



Journal of Financial Regulation and Compliance

Freedom, competition and bank profitability in Sub-Saharan Africa

Emmanuel Sarpong-Kumankoma, Joshua Abor, Anthony Quame Q. Aboagye, Mohammed Amidu,

Article information:

To cite this document:

Emmanuel Sarpong-Kumankoma, Joshua Abor, Anthony Quame Q. Aboagye, Mohammed Amidu, (2018) "Freedom, competition and bank profitability in Sub-Saharan Africa", Journal of Financial Regulation and Compliance, Vol. 26 Issue: 4, pp.462-481, <https://doi.org/10.1108/JFRC-12-2017-0107>

Permanent link to this document:

<https://doi.org/10.1108/JFRC-12-2017-0107>

Downloaded on: 18 June 2019, At: 04:07 (PT)

References: this document contains references to 51 other documents.

To copy this document: permissions@emeraldinsight.com

The fulltext of this document has been downloaded 159 times since 2018*

Users who downloaded this article also downloaded:

(2019), "The internal determinants of bank profitability and stability: An insight from banking sector of Pakistan", Management Research Review, Vol. 42 Iss 1 pp. 49-67 <<https://doi.org/10.1108/MRR-04-2017-0103>>

(2016), "The determinants of bank profitability: empirical evidence from European banking sector", Journal of Financial Reporting and Accounting, Vol. 14 Iss 1 pp. 86-115 <<https://doi.org/10.1108/JFRA-05-2015-0060>>

Access to this document was granted through an Emerald subscription provided by emerald-srm:534301 []

For Authors

If you would like to write for this, or any other Emerald publication, then please use our Emerald for Authors service information about how to choose which publication to write for and submission guidelines are available for all. Please visit www.emeraldinsight.com/authors for more information.

About Emerald www.emeraldinsight.com

Emerald is a global publisher linking research and practice to the benefit of society. The company manages a portfolio of more than 290 journals and over 2,350 books and book series volumes, as well as providing an extensive range of online products and additional customer resources and services.

Emerald is both COUNTER 4 and TRANSFER compliant. The organization is a partner of the Committee on Publication Ethics (COPE) and also works with Portico and the LOCKSS initiative for digital archive preservation.

*Related content and download information correct at time of download.

Freedom, competition and bank profitability in Sub-Saharan Africa

Emmanuel Sarpong-Kumankoma, Joshua Abor,
Anthony Quame Q. Aboagye and Mohammed Amidu
University of Ghana Business School, Accra, Ghana

Abstract

Purpose – This paper aims to examine the effects of financial freedom and competition on bank profitability.

Design/methodology/approach – The study uses system generalized method of moments and data from 139 banks across 11 Sub-Saharan African countries during the period 2006-2012.

Findings – The results of the study show that higher market power (less competition) is positively related to bank profitability, but operating efficiency is a more important determinant of profitability than market power. Also, both financial freedom and economic freedom show a positive impact on bank profits. The authors find evidence that banks with higher market power operating in countries with higher freedom for banking activities are more profitable than their counterparts in countries with greater restrictions on banking activities.

Practical implications – The results have shown that allowing banks greater freedom to operate would enhance their performance, without necessarily damaging the economy, as operating efficiency appears to be a more important reason for the observed profitability than market power.

Originality/value – This study provides insight on the ambiguous relationship between competition and bank profitability by considering the moderating effect of financial freedom which has not been taken into account in previous studies.

Keywords Lerner index, Competition, Bank profitability, Market power, Financial freedom

Paper type Research paper

1. Introduction

A sound and profitable banking sector is better able to withstand negative shocks and contribute to the stability of the financial system. Therefore, the determinants of bank profitability have attracted the interest of academic research as well as of bank management, financial markets and bank supervisors (Athanasoglou *et al.*, 2008). Also, as suggested by the European Central Bank (2010), the question of what is an acceptable level of bank profitability is likely to play a pivotal role in the post-crisis debate among banking executives, investors and regulators, considering the enormous losses in the financial crisis and the huge government intervention required.

Indeed, bank profitability is an intricate issue. Higher profitability may raise concerns about potential abuse of market power and risk-taking by banks. For instance, while market power and regulations can avert arbitrage and keep returns high, standard asset pricing models also suggest that arbitrage will ensure that riskier assets are



compensated with higher returns (Flamini *et al.*, 2009). And if higher profitability is the result of market power, then consumers could be disadvantaged through higher loan rates, lower deposit rates, credit rationing and poor quality of financial services (Chortareas *et al.*, 2011). Thus, high bank profitability may call for policy interventions to reduce bank entry barriers and other obstacles to competition, and to lower risk. However, bank profits may be reinvested, which should produce safer banks and promote financial stability (Flamini *et al.*, 2009). On the other hand, low profitability in the banking sector may suggest intense competition or inefficiency in operations, either of which requires appropriate policy responses on competition, quality of human capital and cost of doing business.

Most recent studies on the relationship between bank competition and profitability test the structure-conduct-performance (SCP) and/or the efficiency structure (ES) hypotheses. Generally, the results have been mixed. While some have found support for the SCP, other studies find no evidence of market structure or market power having an effect on bank profitability. Instead, some have found that the level of bank profitability is explained by efficiency. Of course, even when market structure or market power is found to affect profitability, the outcome is not always the same. In some cases profitability is positively affected by market structure, while the effect is negative in other situations. Support for the market power (MP) hypothesis has been found by Tregenna (2009), Jeon and Miller (2002), Mirzaei *et al.* (2013) and Fu and Heffernan (2009). In contrast, some studies report that the MP argument is not held in the banking industry. Examples are Seelanatha (2010) and Chortareas *et al.* (2011). Instead, these studies suggest that efficiency seems to be the main driving force of increased bank profitability.

However, conspicuously absent in the banking literature is an examination of the links between economic freedom and bank performance. The limited research in this area is somewhat surprising given the importance of bank lending in promoting economic development and the impact that economic freedom is likely to have on the banking sector (Sufian and Habibullah, 2010). Indeed, as noted by Hafer (2013), a number of studies have found that financial development and higher levels of economic freedom are associated with (or cause) economic growth. The unanswered question, however, is whether the financial development-economic growth nexus reflects influences of economic freedom operating through the financial system (Hafer, 2013). Sufian and Habibullah (2010) provide new empirical evidence on the positive impact of economic freedom on banks' performance in Malaysia. Chortareas *et al.* (2013), possibly the first to directly investigate the dynamics between the financial freedom counterparts of the economic freedom index drawn from the Heritage Foundation database and bank efficiency levels, suggest that the higher the degree of an economy's financial freedom, the higher the benefits for banks in terms of cost efficiency. Financial freedom is a measure of the degree of restrictions and controls in the financial sector. When financial institutions operate in a less restricted environment they are more likely to engage in competitive policies, resulting in higher levels of efficiencies. Related studies include Smimou and Karabegovic (2010) who show that changes in economic freedom have a positive impact on equity market returns, and Hafer (2013) finds that countries with higher levels of initial economic freedom, on average, exhibit greater levels of financial intermediary development in subsequent years.

Chortareas *et al.* (2013) have noted that studies that consider the effects of economic freedom on bank performance typically treat the freedom index as one of the control variables, and also focus on the aggregate (economic) freedom index and not on the

specific financial freedom counterparts, which gives rise to the possibility of misspecification bias. Indeed, as it became available some 20 years ago, several studies have used the financial freedom index (sometimes called banking freedom) either as control variable or instrumental variable, but hardly is there any focus on its effect on bank performance.

The Sub-Saharan Africa (SSA) region is an interesting market to study. Banking in this market has undergone dramatic changes over the past 20 years. While dominated by government-owned banks in the 1980s and subject to restrictive regulation – including interest rate ceilings and credit quotas – financial liberalization, institutional and regulatory upgrades and globalization have changed the face of financial systems across the region. Today, most countries have deeper and more stable financial systems, though challenges of concentration and limited competition, high costs, short maturities, and limited inclusion persist (Beck and Cull, 2013). However, as competition gets more intense in SSA banking markets along with greater financial freedom, how will bank performance be affected? Will banks in these markets continue to be profitable, well-capitalized and stable? Or are we likely to witness bank crises again, as experiences from the developed markets suggest, especially given the poor institutional environment in these areas? Our study contributes significantly to the literature by examining the effects of financial freedom and competition on bank profitability. This should enhance our understanding of the ambiguous relationship between competition and bank profitability, by considering the potential effect of financial freedom on this relationship.

