

**FINANCIAL DEEPENING AND PROFITABILITY OF  
COMMERCIAL BANKS IN KENYA**

**BY**

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## DECLARATION

I, the undersigned, declare that this research project is my original work and has not been submitted to any other college, institution or university for academic credit.

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D61/73906/2012

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This research project has been submitted for examination with my approval as the appointed supervisor.

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## **DEDICATION**

I dedicate this research work to wife Kay and daughter Courtney, who are my inspiration in everything I do and every choice I make. To my mum, who always supported me in every endeavour, you made me whom I am today. To my late dad, you are the reason I am here at all, you inspired me immensely.

## **ABSTRACT**

The link between financial deepening and economic growth has long received significant attention in economics, however, the waves of financial deepening cannot raise the tide of the economy without affecting bank profitability; it is against this background that this study was formulated to examine the effects of financial deepening on profitability of commercial banks in Kenya. The study targeted all the commercial banks in Kenya. Secondary data was collected from the Kenya National Bureau of Statistics, Central Bank of Kenya and websites of licensed Commercial banks in Kenya. The study used both explanatory research design and inferential statistics to investigate the effect of financial deepening on profitability of commercial banks. The findings of the study revealed that financial deepening affects bank profitability positively. The results of this paper therefore, present a strong argument towards increasing financial deepening as an important stimulator of greater banking profitability. While Kenya still exhibits relatively low levels of financial deepening, commercial banks profitability displays an increasing trend in recent years. An expansion of credit to the private sector may be an important determinant of further banking profitability increases in the future. Therefore, policy oriented measures in the country should take in consideration the positive causality between financial deepening and banking profitability change and try to increase the level of credit to the private sector as a stimulant of economic growth.

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## **ABBREVIATIONS AND ACRONYMS**

GDP:	- Gross Domestic Product
CRB:	- Credit Reference Bureau
CIS:	- Credit Information Sharing
NPL:	- Non-Performing Loans
NSE:	- Nairobi Securities Exchange
CBK:	- Central Bank of Kenya
SME's:	- Small and Medium Enterprises



# CHAPTER ONE: INTRODUCTION

## 1.1 Background to the study

During the past few decades, the Kenyan financial system experienced profound changes, including the liberalization of banking sector, the privatization of financial institutions and the opening of the markets to attract foreign investments. Such reforms during the early 1990s were expected to increase savings and investment in the country and ultimately produce higher growth rates (Aizenman 2005). There was need to open up the financial system for the developing economies. In the 1990s the economies were characterized by extensive regulation, administration of interest rates, direct credit programs, weak banking structure, lack of proper risk management systems, and lack of transparency in operations among other factors.

Supporters of development hypothesis theory believe that the lack of a developed financial infrastructure restricts economic growth. Thus, the focus of policy at each point in time should be to ensure that the financial system operates efficiently such that the real sector will receive the necessary support. The acceptance of the hypothesis theory made economic theorists to conclude that a measure of intervention is important and in fact necessary for meaningful growth. Various policies should thus be put in place to encourage and promote the activities of financial institutions in this regard, Nzotta and Emeka (2009).

On the other hand, the studies by Mckinnon and Shaw (1973) observed that financial repression is correlated with sluggish growth in developing countries. The implication of their studies is that financial development would contribute most significantly to economic growth, if monetary authorities did not interfere in the operations of financial institutions and the financial infrastructure generally. Such economies, according to Nnanna and Dogo (1998) are typically characterized by high and volatile inflation and distorted interest and exchange rate structures, low

savings and investments and low level of financial intermediation, as interest rates do not reflect the cost of capital.

Institutions that spearhead financial deepening include financial intermediaries, regulatory agencies, financial market systems and the government. Financial inclusion is meant to increase access to financial services, to facilitate legal, regulatory and institutional reforms and need for portfolio diversification, which will be facilitated by legal framework, technology, institutional reforms, regulatory institutions, innovations in financial markets. Commercial banks as financial institutions hold a special place in the economy of a country because of their ability to efficiently transform financial claims of savers into claims (advances) issued to business, individuals, and governments (Mishkin and Eakins, 2007). Chortareas et al (2011) noted that regardless of the transmission channel, however, one would expect that the waves of financial deepening cannot raise the tide of the economy without affecting bank performance, particularly in emerging economies where the banking sector is the main supplier of funds to the financial system

### **1.1.1 Concept of Financial Deepening**

The modern economic analysis of financial policy in developing countries was initiated with the seminal works of McKinnon (1973) and Shaw (1973). McKinnon and Shaw argued that this financial repression was imposing major costs on the countries that practiced it. For one thing, sub-market real interest rates would tend to repress the level of saving, and thereby investment. In addition, the failure to ration credit by price would result in an inefficient allocation of what savings there were. Growth would suffer on both counts: too little would be saved, and what savings there were would not be allocated to those uses promising the best return, and thus would not contribute as much as potentially possible to the rate of growth.

One of the main objectives of financial sector reforms is to boost financial depth, which thus leads to an increase in the resources available for financial intermediation (Odhiambo N. M., 2005).

Shaw and McKinnon (1973) defines financial deepening as the improvement or increase in the pool of financial services that are tailored to all the levels in the society. That it also refers to the increase in the ratio of money supply to Gross Domestic Products or price index which ultimately postulates that the more liquid money is available in the economy, the more opportunities exist in that economy for continued and sustainable growth. It basically supports the view that development in financial sectors leads to development of the economy as a whole.

Financial sector deepening enable the financial intermediaries perform their functions of mobilizing, pooling and channeling domestic savings into productive capital more effectively thereby contributing to economic growth of a country (Ndege, 2012). In addition to mobilizing savings and improving capital allocation (Boyd and Prescott 1986), financial deepening reduces the extent and significance of information asymmetries (Stiglitz and Greenwald 2003) and allows for risk transformation and monitoring (Diamond 1984).

### **1.1.2 Financial Deepening and Measurement**

Financial deepening implies the ability of financial institutions to effectively mobilize savings for investment purposes. The growth of domestic savings provides the real structure for the creation of diversified financial claim. It also presupposes active operations of financial institutions in the financial markets, which in turn entail the supply of quality (financial) instruments and financial services, the views above conform to the conclusions of the study by Nnanna and Dogo (1998) that financial deepening represents a system free from financial repression. Their findings in this study is that policies of financial repression aimed at encouraging domestic investments through suppressing interest rates produced negative results. Here, negative real interest rate did not encourage investment but rather encouraged banks to be more risk averse and more hesitant to lend. On the other hand, when interest rates are more market oriented and less negative in real terms, bank lending increases and same to domestic investment and national savings.

