

Impact of banking industry factors on access to finance in Ghana

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ABSTRACT

This study employs the structure conduct performance (SCP) paradigm to examine how bank concentration, competition and efficiency affect banks' ability to provide affordable credit after 10 years of financial liberalization programs in Ghana. Using concentration ratios and Hirschman-Herfindahl Index, the analyses suggest that owing to moderate concentration in the industry, cost of credit is higher because the three largest banks may be acting collusively to reap higher profits. Furthermore, the study finds that moderate competition hinders the distinction of prices offered by banks and inefficiency among banks is as a result of suboptimal use of scale.

JEL Classification: G21, G28

Keywords: concentration, competition, efficiency, financial liberalization, SCP paradigm, Ghana

INTRODUCTION

The study investigates how the nature of Ghana's banking industry (concentration, competition and efficiency) after 10 years of financial liberalization programs affect its ability to serve as a conduit for monetary policy as well as intermediate funds for economic growth.

Commercial banks play a major role in the transfer of monetary policy especially in developing countries where financial markets are largely underdeveloped (Amidu & Harvey, 2006; Ramirez, 2004). Under Ghana's inflation targeting regime of monetary management, the role of commercial banks in closely relaying changes in monetary policy targets (such as the monetary policy rate) cannot be overemphasized. Both the government and private businesses, expect base market lending rates offered by commercial banks to positively respond to downward revisions in the monetary policy rate and inflation rate via the credit (bank lending) channel of monetary transmission mechanism. Factors affecting the ability of commercial banks in Ghana to expeditiously serve as conduits for monetary policy thus affect the availability and affordability of funds to private businesses (especially small and medium scale enterprises) (Beck, Demirgüç-kunt, & Maksimovic, 2004; Corvoisier & Gropp, 2002; Peek & Rosengren, 1995). In relation to the nature of the banking industry and its ability to facilitate financial intermediation, literature has examined bank concentration, competition and efficiency (Bucks & Mathisen, 2005; Casu & Girardone, 2006).

Many governments in developing and transition economies pursued financial liberalization from the 1980s. The move from financial repression which was prevalent in developing and transitions economies in the 1970s and 1980s was necessitated by shallow deposit mobilization, interest rate controls and allocation of credit to non-performing sectors of

the economy as well as high inflation, to name a few (Hanson & Ramachandran, 2005, pp. 208–209). Financial reforms which began to roll out in South Asia (1970), East Asia (1980) and in transition economies, Latin America and Africa in the 1990s “focused on freeing interest rates and credit allocations” (Hanson & Ramachandran, 2005, p. 210). Reforms during financial liberalization were also aimed at enabling “the private sector to play a greater role in development” (Hanson & Ramachandran, 2005, p. 209). However, weak institutional arrangements coupled with asymmetric information problems between lenders and borrowers in addition to other factors such as the attractiveness of government borrowing led to the crowding out of private businesses in terms of bank credit. Apparently, government borrowing still possess as a challenge to SME access to finance in Ghana (Tagoe, Nyarko, & Anuwa-Amarh, 2005).

Policies such as privatization of state banks and easing the entry of foreign banks under financial liberalization have contributed to the improvement of the market structure (concentration and competition) of the banking industry in many economies (Casu & Girardone, 2006). The impact of financial liberalization in increasing deposit mobilization is taken care of by literature (Ang, 2010; Hanson & Ramachandran, 2005). There is also evidence regarding significant changes in the efficiency of credit allocation owing to financial liberalization (Cho, 1988; Galindo, Schiantarelli, & Weiss, 2007; Wurgler, 2000). Generally, financial liberalization is asserted to contribute more to financial development than financial crises (Ranciere, Tornell, & Westermann, 2006).

However, causation between low market concentration, increased competition or bank efficiency and improved access to bank credit has not been convincingly dealt with in literature. In their research, Casu and Girardone (2006) found that “the degree of concentration is not necessarily related to the degree of competition” and that there is “little evidence that more efficient banking systems are also more competitive” (p. 441).

The main objective of this paper is to contribute to literature bordering on the impact of bank concentration, competition and efficiency on access to finance (especially to private businesses) in a developing country (Ghana). The banking industry factors investigated are classified into structural – bank concentration (using k_3 , $k_{5\%}$ concentration ratios and HHI) as well as non-structural i.e. competition and efficiency (using Panzar-Rosse model and DEA respectively). Furthermore, this study investigates the severity of government crowding out private businesses in relation to bank credit from 2002 to 2011 i.e. 10 years after the first financial reform program from 1988 to 1991 dubbed as the Financial Sector Adjustment Program (FINSAP I).