The results of the study show that higher market power is positively related to bank profitability, suggesting that in less competitive markets banks generally earn higher returns on their assets. Also, both financial freedom and economic freedom show a positive impact on bank profits. We find evidence affirming that financial freedom and economic freedom have conditioning effects on the impact of market power (or competition) on bank profits. It appears that banks with higher market power operating in countries with higher freedom for banking activities are more profitable than their counterparts in countries with greater restrictions on banking activities. The results of the study have important policy repercussions. Our results have shown that allowing banks greater freedom to operate would enhance their performance, without necessarily damaging the economy, since operating efficiency appears to be a more important reason for the observed profitability than market power. This suggests that banks may not be earning their income at the expense of the rest of the economy but through more efficient management. Hence, caution is needed in implementing policies that will flood the market and eliminate pricing power of banks, since that could be damaging to bank stability.

The rest of the paper is as follows: Section 2 reviews the existing literature. In Section 3, the measurement of the variables is outlined together with the estimation methodologies. Section 4 presents the empirical results and discussion, while Section 5 concludes and offers policy recommendations.

2. Literature review

2.1 Competition and bank profitability

As explained by Tregenna (2009), the traditional literature on competition and bank profitability falls into two broad approaches: the MP and ES paradigms. These approaches provide different suggestions for the direction of causality between concentration and profitability. For the MP hypothesis, the direction of causality runs from market structure to behavior, and then performance. In other words, a concentrated structure promotes the use

of market power in ways that may enhance banks' profitability. In contrast, the ES hypothesis perceives causality as running from individual firms' efficiency to their market share and profitability.

Further, within the MP paradigm, two different approaches emerge in the literature: the SCP hypothesis, and the relative market power (RMP) hypothesis. The SCP hypothesis asserts that concentration in a banking market gives rise to potential market power by banks which allows them to set prices that are less favorable to consumers (lower deposit rates, higher loan rates) which may then increase their profitability. The RMP hypothesis posits that only firms with large market shares and well-differentiated products are able to exercise market power in pricing their products and earn supernormal profits (Shepherd, 1982). Thus, whereas the SCP hypothesis would predict generic benefits to banks arising from higher concentration, the RMP hypothesis sees any benefits as accruing to individual banks based on their own market share. According to the latter approach, only large banks can influence prices and increase profits (Tregenna, 2009).

Again, within the ES paradigm there are also two theories that explain the positive relationship between profits and either concentration or market share: the X-efficiency (ESX) and scale-efficiency (ESS) hypotheses. The X-efficiency version of the ES hypothesis asserts that firms with superior management or production technologies have lower costs and therefore higher profits. Such firms tend to gain larger market shares, which may manifest in higher levels of market concentration, but without any causal relationship from concentration to profitability. The scale efficiency approach emphasizes economies of scale rather than differences in management or production technology. Larger firms can obtain lower unit costs and higher profits through economies of scale. Again, as these firms have higher market shares, which may manifest in higher concentration, there may be an apparent – yet spurious – relationship between concentration and profitability. Thus, according to the ES approaches, a positive correlation between concentration and profitability need not indicate a causal relationship, especially not through market power (Tregenna, 2009).

For instance, Tregenna (2009) analyses the effects of structure on bank profitability in the U.S from 1994 to 2005. He found evidence that market concentration increases bank profitability. This holds even when the largest banks are excluded from the sample, suggesting that the relationship between concentration and profitability acts in a generalized structural way and that the higher profits arising from concentration are at the expense of the rest of the economy. Closely related to this are Fu and Heffernan (2009), who investigate the relationship between market structure and performance in China's banking system from 1985 to 2002, a period when this sector was subject to gradual but notable reform. Their results lend some support to the relative market-power hypothesis in the early period.

Similarly, Perera *et al.* (2013) find that even though increasing competition (arguably driven by on-going deregulation and liberalization of the financial services industries) exerts negative pressure on bank profitability, high levels of industry concentration still allows South Asian banks to earn higher profits. For the Arab Gulf Cooperation Council (GCC) region, Al-Muharrami and Matthews (2009) find that the performance in banking industry is best explained by the mainstream SCP hypothesis. Mirzaei *et al.* (2013) empirically investigate the effects of market structure on profitability of 1,929 banks in 40 emerging economies (Eastern Europe and Middle East) and advanced economies (Western Europe) over 1999-2008 by incorporating the traditional SCP and RMP hypotheses. They observe that a greater market share leads to higher bank

profitability being biased toward the RMP hypothesis in advanced economies, yet neither of the hypotheses is supported for profitability in emerging economies. In addition, [Goddard et al. \(2004\)](#) find some evidence of a positive association between concentration and profitability, but little evidence of a link between bank-level X-inefficiency and profitability.

In contrast, [Seelanatha \(2010\)](#) suggest that the traditional SCP argument is not held in the banking industry in Sri Lanka, and that bank profitability does not depend on either market concentration or market power of individual firms but on the level of efficiency of the banking units. Likewise, [Chortareas et al. \(2011\)](#) suggest that despite the significant rise in takeovers from foreign banks and the increase in market concentration, banks' profits do not seem to be explained by greater market power in Latin America. Instead, efficiency (particularly scale efficiency) seems to be the main driving force of increased profitability for most countries. The key implication is that policies aimed at removing the remaining barriers to competition should be expected to benefit the banking system without being detrimental to consumers. While [Flamini et al. \(2009\)](#) assert that bank profits are high in SSA compared to other regions, they do not obtain conclusive results as to whether market power influences bank returns.

2.2 Freedom and bank performance

There is extensive literature on the effect of economic freedom on growth. Most of these studies, such as [De Haan and Sturm \(2000\)](#), [Adkins et al. \(2002\)](#), [Bengoa and Sanchez-Robles \(2003\)](#) and [Farhadi et al. \(2015\)](#), generally show that greater economic freedom has positive impact on economic performance. Indeed, [Ahmed \(2013\)](#) finds that institutional factors (including economic freedom) are important in explaining growth and financial development in SSA. However, the links between economic freedom and bank performance is scarce in the banking literature. In fact, theoretical models that directly analyze the impact of economic freedom on bank performance are yet to be developed, but the effects of restrictions on various aspects of banking have been well established ([Chortareas et al., 2013](#)). For instance, [Delis \(2012\)](#) suggests that financial liberalization policies reduce market power of banks in developed economies with advanced institutions, but competition in banking does not improve at the same rate in countries where institutions are weaker and not well developed. Also, [Mirzaei and Moore \(2014\)](#) report that less intervention of government contributes to bank competition in low-income countries, but financial freedom is one of the main drivers of increasing competition in developed countries.

[Carow and Kane \(2002\)](#) review and extend event-study evidence about the distribution of the benefits and costs of relaxing long-standing geographic and product-line restrictions on USA financial institutions. The evidence indicates that the new financial freedoms may have redistributed rather than created value.

[Sufan and Habibullah \(2010\)](#) provide new empirical evidence on the positive impact of economic freedom on banks' performance in Malaysia. The empirical analysis is confined to the Malaysian banking sector during the period of 1999-2007. They find that overall economic freedom and business freedom exerts positive impacts, implying that higher (lower) freedom on the activities that banks can undertake and entrepreneurs to start businesses increases (reduces) banks' profitability. [Smimou and Karabegovic \(2010\)](#) examine the relationship between economic freedom index and equity market returns for the Middle East and North Africa (MENA) markets. The evidence shows that changes in economic freedom have a positive impact on equity market returns, which are not explained by business-cycle control variables related to expected returns,

and that legal structure and security of property rights have the most significant impact. [Hafer \(2013\)](#) also finds that countries with higher levels of initial economic freedom, on average, exhibit greater levels of financial intermediary development in subsequent years. In addition, if greater financial intermediary development engenders faster economic growth, the results of this study explain, at least partially, the observed link between economic freedom and economic growth.