Financial deepening generally entails an increased ratio of money supply to gross domestic product (Nnanna and Dogo, 1998; and Nzotta, 2004). Financial deepening is thus measured by relating monetary and financial aggregates such as M1, M2 and M3 to the gross domestic product (GDP). The logic here is that, the more liquid money is available in the economy, the more opportunities exist for the growth of the economy. Financial deepening can therefore be defined as the ratio of money supply to GDP, is a function of domestic credit provided by banking industry as a percentage of GDP, domestic credit to private sector as a percentage of GDP, financial savings to GDP, rate of inflation, real lending rates, deposit money bank assets to GDP, currency outside banks to money supply and the Dummy.

Studies attempting to link financial deepening and economic growth have chosen a number of proxy measures and subsequently, have come up with different results (see King and Levine, 1993; Khan and Senhadji, 2000; among others). Therefore, studies using different indicators of financial development not only find a positive correlation between financial sector and growth, but also conclude that the development of bank credit has an important impact on economic growth.

A developed financial system broadens access to funds, conversely, in underdeveloped financial system, access to funds is limited and people are constrained by the ability of their own funds and have to resort to high cost informal sources such as money lenders. These result into few economic activities that would spur growth. Thus in underdeveloped financial system, growth is restricted to the expansion potential of incumbents. In mature financial systems, financial institutions develop appraisal techniques, and information gathering and sharing mechanisms, which then enable banks to finance those firms that are at the margin, thereby leading to their growth-inducing productive activities in addition to incumbents. It is this availability of external

finance to budding entrepreneurs and small firms that enable new entry, while also providing competition to incumbents and consequently encouraging entrepreneurship and productivity

### **1.1.3 Concept of Bank Profitability**

A number of studies on bank performance and profitability are product oriented, i.e. they focus on determinants of bank performance. Similar studies are found in transition economies (Duygun, Karligash and Mohamed, 2008). In such studies, variations in bank performance and profitability are explained at five levels which include, economies of scale and scope (Piloff, 1996); mergers and acquisition within the banking industry (Akhavain, Berger and Humphrey, 1997); suboptimal choice of output prices and inputs known as X-performance or managerial performance (Bos and Schmiedel, 2007); market structure (Nasser, 2004) and bank regulations, competition and financial reforms (Ben Naceur and Omran, 2011).

Athanasoglou et al (2008) pointed out that, during the last two decades the banking sector has experienced worldwide major transformations in its operating environment. Both external and domestic factors have affected its structure and performance. That despite the increased trend toward bank disintermediation observed in many countries, the role of banks remains central in financing economic activity in general and different segments of the market in particular. In their study they noted that sound and profitable banking sector is better able to withstand negative shocks and contribute to the stability of the financial system. It is therefore important to note that, the determinants of bank performance have attracted the interest of academic research as well as of bank management, financial markets and bank supervisors.

### **1.1.4 The Banking Industry in Kenya**

The Companies Act, the Central Bank of Kenya (CBK) Act and the Banking Act are the main regulators and governors of banking Industry in Kenya. These Acts are used together with the

prudential guidelines which CBK issues from time to time. In 1995 the exchange controls were lifted after the liberalization of the banking sector in Kenya. According to the regulator of commercial banks in Kenya, CBK, as at June 30, 2012, the sector comprised 43 commercial banks, 1 mortgage finance company, and 6 deposit taking microfinance institutions, 5 representative offices of foreign banks, 115 foreign exchange bureaus and 2 credit reference bureaus. CBK is tasked with formulating and implementation of monetary and fiscal policies. Central bank is the lender of last resort in Kenya and is the banker to all other banks. The CBK ensures the proper functioning of the Kenyan financial system, the liquidity in the county and the solvency of the Kenya shilling.

According to the Central Bank of Kenya, the Kenyan banking sector was in the 80's and 90's saddled with a momentous Non-Performing Loans (NPLs) portfolio. This invariably led to the collapse of some banks. One of the catalysts in this scenario was "Serial defaulters", who borrowed from various banks with no intention of repaying the loans. Undoubtedly these defaulters thrived in the "information asymmetry" environment that prevailed due to lack of a credit information sharing mechanism.

Credit Reference Bureaus complement the central role played by banks and other financial institutions in extending financial services within an economy. CRBs help lenders make faster and more accurate credit decisions. They collect, manage and disseminate customer information to lenders within a provided regulatory framework – in Kenya, the Banking (Credit Reference Bureau) Regulations, 2008 which was operationalized effective 2nd February 2009. Credit histories not only provide necessary input for credit underwriting, but also allow borrowers to take their credit history from one financial institution to another, thereby making lending markets more competitive and, in the end, more affordable. Credit bureaus assist in making credit accessible to more people, and enabling lenders and businesses reduce risk and fraud. Sharing of information

between financial institutions in respect of customer credit behaviour, therefore, has a positive economic impact.

The association of Kenyan banks noted that the Credit Information Sharing (CIS) mechanism which was launched in July 2010, continues to be used by both commercial banks and individuals. The number of credit reports requested by institutions stood at 1,774,185 in June 2012 up from 1,542,988 reports in March 2012, representing an increase of 15.0 percent or 231,197 reports. Over the same period, the number of reports requested by customers increased from 7,603 to 10,032 reports. The introduction of the credit information sharing mechanism has further strengthened credit appraisal standards. Banks have now incorporated credit reference reports in the credit risk appraisal. It is also expected that credit referencing will go a long way in inculcating credit discipline in borrowers.

The agent banking model was designed to assist banks lower their cost of offering banking services that had been a major impediment to inclusion while at the same time improving banks' earnings as more Kenyans are offered an opportunity to access financial services. The use of the agency banking model by banks in Kenya has continued to improve access to banking services and has also increased financial deepening in the country since it was launched in 2010.

According to the Central Bank of Kenya report dubbed Development in the Kenyan Banking Sector for the Quarter ended 30th June, since the inception of agent banking; the financial sector has recorded a tremendous growth with most Kenyans accessing finances at their convenience. This has reduced the cost of transaction and the time especially for the Kenyans in remote areas. As at 30th June 2012, there were 10 commercial banks that had contracted 12,054 active agents facilitating over 18.7 million transactions valued at Ksh. 93.1 billion. This was an increase from 8 banks that had contracted 10,006 active agents facilitating over 13 million transactions valued at Ksh. 64.8 billion in March 2012.

The increased number and value of transactions demonstrate the increased role of agent banking in promoting financial initiatives being championed by CBK. The increase is due to the fact that Banks and Financial related Institutions in Kenya are increasingly deploying the use of payments using agencies to enhance the quality of their financial services and increase growth. The pace of transformation in the financial sector speeded up with more agency banking businesses realizing the potential of using the agencies in transacting payments in their service delivery.