In short, the research aims at answering the question of the extent to which banking industry factors in Ghana are enabling the smooth transmission of monetary policy via the credit (bank lending) channel in more than 10 years of financial liberalization programs.

LITERATURE REVIEW

This section presents theoretical foundations and empirical support for investigating on how bank concentration, competition and efficiency influence the access to finance in Ghana by facilitating the bank lending channel of monetary transmission after 10 years of financial liberalization programs.

Broadly, the credit channel of monetary transmission mechanism is based on the premise that banks play a pivotal role in the transmission of monetary policy. Consequently, banks willingness and ability to intermediate funds directly affects the level of credit to the private sector, and thus economic activity. Against this backdrop, the concentration of banks or

dominance of the banking sector by a few large banks is likely to deepen the crisis of lending if they are unable or unwilling to lend to the private sector. Currently, in Ghana, the top five out of 27 universal-status banks hold 46 percent of total industry assets, 47 percent of industry deposits and 40 percent of industry loans and advances (PricewaterhouseCoopers, 2012, pp. 31–33). The impact of monetary policy on bank lending behavior is well known in monetary economics literature, (Hubbard, 1994, 2008; Walsh, 2010) and there is ample evidence on the existence of the credit (bank lending) channel in Ghana's case (Amidu & Wolfe, 2008; Quarshie, 2013).

Attempts have been made in empirical literature to link banking industry factors such as concentration and competition to performance (profitability and efficiency) (Bikker & Bos, 2005; Casu & Girardone, 2006). The underlining framework employed in many of those empirical studies is the Structure-Conduct-Performance hypothesis (Hannan, 1991).

According to Edwards, Allen, & Shaik (2005) the Structure-Conduct-Performance (hereafter, SCP) framework consists of two hypotheses which are; "structure performance hypothesis" and "efficient structure hypothesis". While both hypotheses point to a link between market structure (concentration) and competition (or performance), the basic difference is the direction of causation. The structure performance hypothesis holds that as a result of high market concentration, there may be collusion among firms with large market share, which will result in the reaping of higher profits irrespective of their efficiency. This view supports the traditional SCP paradigm where the structure of the market affects conduct (i.e. "activities of the industry's buyers and sellers") (McWilliams & Smart, 1993, p. 64) which in turn affects firm's performance in the industry. On the other hand, the efficient structure hypothesis asserts that a firm's performance (increased profits owing to its efficiency) enables it to gain a larger market share (Edwards et al., 2005). In this paper, both hypotheses are employed in explaining results from bank concentration, competition and efficiency on access to finance in Ghana. This is necessary to (1) assess the impact of the market structure (bank concentration) and (2) assess the influence of industry wide competition as well as bank's efficiency on access to bank credit.

Using firm level data of banks in the European Union, Casu & Girardone (2006) find that banks have become more efficient as a result of competition. However, the data does not support its reverse situation where an increase in efficiency is leading to competition. Here, there is evidence of structure performance hypothesis while the efficient structure hypothesis is unsupported under the scope of their findings. What is relevant here is that empirical studies based on SCP paradigm is acceptable in literature.

Bucks & Mathisen (2005) investigate competition and efficiency of banks in Ghana from 1998 to 2003 and find that the lack of competition in the banking industry negatively affects the efficiency of financial intermediation. Biekpe (2011) also came to the same conclusion having used similar models as Bucks & Mathisen (2005), but with firm level data from 2000 to 2007. Also, in relation to bank competition, Salami (2008) observes, after analyzing survey data and interviews with top ranking official of notable banks, that to improve bank efficiency in the prevailing oligopolistic market environment more competition is needed. Although both qualitative and quantitative studies have been conducted about bank competition in Ghana, an update of such information is necessary especially after 10 years of financial liberalization.

Pertaining to the nature of bank concentration, both Aboagye, Akoena, Antwi-Asare, & Gockel (2008) and Ofori, Bawumia, & Belnye (2005) suggest that the banking industry is dominated by a few large banks. Aboagye, et al. (2008) goes further to posit that the high

concentration in the industry could explain high interest margins to the advantage of the oligopolists, while being detrimental to fund-seekers from banks (Aboagye et al., 2008, p. 583).

In terms of efficiency, Kutsienyo (2011), by using data from 26 commercial banks and macroeconomic data of Ghana from 2000 to 2009 concludes that bank efficiency contributes to the bank profitability in Ghana. In the same vein, Aboagye, et al. (2008) find that bank efficiency in relation to staff costs is instrumental in increasing market share. These results lend support to the existence of the efficient structure hypothesis in Ghana.