[Chortareas et al. \(2013\)](#), possibly the first to directly investigate the dynamics between the financial freedom counterparts of the economic freedom index drawn from the Heritage Foundation database and bank efficiency levels, suggest that the higher the degree of an economy's financial freedom, the higher the benefits for banks in terms of cost efficiency. Financial freedom is a measure of the degree of restrictions and controls in the financial sector. [Sufian \(2014\)](#) also suggests that greater financial freedom positively influence the profitability of Islamic banks operating in the MENA banking sectors. However, [Sufian and Habibullah \(2014\)](#) report that restrictions on the activities of which banks in Malaysia could undertake exert negative impact on their efficiency levels.

[Lin et al. \(2015\)](#) examine how financial freedom moderates the effect of changes in bank ownership on cost efficiency in twelve Asian developing countries during the period 2003-2012. Using the stochastic frontier method for estimating bank efficiency scores, they report that foreign presence improves bank efficiency, mainly in countries with high financial freedom. Additionally, they find evidence that increased government (domestic) ownership of banks seems to enhance (hamper) bank efficiency in economies with more financial freedom following the financial crisis.

3. Data and methodology

3.1 Data

The source of most of the banking data is the Bankscope database, which reports published financial statements from banks across the globe. Unconsolidated financial accounts (income statement and balance sheet) available for the seven-year period from 2006 to 2012 were used. The financial freedom and economic freedom variables were obtained from the Heritage Foundation's indices produced in collaboration with the *Wall Street Journal* annually since 1995. This data is available on the Heritage Foundation Website (www.heritage.org). The macroeconomic data, domestic credit to the private sector as a percentage of GDP, and GDP per capita are from the World Development Indicators produced by the World Bank, and available on the website of the World Bank.

Our initial sample comprised banks in all SSA countries, but because of data limitations, especially inadequate data points at the country level required for some of the regression estimates, we settled on data from 139 banks operating in 11 countries in SSA. Besides, some banks did not have values needed for some of the key variables used in the study and had to be excluded. The final sample is an unbalanced panel with 700 bank-year observations. Countries included in the study are Ethiopia, Ghana, Kenya, Malawi, Mauritius, Mozambique, Namibia, South Africa, Tanzania, Uganda and Zambia. According to the Economic Intelligence Unit (www.eiu.com), our sample comprise most of the largest banking markets in SSA.

3.2 Measuring bank competition

Similar to [Turk-Ariss \(2010\)](#), we measure bank competition using the Lerner indicator of market power defined as:

$$Lerner_{it} = (P_{TA,it} - MC_{TA,it})/P_{TA,it}, \quad (3.1)$$

where $P_{TA,it}$ refers to the price of total assets (calculated as the ratio of total revenues to total assets) and $MC_{TA,it}$ is the marginal cost of producing an additional unit of output. As is common in the literature, we use the following translogarithmic function to model the underlying cost structure of the banking sector:

$$\begin{aligned} \ln TOC_{it} = & \beta_0 + \beta_1 \ln TA_{it} + \frac{\beta_2}{2} (\ln TA_{it})^2 + \sum_{k=1}^3 \bar{\lambda}_k \ln W_{k,it} + \sum_{k=1}^3 \phi_k \ln TA_{it} \ln W_{k,it} \\ & + \sum_{k=1}^3 \sum_{j=1}^3 \delta_{ij} \ln W_{k,it} \ln W_{j,it} + \sum_{j=1}^3 (\delta_j/2) (\ln W_{j,it})^2 + \sum_{k=1}^2 \eta_k trend^k \\ & + \sum_{j=1}^3 \varsigma_j \ln W_{j,it} trend + \wp \ln TA_{it} trend + \varepsilon_i, \end{aligned} \quad (3.2)$$

where $\ln TOC$ represents the natural logarithm of bank's total costs (financial and operating costs) and $\ln TA$ is a proxy for bank output measured as total assets. W_1 , W_2 and W_3 are the prices of funds, labor and physical capital, respectively. They are, respectively, calculated as the ratio of interest expenses to total deposits and money market funds, personnel expenses to total assets, and other operating expenses (excluding personnel expenses) to total assets. It should be noted that, scaling over total employees, instead of total assets is a better proxy for the price of labor, but the latter was chosen because the number of employees is not available for many observations. $Trend$ is a time trend which captures movements in the cost function over time or technical change. We also scale the input prices and TOC by W_3 to ensure homogeneity of degree one in input prices of the cost function.

The marginal cost, $MC_{TA,it}$, is then derived from the translogarithmic cost function by taking the first derivative with respect to the output (total assets) for each bank in the sample as follows:

$$MC_{it} = \frac{TOC_{it}}{TA_{it}} \left[\beta_1 + \beta_2 \ln TA_{it} + \sum_{k=1}^3 \phi_k \ln W_{k,it} + \wp trend_{it} \right] \quad (3.3)$$

The Lerner index computed from [equation \(3.1\)](#) is basically the conventional Lerner index. However, as noted by [Turk-Ariss \(2010\)](#), this approach is likely to result in biased estimates because of a bank's ability to exercise some form of monopoly power in the deposit market which enables it to obtain funds cheaply. He argues that usually when pricing their loans, managers of banks endeavor to cover their cost of funds, and charge a premium to reflect their exercise of market power, in addition to charging a risk premium for the uncertainty of repayment. Hence, to obtain a "raw" or "clean" proxy of pricing power that is not distorted by market power which had previously originated in the deposit market while raising funds, cost of funds should be excluded to produce a funding-adjusted Lerner index. To check the robustness of our results, we estimate another version of the Lerner index by including only two inputs, the price of labor and the price of physical capital to obtain the funding-adjusted Lerner index using the same model.

3.3 Measurement of bank profitability

We measure bank profitability using the common measure in the literature – return on average assets (ROAA). The ROAA is measured as the bank's net income for the year divided by average total assets, and indicates the bank's ability to earn income on its investments in assets.

3.4 The economic freedom index

There are two major measurements of economic freedom, the Economic Freedom of the World Index produced by the Fraser Institute (Gwartney *et al.*, 2014) and the Economic Freedom Index constructed by the Heritage Foundation (Heritage Foundation, 2015) in collaboration with the Wall Street Journal. As noted by Chortareas *et al.* (2013), both indices are highly credible and their results are compatible in general. Even though the Economic Freedom of the World Index has been used extensively in the literature, we use the Heritage Foundation's Index of Economic Freedom for this study because one of its components, the Financial Freedom Index captures the issues of interest (Chortareas *et al.*, 2013).

Financial freedom, one of Heritage Foundation's ten measures of economic freedom, is a measure of banking efficiency, as well as freedom from restrictions or government control and interference in the financial sector. State ownership of banks and other financial institutions such as insurers and capital markets reduces competition and generally lowers the level of available services (Heritage Foundation, 2015).

The Financial Freedom Index scores an economy's financial freedom by looking into the following five broad areas:

- (1) the extent of government regulation of financial services;
- (2) the degree of state intervention in banks and other financial firms through direct and indirect ownership;
- (3) the extent of financial and capital market development;
- (4) government influence on the allocation of credit; and
- (5) openness to foreign competition.

These five areas are considered to assess an economy's overall level of financial freedom that ensures easy and effective access to financing opportunities for people and businesses in the economy. An overall score on a scale of 0 to 100 is given to an economy's financial freedom through deductions from the ideal score of 100, which reflects negligible government interference.

