.0840	-0.0115	0.6035	0.0442	0.0311	1

Notes: BSIZE is the bank size, LRISK is the liquidity risk, CRISK is the credit risk, FUNDRISK is the funding risk, DIV is the diversification in the business model, BSTAB is the bank stability and CAP is the bank capital.

Source: Author's construction (2015).

In short, the mean of each of the explanatory variables appears relatively satisfactory. For example, whilst Flamini et al. (2009) report mean credit risk of 57.40 for banks in SSA countries, the mean credit risk for RCBs is 45.12, meaning, all things being equal, the level of credit risk exposure of RCBs is better than commercial banks in the SSA countries.

The Pearson Correlation Matrix is labeled in Table 4. As can be observed, the correlations are low, suggesting that multicollinearity is not an issue in the model (Bryman & Cramer, 1997)

The empirical results are reported in Tables 5 and 6. Table 5 reports the results when ROA is used to proxy profitability, whilst Table 6 reports the results when ROE is used to measure profitability. The Hausman tests as well as the redundant FE tests results reported in Tables 5 and 6 indicate that the

Table 5. Results of panel least squares regression. Dependent variable: ROA

Variable	Full model (2009Q1–2013Q4)			2009Q1–2011Q2			2011Q3–2013Q4		
	Coefficient	t-Value	p-Value	Coefficient	t-Value	p-Value	Coefficient	t-Value	p-Value
BSIZE (–1)	0.3284	4.4448	0.000***	0.5404	3.698411	0.0002***	0.2760	2.2955	0.0219**
LRISK (–1)	0.0485	1.8032	0.0715	0.0056	0.1202	0.9043	0.0328	0.8958	0.3706
CRISK (–1)	0.0345	0.4322	0.6657	–0.0894	–1.1117	0.2666	0.0462	0.5996	0.5489
FUN- DRISK(–1)	–0.1514	–0.9714	0.3315	–0.1624	–0.5446	0.5862	–0.0846	–0.3368	0.7363
BSTAB (–1)	0.4368	22.298	0.0000***	0.2482	7.5514	0.5862	0.3881	14.168	0.0000***
DIV (–1)	0.0785	2.3438	0.0192***	–0.0141	–0.1813	0.8562	0.0626	1.4522	0.1468
CAP (–1)	0.0345	0.4322	0.6657	–0.0627	–0.4082	0.6832	0.0451	0.3535	0.7238
CONSTANT	–4.4238	–3.5783	0.0004***	–7.6239	–3.2010	0.0004***	–3.8492	–1.8766	0.0609*
	$R^2 = 0.71$; $N=1,901$			$R^2 = 0.73$; $N = 872$			$R^2 = 0.76$; $N = 1,029$		
	Adj. $R^2 = 0.68$			Adj. $R^2 = 0.69$			Adj. $R^2 = 0.72$		
	Durbin–Watson stat = 2			Durbin–Watson stat = 2			Durbin–Watson stat = 2		
	F -statistic = 31.78***			F -statistic = 16.74***			F -statistic = 22.29***		
	Wald test: $\chi^2(8) = 5,909.78$ ***			Wald test: $\chi^2(7) = 980.72$ ***			Wald test: $\chi^2(8) = 4,652.74$ ***		
	Hausman test: $\chi^2 = 315.57$ ***								
	Likelihood ratio (χ^2) = 1,899.16***								

Notes: BSIZE (–1) is the lagged bank size, LRISK is the lagged liquidity risk, CRISK (–1) is the lagged credit risk, FUNDRISK (–1) is the lagged funding risk, BSTAB (–1) is the lagged bank stability, DIV (–1) is the lagged diversification and CAP (–1) is the lagged capital.

**Significance level at 5%.

***Significance level at 1%.

Source: Author's construction (2015).

