TECHNICAL EFFICIENCY OF COMMERCIAL BANKS IN THE GAMBIA: AN EMPIRICAL ANALYSIS FROM 2005 TO 2009

BY

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ABSTRACT

The long term capability of commercial banks (CBs) to survive depend partly on how efficiently they are being ran (Mester, 1997). This study examines overall technical efficiency of commercial banks in the Gambia (six conventional banks and one Islamic bank), from 2005 to 2009. Also, the study examines the influence of banks' specific characteristics on efficiency measures. Two stages of efficiency analysis are applied in this study. In the first stage, the study employs Data Envelopment Analysis (DEA) to measure the overall technical efficiency (OTE) - technical efficiency (TE), pure technical efficiency (PTE) and scale efficiency (SE) - under the assumption of Constant Returns to Scale (CRS) and Variable Returns to Scale (VRS). The study employs two inputs (operating expenses and total deposits) and two outputs (loans and advances and income) based on intermediation approach. Moreover, the study utilizes financial ratios (profitability and liquidity ratios) to measure the performance of Arab Gambian Islamic Bank (AGIB) for the period of 13 years (1997-2009). The second stage of the analysis examines the influence of banks' specific characteristics (i.e. banks size, profitability and market power) on efficiency measures. The results from DEA indicate that the majority of Gambian banks are fully efficient in terms of PTE, under the assumption of VRS. Moreover, it is found that the main source of inefficiency of CBs in the Gambia from 2005-2009 is technical and scale inefficiency. In general, the results indicate that the main source of efficiency in the Gambia is pure technical efficiency. The study found that Trust Bank Limited (TBL) is the most efficient bank in the Gambia during the five years period, while International Commercial Bank (ICB) was found to have the lowest efficiency level in the same period. Interestingly, the Islamic bank AGIB is the second most efficient bank in the Gambia during the period (2005-2009). Although, the results from financial ratios show that AGIB is less profitable but more liquid during the period of 1997 to 2009. The results from linear regression, by using Tobit Regression Model illustrate that only bank's size is significantly and positively associated with TE and SE, while both profitability and market power were negatively associated to TE and SE. This indicates that both profitability and market power did not have influence on efficiency measures of CBs in the Gambia.

خلاصة البحث

إنّ قدرة البنوك التّجارية على البقاء في المدى البعيد تعتمد جزئياً على مدى إدارتها بصورة فعّالة (ميستر، 1997). قام هذا البحث بدراسة الفعّالية الفنيّة الكلّية لعيّنة من البنوك التّجارية في غامبيا (مكوّنة من ستة بنوك تقليدية وبنك إسلامي) للفترة من عام 2005م الي عام 2009م. وإضافة إلى ذلك، قام البحث بتحليل تأثير الخصائص الذّاتية للبنوك على مقاييس الفعّالية. وتمّ إجراء عملية التّحليل في هذه الدّراسة على مرحلتين. في المرحلة الأولى، استخدمت الدّراسة منهجيّة تحليل المعلومات الظرفية (DEA) لقياس الفعالية الفنية الكلية– الفعالية الفنية (TE) الفعالية الفنية المجردة (PTE) والفعالية الحجمية (SE)– على حسب فرضية العائد الثابت للحجم (CRS) (زيادة عوامل الانتاج) والعائد المتغير للحجم (VRS). ووظفت الدراسة اثنين من المدخلات، تتمثل في (مصروفات التشغيل واجمالي الودائع) واثنين من المخرجات تتمثل في (القروض والسلفيات، والدخل) اعتمادا على نظريّة الوساطة. وعلاوة على ذلك، استخدمت الدّراسة النسب المالية لقياس أداء البنك العربي الإسلامي الغامبي لفترة 13 سنة، من (1997-2009). واشتملت المرحلة الثانية تحليل تأثير الخصائص الذّاتية للبنوك على مقاييس الفعالية، وتتمثل في (حجم المصرف، الربحية، قوى السوقية). وتشير النتائج المستخلصة من تطبيقات منهج تحليل المعلومات الظرفية (DEA) إلى أن غالبية البنوك التجاريّة في غامبيا تتصف بالفعالية من الناحية التقنية المجردة PTE، بناء على فرضية العائد المتغير للحجم VR. وتشير النتائج أيضا إلى أن المصدر الرئيسي للانعدام الفعالية لدى البنوك التجارية في غامبيا، كأفراد، تتمثل في الفعالية الفنية TE والفعالية الحجم SE. وعموما، فإن النتائج تدل على ان المصدر الرئيسي للفعالية لدى البنوك التجارية في غامبيا تأتي من الفعالية الفنية المجردة PTE . كما توصلت الدراسة إلى أن بنك (TBL) سجلت أعلي درجة في الفعالية من بين البنوك التجارية في غامبيا خلال فترة الدراسة (الخمس سنوات)، في حين نالت بنك (ICB) المرتبة ألأخيرة، حيث سجلت أدني درجة في الفعالية في نفس الفترة. ومن المثير للعجب، هو أن AGIB أو (البنك العربي الإسلامي الغامبي) أحتل المرتبة الثانية من حيث الفعالية بين البنوك التجارية في غامبيا خلال فترة الدراسة، إلا أن النتائج من تحليل النسب المالية تشير الي أن اداء البنك العربي الإسلامي الغامبي من حيث الربحية متدنية، لكن هذا البنك بدرجة سيولة عالية في فترة ما بين 1997-2009. وحسب نتائج تحليل الانحدار الخطي (linear regression) باستخدام نموذج الانحدار الخطي توبت (Tobit Model Regression) تبين أن ثمة علاقة ايجابية هامة تربط بين حجم البنك ومؤثرات الفعالية التقنية، والحجمية (TEوSE). في حين ظهرت أن كلا من معامل الربحية والقوى السوقية تؤثر سلبا علي الفعالية التقنية، والفعالية الحجمية (TEوSE). لكن النتائج تشير أيضا إلى أن تأثير كلا من معامل الربحية والقوى السوقية علي مقاييس الفعالية للبنوك التجارية في غامبيا ليست مهمة من الناحية الإحصائية.