## **1.2 Research Problem**

Financial deepening is very often used in development studies and refers to the increased provision of financial services with a wider choice of services geared to the development of all levels of society. The World Bank (1932) further contends that financial deepening encompasses the increase in the stock of financial assets. From this perspective, financial deepening implies the ability of financial institutions in general, to effectively mobilize financial resources for development. This view accepts the fact that a financial system's contribution to the economy depends on the quality and quantity of its services and the efficiency with which it performs them.

On one hand, a high degree of financial deepening may affect banking efficiency and productivity through competition and ultimately a more efficient capital allocation which increases the productivity of investment. Moreover, financial deepening mobilizes savings into investment projects, which normally are passed on by the banking sector (Merton and Bodie 1995). Financial deepening also increases the marginal productivity of capital through the intermediation function of well-informed financial institutions (King and Levine 1993a; Beck, Levine, and Loayza 2000). On the other hand, more efficient and profitable banks may increase the degree of financial deepening by increasing competition, improving their services, increasing their network penetration, enhancing transaction processes, and providing consumers with more financial products (e.g. by increasing the amount of credit).



After the financial reforms carried out in the 1990s in Kenya, the banking industry was expected to become more competitive and an important catalyst for economic growth. Financial liberalization was expected to allow for positive real interest rates, and for stimulating the mobilization and efficient allocation of domestic financial resources. At the same time, as the market becomes competitive the costs of intermediation go down, an indication of efficiency in the intermediation of financial assets (Kabubo and Ngugi, 1998). It is also instructive to note that the study by Aizenman (2005), pointed out that the immediate aftermath of the financial reforms brought a much-needed capitalization of the financial sector and a change in the market structure of the banking sector.

One of the intended consequences of the financial liberalization in Kenya was to increase the degree of financial development, for example through credit expansion. A number of studies produced solid empirical evidence on the nexus between finance and economic productivity and growth where the development of financial institutions is treated as a key component of financial deepening (Levine 1997; Beck, Levine, and Loayza 2000; Guillaumont Jeanneney, Hua, and Liang 2006; Lozano-Vivas and Pastor 2006). Nevertheless, it is less clear how exactly finance influences economic growth (Levine 2004). Arestis, Chortareas, and Desli (2006) drew attention to the fact that the literature rarely attempts to identify the particular mechanism through which this nexus materializes.

The aforementioned effects, however, directly impact the financial system and operate through it. Thus, in this paper we complement the existing literature by turning our attention to the microeconomic implications of financial deepening for financial institutions. In particular, we focus on the possible effects of financial deepening on bank productivity, since the degree of financial depth constitutes a significant dimension of the broad environment within which banks operate. Moreover, the Kenyan financial systems are highly bank-based and banks constitute the

most important source of finance. In this paper, the researcher shifts focus from the macroeconomic variables to financial institutions and the possible causal links between financial deepening and bank productivity changes. The study complement the existing literature by turning our attention to the microeconomic implications of financial deepening for financial institutions.

In particular, it focuses on the possible effects of financial deepening on bank profitability, since the degree of financial depth constitutes a significant dimension of the broad environment within which banks operate, Chortareas et al (2011). Moreover, the Kenyan financial systems are highly bank-based and banks constitute the most important source of finance. To the best of my knowledge, there is no work considering explicitly such a link between financial deepening and bank productivity in Kenya, however such studies have been done in Latin America by Chortareas et al (2011). Therefore, the research question in this study is: what effect does financial deepening have on bank profitability?

### **1.3 Research Objective**

The objective is to examine the effect of financial deepening on the profitability of commercial banks in Kenya.

### **1.4 Value of the study**

This study will be of significance to commercial bank managers to be able to understand how financial deepening affects their bottom-line. To the regulators like CBK, the study will help in formulating policies that promote financial sector deepening and ensure continued growth of financial sector in Kenya and even beyond.

The findings will also be important to investors when making their investment decisions on how best to construct investment portfolios within the banking industry. The study will add to the

existing literature on the subject. It will assist researchers who want to carry out further studies in the area of financial deepening and profitability of financial institutions. Generally, the study will be important at this time of economic development when efforts are being made to reposition the financial system to enable it play a key role in economic development in Kenya.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter introduces the concept of financial deepening and economic growth and bank performance, a review of theories as well as empirical studies and provides important conclusions.

### **2.2 Theories underpinning the study**

The supporters of development hypothesis theory believe that the lack of a developed financial infrastructure restricts economic growth. Thus, the focus of policy at each point in time should be to ensure that the financial system operates efficiently such that the real sector will receive the necessary support. The acceptance of the hypothesis theory made economic theorists to conclude that a measure of intervention is important and in fact necessary for meaningful growth. Various policies should thus be put in place to encourage and promote the activities of financial institutions in this regard, Nzotta & Emeka (2009).

Financial repression theory is usually associated with the work of Mckinnon (1973) and Shaw (1973). The implication of their studies is that financial development would contribute most significantly to economic growth, if monetary authorities did not interfere in the operations of financial institutions and the financial infrastructure generally. The studies by Mckinnon and Shaw observed that financial repression is correlated with sluggish growth in developing countries. Such economies, according to Nnanna and Dogo (1998) are typically characterized by high and volatile inflation and distorted interest and exchange rate structures, low savings and investments and low level of financial intermediation, as interest rates do not reflect the cost of capital.

## 2.3 Financial Deepening

Economists have extensively debated the role of financial development on economic growth. Several studies have been carried out both globally and locally. In the global scene, it has been found that financial development affects GDP growth through productivity and technological advancement, Schumpeter (1934). Goldsmith (1969), in his earlier studies suggested that financial development can increase the Total Factor Productivity of the economy through increments in marginal productivity. McKinnon and Shaw (1973) suggested that financial development can improve the efficiency of capital allocation by increasing the overall degree of investment.

The recent financial crisis brought to the fore the increasing importance of financial institutions and financial instruments in helping to reduce transaction and information costs in the economy, but also poses challenges. More recently, an abundant literature has also produced convincing evidence for the existence of a positive link between financial deepening and economic growth by increasing economic efficiency, investment and growth (Ndege, 2012). The relationship between financial intermediation and growth has been studied through many cross-country studies, at the firm and industry levels (Levine 2004).