Table 6. Results of panel least squares regression. Dependent variable: ROE

Variable	Full model (2009Q1–2013Q4)			2009Q1–2011Q2			2011Q3–2013Q4		
	Coefficient	t-Value	p-Value	Coefficient	t-Value	p-Value	Coefficient	t-Value	p-Value
BSIZE (–1)	0.0284	0.3420	0.7324	0.3636	2.2265	0.0263**	–0.1801	–1.4383	0.1507
LRISK (–1)	0.0616	2.0638	0.0392**	0.0642	1.2227	0.2218	–0.0003	–0.0076	0.9939
CRISK (–1)	0.0153	0.3125	0.7547	–0.1310	–1.5789	0.1148	0.01257	0.1746	0.8614
FUNDRISK (–1)	–1.4166	–18.265	0.0000***	–1.1162	–7.5159	0.0000***	–1.0299	–7.1791	0.0000***
BSTAB (–1)	0.4326	19.675	0.0000***	0.2540	6.7344	0.0000***	0.4006	13.792	0.0000***
DIV (–1)	0.1097	3.0248	0.0025***	0.0527	0.6212	0.5347	0.0613	1.4584	0.1451
CONSTANT	3.9873	2.9368	0.0034***	–0.8123	–0.3221	0.7475	7.3652	3.5458	0.0004***
	$R^2 = 0.75$; $N = 1,901$			$R^2 = 0.76$; $N = 872$			$R^2 = 0.81$; $N = 1,029$		
	Adj. $R^2 = 0.73$			Adj. $R^2 = 0.72$			Adj. $R^2 = 0.78$		
	Durbin–Watson stat = 1.9			Durbin–Watson stat = 2			Durbin–Watson stat = 2		
	F -statistic = 40.22***			F -statistic = 19.56***			F -statistic = 31.12***		
	Wald test: $\chi^2(7) = 136,330$ ***			Wald test: $\chi^2(7) = 51,311.83$ ***			Wald test: $\chi^2(7) = 108,615.3$		
	Hausman test: $\chi^2 = 144.2$ ***								
	Likelihood ratio: $\chi^2 = 1,913$ ***								

Notes: BSIZE (–1) is the lagged bank size, LRISK is the lagged liquidity risk, CRISK (–1) lagged credit risk, FUNDRISK (–1) is the lagged funding risk, BSTAB (–1) is the lagged bank stability, and DIV (–1) is the lagged diversification. Capitalization has been dropped from the above model in line with the position of the literature that capitalization should be dropped from the model when ROE is used as proxy for profitability (Athanasoglou et al., 2008).

**Significance level at 5%.

***Significance level at 1%.

Source: Author's construction (2015).

FE model is the optimal estimation technique to be used for analysis. In both tables, the results reject the null hypothesis that the difference between the coefficient of the FE and RE models is not significant. This is because the probability of the χ^2 (χ^2) is less than 0.05 ($\text{Prob} > \chi^2 = 0.0000$). Thus, the study employs the FE panel regression model for analysis. The R^2 in all the models ranges between 71 and 81%, the Durbin–Watson statistic is around 2, the F -statistic ranges between 16.74 and 40.22 significant at 1% significance level and the Wald test χ^2 values are all significant at 1% significance level. The results of these diagnostic tests suggest that the models are reliable and thus the results are also reliable.

The postulation of the size-profitability hypothesis is that large banks are more able to exploit the advantage of economies of scale in transactions which results in higher profits. In addition, large banks may be able to wield market power via stronger brand image or implicit regulatory (too-big-to-fail) protection (Kořak & Čok, 2008). Thus, a positive relationship is expected between the size of a bank and its profitability (Kosmidou, 2008; Pervan et al., 2010). Bertay et al. (2013) provide evidence in support of this hypothesis. The results in Tables 5 and 6 support this hypothesis. Table 5 shows that bank size has a positive statistically significant relationship with bank profitability. The implication is that an increase in the scale of operations of a rural bank results in an increase in its profits. This points to the presence of economies of scale in the operations of the RCBs. However, as can be observed in Table 6, when ROE is used to measure bank profitability, it is only from 2009Q1 to 2011Q2 that a positive statistically significant relationship between size and profitability is observed.

Banks usually reduce the incidence of insolvency problems by maintaining higher amounts of liquid assets which can easily be converted to cash (Ćurak et al., 2012). However, liquid assets usually yield lower rates of return; therefore, higher liquidity has been associated with lower profitability. Thus, the a priori prediction of this study was that there should be a negative relationship between liquidity risk and bank profitability. Contrary to this prediction, Table 5 shows that there is rather a positive statistically

insignificant relationship between liquidity risk of a rural bank and its profitability when ROA is used to measure profitability. However, when ROE is used to proxy profitability, the relationship between liquidity risk and profitability is positive and statistically significant, meaning that RCBs gain from maintaining higher amounts of liquid assets.