APPROVAL PAGE

I certify that I have supervised and read this study and that in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Master of Science (Accounting).

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Supervisor

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Dean, Kulliyyah of Economics and Management Sciences

DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

Bubacar Malang Fatty

Signature …… Date ……

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…….…… ……. ……..

Signature Date

In the name of Allah most gracious and most merciful

I am very much indebted to my beloved father Malang Fatty; may his soul rest in peace, Ameen! Who advises me to keep on my study even if I heard that he pass away. And also to my dearly-loved mother Mariama Juwara, who waited for so long and keep praying for me to succeed in my life. Without their love and support, I would not have been able to come to this moment. I am always and most grateful and appreciating for your support and prayers.

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LIST OF ABBREVIATIONS

AE	Allocative Efficiency
AGIB	Arab Gambia Islamic Bank
ADB	African Development Bank
BBWA	Bank of British West Africa
BCC	Banker, Charnes and Cooper
CB	Commercial Bank
CBs	Commercial Banks
CBG	Central Bank of the Gambia
CCBs	Conventional Commercial Banks
CRS	Constant Returns-to Scale
CCR	Charnes, Cooper and Rhodes
CB	Colonial Bank
CR	Current Ratio
CAR	Current Asset Ratio
DRS	Decreasing Returns to Scale
DFA	Distribution-Free Approach
DEA	Data Envelopment Analysts
DMUs	Decision Making Units
DMU	Decision Making Unit
DFA	Distribution-Free Approach
e.g.	(*Exempli Gratia*): For example
et al.	(*et alia*): and Others
FIB	First International Bank
FDH	Free Disposable Hull Analysis
FDH	Free Disposable Hull
FR	Financial Ratios
FEM	Frontier Efficiency Measures
FSD	Financial Supervision Department
FX	Foreign Exchange
GMD	Gambian Dalasi
GCC	Gulf Cooperation Council
GSB	Government Saving Bank
GDP	Gross Domestic Product
GCDB	Gambia Commercial and Development Bank
GTB	Guaranty Trust Bank
ICB	International Commercial Bank
ICB	Islamic Commercial Bank
i.e.	(*id est*): that is
IB	Islamic Bank
IBWA	International Bank for West Africa
IBCI	International Bank for Commerce and Industry
IMF	International Monetary Found
IRS	Increasing Returns to Scale
MPSS	Most Productive Scale Size
MIB	Meridian International Bank

NIRS	Non – Increasing Returns to Scale
NFA	Net Foreign Asset
ORG	Order of The Republic of The Gambia
OLS	Ordinary Least Squares
OTE	Overall Technical Efficiency
PER	Profit Expense Ratio
PHB	Platinum Habib Bank
PTE	Pure Technical Efficiency
ROA	Return on Assets
ROE	Return on Equity
SE	Scale Efficiency
SCP	Structure Conduct Performance
SCB	Standard Chartered Bank
SFA	Stochastic Frontier Approach
TBL	Trust Bank Ltd
TFA	The thick frontier approach
TFA	Thick Frontier Approach
TE	Technical Efficiency
US	United States of America
UTG	University of The Gambia
VIF	Variance Inflation Factor
VRS	Variable Returns-to-Scale
NAWEC	National Water and Electricity