Less attention has been given, however, to the sources of growth in order to identify the exact mechanisms through which financial development influences economic growth (Rioja and Valev 2004). Jorgenson (2005) suggests that physical accumulation of capital does not necessarily produce long-run economic growth. Therefore, more recent studies attempt to explain the mechanism through which financial deepening impacts economic growth. As Levine (2004, 6) puts it 'if finance is to explain economic growth, we need theories that describe how financial development influences resource allocation decisions in ways that foster productivity growth'. Some authors focused on how financial development affects economic growth through increasing productivity (Levine, Loayza, and Beck 2000; Arestis, Demetriades, and Fattouh 2003; Arestis,

Chortareas, and Desli 2006). Fisman and Love (2003) test how financial deepening affects productivity growth. They found that in the long-run more financially developed countries allocate a higher share of resources towards sectors that rely primarily on external finance. These industries which depend on external financing are most likely to invest in R&D and technology, and access to increased credit may stimulate greater productivity growth.

Hartmann et al. (2007) show that financial deepening in Eastern European countries has led to faster capital reallocation; they conclude that deeper credit markets enhance capital reallocation by contributing to an increase in economic productivity growth. Lower TFP has been explained in developing countries by misallocation of resources across productive units. Thus, the presence of financial frictions increases the misallocation of resources (G.E. Chortareas et al, 2008). Contrastingly, as the financial system develops, information and transaction costs associated with capital reallocation decrease while TFP increases (Hsieh and Klenow 2007; Restuccia and Rogerson 2007).

Greenwood and Jovanovic (1990) provide a theoretical analysis of ways in which financial Intermediation can enhance productivity and growth by allocating efficiently funds in investment projects with high rates of return. Bencivenga and Smith (1991) suggest that financial intermediaries contribute to the efficient allocation of funds by increasing liquidity and diversifying risk, which in turn influences productivity growth. They acknowledge that regulatory measures such as interest rate ceilings can inhibit this process, particularly in developing nations. Recent studies focus on the mechanisms that improve productivity to analyse the financial development-economic growth link. Benhabib and Spiegel (1994) found that financial development enhances growth through greater TFP and capital accumulation. Beck and Levine (2002) employ a cross-country panel data to test the relationship between financial structure, industry growth, and new establishment formation. They find that an efficient legal system and

financial development are both strong determinants of industry growth, new establishment formation and efficient capital allocation.

## **2.4 Profitability**

Guillaumont Jeanneney, Hua, and Liang (2006) study the finance–productivity growth in China for 1993–2001. They use the Malmquist index and its components (namely the technical and efficiency change) to measure productivity and found that financial deepening does affect productivity in China, particularly through efficiency change. In Latin America, G.E. Chortareas et al (2011) studied the financial depth-banking productivity nexus. They considered nine Latin American countries and estimate banking productivity for each of them using the Malmquist TFP index. The results revealed an unambiguously positive and statistically significant relationship, suggesting that financial deepening is an important determinant of banking productivity increases. Their study also uncovered evidence of a reverse causality between the two variables, as a number of plausible channels implies.

In the literature, bank profitability is usually expressed as a function of internal and external determinants. The internal determinants could be termed micro or bank-specific determinants of performance. The external determinants are variables that are not related to bank management but reflect the economic and legal environment that affects the operation and performance of financial institutions (P.P. Athanasoglou et al, 2008). The research undertaken has focused on profitability analysis of either cross-country or individual countries' banking systems. The first group of studies includes Short (1979), Bourke (1989), Molyneux and Thornton (1992) and Demirguc-Kunt and Huizinga (2000).

Another study in this group is Bikker and Hu (2002), though it is different in scope; its emphasis is on the bank profitability–business cycle relationship. Studies in the second group mainly concern the banking system in the US (e.g. Berger et al., 1987) or the emerging market economies

(e.g. Barajas et al., 1999). All of the above studies examine combinations of internal and external determinants of bank profitability. The empirical results vary significantly, since both datasets and environments differ. There exist, however, some common elements that allow a further categorization of the determinants. Studies dealing with internal determinants employ variables such as size, capital, risk management and expenses management. Size is introduced to account for existing economies or diseconomies of scale in the market. Smirlock (1985) finds a positive and significant relationship between size and bank profitability. Demirguc-Kunt and Huizinga (2000) suggest that the extent to which various financial, legal and other factors (e.g. corruption) affect bank profitability is closely linked to firm size.

In addition, as Short (1979) argues, size is closely related to the capital adequacy of a bank since relatively large banks tend to raise less expensive capital and, hence, appear more profitable. Using similar arguments, Bikker and Hu (2002) and Goddard et al. (2004), among others, link bank size – especially in the case of small to medium-sized banks – to capital and in turn to profitability. However, many other researchers suggest that little cost saving can be achieved by increasing the size of a banking firm (Berger et al., 1987). The need for risk management in the banking sector is inherent in the nature of the banking business (P.P. Athanasoglou et al, 2008). Further, poor asset quality and low levels of liquidity are the two major causes of bank failures. During periods of increased uncertainty, financial institutions may decide to diversify their portfolios and/or raise their liquid holdings in order to reduce their risk. In this respect, risk can be divided into credit and liquidity risk. Molyneux and Thornton (1992), among others, find a negative and significant relationship between the level of liquidity and profitability. In contrast, Bourke (1989) reports an opposite result; while the effect of credit risk on profitability appears clearly negative (Miller and Noulas, 1997).



Athanasoglou et al, (2008) explained this result by taking into account the fact that the more financial institutions are exposed to high-risk loans, the higher is the accumulation of unpaid loans, implying that these loan losses have produced lower returns to many commercial banks. Bank expenses are also a very important determinant of profitability, closely related to the notion of efficient management. There has been an extensive literature based on the idea that an expenses-related variable should be included in a profit function. For example, Bourke (1989) and Molyneux and Thornton (1992) find a positive relationship between better-quality management and profitability. Turning to the external determinants of bank profitability, it should be noted that we can further distinguish between control variables, such as inflation, interest rates and cyclical output, and variables that represent market characteristics. The latter refer to market concentration, industry size and ownership status.

A whole new trend about structural effects on bank profitability started with the application of the market-power (MP) and the efficient-structure (ES) hypotheses. The MP hypothesis, which is sometimes also referred to as the structure-conduct-performance (SCP) hypothesis, asserts that increased market power yields monopoly profits. A special case of the MP hypothesis is the relative-market-power (RMP) hypothesis, which suggests that only firms with large market shares and well-differentiated products are able to exercise market power and earn non competitive profits. Likewise, the X-efficiency version of the ES (ESX) hypothesis suggests that increased managerial and scale efficiency leads to higher concentration and, hence, higher profits. Studies, such as those by Smirlock (1985) and Berger (1995a) investigated the profit–structure relationship in banking, providing tests of the aforementioned two hypotheses. To some extent the RMP hypothesis is verified, since there is evidence that superior management and increased market share (especially in the case of small- to medium-sized banks) raise profits.