The risk-return hypothesis predicts that a higher loans-to-asset ratio means higher credit risk exposure which requires a commensurate compensation in the form of higher returns and improved overall profitability (Ćurak et al., 2012). Thus, there is a positive relationship between credit risk and profitability. The results in Tables 5 and 6 fail to confirm this postulation. Generally, credit risk has a positive statistically insignificant relationship with bank profitability, implying that credit risk is not a significant indicator of a rural bank profitability in Ghana. This contradicts the work of Afriyie and Akotey (2013), who find a positive statistically significant relationship between credit risk and bank performance of RCBs in the Brong Ahafo of Ghana.

The funding risk Z-score measures the number of standard deviations by which deposits would have to drop from the mean to compel the bank to resort to equity recapitalization. Thus, the higher the Z-score, the lower the funding risk of the rural bank. The results in Table 5 indicate that funding risk (FUNDRIK) has a positive statistically insignificant relationship with bank profitability when ROA is used to proxy profitability. This result is also observed even when the data are split. However, it can be observed in Table 6 that when ROE is used to measure profitability, a robust negative statistically significant relationship is observed between funding risk and profitability, meaning that as the funding risk of a rural bank improves, its profitability drops. Two reasons could explain this finding. First, ability to mobilize more deposits may induce a rural bank to engage in aggressive lending in order to avoid the opportunity cost of holding idle loanable funds. In the process, the bank would be motivated to lower its underwriting and investment standards culminating in skyrocketing non-performing and bad loans as well as bad investments. As a consequence, the profit of the bank dips. Second, the drive to increase deposits may compel a rural bank to spend more on promotion as well as offer attractive interest rates on deposits to surplus units. This increases the operational costs of the bank and decreases the profitability of the bank if commensurate interest income is not generated from the lending and investment operations.

As more deposits are raised and given out as loans and investments, a bank is more exposed to stability crisis or insolvency risk unless there is adequate capital to cushion it against possible losses emanating from customer default. The contention has been that a more stable bank is a more profitable bank. The results in Tables 5 and 6 support the stability-profitability hypothesis, implying that stable RCBs are more likely to make higher profits than unstable ones.

So far, the results on the relationship between diversification and profitability are mixed. Whereas Elsas et al. (2010) report that diversification boosts bank profitability, Laeven and Levine (2007) provide evidence to the effect that income diversification hurts the market values of financial conglomerates. Sufian and Habibullah (2009) also study the determinants of commercial bank profitability with data from China and report that diversification has a positive impact on profitability of the banks. Evidence in Tables 5 and 6 supports the positive relationship hypothesis. Tables 5 and 6 show that diversification (DIV) is positively and significantly related to profitability. This suggests that commitment of loanable funds into short-term and long-term securities is beneficial to the profitability of RCBs in Ghana.

Sufian and Habibullah (2009) show that capitalization has a positive impact on profitability of banks in China. García-Herrero et al. (2009), Pasiouras and Kosmidou (2007); and Goddard et al. (2004) also report that banks that maintain higher level of equity relative to assets are best-performing banks because they tend to have lower costs of funding owing to lower bankruptcy costs. Dietrich and Wanzenried (2014) also find a positive relationship between capital and profitability (equity over total assets). However, the results in Table 5 do not support the existing literature. As can be observed, capitalization is not a significant predictor of bank profitability.

6. Discussion

The unique features of rural banks have triggered the need to investigate their profitability. The results indicate that rural banks in Ghana can significantly improve their financial performance by strategizing around their size, funding risk, diversification, liquidity risk, and stability.

Economies of scale are derivable from the size of a firm. As the size of a firm waxes, lower fixed costs are predictable which give it some competitive advantage over its competitors. The positive relationship between the size of a rural bank and its profitability suggests that RCBs in Ghana enjoy economies of scale. However, since a greater proportion of the assets of a lending institution is made up of loans, increasing the size of a rural bank could be profit-boosting in the short run, but devastating in the long run if some of the loans turn out to be non-performing in the long run. It is for this reason that some studies have reported that size has a threshold effect on profitability; as the size of a bank grows to some point, any additional growth yields a negative marginal effect on profitability. It is, therefore, not proper to propose that rural banks should increase their scale of operations as a way of improving their profitability.