In a nutshell, the literature survey gathers, that the nature of banking industry affects its ability to play the pivotal role in the credit (bank lending) channel of monetary transmission as well as effectively intermediate funds from fund-suppliers to fund-users. More importantly, the SCP paradigm provides a framework (supported by empirical literature) for assessing the influence of market structure on performance (under the structure performance hypothesis) and also the influence of efficiency and performance on the market structure (under the efficient structure hypothesis). In light of the lessons drawn from the literature review and against the backdrop of discussions on financial liberalization, the paper draws the following hypotheses, which are tested in this study;

- Although a few large banks hold significant proportions of market share, there is low concentration in the banking industry following financial reforms.
- The banking industry is one of monopolistic competition.
- Inefficiency among banks is attributable to scale.
- Government crowds out the private sector with respect to bank credit.

DATA AND METHODOLOGY

Data

Two separate cross-sectional time series datasets are constructed and used in this study. Both comprise unconsolidated financial statements sourced from Fitch Solutions in 2013. The first (hereafter, Panel 1) is a compilation of data on 11 banks spanning 10 years from 2002 to 2011. The second dataset (hereafter, Panel 2) covers 17 banks over five years (2007 to 2011). This period is chosen to reflect five years of banking activity after the official adoption of inflation targeting in Ghana. In the case of the Panel 1, the period of analysis encompasses 5 years before and after the official adoption of inflation targeting in Ghana. Coincidentally, inflation targeting as a monetary policy regime began to be formally practised in Ghana in 2002. In all, the selection of 11 banks (in Panel 1) and 17 banks (in Panel 2) out of the 27 licensed banks in Ghana is as a result of; (1) availability of data and (2) although data on some banks were available, the financial statements were not included in this study because they were consolidated and thus are likely to amplify the position of pertinent banks which in turn lead to misleading results.

Methodology

Bank concentration. In measuring bank concentration, various researches have used the k -bank concentration ratio, the Herfindahl-Hirschman index (HHI), the Lerner index or combinations of the aforementioned. According to Alegria & Schaeck (2006), the k_3 bank concentration ratio, which is calculated by dividing the assets of the three largest banks by the total size of the banking system, is more appropriate when dealing with small samples where $N < 50$ i.e. total number of banks is less than 50 (Alegria & Schaeck, 2006, p. 5). Representatively,

$$k_3 = \frac{\sum_{i=1}^3 Z_i}{Z_T} \quad (1)$$

Notwithstanding the suitability of the k_3 ratio in analyzing bank concentration for small samples, results from the $k_{5\%}$ bank concentration ratio as well as HHI are reported and discussed in this section. The $k_{5\%}$ ratio differs from the k_3 ratio in terms of how the numerator is computed. Unlike the k_3 ratio, the numerator of the $k_{5\%}$ ratio is not simply a sum of the assets of 5 largest banks in the sample but rather, the sum of banks that constitute the top 5 percent (5th percentile) of the sample. The HHI, which is reported by regulators (see Cetorelli, 1999) is calculated by summing the squares of individual market shares of the all units (banks) in the sample. In other words, it is the “sum of squared bank market shares” (Alegria & Schaeck, 2006, p. 2). Therefore, the HHI can be described as a weighted score and is notable for taking into account the markets share of all banks in the sample instead of using only the three (3) largest banks or the top 5 percent banks in the k_3 and $k_{5\%}$ concentration ratio respectively.

The $k_{5\%}$ and HHI are defined as:

$$k_{5\%} = \frac{\sum_{i=1}^a Z_i}{Z_T} \quad (2)$$

$$HHI = \sum_{i=1}^N \left(\frac{Z_i}{Z_T} \right)^2 \quad (3)$$

The results from the concentration ratios (both k_3 and $k_{5\%}$) are interpreted as low (between 0% and 50%), medium (between 50% and 80%) and high (above 80%). Representatively we can let x be k_3 and $k_{5\%}$, so that;

Ratio	In percentage	Interpretation
$0 \leq x \leq 0.5$	0% to 50%	Low concentration (Perfect competition)
$0.5 \leq x \leq 0.8$	50% to 80%	Medium concentration (Oligopoly or Monopolistic competition)
$0.8 \leq x \leq 1$	80% to 100%	High concentration (Monopoly)

Bank competition. In banking literature, the Iwata, Bresnahan, Panzar-Rosse, Structure-Conduct-Performance model, Cournot model and X-efficiency and Efficiency Hypothesis are used to measure bank market power and competition (Armenuhi, 2005).