In contrast, weak evidence is found for the ESX hypothesis. According to Berger (1995a), managerial efficiency not only raises profits, but may lead to market share gains and, hence, increased concentration, so that the finding of a positive relationship between concentration and profits may be a spurious result due to correlations with other variables. Thus, controlling for the other factors, the role of concentration should be negligible. Other researchers (e.g. Bourke, 1989; Molyneux and Thornton, 1992) argue instead that increased concentration is not the result of managerial efficiency, but rather reflects increasing deviations from competitive market structures, which lead to monopolistic profits. Consequently, concentration should be related to bank profitability. A rather interesting issue is whether the ownership status of a bank is related to its profitability. However, little evidence is found to support the theory that privately-owned institutions will return relatively higher economic profits (e.g. Short, 1979). In contrast, Bourke (1989) and Molyneux & Thornton (1992) report that ownership status is irrelevant for explaining profitability.

The last group of profitability determinants deals with macroeconomic control variables. The variables normally used are the inflation rate, the long-term interest rate and/or the Average Payment Period of money supply. Revell (1979) introduces the issue of the relationship between bank profitability and inflation. He notes that the effect of inflation on bank profitability depends on whether banks' wages and other operating expenses increase at a faster rate than inflation. The question is how mature an economy is so that future inflation can be accurately forecasted and thus banks can accordingly manage their operating costs. In this vein, Perry (1992) states that the extent to which inflation affects bank profitability depends on whether inflation expectations are fully anticipated. An inflation rate fully anticipated by the bank's management implies that banks can appropriately adjust interest rates in order to increase their revenues faster than their costs and thus acquire higher economic profits. Most studies (e.g. Bourke, 1989; Molyneux and Thornton,

1992) have shown a positive relationship between either inflation or long-term interest rate and profitability.

Recently, Demirguc-Kunt and Huizinga (2000) and Bikker and Hu (2002) attempted to identify possible cyclical movements in bank profitability—the extent to which bank profits are correlated with the business cycle. Their findings suggest that such correlation exists, although the variables used were not direct measures of the business cycle. Overall, but the effect of the macroeconomic environment is not adequately dealt with. The time dimension of the panels used in empirical studies is usually too small to capture the effect of control variables related to the macroeconomic environment (in particular the business cycle variable). Finally, sometimes there is an overlap between variables in the sense that some of them essentially proxy the same profitability determinant. It follows that studies concerning the profitability analysis of the banking sector should address the above issues more satisfactorily, in order to allow a better insight into the factors affecting profitability.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter details the research methodology used in this study. The sections presented include research design, population and sample descriptions, data collection and data analysis.

### **3.2 Research Design**

Research design in this study is a causal study design which involves an investigation of what causes the other among different variables (Chandran, 2004) this study adopted both descriptive and explanatory designs. Causality in this study was most preferred because the study attempted to investigate what effect financial deepening has in profitability of commercial banks in Kenya. First the study described the trend in both financial deepening and profitability of banks. Secondly, an explanatory approach to explain whether financial deepening has any effect on profitability and carefully test causal research objective of the study.

The independent variable is the presumed cause, and the dependent variable is the potential effect. In the context of this study, profitability of commercial banks is the dependent variable while proxy measures of financial deepening form independent variables. The design involved philosophical assumptions that guide the economic direction of the collection and analysis of microeconomic data and quantitative approach in research (Creswell and Plano, 2007). This gave insight into complex economic phenomena by producing findings that elucidate the correlation complexity of variables used in the study

### **3.3 Target Population**

The study considered a set of Commercial banks during a period of financial reforms that enhanced financial depth, examining whether financial deepening affects banking profitability.

The population of the study comprised all the commercial banks in Kenya. The study used time series econometric data hence there was no need to sample

### **3.4 Data Collection**

The study used secondary data covering the period 2003 to 2011. This was an era of development of financial institutions and financial liberalization in Kenya. Data was collected from Central Bank of Kenya, websites of licensed Commercial banks in Kenya, Kenyan Capital Markets Authority, Kenya National Bureau of Statistics and Nairobi Securities Exchange. All the variables on financial deepening and bank profitability of interest namely; advances of commercial banks to private sector, money supply (M3), domestic financial savings, normal interest rates and profitability of banks were obtained using a data collection guide. With the use of data collection guide, the researcher extracted the secondary data that were relevant to the study.

### **3.5 Data Analysis**

The study used both the descriptive and inferential statistics in analyzing the data. Regression analysis was used to test the relationship between the variables. First, data collected was cleaned, sorted and collated. The data was then entered into the computer and analysis was done. Using frequency distribution tables and line charts, descriptive statistics for each variable were then calculated and tabulated. To test the relationship between the variables, inferential tests including the Pearson product-moment correlation coefficient and regression analysis were used. The correlation coefficient determined the strength of linear association between the variables. Correlation is always between -1.0 and +1.0. If the correlation is positive, then the variables have a positive correlation; if correlation is negative, then there is a negative relationship and if correlation value is 0, then, there is no relationship. To measure the effect of financial deepening on profitability of commercial banks the researcher used regression analysis specified as follows,

$$Y_{i,t} = \alpha_i D_i + \alpha_i G_i + \alpha_i S_i + \varepsilon \quad \text{Where, } i=1,2,3,\dots$$

In this specification,  $Y$  is the dependent variable which measured banking profitability change; while the independent variables  $D$ ,  $G$ ,  $S$ , measured the degree of financial deepening such that;  $D$  measured credit to the private sector in terms of GDP,  $G$  measured money supply,  $S$  measured gross domestic savings;  $a_i$  are the slope coefficients whose sign depicted the relationship between the dependent variable and the independent variable and  $\varepsilon$  is the disturbance term which measured the goodness of fit by capturing the effects of all other independent variables not included in the model. A positive relationship between the banking profitability change and financial deepening was established. Greater financial deepening could be increasing the productivity level in the banking sector through increasing returns because of more lending activities.

Analysis was done with the help of EViews (Econometric Views) Version 6. This is a computer programme used to analyze data and it was preferred because it is used for time series oriented econometric analysis.

