

EXECUTIVE SUMMARY OF THESIS

**Banking Sector Liberalization, Competition and Efficiency in
Ghana**

by

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(12B2004)

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Objectives of the Study

Financial Sector Liberalization policies are implemented on the assumption that removing market rigidities in the form of monopolies and government controls will promote competition which in turn will lead to efficient pricing and allocation of resources needed for economic growth. Ghana began the implementation of bank sector liberalization policies in the late 1980s with the aim of creating a “free market” environment to improve competition and efficiency in the sector. This study analyzes whether banking sector competition and efficiency have improved during the last decade of liberalization. It also tests whether improvements in competition leads to improvements in efficiency or vice versa.

Data

The study is based on quarterly bank level data from third quarter of 2000 to fourth quarter 2011. During the period, 30 different banks were licensed to operate as deposit money banks. However, due to three cases of take-over and one case of merger, the number of banks in the study involved 27 banks, where banks in take-overs and mergers were treated as individual banks in continuum. Therefore, the study is based on an unbalanced panel of 27 banks for the period 2000q3-2011q4 and involves 979 bank observations.

Methodology:

Two measures each were adopted for both structural and non-structural approaches to measuring market competition. The structural measures include Four-firm Concentration Ratios (CR_4) and Hirfindahl-Hirshman Index (HHI). The non-structural measures involved market weighted Price Cost Margins (PCM) and Panzar-Rosse model (P-R H). Except for P-R H , the other three measures of competition were derived for loans, deposits, assets and net profit.

Next, Data Envelopment Analysis (DEA) was employed to measure three different aspects of technical efficiency; namely Overall Technical Efficiency (OTE), Pure Technical Efficiency (PTE) and Scale Efficiency (SE). For each of these three forms of efficiency, five different sets of input/output variables (or five models) were used.

Finally, the study utilized Granger causality test to analyze the causality between competition and efficiency in the Ghanaian banking industry. The Granger causality test involved six (6) different measures of market competition and fifteen (15)

different measures of market efficiency. In all, ninety (90) different tests were conducted.

Empirical Findings

1. **Competition:** First, trend analysis of both concentration ratios and Hirfindahl-Hirshman indices indicate that market concentration in the Ghanaian banking sector reduced over time. This means that market barriers reduced and hence competition may have improved during the period. Hence based on the results from the structural measures, the null hypothesis that competition improved over time can be accepted. Similarly, linear trend analyses of the results from PCMs indicate that banks' ability to set prices above their average cost reduced with time though with intermittent rise and fall. In other words, the PCMs show that even though competitive conduct was unstable it saw some improvements. This again presents some evidence to support the null hypothesis that competition generally improved with time.

Similar to the PCM, the yearly estimates of the H-statistic was volatile. A linear trend analysis of the yearly estimates from the P-R model indicated a negatively sloping but almost flat line, meaning that competitive conduct reduced, though marginal. Therefore, the study fails to accept the null hypothesis in this case. Finally, the recursive estimates of P-R H indicate that competitive conduct improved cumulatively from 2001, peaked in 2003 and deteriorated to the minimum in 2008 before bouncing back to improve in the final three years of study. A fitted linear trend was negatively sloping with a relatively larger gradient in comparison with the yearly estimates. Thus from the recursive results on P-R H, the study again fails to accept the null hypothesis.

The study concludes that though market structures improved in terms of reducing barriers to entry and exit, as typified by the structural measures, these improvements did not necessarily translate similarly into improvements in competitive conduct among the banks.