In this study, bank competition is measured using the Panzar-Rosse (P-R) model under the efficient structure hypothesis. The P-R model postulates that the market structure of a firm is predictive of its change in price as a result of a change in cost. To wit, a firm’s change in price following a change in cost is dependent on its position in the market i.e. either monopoly or not. P-R model is computed using reduced-form revenue equations. Bank competition is defined by an ‘H-statistic’ which ranges between 0 and 1 where $H \leq 0$, $0 < H < 1$ and $H = 1$ represent monopoly, monopolistic competition and perfect competition respectively (Gaertner & Sanya, 2012, p. 12; Gelos & Roldos, 2002, p. 13). The H-statistic is derived by adding the elasticities (or coefficients) of input variables (labor, funds and capital) (see Goddard & Wilson, 2007; Shaffer, 1982).

To attain the elasticities required for computing H-statistic, the cost of labor, funds and capital as well as control variables such as size is regressed on the ratio of Interest Income to Total Assets (IIASS). The functional form of the model is given as:

$$\ln IASS_{it} = \alpha_0 + \beta_1 \ln W_{i1} + \beta_2 \ln F_{i2} + \beta_3 \ln K_{i3} + \gamma_4 \ln SIZE_{i4} + \gamma_5 \ln CAPASS_{i5} + \gamma_6 \ln LNASS_{i6} + \varepsilon_{it} \quad (4)$$

where, the dependent variable $\ln IASS$ represent the log of Total Interest Income over Total Assets, respectively. Other notations in the equation are explained in Table 1.

Table 1. Definition of variables used in Panzar-Rosse model

Label	Variable	Definition
$\ln W$	Labour	Personnel expenses/(Total Deposits + Total Loans)
$\ln F$	Funds	Total interest expense/Total funds
$\ln K$	Capital	(Total non-interest expense - Personnel expenses)/Fixed assets
$\ln SIZE$		Market share of Total assets
$\ln CAPASS$		Total equity / Total assets
$\ln LNASS$		Total loans / Total assets
i	No. of observed bank	
t	Time of i^{th} observation	
ε	Error term	

Note: 'ln' represents natural logarithm

The choice of $IASS$ as the dependent variable is informed by literature and under the assumption that the primary business of commercial banks is financial intermediation (Aboagye et al., 2008; Armenuhi, 2005; J. Bikker & Groeneveld, 1998; Gelos & Roldos, 2002). Equation (1) above is constructed to reflect the impact of individual bank's market power, riskiness and combination of resources over time on its profitability or revenue generation. In that light, a bank's competitiveness is tantamount to its market share coupled with its ability to make use of its resources in order to be profitable and stay ahead of the competition.

The panel regression specified in Equation (4) is run using the fixed effects estimator. The fixed effects estimator is used because individual bank-specific characteristics are oftentimes correlated with other independent variables. The use of fixed effects in panel regression also helps to mitigate the impact of "unobserved heterogeneity" i.e. differences across banks with respect to time (Gelos & Roldos, 2002, p. 15). Moreover, the use of fixed effects regression on panel data when estimating H-statistics is a standard procedure (Goddard & Wilson, 2007).

Bank efficiency. Simply put, efficiency is the ratio of output over input. Therefore the efficiency of a unit ε , which has α outputs and β inputs, can be mathematically denoted as ($\varepsilon = \alpha/\beta$). Banking, like other service industries, use many inputs to generate many outputs. Measuring bank efficiency therefore requires models that can evaluate these multiple inputs and outputs.

Financial ratios fall short of analyzing bank performance from a broader perspective because their computation usually involves the use of two (2) or three (3) variables. Frontier techniques like Data Envelopment Analysis (DEA) on the other hand, can measure efficiency using multiple inputs and outputs, which is akin to bank operations.

DEA is used to measure bank efficiency in this study. Basically, DEA analyses the relative efficiencies of entities, referred to as 'Decision Making Units' or DMUs (Charnes, Cooper, & Rhodes, 1978). In a sense, DEA permits the use of relatively efficient banks as benchmarks wherewith recommendations are provided for inefficient units to attain efficiency by refining input combinations or other (Sherman & Zhu, 2006; Vuj & Jemri, 2001).

An inefficient unit can become more efficient by either producing the same level of outputs with fewer inputs, by increasing the output given the same level of input or by both.