## CHAPTER FOUR: EMPIRICAL FINDINGS AND DISCUSSION OF RESULTS

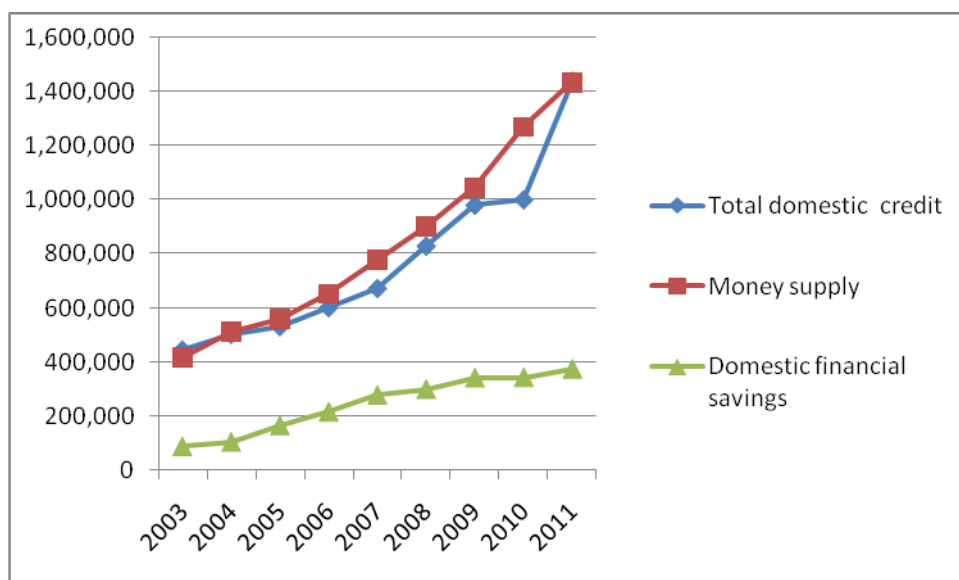
### 4.1 Introductions

This chapter presents analysis of the empirical results of the study. We start with the graphical presentations of variables used; thereafter we look at the correlation matrix and conclude with the regression results.

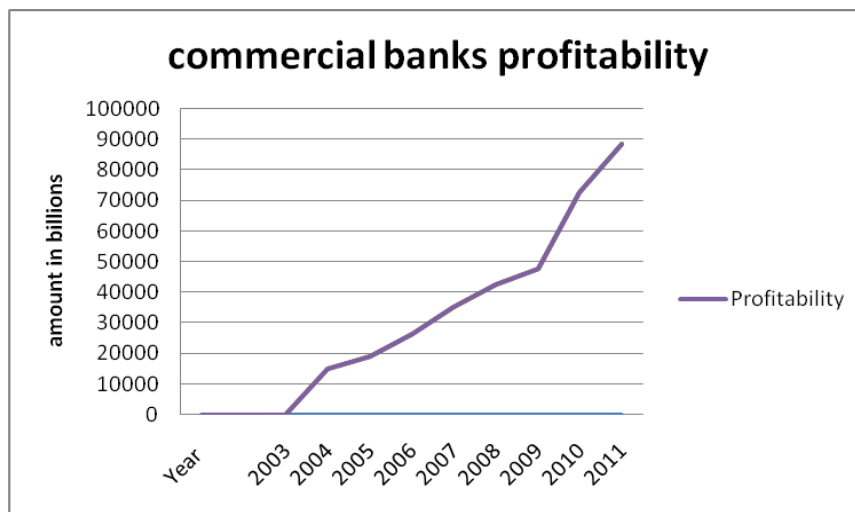
### 4.2 Graphical Presentation of Variables Used

The independent variables used in the study were; total domestic credit, Money supply and Domestic financial savings. According to figure 4.1, domestic savings rose steadily over the years, while the rise of total domestic credit and money supply was steady from the year 2003 to 2007 and rose sharply from the year 2008 to 2011 this was attributed to financial sector reforms aimed at enhancing financial inclusion.

**Figure 4.1: Graphical Representation of Financial Deepening Measures**



**Figure 4.2: Graphical Representation of Commercial Banks Profitability**



### 4.3 Correlation Analysis

Correlation matrix helps in testing the relationship between the explanatory variable so that the strength of the variables can be determined, to help explain which variable best explain the relationship between profitability and measures of financial deepening. Correlation matrix helped the researcher determine which variable was not strong enough in the model so that only the strong variables were picked for the model

**Table 4.1 Correlation Matrix at Levels**

	Profitability	Money Supply	Total Domestic Credit	Domestic savings
Profitability	1			
Total Domestic Credit	0.603	1		
Money Supply	0.725	0.485	1	
Domestic savings	0.839	0.251	0.049	1

The table above shows that there is a positive relationship between profitability of commercial banks and financial deepening measures in terms of total domestic credit, money supply domestic financial savings. The correlation coefficients were 0.603, 0.725 and 0.839 respectively indicating strong relationship between the variables.



#### **4.4 Regression Analysis**

After performing a regression analysis, the study found out that all the coefficients of explanatory variables are statistically significant implying that all the measures of financial deepening affect commercial banks profitability positively. The regression performed indicated a goodness of fit with adjusted  $R^2$  of 65% implying that 65% of deviations of regression from the actual fit are explained by the explanatory variables, while the residuals only explain 35%.

The positive effect of financial deepening on profitability is such that, a 1% increase in domestic credit leads to 0.134% growth in profitability of commercial banks; , a 1% increase in money supply leads to 0.466% growth in profitability of commercial banks and , a 1% increase in domestic financial savings leads to 0.142% growth in profitability of commercial banks

## **CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Introduction**

This chapter presents the discussions from the data findings analyzed and presented in chapter four. The chapter is structured into a summary, conclusions, recommendations and areas for further research.

### **5.2 Summary**

Descriptive statistics were computed for both metrics measuring profitability and that measuring financial deepening. Our results reveal an unambiguously positive and statistically significant relationship, suggesting that financial deepening is an important determinant of banking profitability increases. Overall these results appear to suggest that as a result of the financial reforms, there has been a significant improvement in financial sector performance

Table 4.1 provides a summary of the effects of financial deepening on profitability of commercial banks in Kenya. In general, the signs of the coefficients of financial deepening obtained were positive and statistically significant. Using money supply as indicator of financial deepening in the profitability model, the coefficient obtained was positive indicating that increase in money supply has a significant positive influence in bank profitability. Similar results were also found when other measures of financial deepening such as domestic credit to private sector and domestic financial savings were computed in the profitability model. This as was found out, has the implication that financial deepening has contributed to the growth of commercial banks in terms of profitability.

The study also revealed that all the financial deepening measures considered in this study rose steadily from 2003 to 2011. Similarly, bank profitability also rose steadily from KSHS 14.123 billion in 2003 to KSHS. 88.478 billion In 2011. The correlation co-efficient were 0.603 for total domestic credit; 0.725for money supply and 0.839 for domestic financial savings. From the data

presented, commercial banks with large number of branches had the highest profits over the years this enhanced financial deepening resulted to the growth in their profitability. The result further suggest that liberalizing banking industry to eliminate financial repression and development of better financial market promotes growth in the banking industry

### **5.3 Conclusions**

The results of this paper present a strong argument towards increasing financial deepening as an important stimulator of greater banking productivity. While the country still exhibits relatively low levels of financial deepening, the latter displays an increasing trend in recent years. The result indicates that the financial reforms undertaken in the last two decades have yielded desired results of improving efficiency in the banking sector. Therefore, an expansion of credit to the private sector may be an important determinant of further banking profitability increases in the future.