2. **Efficiency:** Changes in DEA efficiency scores were analyzed at macro and micro levels. In each case, trends in the evolution of OTE, PTE and SE were analyzed. The sources of changes in scale inefficiencies were also explored in each case. The results show that the trends in OTE, PTE and SE scores were all downward sloping. Scale inefficiencies were found to explain more of the deterioration in the overall technical efficiencies than was explained by pure management inefficiencies. Also, increasing returns to scale dominated decreasing returns to scale at both the macro

and micro levels. Based on the empirical results, the following conclusions are made on Bank sector efficiency in Ghana:

- a. That the overall technical efficiency of the banking sector in Ghana reduced during the period.
- b. That the reduction in the overall technical efficiency resulted from decline in both pure managerial efficiency (PTE) and scale efficiency (SE).
- c. That compared to pure technical inefficiency, the level and prevalence of scale inefficiency was dominant among the banks during the period.
- d. That the observed scale inefficiency was mainly due to the relatively high prevalence of increasing returns (IRS) to scale among the banks and in most of the time than for decreasing returns to scale (DRS).
- e. That IRS was more prevalent among the relatively new banks, whereas DRS was common among the relatively older banks.
- f. That the number of cases of IRS reduced with time but at the expense of rising prevalence of decreasing returns to scale.

3. Causality between Competition and Efficiency

Granger causality tests were applied to test whether there exist causal relationship between competition and efficiency in the Ghanaian banking industry and whether it follows the Quite Life Hypothesis (QLH) or the Efficiency Structure Hypothesis (ESH) or the Specificities of Banking Competition Hypothesis (SBCH). For each hypothesis, 30 different cases were tested. First, No significant result was found in support of QLH. This means improvement in competition does not positively Granger cause efficiency in the Ghanaian Banking industry. Second, limited results were established to support ESH; That is, improvements in the overall technical efficiency was possible but at the expense of worsening market competition. Efficiency was found to affect competition this way especially through scale efficiency.

Finally, irrespective of the choice of DEA efficiency and competition measures, the results were greatly in support of SBCH. That is, increases in market concentration, and hence decreases in the level of market competition, leads to increases in the overall technical efficiencies in all segments of the market. Competition affects efficiency this way mainly through management capabilities than through scale of production. Also, two cases of bi-causality were established in support of the fact that SBCH and ESH coexist between overall technical efficiency and competition in the

deposit market on one side; and between scale efficiency and competition in the loans market. The study concludes that there existed competition-efficiency trade-off in the Ghanaian banking sector during the study period

Policy Recommendations

1. Pro-competition policies should be refocused from reducing market concentration to strengthening consumers' rights and legal options to stimulate competitive conduct among banks. Such policies may be geared toward reducing switching cost; instituting strict requirement for disclosures of over-head and hidden charges on services by banks with clearly specified associated penalties for defaults; undertaking public education on financial service rights and options etc. The study believes strongly that such interventions could help connect competitive conduct to the improved market structure more tightly.
2. Though the universal banking policy has helped level the common playing field, it is also likely that the accompanied recapitalization requirements may have compelled some of the banks to expand their scale of operations beyond the optimal levels. A policy which strategically segments the market to allow banks to choose just the appropriate scale for specific lines of business they have the most interest and expertise is recommended to enhance the overall technical efficiency in the sector.
3. The trade-off between competition and efficiency contradicts the philosophy behind financial liberalization and thus challenges the status quo in Ghana. This definitely presents a new challenge to policy makers in terms of which of the two, competition or efficiency, should be prioritized for policy formulation and implementation. This study, however, argues in favour of efficiency since it's the ultimate end of competition. Efficiency is the sure means to reducing interest rate spread and other charges on banking services as well as ensuring that limited resources are effectively allocated to enhance overall economic welfare in the economy.

Major Contributions

1. Date:

By estimating the Panzar-Rosse Model and DEA scores for OTE, PTE and SE from 2000q3 to 2011q4, the study provides as many as 46 data points. To the best of knowledge, these are the longest empirical time series data on Ghana.