Producing the same level of output with fewer inputs is termed as input-oriented DEA whereas seeking to increase output while keeping the input level constant is referred to as output-oriented DEA. Output-oriented DEA is used in this study in order to capture dynamics in bank's use (lending) of borrowed funds under the intermediation approach. In other words, the use of output-oriented DEA will focus on assessing the output, thus, the efficiency of traditional financial intermediation, which is channeling funds from fund-suppliers to fund-users.

As a result of multiple inputs and outputs used by banks, the construction of variables for measuring efficiency depends on one or more approaches adopted by the researcher. In this study, the intermediation approach informs the selection of variables. The variables used in the analysis are in line with literature (Berger & Humphrey, 1997; Luo & Yao, 2010; Thagunna, 2013; Tortosa-ausina, 2002) and are appropriate for studying efficiency of banks in terms of borrowing (mobilization of funds) and lending (use of funds).

Table 2. Description of variables for DEA analysis

	Variable	Definition
Input	Physical Capital	Total Fixed Assets
	Labour	Total Personnel Expenses
	Funding	Total Deposits
Output	Loans	Total Loans
	Other earning assets	Total Securities

Multi-stage, output-oriented DEA is executed under the assumption of variable returns to scale (VRS). The multi-stage DEA method is used because, the approach "identifies efficient projected points which have input and output mixes which are as similar as possible to those of the inefficient points, and that it is also invariant to units of measurement." (Coelli, 1996, p. 14) The multi-stage method is thus not biased to the scale of the DMUs being measured. Also, the option of Variables Returns to Scale (VRS) is used instead of Constant Returns to Scale (CRS) because under CRS, it is assumed that "DMUs are operating at an optimal scale". Additionally, the use of the VRS specification will permit the calculation of TE devoid of scale efficiency effects (Coelli, 1996, p. 17).

RESULTS AND ANALYSES

Bank concentration

Table 3. Concentration ratio and market power using Panel 1

Year	k_3	$k_{5\%}$	HHI_TA	HHI_TD	HHI_TL
2003	0.67	0.27	0.18	0.18	0.19
2004	0.66	0.25	0.17	0.18	0.18
2005	0.63	0.23	0.16	0.17	0.17
2006	0.61	0.22	0.15	0.16	0.15
2007	0.60	0.23	0.15	0.16	0.16
2008	0.58	0.24	0.14	0.15	0.15
2009	0.57	0.23	0.14	0.13	0.16
2010	0.54	0.21	0.13	0.13	0.13
2011	0.55	0.21	0.13	0.14	0.11

Source: FitchSolutions (2013)

Market share held by the three largest banks is generally within medium concentration (monopolistic competition) in the case of both samples (Tables 3 and 4). The share of the

market held by five percent of the largest banks is below 20 percent in both samples. HHI with respect to total assets, total deposits and total liabilities also show a low concentration (less than 50%) in the case of both samples.

After 10 years of financial liberalization programs, the results show that banking industry in Ghana is broadly under perfect competition although, the three largest banks hold a significant share of industry assets. The hypothesis regarding market concentration is therefore validated. Pertaining to the structure performance hypothesis, the significant market share held by the three largest banks is likely to affect industry performance in the sense that those banks can act collusively to reap higher profits. The study opines that medium bank concentration in Ghana results in higher cost of credit since the increase in profits of oligopolists' most likely stems from an increase in prices rather than a reduction in cost.

Table 4. Concentration ratio and market power using Panel 2

Year	k_3	$k_{5\%}$	HHI_TA	HHI_TD	HHI_TL
2007	0.55	0.13	0.21	0.13	0.14
2008	0.49	0.11	0.20	0.11	0.13
2009	0.46	0.10	0.19	0.09	0.12
2010	0.43	0.09	0.17	0.09	0.09
2011	0.42	0.09	0.16	0.09	0.08

Source: FitchSolutions (2013)

Bank competition

The probability of F-statistics (0.000) in the regression results validates the overall fitness of the model. R-squared of 44 percent and 49 percent from the two samples indicate that almost half of the variations in the dependent variable can be explained by the independent variables. The coefficients of Labour ($\ln W$), Funds ($\ln F$) and Capital ($\ln K$) in panel 1 are significant at the 5 percent significance level while in panel 2, all except labour is statistically significant at 5 percent.