3.5 Modeling competition, financial freedom and bank profitability

We specify a dynamic model to determine the effect of competition and financial freedom on bank profitability as shown below. This approach follows several studies on bank profitability such as Athanoglou *et al.* (2008), Garcia-Herrero *et al.* (2009), Trujillo-Ponce (2013) and Dietrich and Wanzenried (2014).

$$\begin{aligned} Prof_{it} = & \Phi Prof_{it-1} + \rho_1 Lerner_{it} + \rho_2 Freedom_{it} \\ & + \rho_3 Lerner_{it} * Freedom_{it} + \sum_{n=1}^8 \Theta_n Z_{it}^n + \epsilon_{it}, \end{aligned} \quad (3.4)$$

where, $\epsilon_{it} = \Psi_i + \zeta_t + \varphi_{it}$ and the subscripts i , and t represent bank i at year t , respectively. $Prof_{it}$ is our measure of bank profitability and $Prof_{it-1}$ is the observation on the same bank in the same country in the previous year. We measure bank profitability as ROAA. *Lerner* represents the conventional Lerner index or the funding-adjusted Lerner index, and is our measure of competition. *Freedom* is the degree of financial freedom or economic freedom, and *Lerner*Freedom* is the interaction between competition and the freedom variables. The variable Z_{it} is a vector representing control variables. The error term, ϵ_{it} has three components: the unobserved time-invariant bank-specific effect (Ψ_i), the unobserved time effects (ζ_t), and the random error (φ_{it}). This is a two-way error component regression model, where $\Psi_i \sim \text{IIN}(0, \sigma_\Psi^2)$ and independent of $\varphi_{it} \sim \text{IIN}(0, \sigma_\mu^2)$.

We control for a number of variables that generally affect the relationship between competition and bank profitability. These include bank-specific and country-level characteristics. The bank-level variables are *Cost to income* (ratio of non-interest operating expenses to operating income), *Bank size* (natural logarithm of total assets), *Capitalization* (ratio of equity to total assets), *Credit risk* (ratio of total loans to total assets) and *Diversification* (ratio of non-interest income to total income). The country-level variables are *Concentration* (Hirschman–Herfindahl Index—the sum of the squares of the market share of assets of each bank), *Financial development* (domestic credit to the private sector as a percentage of GDP) and *Economic development* (natural logarithm of per capita GDP).

The operating efficiency of banks is known to be an important determinant of bank profitability. In this study, we use the *Cost to income* ratio as a proxy for efficiency. Banks with high operating efficiency are usually able to maintain a lower cost to income ratio, which enhances profits. Hence, we expect a negative relationship between *Cost to income* and bank profitability. Of course, if the benefits of improvements in efficiency are shared with customers in the form of lower loan rates and/or higher deposit rates, then the expected increase in profitability may not materialize (Goddard *et al.*, 2013).

The relationship between *Bank size* and profitability is quite ambiguous. Smirlock (1985) argues that a growing bank size is positively related to bank profitability. As larger banks are in a better position to realize economies of scale and reduce the cost of gathering and processing information, bank size should be positively associated with its performance (Dietrich and Wanzenried, 2011). However, extremely large banks might show a negative relationship between size and profitability. This is because of agency costs, the overhead of bureaucratic processes and other costs related to managing large firms (Stiroh and Rumble, 2006; Pasiouras and Kosmidou, 2007).

In line with the general literature, we measure bank *Capitalization* with the ratio of equity to total assets. Highly capitalized banks have a reduced need for external funds, and might be able to reduce their funding costs, which should positively affect their profitability. Besides, Athanasoglou *et al.* (2008) explain that the positive relationship between capital and bank profitability could be attributed to the ability of banks with sound capitalization to pursue business opportunities more effectively, and also because such banks have more time and flexibility to deal with problems arising from unexpected losses. However, if we consider the conventional risk-return hypothesis, we have to expect banks with lower capital ratios (which makes them more risky) to have higher returns in comparison to better-capitalized financial institutions (Dietrich and Wanzenried, 2011). Hence, we have no specific expectation as to the direction of the relationship between *Capitalization* and bank profitability.

The ratio of total loans to total assets is used as a proxy for *Credit risk*. An increased exposure to credit risk may be associated with decreased bank profitability. We thus generally expect a negative effect of this variable on bank returns (Dietrich and Wanzenried, 2014). As suggested by Dietrich and Wanzenried (2011), the negative relationship between credit risk and bank profits might be a reflection of exposure to high-risk loans, resulting in loan losses that lower the returns of the affected banks. On the other hand, banks that make risky loans may also be obliged to hold a higher amount of provisions. To compensate for the higher risk of default, they may charge higher margins, leading to a positive relationship (Maudos and de Guevara, 2004).

In recent times, an increasing proportion of bank income have been generated from non-interest activities, such as payment and other commission-based services, investment banking and insurance underwriting, among others. We measure *Diversification* as the ratio of non-interest income to total income. Chiorazzo *et al.* (2008) and Elsas *et al.* (2010) assert that revenue diversification enhances bank profitability via higher margins from non-interest businesses. However, other previous studies (Stiroh and Rumble, 2006) show that greater diversification of the banking business does not necessarily translate into an improvement of the bank's profitability. In fact, such diversification may be detrimental to profitability.

Our proxy for banking market *Concentration* is the Hirschman–Herfindahl Index (HHI). It is measured as the sum of the squares of the market share of assets of each bank in the industry. The SCP hypothesis suggests that higher concentration in banking markets has a positive impact on bank profitability, because collusion among banks may result in higher rates on loans and lower interest rates on deposits. However, if concentration is the result of tougher competition in the banking industry, this would suggest a negative relationship between performance and market concentration (Boone and Weigand, 2000). Consequently, the overall effect of market concentration on bank performance is uncertain.

We control for the level of *Financial development* and *Economic development* using domestic credit to the private sector as a percentage of GDP, and the natural logarithm of per capita GDP, respectively. The existing literature shows that GDP per capita could be expected to have a positive impact on bank performance (Bashir, 2003). On the other hand, we anticipate that higher levels of financial development would be associated with lower profits, as there may be little room for new business, as a result of higher competition.

3.6 Model estimation

We estimate the regressions based on the system generalized method of moments (GMM) estimator (Arellano and Bover, 1995). We used this dynamic panel model to deal with possible endogeneity of some of the variables used in the estimations, and to account for persistence of profitability. The model includes the first lag of the dependent variable as part of the covariates, and unobserved individual bank effects. Hence, the standard fixed effects or random effects estimators would be inconsistent, since by construction, the individual bank effects are correlated with the lagged dependent variable. To address these issues, Arellano and Bond (1991) use a GMM estimator for such models, popularly known as the difference GMM. In the difference GMM model, lagged exogenous variables in levels are used as instruments for the first differenced, lagged dependent variable. However, Arellano and Bover (1995) and Blundell and Bond (1998) have shown that these lagged variables may provide little information about the first differences. Consequently, Blundell and Bond (1998)

expanded the work of [Arellano and Bover \(1995\)](#) to develop a system estimator that exploits additional moment conditions on both first-differences and levels, with lagged first-differences of the series employed as instruments in the levels equation. The system GMM estimator reduces potential bias in finite samples as well as asymptotic imprecision associated with the difference estimator ([Blundell and Bond, 1998](#)).

The estimation is done using the two-step system GMM estimator with Windmeijer-corrected standard errors, small-sample adjustments, and orthogonal deviations ([Windmeijer \(2005\)](#)). The difference and system GMM estimators have one-step and two-step variants. The two-step system GMM uses residuals from the one-step estimates and is asymptotically more efficient than the one-step. Even so, the consistency of the system GMM estimator depends on two key assumptions: that the error term is not autocorrelated, and that the instruments used are valid. The presence of first-order autocorrelation in the differenced residuals does not imply that the estimates are inconsistent. However, the presence of second-order autocorrelation suggests that the estimates are inconsistent. We test the hypothesis of no autocorrelation in the error term and report the results together with the main results. We also use the Hansen test of over-identifying restrictions to examine the validity of the instruments. The Hansen test analyses the sample analog of the moment conditions used in the estimation procedure to determine the validity of the instruments ([Liu et al., 2013](#)).