Funding risk shows a negative statistically significant impact on bank profitability, implying that a rural bank that improves its funding risk in one quarter is likely to experience a fall in its profitability in the subsequent quarter. What accounts for this? The reason could be attributed to technical inefficiency in terms of how deposits are transformed into loans. It is, therefore, reasonable to argue that a rural bank that strengthens its lending standards in the midst of mounting deposits is likely to significantly benefit from them (deposits).

The concept of diversification is at the heart of investment portfolio analysis. A well-diversified investment portfolio guarantees good returns. Despite the fact that loans are the fulcrum around which the operations of banks revolve, in practice, banks diversify their assets by investing some of their funds in short- and long-term securities. Evidence from the data indicate that diversification into securities has generally supported the financial performance of rural banks. Judging from the fact that credit risk has no significant impact on profitability, the obvious impression is that RCBs would be better off if they invest more in securities than in loans. Should RCBs skew their operations towards investment banking? From the shareholder wealth maximization perspective, the answer is yes because more investment in securities would mean more profits. However, from the socio-economic point of view, the answer is No. This is because the motive behind the introduction of the rural banking concept is to promote rural financial intermediation as a tool for tackling poverty in the rural communities. Thus, shifting focus from lending to investment will defeat the purpose for introducing the concept.

The study has found a positive statistically significant relationship between liquidity risk and bank profitability. The obvious argument is that RCBs can boost their profitability if they maintain higher liquidity. However, this must be done with a lot of caution. This is because keeping excessive funds in liquid assets may decrease the value of the firm.

The finding that stability promotes profitability has come as no surprise because theoretically, profitability has been linked to stability. This is evident in the hackneyed measure of bank stability: the Z-score. As indicated above, the bank stability Z-score measures the number of standard deviations by which a bank's ROA has to fall for the bank to become insolvent.

7. Conclusion and policy implications

The paper explores whether bank size, capitalization, risks (liquidity, credit, stability, and funding), and diversification in the business model significantly explain variations in its profitability with quarterly data (2009Q1–2013Q4) from 112 RCBs in Ghana. These banks have been selected based on the availability of data. Panel Least Squares regression with FEs has been used for estimation. The results show that generally size, funding risk, stability risk, liquidity risk, and diversification are significant predictors of rural bank profitability. The analysis shows that an increase in size supports profitability in the rural

banking industry in Ghana. This supports the size-profitability hypothesis. Furthermore, the analysis reveals that funding risk has a negative effect on rural bank profitability, implying that a rural bank that improves its deposit-mobilization in one quarter is likely to record a drop in its profitability in the next quarter. This finding constitutes an expansion of the indicators of bank profitability. Again, evidence that stability, liquidity risk, and diversification support profitability confirms the extant literature that stability, liquidity risk, and diversification are significant indicators of bank profitability.

The above results suggest two major policy implications. One policy implication is that funding, liquidity, and stability risks management should be given much attention in the day-to-day management of rural banks. It is known that following the demise of some RCBs and the concomitant negative consequences for the entire financial system, the Bank of Ghana has pursued radical reforms in the rural banking industry, including the introduction of a new minimum capital requirement as well as new directives on the configuration of the boards of rural banks. However, more reforms are needed to fine-tune the operations of RCBs. It is, thus, recommended that the Bank of Ghana should make risk management experts compulsory members of the boards and management teams of RCBs. These experts will provide the needed direction for effective and efficient management of risks. This is likely to strengthen the operations of the banks and ultimately ensure stability in the entire financial system.

The finding that diversification supports profitability underpins the recommendation that the boards of RCBs should commit more loanable funds to investment in financial securities. This will not only guarantee shareholder wealth maximization, but also the sustainability of the banks.

This paper has omitted external or macroeconomic factors in its analysis of rural bank profitability. It is, therefore, recommended that future researchers should explore how external or macroeconomic factors in Ghana affect the profitability of rural banks.

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Author details

Michael Adusei¹

E-mail: madusei10@yahoo.com

¹ Department of Accounting and Finance, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

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Note

1. In this paper rural banks and RCBs are used interchangeably.

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