Table 5. Results from P-R model

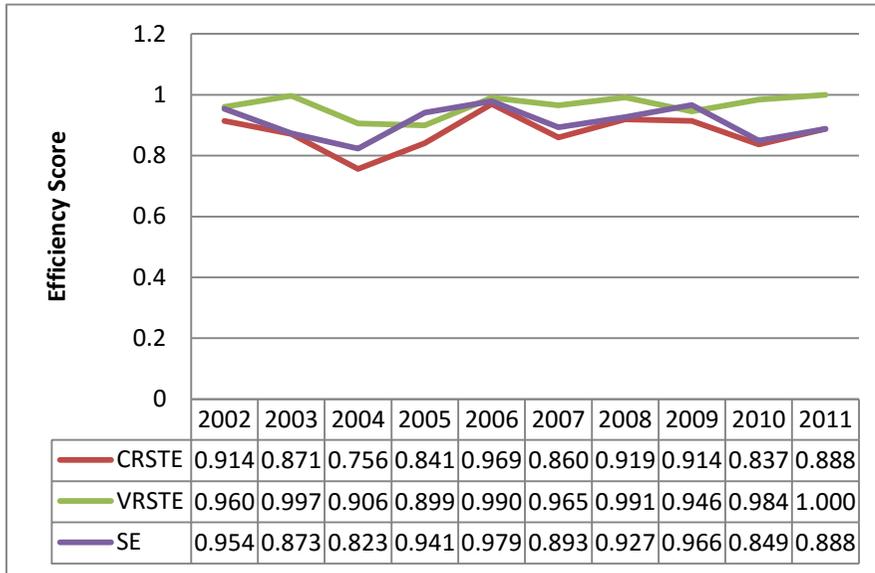
Variable	Panel 1			Panel 2		
	Coefficient	Std. Err.	P-value	Coefficient	Std. Err.	P-value
$\ln W$ (a)	0.086255	0.04145	0.040	0.056942	0.061518	0.358
$\ln F$ (b)	0.457762	0.042751	0.000	0.128853	0.047816	0.009
$\ln K$ (c)	0.064534	0.030517	0.037	0.507682	0.048858	0.000
$\ln SIZE$	0.004597	0.036546	0.900	-0.03898	0.059197	0.513
$\ln CAPASS$	0.099519	0.037011	0.009	0.079958	0.035414	0.028
$\ln LNASS$	0.045879	0.044943	0.310	0.024506	0.078947	0.757
Obs	109			82		
R-squared	0.44			0.49		
Prob (F-stat)	0.000			0.000		
H-Statistic	0.61			0.69		
= (a)+(b)+(c)						

The H -statistics for the two samples are 0.61 and 0.69, respectively. According to Panzar & Rosse (1987), the aforementioned results in the range of ($0 < H < 1$) demonstrate that competition in the banking industry, relative to the two samples is one of monopolistic competition. The results from the P-R model suggest that the revenue of banks is moderately affected by change in costs. Banks are able to raise prices to offset increases in cost of inputs. Putting this together with the finding of medium market concentration as a result of a few large banks, prices are influenced. In effect, other banks in the industry become price-takers, which then leaves the market in monopolistic competition. Again monopolistic competition as well as

slow growth of competition in the face of oligopolists price-setting advantage is in keeping up with the efficient market hypothesis.

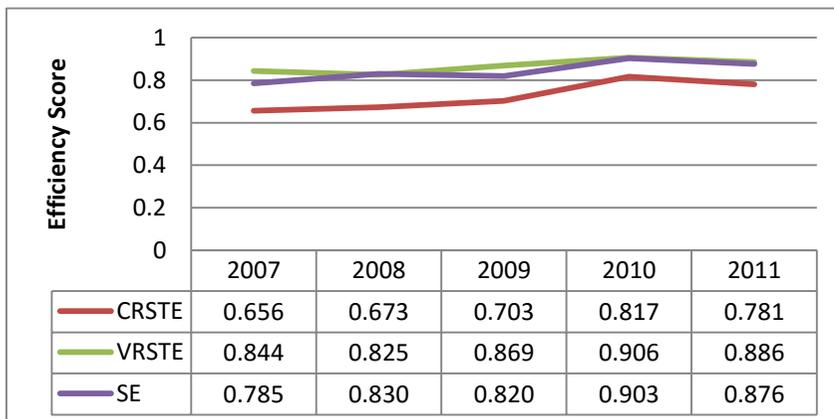
Bank efficiency

The results from the DEA analysis in Figures 1 and 2 reveal that the mean efficiency score for banks in Ghana over the period is generally high. With respect to the first sample (2002 to 2011), the mean efficiency score for all banks is 0.8769 (CRSTE), 0.9638 (VRSTE) and 0.9093 (SE). The larger value for VRSTE compared to scale efficiency (SE) is indicative of banks having the potential to further utilize their scale.