4. Empirical results

4.1 Descriptive statistics

A summary of descriptive statistics for the key variables are presented in [Table I](#). In addition, [Table II](#) provides details of differences in banking regulatory framework, performance and structure in the various countries. Among the countries in SSA included in this study, average profitability for the period are about 1.8 per cent for ROAA, 16.2 per cent for ROAE (return on average equity) and 5.6 per cent for NIM (net interest margin). Generally, the most profitable banks are in Ethiopia, Kenya and Malawi, while banks in Mozambique, Zambia and Uganda earn the highest margins on their intermediation activities. Banks in Zambia, Mauritius and Tanzania make the least profit, while those in Mauritius, Ethiopia and South Africa earn the lowest margins.

Market power, represented as Conventional Lerner index and Funding-adjusted index show a moderate level in most of the countries, averaging 0.22 and 0.23, respectively. The funding-adjusted Lerner is slightly higher than the conventional Lerner on average, suggesting little underestimation with the conventional Lerner index, but there are considerable differences in the two indices among the countries. Banks enjoy significantly higher monopoly power in Ethiopia and Malawi, with those in Mauritius, Zambia and Uganda having the least power in pricing their products and services. This means that banking markets in Mauritius, Zambia and Uganda are the most competitive, while those in Ethiopia and Malawi face little competition.

The mean of the index of financial freedom (53.6) indicates that the countries in SSA portray significant restrictions on banking activities and the provision of other financial services for the study period (2006-2012). This may have adverse implications for the efficient operation of banks in this region. Among the countries in SSA included in this study, Mauritius (64.3) has the highest degree of financial freedom while supervision of the financial sector in Ethiopia (20.0) is considered repressive. On the other hand, the mean level

Variable	Obs	Mean	SD	Min	Max
ROAA	700	0.0177	0.0266	-0.1818	0.0938
Conventional Lerner index	700	0.2243	0.3255	-3.7698	1.0300
Adjusted Lerner index	643	0.2330	0.3946	-5.3563	0.9830
Concentration	700	7.4258	0.5379	6.6984	8.7064
Cost to income	700	0.66455	0.4001	0.6540	5.7877
Economic freedom	700	60.1826	5.0582	50.5000	77.0000
Financial freedom	700	53.6000	9.6229	20.0000	70.0000
Financial development	700	0.4518	0.4737	0.1023	1.6754
Capitalization	700	0.1400	0.0810	0.0107	0.8358
Credit risk	700	0.5355	0.1579	0.0970	1.0071
Bank size	700	6.0505	1.6135	3.0000	11.7500
Diversification	700	0.2864	0.1293	-0.3889	0.9091
Economic development	700	7.1209	1.0453	5.5858	9.0895

Notes: The dependent variable *ROAA* is the ratio of net income to average total assets. The degree of market power is proxied by the *Conventional Lerner Index* and *Adjusted Lerner Index*. The *Lerner Index* is the price mark-up over marginal cost, with higher scores indicating a higher degree of pricing power. *Concentration* is measured by natural logarithm of HHI, measured as the sum of the squares of the market share of assets of each bank. *Cost to income* ratio is measured by the ratio of non-interest operating expenses to operating income. *Economic freedom* and *Financial freedom* are from the Economic Freedom Indicators of Heritage Foundation. They are scaled from 0 to 100 with higher values, indicating greater freedom. *Financial development* is measured as domestic credit to private sector as a percentage of GDP. *Capitalization* is the bank total equity to total assets ratio. *Credit risk* is measured as total loans to total assets. *Bank size* is measured as the natural logarithm of total assets. *Diversification* is the ratio of non-interest income to total income. *Economic development* is measured as the natural logarithm of GDP per capita

Table I.
Summary descriptive
statistics

of economic freedom (60.2) signifies a reasonable level of liberty to own and employ capital in these countries. Again, Mauritius (73.3) and Ethiopia (51.8) have the highest and lowest levels of economic freedom, respectively.

A significant portion of bank income (66 per cent) is consumed by costs (cost to income). This gives an indication of the level of operating efficiency. Differences in operating efficiency are not very large, except for Ethiopian banks (30.6 per cent) which appear to be significantly more efficient than the rest, with the most inefficient banks operating in Zambia, Uganda and Mozambique. Similarly, domestic credit to the private sector as a percentage of GDP (Financial development) remains relatively low at about 45 per cent. It is significantly higher in the more developed markets in the region, South Africa (154.1 per cent) and Mauritius (85.3 per cent). Countries giving the least amount of credit to the private sector are Zambia (13.8 per cent), Uganda (14.5 per cent) and Ghana (14.7 per cent).

With a mean of about 14 per cent capitalization ratio, banks in SSA appear to be generally well-capitalized. The highest capitalization levels are observed in Uganda, South Africa and Ethiopia, with the least capitalized banks operating in Zambia and Namibia. On average, about 54 per cent of banking assets in these SSA countries are devoted to lending activities (Credit risk), with the highest level of specialization in lending occurring in Namibia (77 per cent) and South Africa (66 per cent). On the other hand, banks in Tanzania (46.1 per cent), Malawi (46.4 per cent) and Ghana (46.6 per cent) devote much less to lending. Also, a significant portion of bank income (about 29 per cent) is earned from non-interest activities (Diversification). The most diversified banks are found in Malawi (49.1 per cent) and Ethiopia (41.9 per cent). On the other

Country	Financial freedom	Economic freedom	Conven. lerner	Adjusted lerner	ROAA	ROAE	NIM
Ethiopia	20.0	51.8	0.530	0.608	0.030	0.266	0.032
Ghana	55.7	58.4	0.219	0.240	0.021	0.169	0.066
Kenya	50.0	58.5	0.291	0.323	0.024	0.196	0.057
Malawi	50.0	54.5	0.688	0.576	0.034	0.236	0.062
Mauritius	64.3	73.3	0.057	N/A	0.011	0.106	0.026
Mozambique	50.0	56.2	0.226	0.168	0.018	0.142	0.080
Namibia	47.1	62.1	0.234	0.240	0.019	0.210	0.047
South Africa	58.6	63.2	0.253	0.194	0.023	0.156	0.044
Tanzania	52.9	57.5	0.263	0.214	0.014	0.143	0.053
Uganda	63.3	62.7	0.113	0.108	0.022	0.108	0.073
Zambia	50.0	57.5	0.058	0.080	0.002	0.055	0.073

Country	Cost/income	Equity/Assets	Credit risk	Diversification	Financial development
Ethiopia	0.306	0.154	0.532	0.416	0.252
Ghana	0.650	0.136	0.466	0.270	0.147
Kenya	0.596	0.140	0.537	0.256	0.307
Malawi	0.692	0.140	0.464	0.491	0.166
Mauritius	0.599	0.120	0.574	0.167	0.853
Mozambique	0.720	0.150	0.478	0.315	0.238
Namibia	0.591	0.100	0.771	0.217	0.486
South Africa	0.616	0.157	0.660	0.268	1.541
Tanzania	0.657	0.119	0.461	0.313	0.159
Uganda	0.788	0.162	0.492	0.289	0.145
Zambia	0.895	0.105	0.490	0.376	0.138

Notes: *Financial freedom* and *Economic freedom* are from the Economic Freedom Indicators of [Heritage Foundation \(2015\)](#). They are scaled from 0 to 100 with higher values indicating greater freedom. *ROAA* is Return on Average Assets (the ratio of net income to average total assets). *ROAE* is Return on Average Equity (ratio of net income to average total equity). Net Interest Margin (*NIM*) is defined as the ratio of the net interest income to total assets as a measure of spread. The degree of market power is proxied by the *Lerner index* or the price mark-up over marginal cost, with higher scores indicating a higher degree of pricing power. Two variants of the Lerner index are reported: a conventional Lerner and a funding-adjusted Lerner. *Cost to income* ratio is measured by the ratio of non-interest operating expenses to operating income. *Equity/Assets* is the bank total equity to asset ratio (Capitalization). *Credit risk* is measured as total loans to total assets. *Diversification* is the ratio of non-interest income to total income. *Financial development* is measured as domestic credit to private sector as a percentage of GDP

Table II.
Comparative
analysis of country
characteristics

hand, the least diversified banks are in Mauritius (16.7 per cent) and Namibia (21.7 per cent).