2. Methodology:

a. First, flowing from the generation of a relatively long time series, the study apply Granger causality tests in time series data. Similar study on Ghana is yet to be cited in literature. The 90 different Granger causality tests conducted is the largest study on a country in comparison to known literature.

b. By allowing new entrant banks to enter the data on as-and-when basis, the competition and efficiency measures more meaningful to the industry since each bank is assessed in relation to all operating banks in each period. In this respect, the study improves upon all sited empirical studies on Ghana since all restricted the number of banks on the basis of data non-available

3. Important Empirical Finding

This study establishes that competitive conduct and efficiency deteriorated with time. It also rejects the more intuitive quite life hypothesis based on thirty (30) different chances of being accepted, convincing enough to challenge the status quo in Ghana. It is believed that the existence of competition-efficiency trade-off in the Ghanaian banking sector established in this study will forcefully inform future policies.

博士学位論文審査報告書

1. 氏名 Frank Prah

2. 学位請求論文の題目

Banking Sector Liberalization, Competition and Efficiency in Ghana

3. 論文の要旨及び論文審査の結果

金融セクターの自由化政策は、独占や政府のコントロールの形で市場の硬直性を軽減し、さらに効率的な価格設定と経済成長のために必要な資源の配分につながる競争を促進することを前提としている。ガーナは、金融セクターにおける競争と効率を向上させるために「自由市場」環境づくりを目的に 1980 年代後半の銀行セクターの自由化政策を実施した。Prah 氏の研究の目的は、銀行部門の競争と効率が自由化の最後の 10 年間の間に改善されているかどうかを分析することにある。また、競争の改善が効率またはその逆の改善につながるかどうかをテストしている。この研究は、第四四半期 2011 年に 2000 年の第三四半期から四半期ごとの銀行レベルのデータに基づいている。

分析手法として、市場競争を測定することに両方の市場の構造的および非構造的な 2 つのアプローチが採用されている。構造的アプローチでは、4 企業の集中度比 (CR4)

The CR4 :

$4 CR4 = \sum_{i=1}^4 s_i$, where $s_1 \geq s_2 \geq s_3 \geq s_4 \geq s_5, \forall j \geq 5$,

s_i is bank i 's share of the market in a period

ならびに Hirfindahl-Hirshman 指数 (HHI)

HHI:

$HHI = \sum_{i=1}^n s_i^2, \forall i = 1, 2, \dots, n$,

s_i is bank i 's share of the market for the period

が使用されている。

他方、非構造物アプローチでは、関係する市場加重価格原価マージン (PCM) は、ある一時点の単一銀行の PCM として以下のように定義される、価格 p , 限界費用 c に対して

$$PCM_i = \frac{p_t - c_t}{p_t}$$

さらに産業全体では、

$$PCM_{it} = \sum_{i=1}^n \frac{p_t - c_t}{p_t} \times s_{it}, \quad \forall i = 1, 2, \dots, n$$

となる。ただし、 s_{it} は i 企業の産業に占める割合である。また、論文では、Panzar・ロッセモデル (PRH) の指標を含む。PRH を除き、競争の他の 3 つの指標はローン、預金、資産、当期純利益等が用いられている。次に、データ包絡分析 (DEA) は、技術的な効率の三つの異なる側面を測定するために用いられた。すなわち全体的に技術効率 (OTE)、ピュア技術効率 (PTE) とスケール効率 (SE) である。これらの効率性は、入力/出力変数として 5 つの異なる指標とモデルが使用された。最後に、グレンジャー因果性テストによって、ガーナの銀行業界における競争と効率の間の因果関係を分析している。指標には 5 つの代替的モデルを提供しており、分析の信頼性を高めている。分析結果を競争性と効率性についてまとめると以下の通りとなる。