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Commercial bank is an institution that provides banking services, such as current accounts and savings accounts. In general, commercial banks operate in an increasingly competitive environment (Isik & Hassan, 2002b; Mester, 1997; Yeh, 1996). Thus, long term sustainability of these banks depends partly on how efficiently they are being ran (Mester, 1997). In this regards, the main objective of the bank's management is to use the resources in an efficient and effective manner (Siyaka, 2008). This issue has been always relevant in the context of globalization that results increasing competition for financial services, deregulation, and technological innovations. It has lead banking consolidation that has brought more concentration on controlling costs and providing products and services more efficiently (Spong, Sullivan, & DeYoung, 1995). Thus, the presence of inefficiencies is considered an essential feature of banking sector.

According to Turati (2003)"banks are regarded as firms that emerge as a result of some sort of market imperfections; hence they bring about certain degree of inefficiency with respect to perfect competitive outcomes". Banking efficiency is a very important issue at both macro and micro levels. As such banks should be sound efficient in order to allocate resources effectively (Hussein, 2000; as stated by Siyaka, 2008).

Efficiency of the firm (bank) is defined as the relationship between what a firm (producer, production unit, or any decision - making unit) produces and what it could

possibly produce, under the assumption of full utilization of the resources that available (Hoyo et al., 2004). According to Kumbhakar and Lovell (2000, p. 15) as stated by (Kokkinou & Dr. Geo., 2009).

> Efficiency represents the degree of success which producers achieve in allocating the available inputs and the outputs they produce, in order to achieve their goals, namely: to attain a high degree of efficiency in cost, revenue, or profit

Efficiency in banking industry can be categorized into Allocative Efficiency (AE) and Technical Efficiency (TE). AE is the degree to which resources are being allocated to the use with the highest expected return. A firm can be TE if it produces a given set of outputs using the minimum possible amount of inputs (Falkena et al., 2004 as stated by Siyka, 2008). Outputs could be loans or total balance of deposits, whereas inputs include labor, capital and other operating costs (Mester, 1997). There are lot of literature in this area written in US, Europe and Asia, yet only few empirical studies have been done on technical efficiency of CBs in Africa generally and Gambia in particular, as noted in the literature. Therefore, the researcher's aim in this study is to explore the efficiency of commercial banks in Gambia.

1.2 PROBLEM STATEMENT

The Gambian banking sector has experienced fundamental changes over the last two decades. The current profile or structure of banking industry finally emerged when the Central Bank of the Gambia (CBG) introduced significant financial sector reform in mid-1980s. The financial reform was introduced to further financial liberalization, institutional development and enhancing the stability of the financial sector. There are rules of entry into the Gambian banking industry regarding capital adequacy of about USD$7.2 million, fit and proper test of Shareholders and Directors, feasibility study

and projected financial plan of at least five years are required, among others, relatively much relax than in some neighboring countries in the region[1]. There were 12 banks operating in the Gambia before 2008and then the number increases to 14 banks in 2009, 13 conventional commercial banks (CCBs) and one Islamic bank (IB), (CBG, 2011).

Meanwhile, in its Fifth Review of Gambia's Three-Year Arrangement under the Poverty Reduction and Growth Facility that was released on August 24th 2009, the IMF expressed concerns about the current trend growth of the banking system and the "risk that the quality of oversight may come under pressure" which may cause uncertainty to banking performance in the Gambia[2]. There are limited credit instruments available to the private sector in Gambia; the only money market instruments available are the government treasury bills with a population of 1.8 million, majority of who do not have bank accounts. Thus, it is expected that the entry of new banks would increase competition and may affect efficiency levels of CBs in the Gambia, thus the weaker banks may drop in efficiency level while the strong ones will benefit from increased scale and efficiency levels.

Currently, there were only few empirical studies that examine the efficiency of banking sector in the Gambia, like the study of (Agu, 2004) who focused only on the functions of a financial sector in the Gambia using industry data. Thus, the researcher attempts to extend the study by examining the technical efficiency of individual banks spanning from 2005 to 2009. Our study seeks to determine the relationship between technical efficiency and banks' specific characteristics (Bank's Size, Profitability and

[1] The Gambia incorporated... vision 2020, may 1996
[2]2010 Investment Climate Statement, Bureau of Economic, Energy and Business Affairs, March 2010

Market Power), and to measure the performance of Arab Gambian Islamic Bank (AGIB) in 13years period.