4.2 Freedom, competition and bank profitability

The results of the regression are presented in [Tables III](#) and [IV](#). Two specifications of the Lerner index are used for the estimations: the conventional Lerner and the funding-adjusted Lerner. As shown by the highly significant coefficients of the lagged dependent variable ($ROAA_{t-1}$) in both tables, bank profits tend to persist from year to year. All the regressions were estimated with the Windmeijer-corrected standard error version of the two-step system GMM model, with small-sample adjustments and orthogonal deviations. The results of the robustness tests indicate that the model seems to fit the panel data reasonably well. The *F*-test shows overall goodness of fit, the

Dependent variable: ROAA	Model 1	Model 2	Model 3	Model 4	Model 5
ROAA _{t-1}	0.1796*** (0.0561)	0.1826*** (0.0572)	0.1806*** (0.0586)	0.1700*** (0.0548)	0.1778*** (0.0534)
Lerner	0.0341*** (0.0072)	0.0354*** (0.0075)	0.0353*** (0.0082)	-0.0315 (0.0232)	-0.1881*** (0.0572)
Financial freedom		0.0002** (0.0001)	0.0003 (0.0002)	-0.0001 (0.0001)	
Economic freedom				0.0012*** (0.0004)	-0.0001 (0.0002)
Conv. Lerner * Fin. freedom					0.0038*** (0.0010)
Conv. Lerner * Econ. freedom					-0.0020 (0.0019)
Concentration	-0.0049*** (0.0018)	-0.0042** (0.0017)	-0.0053*** (0.0019)	-0.0015 (0.0017)	-0.0421*** (0.0078)
Cost to income	-0.0389*** (0.0074)	-0.0392*** (0.0076)	-0.0384*** (0.0082)	0.0000 (0.0007)	-0.0001 (0.0007)
Bank size	-0.0002 (0.0007)	-0.0002 (0.0006)	-0.0002 (0.0007)	0.0000 (0.0007)	-0.0001 (0.0007)
Capitalization	0.0660** (0.0332)	0.0621* (0.0315)	0.0665** (0.0304)	0.0629* (0.0343)	0.0557 (0.0343)
Credit risk	-0.0061 (0.0065)	-0.0033 (0.0062)	-0.0036 (0.0060)	-0.0036 (0.0062)	-0.0010 (0.0061)
Diversification	0.0267*** (0.0088)	0.0289*** (0.0088)	0.0289*** (0.0084)	0.0281*** (0.0081)	0.0307*** (0.0077)
Financial development	-0.0032 (0.0025)	-0.0036 (0.0025)	-0.0028 (0.0025)	-0.0043* (0.0024)	-0.0045 (0.0027)
Economic development	0.0031** (0.0013)	0.0021 (0.0015)	0.0020 (0.0018)	0.0019 (0.0012)	0.0006 (0.0016)
Constant	0.0390** (0.0175)	0.0270 (0.0162)	0.0283 (0.0180)	0.0301* (0.0169)	0.0367* (0.0200)
No. of observations	561	561	561	561	561
No. of instruments	54	55	55	56	56
F-test	46.57***	54.97***	46.12***	47.33***	50.90***
AR(2)	-0.93	-0.87	-0.92	-0.84	-0.86
p-value	(0.355)	(0.386)	(0.360)	(0.400)	(0.387)
Hansen	37.06	36.25	36.48	34.21	33.13
p-value	(0.513)	(0.550)	(0.540)	(0.646)	(0.694)

Notes: The dependent variable *ROAA* is the ratio of net income to average total assets. The degree of market power is proxied by the *Conventional Lerner Index* or the price mark-up over marginal cost, with the higher scores indicating a higher degree of pricing power. *Financial freedom* and *Economic freedom* are from the Economic Freedom Indicators of Heritage Foundation. They are scaled from 0 to 100 with higher values, indicating greater freedom. *Concentration* is measured by natural logarithm of HHI, measured as the sum of the squares of assets of each bank. *Cost to income* ratio is measured by the ratio of non-interest operating expenses to operating income. *Bank size* is the natural logarithm of total assets. *Capitalization* is the bank total equity to asset ratio. *Credit risk* is total loans to total assets. *Diversification* is measured as the ratio of non-interest income to total income. *Financial development* is measured as domestic credit to private sector as a percentage of GDP. *Economic development* is the natural logarithm of GDP per capita. All the regressions were estimated with the Windmeijer-corrected standard error version of the two-step system GMM model, with small-sample adjustments and orthogonal deviations. Robust standard errors are in parentheses; ***, **, and * show 1, 5 and 10 per cent levels of significance, respectively

Table III.
Effects of competition
and freedom on
bank ROAA
(Conventional Lerner)

Table IV.
Effects of
competition and
freedom on bank
ROAA (Adjusted
Lerner)

Dependent variable: ROAA	Model 1	Model 2	Model 3	Model 4	Model 5
ROAA _{t-1}	0.1547*** (0.0538)	0.1621*** (0.0529)	0.1658*** (0.0529)	0.1501*** (0.0564)	0.1528*** (0.0571)
Funding-Adjusted Lerner	0.0218 (0.0137)	0.0217 (0.0140)	0.0228 (0.0138)	-0.0462 (0.0284)	-0.2176** (0.0996)
Financial freedom		0.0003*** (0.0001)		-0.0003 (0.0002)	
Economic freedom			0.0009** (0.0004)		-0.0005 (0.0008)
Lerner * Fin. freedom				0.0013** (0.0005)	
Lerner * Econ. freedom					0.0041** (0.0018)
Concentration	-0.0042** (0.0020)	-0.0024 (0.0019)	-0.0041** (0.0019)	-0.0012 (0.0019)	-0.0022 (0.0020)
Cost to income	-0.0566*** (0.0124)	-0.0577*** (0.0125)	-0.0560*** (0.0120)	-0.0596*** (0.0138)	-0.0552*** (0.0124)
Bank Size	-0.0017* (0.0009)	-0.0016* (0.0009)	-0.0016* (0.0008)	-0.0016 (0.0010)	-0.0019* (0.0011)
Capitalization	0.0488 (0.0310)	0.0441 (0.0306)	0.0486 (0.0300)	0.0483 (0.0316)	0.0439 (0.0310)
Credit risk	-0.0029 (0.0069)	-0.0011 (0.0065)	-0.0023 (0.0065)	-0.0014 (0.0063)	-0.0004 (0.0067)
Diversification	0.0260** (0.0099)	0.0285*** (0.0096)	0.0277*** (0.0093)	0.0293*** (0.0100)	0.0310*** (0.0095)
Financial development	-0.0021 (0.0027)	-0.0035 (0.0027)	-0.0022 (0.0026)	-0.0014 (0.0032)	-0.0001 (0.0034)
Economic development	0.0040*** (0.0012)	0.0033*** (0.0012)	0.0022 (0.0014)	0.0025** (0.0012)	0.0018 (0.0013)
Constant	0.0521** (0.0205)	0.0279 (0.0205)	0.0105 (0.0219)	0.0530** (0.0238)	0.0815** (0.0403)
No. of observations	516	516	516	516	516
No. of instruments	54	55	55	56	56
F-test	54.82***	66.54***	63.98***	43.08***	42.63***
AR(2)	-0.77	-0.69	-0.75	-0.67	-0.66
p-value	(0.439)	(0.491)	(0.456)	(0.506)	(0.507)
Hansen	39.95	37.06	37.51	39.62	38.86
p-value	(0.384)	(0.513)	(0.492)	(0.398)	(0.431)

Notes: The dependent variable *ROAA* is the ratio of net income to average total assets. The degree of market power is proxied by the *Funding-adjusted Lerner* Index or the price mark-up over marginal cost, with the higher scores indicating a higher degree of pricing power. *Financial freedom* and *Economic freedom* are from the Economic Freedom Indicators of Heritage Foundation. They are scaled from 0 to 100 with higher values, indicating greater freedom. *Concentration* is measured by natural logarithm of HHI, measured as the sum of the squares of the market share of assets of each bank. *Cost to income* ratio is measured by the ratio of non-interest operating expenses to operating income. *Bank size* is the natural logarithm of total assets. *Capitalization* is the bank total equity to asset ratio. *Credit risk* is total loans to total assets. *Diversification*, is measured as the ratio of non-interest income to total income. *Financial development* is measured as domestic credit to private sector as a percentage of GDP. *Economic development* is the natural logarithm of GDP per capita. All the regressions were estimated with the Windmeijer-corrected standard error version of the two-step system GMM model, with small-sample adjustments and orthogonal deviations. Robust standard errors are in parentheses; ***, **, and * show 1, 5 and 10 per cent levels of significance, respectively

Hansen test for the validity of the over-identifying restrictions in the GMM estimation is accepted for all the specifications, and the presence of second-order autocorrelation in the errors is also rejected by the test for AR (2).