・競争性について：まず、集中度比と Hirschman-Herfindahl 指標の両方の傾向分析は、時間の経過とともに減少するガーナの銀行部門でその市場集中を示している。これは、市場障壁が小さく、したがって、競争期間中に改善していることができることを意味する。したがって、構造的措置の結果に基づいて、競争が経時的に改善された帰無仮説を受け入れることができる。同様に、線形トレンドは PCM のからの結果の分析は、彼らの平均コストの上に価格を設定する銀行の能力は断続的な上昇にも時間の経過とともに減少し、秋ことを示している。言い換えれば、PCM は競争力のある行為が不安定であったにもかかわらず、それはいくつかの改善を見たことを示している。これは再び一般的に時間の経過とともに改善された競争帰無仮説をサポートするためのいくつかの証拠を提示している。研究では、市場構造が入口と出口の障壁を減らすという点で改善されたものの、構造物アプローチに代表されるように、これらの改善は必ずしも銀行間の競争の改善にも同様に通じているという結論にはいたらなかったと結論している。

・効率性について：DEA 効率のスコアの変化は、マクロとミクロのレベルで分析した。各ケースにおいて、OTE、PTE および SE の発展の動向を分析した。規模の非効率性の変化の原因は、各場合において調査した。結果は OTE、PTE および SE スコアの傾向はすべての下向きの傾斜したことを示している。規模の非効率性は、純粋な管理の非効率性によって説明されたよりも全体的な技術的効率の低下の多くを説明することが見出されている。またミクロ、マクロレベル双方において、収穫逓増の状況が収穫逓減を支配していることを示している。すなわち、1) ガーナにおける銀行部門の全技術的効率性の減少が見られる、2) 純粋な経営効率とスケール効率ともに減少が見られる、3) 技術的そして規模の経済性における非効率性が見られる、4) この観察された銀行部門の規模に関する非効率性は規模の収穫逓減時期よりも収穫逓増の時期が勝っていたためである、5) 規模に関する収穫逓増は主に新規参入の銀行に見られ、他方規模に関する収穫逓減は既存の銀行に見られる、6) 収穫逓増を示す銀行数は減少傾向にある等の結果を得ている。

競争性と効率性の因果関係を調べるために、グレンジャー因果性テストを実施している。テストでは、因果関係がライフ仮説、効率構造仮説また銀行競争仮説の特異性に従うかどうかを検討している。各仮説については、30 の異なる例を試験している。まず、有意な結果がライフ仮説からでは見られなかった。これは競争の中での改善が積極的にはガーナの銀行業界の効率を引き起こさないことを意味している。第二に、制約された結果では、効率構造仮説を ESH を指示している。結果として、市場の競争を犠牲にして、全体的な技術的な効率の向上が可能であったことを示している。効率性、特に規模の効率化は、競争に影響を与えることが判明したとしている。

Prah 氏の研究は、そのモデル分析の厳格さ、分析の進め方の丁寧さを見るものが大きい。しかしながら、ここで用いられている手法は基本的に線形計画法を発展させたものであり、さらに経済学への応用が試みられたものである。

基本モデルは、

$$\begin{aligned} \text{Max}_{u,v} e^i &= \frac{u_i y_i}{v_i x_i} \\ \text{St.} \\ \frac{u_j y_j}{v_j x_j} &\leq 1, j = 1, 2, \dots, N \\ u, v &\geq 0, \end{aligned}$$

where y_i is a vector of output produced by DMU_i using the input vector x_i , and the i corresponding efficiency measure is defined by e .

で与えられている。論文では、この基本モデルからの5つの発展型の推計モデルが提示される。この手法を経済分野で用いるのは未だに少なく、興味深い結果をもたらしている。

しかしながら、マイクロデータを量的に直接分析する手法は、自然科学では問題ないとしても経済

学の分野ではさらなる改善が必要であると思われる。実際、グレンジャー因果性テストを用いるより、簡便な経済理論モデルを構築し、その構造の安定性をみることで経済的因果関係を示すほうが、格段にわかりやすいと考えられるからである。こうした、課題は見られるものの、研究は意欲的で興味深いものである。審査委員会は一致してその能力の高さと論文の質の高さを認め、博士論文として十分な水準にあると判断する。

審査委員	主査	<u>下田 憲雄</u>
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