Source: FitchSolutions (2013)

Figure 1. Mean Efficiency Scores of 11 banks from 2002 to 2011.



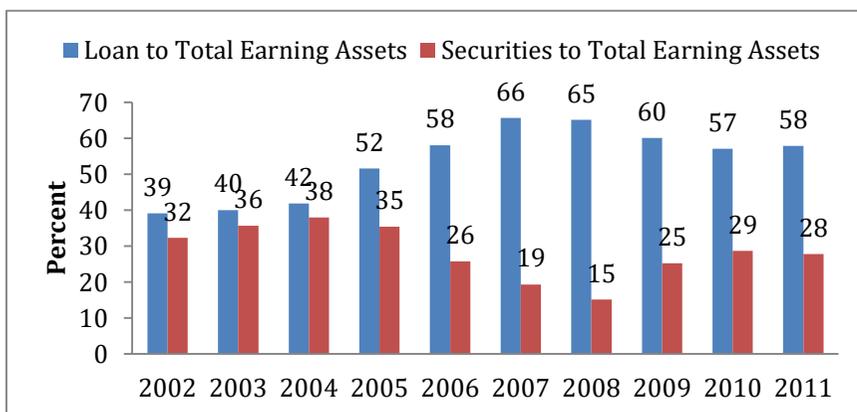
Source: FitchSolutions (2013)

Figure 2. Mean Efficiency Scores of 16 banks from 2007 to 2011.

Figure 2 presents the results from 16 banks over 5 years. There is an increase in all efficiency scores. The mean efficiency score for all banks with regards to CRSTE, VRSTE and SE were 0.726, 0.866 and 0.842, respectively.

The inefficient use of bank sizes could be as a result of reasons such as: a diluted or depleting customer and deposit base, physical concentration of banking infrastructure within a limited geographical space, just to mention a few. Before financial sector reforms in 1988, there were only 7 banks operating in Ghana (Bank of Ghana, 2011). The additional 19 banks were licensed to operate between 1988 and 2008 (PricewaterhouseCoopers, 2011). Consequently, physical banking infrastructure increased significantly during financial liberalization. For example, according to the World Bank, bank branches doubled from 360 in 2004 to 790 in 2011. However, since other banks besides the oligopolists are price-takers their profits may not correspond with increase in operational costs or scale of operations thus making them inefficient in relation to their use of scale. In this regard, the position of the efficient market hypothesis in relating efficiency to competition is upheld.

Financial liberalization led to the deposit mobilization by banks. However, owing to the underdevelopment of institutions like property rights, collateral registries, etc., that is necessary to support allocation of funds to the private sector, lending to the government by purchasing government securities like Treasury bills prevailed (Hanson & Ramachandran, 2005, p. 212). In their studies, Bucks & Mathisen (2005) and Biekpe (2011) find that both nominal and real Treasury bill rate significantly contribute to total revenue and interest revenue of banks in Ghana. They argue that such an impact of government borrowing on bank's profitability crowds out the private sector in "capturing banks' investments" (Bucks & Mathisen, 2005, p. 21). Furthermore, the level of banks' dependence on government securities inhibits competition and inefficiency among banks in Ghana (Biekpe, 2011; Bucks & Mathisen, 2005).



Source: FitchSolutions (2013)

Figure 3. Average proportion of loans and securities to total earning assets of 11 banks.

Both studies have used regression analyses in arriving at their findings on government crowding out. This study goes further to investigate the proportion of net loans and total securities in banks' total earning assets in order to ascertain banks' allocation of funds between the private sectors and the government from 2002 to 2011. The result in Figure 3 below shows that the larger portion of banks' total earning assets is loans (i.e. mortgage loans, retail loans, corporate and commercial loans and other loans). Based on the result, the study posits that lending to the private sector remains the primary business of banks. This position does not

refute the finding of government crowding out by previous research (Biekpe, 2011, p. 85; Bucks & Mathisen, 2005, p. 21). However, it brings clarity to banks' management (or allocation) of earning assets and in addition mitigates the overdramatized impact of government borrowing (through securities) on access to finance by the private sector.

CONCLUSION

This study paper employs the structure-conduct-performance (SCP) paradigm to examine how bank concentration, competition and efficiency affect banks' ability to provide affordable credit (especially to the private sector) after 10 years of financial liberalization programs in Ghana.