### **5.4 Recommendations**

From the foregoing, it is evident that there is need to sustain a higher level of financial deepening in Kenya. Incidences of non-performing loans should be minimized and private sector credits channeled to the real sector of the economy. Moreover, policy oriented measures should take into consideration the positive causality between financial deepening and bank profitability and try to increase the level of credit to the private sector as a stimulant of economic growth

### **5.5 Limitations to the study**

First, availability of relevant and timely data in Kenya was a source of limitation to this study since different sources give distorted data for the same variable. Therefore, to maintain consistency, the study relied on data published by the government press through Kenya National Bureau of Statistics and the Central Bank of Kenya

Secondly, the study used time series data and therefore is limited to the extent of limitations of time series data. Moreover, the study only focused on commercial bank industry while there are other industries such as insurance and capital markets in the financial sector

### **5.6 Area for Further Research**

This study only focused on the effect of financial deepening on profitability of banks, while reverse causality between the two variables was not considered. A more detailed study on reverse causality should therefore be considered.

## REFERENCES

- Aizenman, J. 2005. Financial liberalizations in Latin America in the 1990s: a reassessment. *The World Economy* 28, no. 7: 959–83.
- Arellano, M. and S. Bond. 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies* 58, no. 2: 277–97.
- Arellano, M., and O. Bover. 1995. Another look at the instrumental-variable estimation of error component models. *Journal of Econometrics* 68, no. 1: 29–52.
- Arestis, P., G. Chortareas, and E. Desli. 2006. Financial development and productive efficiency in OECD countries: An exploratory analysis. *The Manchester School* 74, no. 4: 417–40.
- Arestis, P., and P. Demetriades. 1997. Financial development and economic growth: Assessing the evidence. *The Economic Journal* 107, no. 442: 783–99.
- Arestis, P., P. Demetriades, and B. Fattouh. 2003. Financial policies and the aggregate productivity of the capital stock. *Eastern Economic Journal* 29, no. 2: 217–42.
- Barajas, A., Steiner, R., Salazar, N., 1999. Interest spreads in banking in Colombia 1974–1996. *IMF Staff Papers* 46, 196–224.
- Barro, R. 1997. *Determinants of economic growth: A cross-country empirical study*. Cambridge, MA: The MIT Press.
- Beccalli, E., B. Casu, and C. Girardone. 2006. Efficiency and stock performance in European banking. *Journal of Business, Finance, and Accounting* 33, nos. 1–2: 245–62.
- Beck, T., and R. Levine. 2002. Industry growth and capital allocation: Does having a market- or bank-based system matter? *Journal of Financial Economics* 58, nos. 1–2: 147–80.
- Beck, T., R. Levine, and N. Loayza. 2000. Finance and the sources of growth. *Journal of Financial Economics* 58, nos. 1–2: 261–310.
- Bencivenga, V., and B. Smith. 1991. Financial intermediation and endogenous growth. *Review of Economic Studies* 58, no. 2: 195–209.

- Benhabib, J., and M. Spiegel. 1994. The role of human capital in economic development: Evidence from aggregate cross-country data. *Journal of Monetary Economics* 34, no. 2: 143–74.
- Berger, A.N., Hanweck, G.A., Humphrey, D.B., 1987. Competitive viability in banking: scale, scope and product mix economies. *Journal of Monetary Economics* 20, 501–520.
- Bikker, J.A., Hu, H., 2002. Cyclical patterns in profits, provisioning and lending of banks and procyclicality of the new Basel capital requirements. *BNL Quarterly Review* 221, 143–175.
- Blundell, R., and S.R. Bond. 1998. Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics* 87, no. 1: 115–43.
- Boyd, J., and E. Prescott. 1986. Financial intermediary-coalitions. *Journal of Economic Theory* 38, no. 2: 211–32.
- Demirguc-Kunt, A., Huizinga, H., 2000. Financial structure and bank profitability. Policy Research Working Paper Series 2430. The World Bank.
- Diamond, D.W. 1984. Financial intermediation and delegated monitoring. *Review of Economic Studies* 51, no. 3: 393–414.
- Felix, Ndege. 2012. The impact of financial sector deepening on economic growth in Kenya. University of Nairobi.
- Fisman, R., and I. Love. 2003. Trade Credit, financial intermediary development, and industry growth. *Journal of Finance* 58, no. 1: 353–74.
- Georgios E. Chortareas, Jess G. Garza-Garca & Claudia Girardone (2011) Financial deepening and bank productivity in Latin America, *The European Journal of Finance*, 17:9-10, 811-827, DOI:10.1080/1351847X.2010.538512
- Goddard et al., 2004. The profitability of European banks: a cross-sectional and dynamic panel analysis. *Manchester School* 72, 363–381.
- Goldsmith, R. 1969. *Financial structure and development*. New Haven, CT: Yale University Press.

- Greenwood, J., and B. Jovanovic. 1990. Financial development, growth, and the distribution of income. *Journal of Political Economy* 98, no. 5: 1076–107.
- Guillaumont Jeanneney, S., P. Hua, and Z. Liang. 2006. Financial development, economic efficiency, and productivity growth: Evidence from China. *The Developing Economies* 44, no. 1: 27–52.
- Hartmann, P., F. Heider, E. Papaioannou, and M.L. Duca. 2007. The role of financial markets and innovation in productivity and growth in Europe. ECB Occasional Paper Series 72, European Central Bank, Bonn, Germany.
- Herrero, A., J. Santillan, S. Gallego, L. CuaDomestic financiero, and C. Egea. 2002. Latin American financial development in perspective. *Banco de Espana*, Document 0216.
- Hsieh, C., and P. Klenow. 2007. Misallocation and manufacturing TFP in China and India. NBER Working Paper 13290, National Bureau of Economic Research, Cambridge, USA.
- King, R., and R. Levine. 1993a. Finance and growth: Schumpeter might be right. *Quarterly Journal of Economics* 108, no. 3: 717–37.
- King, R., and R. Levine. 1993b. Financial intermediation and economic development. In *Financial intermediation in the construction of Europe*, eds. C. Mayer and X. Vives, 156–89. London: CEPR.
- King, R., and R. Levine. 1993c. Finance, entrepreneurship and growth: Theory and evidence. *Journal of Monetary Economics* 32, no. 3: 717–37.
- Kularante, Chandana. The impact of financial deepening on long-run economic growth.
- Levine, R. 1997. Financial development and economic growth: View and agenda. *Journal of Economic Literature* 35, no. 2: 688–726.
- Levine, R. 1998. The legal environment, banks, and long-run economic growth. *Journal of Money, Credit and Banking* 30, no. 3: 596–613.
- Levine, R. 2004. Finance and growth: Theory and evidence. NBER Working Paper Series 10766, National Bureau of Economic Research, Cambridge, MA.