The coefficient of market power (*Lerner*) is generally positive, but significant only in the conventional Lerner model, suggesting that in less competitive markets (higher bank market power) banks generally earn higher returns on their assets. *Financial freedom* has a positive and significant coefficient in both the conventional and funding-adjusted Lerner models, meaning that banks operating in countries where government intervention in the banking sector is minimal earn higher returns on their assets. Thus, as expected, financial freedom has a positive effect on bank profitability. Again, *economic freedom* is positively related to ROAA (but insignificant in the conventional Lerner model), denoting that higher levels of freedom to carry out general business activities may translate into higher bank profits.

The outcome for ROAA when Lerner is interacted with the freedom variables shows that the impact of competition on bank profits is sensitive to the level of financial and economic freedom prevailing in an economy. The coefficients of the interaction terms (*Lerner*Financial freedom* and *Lerner*Economic freedom*) are significantly positive in both models. Again, we find that the sign on Lerner changes to negative when interacted with the freedom variables, thus affirming that financial and economic freedom have a conditioning effect on the impact of competition on bank profits. This suggests that banks with higher market power operating in countries with higher freedom for banking activities are more profitable than their counterparts in countries with greater restrictions on banking activities.

For the control variables, the results show that in highly concentrated markets, bank profits are likely to be lower as indicated by the negative coefficient for Concentration, except that this is not significant in some cases. This is inconsistent with the SCP Hypothesis which suggests that concentration enables banks to collude and earn higher profits. On the other hand, bank operating efficiency (Cost to income) shows a significantly negative relationship with ROAA in all the estimations, signifying that, as expected, banks that are able to control costs more effectively earn higher profits, and those that are inefficient have reduced profits. This result is also in line with previous empirical literature which suggests that efficiency is a more important determinant of profitability than concentration or market power (Berger, 1995). In addition, bank capitalization is positively related to profits (ROAA), and significantly so in the conventional Lerner model, an indication that highly capitalized banks have the tendency to earn higher returns. It may be that bank managers are more concerned about controlling costs when bank capital is high, to earn reasonable returns for shareholders. Similarly, there is some indication that increasing bank size and higher credit risk associate with lower profits except that the coefficients are not statistically significant.

The diversification variable has a significantly positive coefficient. This means that diversification is an important determinant of bank return on assets, and that banks that engage in other activities outside their core business earn significantly higher returns than those not engaging in similar activities. As suggested by Goddard *et al.* (2013), this might be attributable to synergies between core and related activities, thus enabling diversified banks to gain and maintain a competitive advantage over their less diversified counterparts. Another plausible explanation for the positive effect of diversification on bank profitability may be the limited losses associated with non-traditional banking activities, compared to the generally huge losses on loans in some

of these economies. The finding is consistent with Chiorazzo *et al.* (2008) and Elsas *et al.* (2010) but contrary to Stiroh and Rumble (2006).

The level of financial development is largely insignificant in determining bank return on assets, but the negative coefficients show that higher levels of domestic credit to the private sector have the tendency to dampen bank returns. In addition, bank returns seem to have a positive relationship with the level of economic development. Increase in economic development may enhance the ability of borrowers to service loans, resulting in reduced loan losses and hence greater bank profitability.

5. Conclusions and policy implications

This study analyzed the potential effect of financial and economic freedom on the competition-bank profitability relationship in SSA for the period 2006-2012. Using system GMM and data from 139 banks in 11 countries, we found that higher market power is generally positively related to bank profitability (ROAA). In addition, both financial freedom and economic freedom show a positive impact on bank profits. We find evidence affirming that financial freedom and economic freedom have conditioning effects on the impact of market power (or competition) on bank profits. It appears that banks with higher market power operating in countries with higher freedom for banking activities are more profitable than their counterparts in countries with greater restrictions on banking activities.

An analysis of the control variables shows that bank profits are likely to be lower in highly concentrated markets. This is inconsistent with the SCP hypothesis which suggests that concentration enables banks to collude and earn higher profits. On the other hand, the bank operating efficiency measure shows a significantly negative relationship with ROAA, signifying that, as expected, banks that are able to control costs more effectively earn higher profits. The results also show that diversification and capitalization are important determinants of bank return on assets. However, bank size, credit risk and financial development do not appear to be important determinants of bank profitability.

The results of the study have important policy repercussions. Our results have shown that allowing banks greater freedom to operate would enhance their performance, without necessarily damaging the economy, since operating efficiency appears to be a more important reason for the observed profitability than market power. This suggests that banks may not be earning their income at the expense of the rest of the economy but through more efficient management. Hence, caution is needed in implementing policies that will flood the market and eliminate pricing power of banks, as that could be damaging to bank stability.

References

- Adkins, L.C., Moomaw, R.L. and Savvides, A. (2002), "Institutions, freedom, and technical efficiency", *Southern Economic Journal*, Vol. 69 No. 1, pp. 92-108.
- Ahmed, A.D. (2013), "Effects of financial liberalization on financial market development and economic performance of the SSA region: an empirical assessment", *Economic Modelling*, Vol. 30, pp. 261-273.
- Al-Muharrami, S. and Matthews, K. (2009), "Market power versus efficient-structure in arab GCC banking", *Applied Financial Economics*, Vol. 19 No. 18, pp. 1487-1496.
- Arellano, M. and Bond, S. (1991), "Some tests of specification for panel data: Monte carlo evidence and an application to employment equations", *Review of Economic Studies*, Vol. 58 No. 2, pp. 277-297.

- Arellano, M. and Bover, O. (1995), "Another look at the instrumental variable estimation of error component models", *Journal of Econometrics*, Vol. 68 No. 1, pp. 29-51.
- Athanasoglou, P.P., Brissimis, S.N. and Delis, M.D. (2008), "Bank-specific, industry-specific and macroeconomic determinants of bank profitability", *Journal of International Financial Markets, Institutions and Money*, Vol. 18 No. 2, pp. 121-136.
- Bashir, A.-H.M. (2003), "Determinants of profitability in islamic banks: some evidence from the Middle east", *Islamic Economic Studies*, Vol. 11 No. 1, pp. 31-57.
- Beck, T. and Cull, R. (2013), "Banking in africa", Policy Research Working Paper 6684. The World Bank Development Research Group, Finance and Private Sector Development.
- Bengoa, M. and Sanchez-Robles, B. (2003), "Foreign direct investment, economic freedom and growth: new evidence from latin america", *European Journal of Political Economy*, Vol. 19 No. 3, pp. 529-545.
- Berger, A.N. (1995), "The profit-structure relationship in banking-tests of market-power and efficient-structure hypotheses", *Journal of Money, Credit and Banking*, Vol. 27 No. 2, pp. 404-431.
- Blundell, R.W. and Bond, S.R. (1998), "Initial conditions and moment restrictions in dynamic panel data models", *Journal of Econometrics*, Vol. 87 No. 1, pp. 115-143.
- Boone, J. and Weigand, J. (2000), "Measuring competition in the dutch manufacturing sector: how are cost differentials mapped into profit differentials?", CPB Working Paper No. 131, Den Haag.
- Carow, K.A. and Kane, E.J. (2002), "Event-study evidence of the value of relaxing long-standing regulatory restraints on banks, 1970-2000", *The Quarterly Review of Economics and Finance*, Vol. 42 No. 3, pp. 439-463.
- Chiorazzo, V., Milani, C. and Salvini, F. (2008), "Income diversification and bank performance: evidence from italian banks", *Journal of Financial Services Research*, Vol. 33 No. 3, pp. 181-203.
- Chortareas, G.E., Garza, -Garcia, J.G. and Girardone, C. (2011), "Banking sector performance in latin america: market power versus efficiency", *Review of Development Economics*, Vol. 15 No. 2, pp. 307-325.
- Chortareas, G.E., Girardone, C. and Ventouri, A. (2013), "Financial freedom and bank efficiency: evidence from the European union", *Journal of Banking and Finance*, Vol. 37 No. 4, pp. 1223-1231.
- De Haan, J. and Sturm, J.E. (2000), "On the relationship between economic freedom and economic growth", *European Journal of Political Economy*, Vol. 16 No. 2, pp. 215-241.
- Delis, M.D. (2012), "Bank competition, financial reform, and institutions: the importance of being developed", *Journal of Development Economics*, Vol. 97 No. 2, pp. 450-465.
- Dietrich, A. and Wanzenried, G. (2011), "Determinants of bank profitability before and during the crisis: evidence from Switzerland", *Journal of International Financial Markets, Institutions and Money*, Vol. 21 No. 3, pp. 307-327.
- Dietrich, A. and Wanzenried, G. (2014), "The determinants of commercial banking profitability in low-, middle-, and high-income countries", *The Quarterly Review of Economics and Finance*, Vol. 54 No. 3, pp. 337-354.
- Elsas, R., Hackethal, A. and Holzhauser, M. (2010), "The anatomy of bank diversification", *Journal of Banking and Finance*, Vol. 34 No. 6, pp. 1274-1287.
- European Central Bank (2010), "Beyond ROE – how to measure bank performance", Appendix to the report on EU banking structures, ECB.
- Farhadi, M., Islam, R. and Moslehi, S. (2015), "Economic freedom and productivity growth in resource-rich economies", *World Development*, Vol. 72, pp. 109-126.
- Flamini, V., Schumacher, L. and McDonald, C.A. (2009), "The determinants of commercial bank profitability in Sub-Saharan Africa", International Monetary Fund wp/09/15.
- Fu, X.M. and Heffernan, S. (2009), "The effects of reform on china's bank structure and performance", *Journal of Banking and Finance*, Vol. 33 No. 1, pp. 39-52.

- Garcia-Herrero, A., Gavila, S. and Santabarbara, D. (2009), "What Explains the Low Profitability of Chinese Banks?", *Journal of Banking and Finance*, Vol. 33 No. 11, pp. 2080-2092.
- Goddard, J., Liu, H., Molyneux, P. and Wilson, J.O.S. (2013), "Do bank profits converge?", *European Financial Management*, Vol. 19 No. 2, pp. 345-365.
- Goddard, J., Molyneux, P. and Wilson, J.O.S. (2004), "Dynamics of growth and profitability in banking", *Journal of Money, Credit and Banking*, Vol. 36 No. 6, pp. 1069-1090.
- Gwartney, J., Lawson, R. and Hall, J. (2014), *Economic freedom of the world: 2014 annual report*, Vancouver: The Fraser Institute.
- Hafer, R.W. (2013), "Economic freedom and financial development: international evidence", *Cato Journal*, Vol. 33 No. 1, pp. 111-126.
- Heritage Foundation (2015), "Index of economic freedom. The heritage foundation", available at: www.heritage.org/index.
- Jeon, Y. and Miller, S.M. (2002), "Bank concentration and performance", Economics Working Papers, Paper 200225, University of Connecticut.
- Lin, K., Doan, A.T. and Doong, S. (2015), "Changes in ownership structure and bank efficiency in asian developing countries: the role of financial freedom", *International Review of Economics and Finance*, Vol. 43, pp. 19-34.
- Liu, H., Molyneux, P. and Wilson, J.O. (2013), "Competition and stability in european banking: a regional analysis", *The Manchester School*, Vol. 81 No. 2, pp. 176-201.
- Maudos, J. and de Guevara, J.F. (2004), "Factors explaining the interest margin in the banking sectors of the european union", *Journal of Banking and Finance*, Vol. 28 No. 9, pp. 2259-2281.
- Mirzaei, A. and Moore, T. (2014), "What are the driving forces of bank competition across different income groups of countries?", *Journal of International Financial Markets, Institutions and Money*, Vol. 32, pp. 38-71.
- Mirzaei, A., Moore, T. and Liu, G. (2013), "Does market structure matter on banks' profitability and stability? emerging vs. Advanced economies", *Journal of Banking and Finance*, Vol. 37 No. 8, pp. 2920-2937.
- Pasiouras, F. and Kosmidou, K. (2007), "Factors influencing the profitability of domestic and foreign commercial banks in the european union", *Research in International Business and Finance*, Vol. 21 No. 2, pp. 222-237.
- Perera, S., Skully, M. and Chaudrey, Z. (2013), "Determinants of commercial bank profitability: South asian evidence", *Asian Journal of Finance and Accounting*, Vol. 5 No. 1, pp. 365-380.
- Seelanatha, L. (2010), "Market structure, efficiency and performance of banking industry in Sri-Lanka", *Banks and Bank Systems*, Vol. 5 No. 1, pp. 20-31.
- Shepherd, W.G. (1982), "Economies of scale and monopoly profits", In John V. Craven (Eds), *Industrial Organization, Antitrust, Public Policy*, Mass.: Kluwer Nijhoff, Boston.
- Smimou, K. and Karabegovic, A. (2010), "On the relationship between economic freedom and equity returns in the emerging markets: evidence from the Middle east and North africa (MENA) stock markets", *Emerging Markets Review*, Vol. 11 No. 2, pp. 119-151.
- Smirlock, M. (1985), "Evidence on the (non) relationship between concentration and profitability in banking", *Journal of Money, Credit, and Banking*, Vol. 17 No. 1, pp. 69-83.
- Stiroh, K.J. and Rumble, A. (2006), "The dark side of diversification: the case of U. S. financial holding companies", *Journal of Banking and Finance*, Vol. 30 No. 8, pp. 2131-2161.
- Sufian, F. (2014), "The nexus between economic freedom and islamic bank performance: Empirical evidence from the MENA banking sectors", *Contemporary Review of the Middle East*, Vol. 1 No. 4, pp. 411-439.

-
- Sufian, F. and Habibullah, M.S. (2010), "Does economic freedom foster banks' performance? panel evidence from Malaysia", *Journal of Contemporary Accounting and Economics*, Vol. 6 No. 2, pp. 77-91.
- Sufian, F. and Habibullah, M.S. (2014), "Economic freedom and bank efficiency: does ownership and origins matter?", *Journal of Financial Regulation and Compliance*, Vol. 22 No. 3, pp. 174-207.
- Tregenna, F. (2009), "The fat years: the structure and profitability of the U. S banking sector in the pre-crisis period", *Cambridge Journal of Economics*, Vol. 33 No. 4, pp. 609-632.
- Trujillo-Ponce, A. (2013), "What determines the profitability of banks? Evidence from Spain. Journal of", *Accounting and Finance*, Vol. 53 No. 2, pp. 561-586.
- Turk-Ariss, R. (2010), "On the implications of market power in banking: evidence from developing countries", *Journal of Banking and Finance*, Vol. 34 No. 4, pp. 765-775.
- Windmeijer, F. (2005). "A finite sample correction for the variance of linear efficient two step GMM estimators", *Journal of Econometrics*, Vol. 126 No. 1, 25-51, available at: www.eiu.com

Corresponding author

Emmanuel Sarpong-Kumankoma can be contacted at: esarpong-kumankoma@ug.edu.gh

For instructions on how to order reprints of this article, please visit our website:

www.emeraldgroupublishing.com/licensing/reprints.htm

Or contact us for further details: permissions@emeraldinsight.com