Two panel datasets are constructed using firm-level data of banks. The first comprises 11 banks from 2002 to 2011 and the second is on 17 banks from 2007 to 2011. The study finds:

- Low concentration in the banking industry. A general decrease in market concentration as shown by the results of HHI on total assets, total deposits and total liabilities suggest that the increase in the number of banks licensed to operate in Ghana during financial liberalization has yielded positive results.
- Market concentration affects cost of credit. The k_3 concentration ratio reveals that the three largest banks possess a significant portion of industry assets, which according to the structure performance hypothesis, results in the oligopolists acting collusively to reap higher profits. Aboagye et al. (2008) and Ofori et al. (2005) came to similar conclusions in their work.
- Moderate competition hinders distinction of prices. H-statistics of (0.61 and 0.69) from the Panzar-Rosse model suggest that banks are able to raise prices to offset increases in input costs. On the other hand, it is assumed that under the efficient structure hypothesis, oligopolists are able to influence industry wide prices thus making other banks 'price-takers' and thereby inhibiting competition. This finding is in agreement with the findings of Aboagye et al. (2008) and Salami (2008).
- Inefficiency among banks stems out of sub-optimal use of scale. Financial liberalization has undoubtedly contributed to an increase in physical banking infrastructure. Nonetheless, being price-takers under oligopolistic competition, many banks are unable to pass on operational costs to customers, which in turn negatively affect their profits. The inability of profits to match the scale of operations explains their sub-optimal use of scale.
- Banks lend more to businesses than the government. The portion of banks' total earning assets allotted to businesses is more than that of government securities from 2002 to 2011. The attractiveness of treasury bills may remain a source of competition for bank credit between the government and private sector; however, such findings may have been over amplified by previous research.

Regarding the composition of banks' total earning assets, future research could decompose net loans into loans to private businesses and public corporations. Such an undertaking is worthwhile because previous researches have mainly used government securities (especially Treasury bill rates) as proxy for government borrowing without considering bank loans to government agencies and corporations.

A limitation of the study is the absence of a model that simultaneously incorporates all aspects of banking industry factors discussed, for example, a regression of variables pertaining to bank concentration, competition, and efficiency on a proxy for access to finance.

While entry of more banks into the Ghanaian banking system has yielded positive results in the past, the challenge of expanding financial services to non-urban centers remain a challenge.

Young and smaller banks are encouraged to develop a new customer base instead of attempting to share existing customers with older and larger banks. Creating a niche market based on income levels, geographical location of customers and industry sectors is deemed relevant. Put together, such steps are envisaged to increase the banks' deposit base, which will probably lead to lower concentration, higher competition and a more efficient use of scale. To mitigate the negative effect so-called oligopolists exert on the development of the banking industry, the Bank of Ghana could employ moral suasion to deal with banks acting collusively to reap higher profits by way of increasing prices.

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APPENDICES

Appendix 1. Summary statistics of variables in Panel 1 for P-R model

Variable	Obs	Mean	Std. Dev.	Min	Max
<i>LnIIASS</i>	110	-2.10568	0.224585	-2.7139	-1.45502
<i>LnW</i>	109	-3.60014	0.459052	-5.62065	-2.74378
<i>LnF</i>	110	-2.90525	0.497346	-4.31679	-1.79176
<i>LnK</i>	110	0.305872	0.571091	-0.96024	1.892564
<i>LnSIZE</i>	110	-2.82896	1.007041	-5.68464	-1.13686
<i>LnCAPASS</i>	110	-2.23892	0.452038	-4.71929	-1.30988
<i>LnLNASS</i>	110	-0.87952	0.345291	-2.21789	-0.32431

Note: Data from FitchSolutions (2013)

Appendix 2. Summary statistics of variables in Panel 2 for P-R model

Variable	Obs	Mean	Std. Dev.	Min	Max
<i>LnIIASS</i>	85	-2.18281	0.265822	-2.84458	-1.45502
<i>LnW</i>	82	-3.62509	0.493632	-5.62065	-2.41127
<i>LnK</i>	84	0.281187	0.547064	-1.00145	1.429756
<i>LnF</i>	84	-2.85965	0.488986	-4.31679	-1.79176
<i>LnSIZE</i>	85	-3.21431	0.975886	-6.3124	-1.57349
<i>LnCAPASS</i>	85	-2.19539	0.656107	-4.71929	-0.03874
<i>LnLNASS</i>	84	-0.8635	0.348265	-1.95926	-0.32431

Note: Data from FitchSolutions (2013)