1.3 OBJECTIVES OF THE STUDY

Banks contribute to economic growth through their financial intermediation role. Banking sector in the Gambia has experienced fundamental changes over the last decade, based on the fact that the country is small and has very limited natural resource. Based on this, it should focuses on banking, finance and inter-port trade (Sillah, 2005). However, no study has been done to investigate the level of technical efficiency (TE) of CBs in the Gambia. Thus, the aim of this study is to measure the TE of these banks from 2005 to 2009 by using Data Envelopment Analysis (DEA) method. More specifically, the objectives of this study are:

1. To examine the overall technical efficiency[3] of CBs in the Gambia from 2005-2009.
2. To evaluate the performance of AGIB from 1997-2009.
3. To examine the factors influencing the level of efficiency of CBs in the Gambia. The study aimed to analyze bank size, profitability and market power as factors influencing technical efficiency measures of the banks in Gambia.

1.4 RESEACH QUESTIONS

In order to explain the research objectives; the following research questions were made:

[3]Overall technical efficiency , is a combination of technical , pure technical and scale efficiency

1. What is the level of overall technical efficiency of CBs in the Gambia from 2005-2009?
2. What is the performance of AGIB from 1997-2009?
3. How bank size, profitability and market power influence technical efficiency measures of CBs in the Gambia?

1.5 SIGNIFICANCE OF THE STUDY

This study is significant for many reasons: Firstly: The findings will highlight the level of efficiency of CBs in the Gambia in order to explain any changes based on existing economic conditions. Secondly: This study could be useful to bank managers for understanding overall technical efficiency of Gambian banking sector, in order to utilize the resources of the banks efficiently. Thirdly, it will help investors in making investment decision in any bank in the Gambia. Fourthly, it will help the regulatory body- CBG- in its oversight functions the state of commercial banks efficiencies in the industry. Lastly, it will add to the literature on banks' efficiency especially in Gambian context.

1.6 MOTIVATION OF THE STUDY

The banking industry around the world has undergone profound and extensive changes over the last two decades. The globalization of financial markets and institutions which accompanied government deregulation, financial innovations, information revolution and advanced application in communication and technology, has created a competitive banking environment and modified the technology of bank production. Due to these developments and changes in the modern banking field, banks are trying to operate more efficiently in order to stay competitive (Karim and

Gee, 2007). There are many literature on measuring efficiency of banking industry internationally, but only study of (Agu, 2004) was noted in the case of Gambia, using aggregate data. Indeed, this study to the best knowledge of the researcher could be the first of its kind to evaluate and analyze technical efficiency of CBs in Gambia from 2005 to2009, thus being more specific in our analysis than the earlier study on aggregate banking sector data. Our study also included an Islamic bank among conventional banks, making our work more enriching using Non-parametric DEA method of analysis. This study employs DEA to estimate overall technical efficiency of 7 CBs for the period 2005-2009. Furthermore, the study will show the performance of CBs in Gambia with one IB, the time duration was specifically chosen due to availability of data for individual banks.

1.7 ORGANIZATION OF CHAPTERS

The structure of this study is organized into six major chapters.

Chapter One: Introduction: This chapter is a brief introduction, discussion on problem statement of the study, objectives of the study, research questions, and significance of the study and motivation of the study.

Chapter Two: Literature Review: The chapter reviews the measurement of efficiency by focusing on parametric SFA and non-parametric DEA. Also, the chapter reviews the performance and efficiency of Islamic banks and efficiency of banks in Africa from different methods, and bank's specific characteristics. Further, the theories and theoretical framework of efficiency are highlighted, and then the chapter concluded.

Chapter Three**:** Overview of commercial banking in the Gambia. This chapter reveals background of the country, history of commercial banking in the Gambia, central

banking, and commercial banking and finally Islamic banking in the Gambia is discussed, and then the chapter concluded.

Chapter Four: Research Method: In chapter four, the research objectives are reintroduced, sample selection procedures is discussed as well as sample size. Data sources are also explained. This chapter outlines DEA model to evaluate the overall technical efficiency measures and linear regression to test the bank's characteristic that may influence efficiency of banking industry in the Gambia.

Chapter Five: Empirical results and findings are presented in this chapter, this chapter empirically analyses and presents the findings of overall technical efficiency measures (TE, PTE and SE) of individual commercial banks in the Gambia for a period from 2005 to 2009 using DEA method, performance of AGIB is also analyzed in 13 years period by using accounting ratios and bank's characteristics that influences the efficiency measures in the Gambia by using linear regression models.

Chapter Six: Conclusion. This chapter summarizes research findings accordingly with each of research objectives. Finally, limitations, contributions of the study and suggestions for future research areas are carefully highlighted in this chapter.