- Levine, R., N. Loayza, and T. Beck. 2000. Financial intermediation and growth: Causality and causes. *Journal of Monetary Economics* 46, no. 1: 31–77.
- Lozano-Vivas, A. and J.T. Pastor. 2006. Banking and economic activity performance: An empirical study at the country level. *The Manchester School* 74, no. 4: 469–82.
- Malmquist, S. 1953. Index numbers and indifference surfaces. *Trabajos de Estadística* 4, no. 1: 209–42.
- McKinnon, R. 1973. *Money and capital in economic development*. Washington, DC: Brookings Institution.
- Merton, R.C. and Z. Bodie. 1995. A conceptual framework for analyzing the financial environment. In *The global financial system: A functional perspective*, chap. 1, ed. D.B. Crane, K.A. Froot, S.P. Mason, A. Perold, R.C. Merton, Z. Bodie, E.R. Sirri, and P. Tufano, 3–31. Boston: Harvard Business School Press.
- Miller, S.M., Noulas, A.G., 1997. Portfolio mix and large-bank profitability in the USA. *Applied Economics* 29, 505–512.
- Molyneux, P., Thornton, J., 1992. Determinants of European bank profitability: a note. *Journal of Banking and Finance* 16, 1173–1178.
- Nicholas M. Odhiambo, 2005. Financial Liberalisation and Financial Deepening: Evidence from three sub-Saharan African (SSA) countries. *African review of money finance and banking*, (2005), pp. 5-23
- Pagano, M. 1993. Financial markets and growth: An overview. *European Economic Review* 32, nos. 2–3: 613–22.
- Panayiotis P. Athanasoglou et al, 2006. Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *International Financial Markets, Institutes and Money* 18 (2008) 121–136
- Perry, P., 1992. Do banks gain or lose from inflation? *Journal of Retail Banking* 14, 25–30.
- Revell, J., 1979. Inflation and financial institutions. *Financial Times*, London.



- Restuccia, D., and R. Rogerson. 2007. Policy distortions and aggregate productivity with heterogenous plants. NBER Working Papers 13018, National Bureau of Economic Research, Cambridge, USA.
- Rioja, F., and N. Valev. 2004. Finance and the sources of growth at various stages of economic development. *Economic Enquiry* 42, no. 1: 127–40.
- Rose W. N. and J. W. Kabubo. 1998. Financial sector reforms and interest rate liberization: the Kenyan experience. University of Nairobi.
- Samuel Mbadike Nzotta & Emeka .J. Okereke Financial deepening and economic development of Nigeria: An empirical investigation. *African Journal of Accounting, Economics, Finance and Banking Research* Vol. 5. No. 5.
- Schumpeter, J. 1934. *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*. Cambridge, MA: Harvard University Press.
- Shaw, E. 1973. *Financial deepening in economic development*. New York: Oxford University Press.
- Shephard, R.W. 1970. *Theory of cost and production functions*. Princeton: Princeton University Press.
- Simar, L., and P.W. Wilson. 1998. Sensitivity analysis of efficiency scores: How to bootstrap in nonparametric frontier models. *Management Science* 44, no. 1: 49–61.
- Simar, L., and P.W. Wilson. 1999. Estimating and bootstrapping Malmquist indices. *European Journal of Operational Research* 115, no. 3: 459–71.
- Simar, L., and P.W. Wilson. 2000. Statistical inference in nonparametric frontier models: The state of the art. *Journal of Productivity Analysis* 13, no. 1: 49–78.
- Short, B.K., 1979. The relation between commercial bank profit rates and banking concentration in Canada, Western Europe and Japan. *Journal of Banking and Finance* 3, 209–219.
- Smith, P. 1997. Model misspecification in data envelopment analysis. *Annals of Operations Research* 72, no. 1: 233–52.

Stiglitz, J.E., and B. Greenwald. 2003. *Towards a newparadigm in monetary economics*.  
Cambridge: Cambridge University Press.

Tortosa-Ausina, E., E. Grifell-Tatje, C. Armero, and D. Conesa. 2008. Sensitivity analysis of efficiency and Malmquist productivity indices: An application to Spanish savings banks. *European Journal of Operational Research* 184, no. 3: 1062–84.

## APPENDICES

### Appendix: Secondary Data used

Year	No of Banks	Profitability (billions)	Average profit (billions)	Profitability Growth rate (%)	Total domestic credit Kshs. (million)	Money supply (M3) Kshs. (million)	Domestic financial savings Kshs. (millions)
2003	43	13.395	0.31151	125.34	443,157	415,172	87,631
2004	44	14,948	0.33973	5.84	501,160	511,425	104,203
2005	41	18,972	0.46273	26.92	529,710	558,164	164,795
2006	41	26,375	0.64329	39.02	600,017	653,036	215,310
2007	41	35,091	0.85588	33.05	670,771	777,596	277,186
2008	43	42,633	1.01507	21.49	827,413	901,055	298,899
2009	43	47,557	1.13231	11.55	978,319	1,045,657	341,253
2010	43	72,712	1.73124	52.89	998,456	1,271,638	342,567
2011	43	88,478	2.10662	21.68	1,437,255	1,436,877	373,615

## Appendix 2: List of Commercial Banks in Kenya

1	KCB:
2	Barclays
3	Cooperative
4	Standard Chartered
5	Equity
6	CFC Stanbic
7	Commercial Bank of Africa
8	Citibank
9	National Bank of Kenya
10	Diamond Trust
11	NIC
12	Prime Bank
13	Baroda
14	Ecobank
15	Bank of Africa
16	Chase
17	Family Bank
18	bank of India
19	Imperial
20	Fina Bank
21	Development Bank of Kenya
22	Consolidated
23	Equatorial
24	ABC
25	Giro
26	Gulf African
27	Fidelity
28	Habib AG Zurich
29	Guardian
30	K-Rep
31	First Community Bank
32	Victoria
33	Habib Bank
34	Transnational
35	Oriental
36	Credit
37	Paramount
38	Middle East
39	UBA
40	Dubai Bank
41	Jamii Bora: