EFFECTS OF MERGERS AND ACQUISITIONS ON COST AND SCALE EFFICIENCY OF THE COMBINED COMMERCIAL BANKS IN KENYA

BY

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Declaration

This research project report is my original work and has never been presented for a degree in any other university.

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This research project report has been submitted for examination with our approval as the University Supervisors.

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Dedication

I dedicate this research report to my dear wife and family, my employer, and colleagues at Standard Chartered Bank Limited for being supportive throughout my studies.

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Abstract

The broad objective of the study was to determine the effect of mergers and acquisitions on the scale and cost efficiency of the combined commercial banks in Kenya. The study hypothesized that the combined firms should demonstrate improved efficiency after conclusion of the merger, take over, or stock swap. This hypothesis was based on the argument that the newly formed firm (post-merger) is highly capitalized and brings together a pool of technically equipped workforce, besides the infrastructure. In achieving the above objective, the study applied secondary data obtained from the audited financial statements of the commercial banks for the period 1994-2009. Data were obtained from the Banks Supervision Department at the Central Bank of Kenya. In order to measure the cost and profit efficiency of the listed banks, the study employed the Data Envelopment Analysis (DEA) technique.

The key findings of the study are as follows. First, the findings indicated that firm which engaged in take-over of subsidiaries had no significant changes in levels of their cost efficiency after mergers. However, some of the firms that merged with other banking institutions demonstrated significant declines in their cost efficiency that would most likely be attributable factors such as overstaffing due to the combined workforce, the long learning curve of management on how to best use technology to reduce costs, and increase operational costs occasioned by the integration of operations from the two previously independent institutions. Secondly, it emerged that a decline (or no change) in CE does not necessarily translate to profit efficiency for the combined bank. This is because the staff who are responsible for bringing new business are not able to generate revenues to offset their expenses which are fixed and this affects both the cost efficiency and profit efficiency. Thirdly, the findings showed that after the mergers and takeovers, the combined commercial banks continued to realize profits against declining cost efficiency and relatively low profit efficiency because they are key players in lending to the government through the low risk treasury bonds and bills, from which they realize good returns

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List of Abbreviations and Acronyms

Cap	-	Chapter
CBK	-	Central Bank of Kenya
CRS	-	Constant Returns to Scale
DEA	-	Data Envelopment Analysis
M&A	-	Mergers and Acquisitions
NBFIs	-	Non-Bank Financial Institutions
ROCE	-	Return on Capital Employed
VRS	-	Variable Return to Scale

CHAPTER ONE

1.0. INTRODUCTION

1.1. Background to the Study

Mergers and Acquisitions (M&A) is a general term used to refer to the consolidation of companies. A merger is a combination of two companies to form a new company, while an acquisition is the purchase of one company by another with no new company being formed (Cartwright and Schoenberg, 2006). A merger occurs when one firm assumes all the assets and all the liabilities of another. The combined firm retains its identity, while the acquired firm ceases to exist. A majority vote of shareholders is generally required to approve a merger. A merger is just one type of acquisition. One company can acquire another in several other ways, including purchasing some or all of the company's assets or buying up its outstanding shares of stock (DePamphilis, 2008).

The dominant rationale used to explain M&A activity is that combined firms seek improved financial performance. The following motives are considered to improve financial performance: Synergy: This refers to the fact that the combined company can often reduce its fixed costs by removing duplicate departments or operations, lowering the costs of the company relative to the same revenue stream, thus increasing profit margins. Increased revenue or market share: This assumes that the buyer will be absorbing a major competitor and thus increase its market power (by capturing increased market share) to set prices. Cross-selling: For example, a bank buying a stock broker could then sell its banking products to the stock broker's customers, while the broker can sign up the bank's customers for brokerage accounts. Or, a manufacturer can acquire and sell complementary products. Economy of scale: For example, managerial economies such as the increased opportunity of managerial specialization. Another example are purchasing economies due to increased order size and associated bulk-buying discounts. Taxation: A profitable company can buy a loss maker to use the target's loss as their advantage by reducing their tax liability. In many countries, rules are in place to limit the

ability of profitable companies to "shop" for loss making companies, limiting the tax motive of an combined company (Barney, 1991; Carney, 2000).

Other motives include: Geographical or other diversification: This is designed to smooth the earnings results of a company, which over the long term smoothes the stock price of a company, giving conservative investors more confidence in investing in the company. However, this does not always deliver value to shareholders. Resource transfer: resources are unevenly distributed across firms and the interaction of target and combined firm resources can create value through either overcoming information asymmetry or by combining scarce resources (King, Slotegraaf, and Kesner, 2008). Vertical integration: Vertical integration occurs when an upstream and downstream firm merges (or one acquires the other). There are several reasons for this to occur. One reason is to internalize an externality problem. A common example is of such an externality is double marginalization. Double marginalization occurs when both the upstream and downstream firms have monopoly power; each firm reduces output from the competitive level to the monopoly level, creating two deadweight losses. By merging the vertically integrated firm can collect one deadweight loss by setting the upstream firm's output to the competitive level. This increases profits and consumer surplus. A merger that creates a vertically integrated firm can be profitable (Maddigan and Zaima, 1985).

In general, mergers and other types of acquisitions are performed in the hopes of realizing an economic gain. For such a transaction to be justified, the two firms involved must be worth more together than they were apart. Some of the potential advantages of mergers and acquisitions include achieving economies of scale, combining complementary resources, garnering tax advantages, and eliminating inefficiencies. Other reasons for considering growth through acquisitions include obtaining proprietary rights to products or services, increasing market power by purchasing competitors, shoring up weaknesses in key business areas, penetrating new geographic regions, or providing managers with new opportunities for career growth and advancement. Since mergers and acquisitions are so complex, however, it can be very difficult to evaluate the transaction.

define the associated costs and benefits, and handle the resulting tax and legal issues (Carney, 2000).

The efficiency of firms has been addressed in literature either in terms of scale and scope or in terms of X-efficiency or both. According to Limam (2001), Scale efficiency addresses the question of whether a firm is operating at the minimum of its long-run average cost curve. On the other hand, scope efficiency is measured by the difference between the cost of joint production and the sum of producing the different outputs individually. Cost efficiency (or X-efficiency) refers to how close a firm's actual costs are to the costs of a best-practice firm producing the same outputs. Cost X-inefficiency may arise because managers use more inputs than would a best practice firm (technical inefficiency) or because they employ an input mix that does not minimize costs for a given input price vector (allocative inefficiency) (Berger, 2000). This study sought to establish the effects of mergers and acquisitions on efficiency of the combined firms in the Kenyan banking industry.

1.1.1. Mergers and Acquisitions In Kenya

The Restrictive Trade Practices, Monopolies and Price Control Act (Cap 504 Laws of Kenya) is the legislative statute that regulates mergers and acquisitions in Kenya. The Act defines a merger as two or more independent business concerns dealing in the same or similar good/services combining to form one business concern. In the case of take-overs, one business acquires and controls 50 percent or more of the ownership of another business entity. Mergers and take-overs in Kenya must be consummated with the prior approval of the Minister. The criteria for determining whether mergers and take-overs are prejudicial to the public interest or not are set out in sections 30(a), (b) and (c) of the Act. The criteria include increased productivity, competitiveness and employment creation potential and/or the enhancement of capital intensive, as opposed to labour intensive technology (Republic of Kenya, 1990).

In Kenya, businesses may combine through mergers whereby the assets of two or more companies become vested in or under the control of one company; this is found under

section 27(1) (a) of the Restrictive Trade Practices, Monopolies and Price Control Act. Further, businesses may combine through a takeover of one or more enterprises by another enterprise: this is found under section 27(1) (b) of the Restrictive Trade Practices, Monopolies and Price Control Act. The main laws governing business combinations are: Cap 504 Laws of Kenya (Restrictive Trade Practices, Monopolies and Price Control Act) – an act of parliament that encourages competition in the economy by prohibiting restrictive trade practices, controlling monopolies, concentration of economic power and prices and connected purposes; Cap 485A (Capital Market Authority Act) and the Capital Markets (Take-overs and Mergers) Regulations 2002 that set out rules governing takeovers and mergers in Kenya; Cap 486 Laws of Kenya (The Companies Act) that relates to the incorporation, regulation and winding-up of companies and other associations; Cap 491 Laws of Kenya (Central Bank of Kenya Act) that governs and regulates the banking sector. It is applicable to mergers and takeovers involving financial companies; and Cap 487 Laws of Kenya (The Insurance Act). It is applicable in mergers and takeovers involving insurance.

The transaction agreements for listed companies are generally governed by Cap 485A (the Capital Markets Authority Act) and the Capital Markets (Take-Overs and Mergers) Regulations which are made under the Act. These regulations prescribe the procedure to be followed in the transactions as well as setting out the timelines within which they must be done. Regulation 4 of the Capital Markets (Take-Overs and Mergers) Regulations 2002 provides that a company which intends to acquire or acquires effective control in a listed company shall not later than 24 hours from the resolution of its board to effective control in the company or not later than 24 hours prior to making a decision to acquire effective control in the company announce the proposed offer by press notice and serve a notice of intention, in writing of the takeover scheme to the: proposed offeree at its registered office; securities exchange at which the offeree's voting shares are listed; Capital Markets Authority; the Commissioner of Monopolies and Prices appointed under the Restrictive Trade Practices, Monopolies and Price Control Act, where the offeror is engaged in the same business as the offeree.

Since the late 1990s there have been increasing numbers of M&As in the Kenyan economy. For example in 1999 there were 24 M&A cases compared to 23 in 1998 and 11 in 1997. The Commission attributed this increase to both the poor state of the economy at the time which "...forced firms to combine resources in order to improve their survival rate" and "Increased awareness of the legal provisions of Cap 504 on the part of the business community" (Republic of Kenya, 1999). In the case of commercial banks, the Central Bank of Kenya's requirement for banks to increase their minimum capital base to Kshs 200 million before the end of 1999 and KShs. 500 million before the end of 2002 certainly played a big role in the flurry of merger applications to the Commission. In line with the outcome elsewhere, almost all the cases were approved. In the recent past, several listed firms have merged with, acquired other private firms, or performed stock swaps. A stock swap is a business taker over in which the combined company uses its own stock to pay for the acquired company. This study sought to establish whether or not such actions accrue any significant benefits in regard to efficiency of the combined firms.

1.1.2. Mergers and Acquisitions in the Kenyan Banking Industry

After the liberalization of the banking sector and exchange controls lifted in 1995, the non-bank financial institutions (NBFIs) had exhibited an ability to compete with commercial banks, particularly because of the less restrictive regulatory framework within which they operated. On paper, NBFIs operated as merchant or investment banks. In practice, they operated as commercial banks, taking deposits and making short-term loans. In June 1994, the Central Bank instructed NBFIs to convert and operate as commercial banks. As a result, 18 NBFIS became commercial banks and 7 merged with parent commercial banks. Kenya, already a regional leader, is expected to develop one of the largest commercial banking industries in Africa. Despite the existence of a relatively developed and sophisticated financial system, Kenya's capital market is still in its infancy.

In the recent years, according to Central Bank of Kenya (2005), a number of mergers and acquisitions have taken place in the banking sector in Kenya. Some mergers have been occasioned by the need to meet the increasing minimum core capital requirements and to

enhance the institution's market share in the local banking environment. Between 1994 and 2008 there were 25 successful mergers. A full list of successful mergers is appended to this proposal (See Appendix II). It has been noted however, that in spite of the efforts made by the Central Bank to encourage mergers, the rate of mergers has not been as high as expected. This has been attributed to the inability of individual institutions to get to the negotiating table and integrate their diverse business philosophies and corporate cultures. The Central bank notes that the convergence has been made difficult by the nature of ownership of banks in Kenya where shareholding is mainly family or community based.

1.2. Problem Statement

A number of studies were done in developed capital markets of Europe, Australia, and the USA, on evaluation of corporate financial performance following mergers. Lubatkin (1983) reviewed the findings of studies that have investigated either directly or indirectly the question, "Do mergers provide real benefits to the combined firm?" The review suggested that combined firms might benefit from merging because of technical, pecuniary and diversification synergies. Healy, Palepu, and Ruback (1992) examined post-acquisition performance for 50 largest U.S. mergers between 1979 and 1984 by measuring cash flow performance, and concluded that operating performance of merging firms improved significantly following acquisitions, when compared to their respective industries. Ghosh (2001) examined the question of whether operating cash flow performance improves following corporate acquisitions, using a design that accounted for superior pre-acquisition performance, and found that merging firms did not show evidence of improvements in the operating performance following acquisitions

Empirical studies conducted in Kenya (Chesang, 2002; Katuu, 2003; Yash pal Bansal, 2005; Muya, 2006; Kiplagat, 2006; Wesonga, 2006; Nyagah, 2007; Njoroge, 2007; and Kithinji, 2007) have all failed to show the effects of mergers and acquisitions on efficiency of either listed or non-listed firms. The study by Chesang (2002) had sought to determine the relationship between merger restructuring and financial performance of commercial banks in Kenya. A year later, Katuu (2003) conducted a survey to determine factors considered important in merger & acquisition decisions by selected Kenyan based

firms The study by Yash pal Bansal (2005) focused on the process and challenges in the merger between Apollo & Pan Africa General insurance companies. Muya (2006) conducted an overall survey of experiences of mergers in Kenya In the same year Kiplagat (2006) sought to determine the effects of mergers on financial performance of companies listed at the NSE. The study by Wesonga (2006) was a survey of the factors that determine the choice of mergers & acquisition partners in Kenya. In 2007, nyagah sought to establish doctor's perception of mergers & acquisitions in the pharmaceutical industry in Kenya. In the same year, Njoroge (2007) conducted a survey of mergers & acquisitions experiences by commercial banks in Kenya. Finally, Kithinji (2007) had sought to determine the effects of mergers on financial performance of non listed banks in Kenya.

Given the gaps poised by the above empirical studies, this study poses the research question: "Do mergers & acquisitions improve the technical and cost efficiency of the combined firms?" The study hypothesized that the combined firms should demonstrate improved efficiency after conclusion of the merger, take over, or stock swap. This hypothesis is based on the argument that the newly formed firm (post-merger) is highly capitalized and brings together a pool of technically equipped workforce, besides the infrastructure. To answer the above question, the study measured the operating efficiency of each distribution utility over a period of time that brackets any merger or acquisition The efficient-merger hypothesis implies that the target firm's pre-merger efficiency should be below the norm established by non-merging firms (and certainly below the combined firm's efficiency level), but that post-merger, the combined firm should show improved efficiency. The buying firm should have pre-merger efficiency above the norm, as it seeks to exploit its superiority through merger or acquisition involving a relatively poor performing firm.

1.3. Objective of the Study

The broad objective of the study was to determine the effect of mergers and acquisitions on efficiency of the combined commercial banks in Kenya.

The study further sought to achieve the following specific objectives:

i). To determine the effect of mergers and acquisitions on cost efficiency of the combined firms

ii). To determine the effect of mergers and acquisitions on scale efficiency of the combined firms

1.4. Significance of the Study

Investors

The study seeks to inform investors on the rationality of whether or not to approve mergers and acquisitions amongst the listed firms thus ensuring that their interests are still safeguarded even after the acquisition.

Management of combined commercial banks

This study will seek to inform the managers of the combined banks on how the mergers and acquisitions would affect the efficiency of their firms and hence financial performance. This will enable them to lay out appropriate strategies to aid in the management of the firm post-merger given that features such as technology and personnel are usually imported to the combined firm.

The policy makers

The findings of the study will be useful to the Government, through the Central Bank of Kenya, the Capital Markets Authority, the Nairobi Stock Exchange, and the Monopolies and Price Commission in regard to formulation of guidelines towards the approval of mergers and acquisitions amongst the listed firms.

Researchers and Academicians

The study forms a basis for future researchers and academicians who may be conducting research on mergers, acquisitions, and takeovers on Kenyan firms

CHAPTER TWO

2.0. LITERATURE REVIEW

2.1. Introduction

There have been numerous studies on mergers and acquisitions abroad, in the last four decades, and several theories have been proposed and tested for empirical validation. Researchers have studied the economic impact of mergers and acquisitions on industry consolidation, returns to shareholders following mergers and acquisitions, and the post-merger performance of companies. Whether or not a merged company achieves the expected performance is the critical question that has been examined by most researchers. Several measures have been postulated for analyzing the success of mergers. Such measures have included both short term and long-term impacts of merger announcements, effects on shareholder returns of aborted mergers hostile takeover attempts and open offers (Mantravadi and Reddy, 2008).

This chapter presents a review of the related literature on efficiency and M & As in the banking industry. The chapter is organized as follows: Section 2.2 provides a theoretical basis for the study; Section 2.3 is a brief review on sources and indicators of commercial banks' performance; Section 2.4 focuses on measuring efficiency in banking; section 2.5 is a review on the post merger characteristics of the combined firms; and Section 2.6 is the chapter summary.

2.2. Theoretical Basis of Mergers and Acquisitions

2.2.1. The Value-Increasing Theories

According to the value increasing school, mergers occur, broadly, because mergers generate 'synergies' between the acquirer and the target, and synergies, in turn, increases the value of the firm (Hitt et al., 2001). Value-increasing theories of mergers and acquisitions include the following: the theory of efficiency, the market power theory, and the theory of corporate control.

The *theory of efficiency* suggests, in fact, that mergers will only occur when they are expected to generate enough realizable synergies to make the deal beneficial to both parties; it is the symmetric expectations of gains which results in a 'friendly' merger being proposed and accepted. If the gain in value to the target was not positive, it is suggested, the target firm's owners would not sell or submit to the acquisition, and if the gains were negative to the bidders' owners, the bidder would not complete the deal. Hence, if we observe a merger deal, efficiency theory predicts value creation with positive returns to both the acquirer and the target. Banerjee and Eckard (1998) and Klein (2001) evidenced this suggestion. Following Chatterjee (1986), we must, however, distinguish between 'operative synergies' – or 'efficiency gains' achieved through economies of scale and scope – and 'allocative synergies' – or 'collusive synergies' resultant from increased market power and an improved ability to extract consumer surplus – when commenting on value creation in mergers and acquisitions. Most of the more recent literature concludes that operating synergies are the more significant source of gain (Devos et al., 2008; Houston et al., 2001; Mukherjee et al., 2004), although it does also suggest that market power theory remains a valid merger motive. Mukherjee et al. (2004) found that 90% of managers identify operative motives as a reason to merge, and Devos et al. (2008) suggested that, of a total 10.3% synergy gain, some 8.3% arise through operative synergies.

According to *market power theory*, increased 'allocative' synergies is said to offer the firm positive and significant private benefits (Feinberg, 1985) because, *ceteris paribus*, firms with greater market power charge higher prices and earn greater margins through the appropriation of consumer surplus. Indeed, a number of studies find increased profits and decreased sales after many mergers (Prager, 1992; Chatterjee, 1986; Kim and Singal, 1993; Sapienza, 2002; Cefis et al., 2008) - a finding which has been interpreted by many as evidence of increasing market power and allocative synergy gains (Gugler et al., 2003). From a dynamic point of view too, market power is said to allow for the deterrence of potential future entrants (Motta, 2004; Gugler et al., 2003), which can again afford the firm a significant premium, and so offer another long-term source of gain. Few bidders, of course, openly announce the goal of increased market power as an explicit

merger motivation, but the fact that horizontal mergers – that is, mergers between competitors – dominate the M&A industry (Gugler et al., 2003) is surely indicative of just how popular it is as a merger motive.

In an efficient merger market the *theory of corporate control* provides a third justification, beyond simply synergistic gains, for why mergers must create value. It suggests that there is always another firm or management team willing to acquire an underperforming firm, to remove those managers who have failed to capitalize on the opportunities to create synergies, and thus to improve the performance of its assets (Weston et al., 2004). Managers who offer the highest value to the owners, it suggests, will take over the right to manage the firm until they themselves are replaced by another team that discovers an even higher value for its assets. Hence, inefficient managers will supply the 'market for corporate control' (Manne, 1965), and managers that do not maximize profits will not survive, even if the competitive forces on their product and input markets fails to eliminate them. 'Hostile' takeovers should, as a result, be observed amongst poorly performing firms, and amongst those whose internal corporate governance mechanisms have failed to discipline their managers. Once again the empirical evidence again seems to support this conclusion (Hasbrouck, 1985; Palepu, 1986).

From the bidder's perspective, the theory of corporate control is partially based on efficiency theory, although there are two important differences. First, it does not assume, *per se*, the existence of synergies between the corporate assets of both firms, but rather between the bidder's managerial capabilities and the targets assets. Hence, corporate control predicts managerial efficiencies from the re-allocation of under-utilized assets. Second, it implies that the target's management team is likely to resist takeover attempts, as the team itself and its managerial inefficiency is the main obstacle to an improved utilization of assets. Typical bidders are either private investors – or 'corporate raiders' – who bring in more competent management teams, or more efficient firms, as measured by Tobin's Q, with better growth prospects and superior performance.

2.2.2. The Value-Destroying Theories

The impact of mergers and acquisitions on the performance of the combined firm remains, however, at best, "inconclusive" and, at worst, "systematically detrimental" (Dickerson et al., 1997). Mergers fail to create value, it is suggested – with somewhere between 60 and 80% classified as 'failures' (Puranam and Singh, 1999) – and a number of value destroying theories have been put forward in explanation. Generally speaking, these value-destroying theories can be divided into two groups: the first assumes that the bidder's management is 'boundedly rational', and thus makes mistakes and incurs losses due to informational constraints despite what are generally value-increasing intentions. The second assumes rational but self-serving managers, who maximize a private utility function, which at least fails to positively affect firm value.

Within the first category, the *theory of managerial hubris* (Roll, 1986) suggests that managers may have good intentions in increasing their firm's value but, being over-confident; they over-estimate their abilities to create synergies. Over-confidence increases the probability of overpaying (Hayward and Hambrick, 1997; Malmendier and Tate, 2008), and may leave the winning bidder in the situation of a winner's-curse, which dramatically increases the chances of failure (Dong et al., 2006). The winner's curse is a phenomenon that occurs in common value auctions with incomplete information. If the auctioned item is worth roughly the same to all bidders, the winner is the bidder who makes the highest estimate of its value. If we assume that the average bid is accurate, the winning bidder overpays. Empirically speaking, Berkovitch and Narayanan (1993) found strong evidence of hubris in US takeovers, and Goergen and Renneboog (2004) found the same in a European context. The latter estimated that about one third of the large takeovers in the 1990s suffered from some form of hubris. Malmendier and Tate (2005) showed that overly optimistic managers, who voluntarily retain in-the-money stock options in their own firms, more frequently engage in less profitable diversifying mergers, and Rau and Vermaelen (1998) find that hubris is more likely to be seen amongst low book-to-market ratio firms – that is, amongst the so-called 'glamour firms' – than amongst high book-to-market ratio 'value firms'.

Jensen's (1986) *theory of managerial discretion* claims that it is not over-confidence that drives unproductive acquisitions, but rather the presence of excess liquidity, or free cash flow (FCF). Firms whose internal funds are in excess of the investments required to fund positive net present value projects, it is suggested, are more likely to make quick strategic decisions, and are more likely to engage in large-scale strategic actions with less analysis than their cash-strapped peers. High levels of liquidity increase managerial discretion, making it increasingly possible for managers to choose poor acquisitions when they run out of good ones (Martynova and Renneboog, 2008). Indeed, several empirical studies demonstrate that the abnormal share price reaction to takeover announcements by cash-rich bidders is negative and decreasing in the amount of FCF held by the bidder (Harford, 1999). Moreover, it is suggested that the other stakeholders in the firm will be more likely to give management the benefit of the doubt in such situations, and to approve acquisition plans on the basis of fuzzy and subjective concepts such as managerial 'instincts', 'gut feelings' and 'intuition', based on high past and current cash flows (Rau and Vermaelen, 1998). Thus, like the hubris theory, the theory of FCF suggests that otherwise well-intentioned managers make bad decisions, not out of malice, but simply because the quality of their decisions are less challenged than they would be in the absence of excess liquidity.

Of course, as the degree of managerial discretion increases in FCF, or in high market valuations (as in the case of 'glamour firms' above), or in other proxies, so, too, does the opportunity for self-interested managers to pursue self-serving acquisitions (Jensen, 2005). It is generally agreed that managerial self-interest does play a role in M&A; research has shown that bidder returns are, for example, generally higher when the manager of the combined firm is a large shareholder (Lewellen et al., 1985), and lower when management is not (Lang et al., 1991; Harford 1999). This suggests that managers pay more attention to an acquisition when they themselves are financially concerned. Further, it supports the notion of 'agency cost' and the 'managerial theories' of the firm' (Berle and Means, 1932; Marris, 1963), which broadly suggest that managers pursue self-serving acquisitions, and it is this fact that leads to value-destruction.

The *theory of managerial entrenchment* (Shleifer and Vishny, 1989), for example, claims that unsuccessful mergers occur because managers primarily make investments that minimize the risk of replacement. It suggests that managers pursue projects not in an effort to maximize enterprise value, but in an effort to entrench themselves by increasing their individual value to the firm. Entrenching managers will, accordingly, make manager-specific investments that make it more costly for shareholders to replace them, and value will be reduced because free resources are invested in manager-specific assets rather than in a shareholder value-maximizing alternative. Amihud and Lev (1981) empirically supported this notion, and suggested that managers pursue diversifying mergers in order to decrease earnings volatility which, in turn, enhances corporate survival and protects their positions. Shleifer and Vishny (1991) suggested that during the third merger wave in the US, risk diversification played a large role in M&A policy – as prior to the 1980s managers had insufficient incentive to focus on shareholder concerns – and it has been suggested that the rise of the conglomerate may be an outgrowth of this principle agent problem (Martynova and Renneboog, 2008).

Of course, entrenchment is not only pursued for job security itself, but also because entrenched managers may be able to extract more wealth, power, reputation and fame. While entrenchment theory primarily explains the process of how managers position themselves to achieve these objectives, the *theory of empire-building* and other related, well-tested theories provide both the motivations and evidence behind these objectives (Marris, 1963; Ravenscraft and Scherer, 1987; Rhoades, 1983; Black, 1989). According to empire theory, managers are explicitly motivated to invest in the growth of their firm's revenues (sales) or asset base, subject to a minimum profit requirement (Marris, 1963). Mueller (1969) introduced mergers as a vehicle for growth maximization (not profit maximization), and Williamson (1964) complements this by introducing company cars, excess staff or prestigious investments as complementary motives. Rhoades (1983) analyses the third merger wave, and shows that managerial power serves as an explanation of firm growth through M&A, and concludes that the power motive replaced the profit motive as the driving force behind large companies' behaviour.

2.3. Sources and Indicators of Commercial Banks' Performance

Traditional theories of intermediation are based on transaction costs and asymmetric information. They are designed to account for institutions which take deposits or issue insurance policies and channel funds to firms. However, in recent decades there have been significant changes. Although transaction costs and asymmetric information have declined, intermediation has increased. New markets for financial futures and options are mainly markets for intermediaries rather than individuals or firms. These changes are difficult to reconcile with the traditional theories (Allen and Santomero, 1996).

According to Merton and Bodie (1995), the financial system is considered to perform six basic functions: to provide ways of clearing and settling payments in order to facilitate trade; to provide a mechanism for the pooling of resources and for portfolio diversification; to provide ways of transferring economic resources through time, across borders, and among industries; to provide ways of managing risks; to provide price information to help coordinate decentralized decision making in the various sectors of the economy; to provide ways of dealing with the incentive problems created when one party in a transaction has information that the other party does not have or when one party acts as agent for another.

Grigorian and Manole (2002), while analyzing the performance of banks in transition observed that banking sectors in transitional economies have experienced transformations throughout the 1990s. While some countries have been successful in eliminating underlying distortions and restructuring their financial sectors, in some cases financial sectors remain underdeveloped and the rates of financial intermediation continue to be quite low. To fully assess the efficiency of bank operations it is necessary to model various types of functions performed by banks, and control for the inputs necessary to provide a certain level of utility to owners and depositors (whereby the utility to owners is profits and to depositors is services) while performing those functions. Fries et al (2002) while examining the same phenomenon found out that bank performance differ significantly depending on the reform environment as well as the competitive conditions

in which they operate. In the Kenyan context, the performance of a bank can therefore be measured by the following indictors:

2.3.1. Cost Efficiency

Numerous studies, for instance Seballos and Thomson (1990), Looney et al. (1989) or Cates (1985), emphasize the management quality as the key determinant of banks' success in a risky world. Barr and Siems (1994) used cost efficiency to proxy the management quality and found its significant explanatory power for explaining bankruptcy in the U.S. The cost efficiency is the most conventional concept of efficiency pursued in studies of bank performance. Especially the stochastic frontier techniques have recently gained on popularity because of their property to remove the effect of differences in prices or other exogenous market factors which could, if not accounted for, shade the correct assessment of managerial performance (Bauer et al., 1998). The cost efficiency analysis implies that banks are being ranked according to their relative performance to the best practice bank in terms of managing the operating costs of producing the same output under the same conditions, such as output quality, production function and market conditions, (Berger and Humphrey, 1997). Thus, deterioration of the bank's relative cost efficiency might signal its increasing vulnerability.

2.3.2. Capital Adequacy

The capital adequacy ratio indicates the coverage of banks' assets by owners' funds. This variable is computed as the ratio of shareholders' equity and net income to total deposits and non-deposit funds. The significance of capital adequacy ratio in explaining efficiency implies that banks with higher capital adequacy ratio, are less efficient since they are risk-averse and prefer safer and lower-earning portfolios (Jackson and Fethi, 2000).

In Kenya, the need for capital adequacy has explained mergers and acquisitions in the banking industry. According to Central Bank of Kenya (2005), the country had two acquisitions in year 2005 where a building society was acquired by a commercial bank as a strategy to increase the bank's capital base to enhance compliance with capital adequacy requirements and enhance its competitiveness. In the other instance, a commercial bank acquired the assets and liabilities of another commercial bank as part of

its expansion strategy. In the banking sector, according to CBK (2005), capital adequacy is measured by the ratio of total capital to total risk weighted assets ratio which shows the amount of capital and institutions holds relative to the risk profile of its assets. It provides the cushion to protect depositors and creditors in case of loss. In the Kenyan situation, institutions are required to maintain a minimum ratio as directed by the Central Bank from time to time.

The Basel Committee on Banking Supervision issued the International Convergence of Capital Measurement and Capital Standards commonly known as Basel II in June 2004 with a fundamental objective of further strengthening the soundness and stability of the international banking system. Basel II is underpinned by a three-pillar approach. The first Pillar stipulates the minimum capital requirements. It states that the Capital adequacy of a bank is assessed in relation to the credit, market and operational risks it faces. This is an extension of the Basel I accord which initially only assessed capital adequacy in relation to credit risk. Basel I was however extended to include market risk in 1996.

2.3.3. Other Indicators

Asset quality is used as an indicator of banks' performance in Kenya. This is rated on the basis of the proportion of non-performing loans net of provisions to gross loans. It involves loans and advances which are categorized into five groups depending on the time past due: normal risk, watch, substandard, doubtful, and; loss. The other measure is earnings and liquidity. Earnings are measured on the basis of return on assets while liquidity of the banking system is measured by the ratio of the net liquid assets to total deposits. Other parameters may also include: market share, lending behaviour, distribution of bank profitability, credit distribution, composition and changes in assets, liabilities, deposits, capital and reserve, and profit & loss.

2.4. Measuring Efficiency in Banking

2.4.1. Measuring Cost Efficiency

According to Fiorentino, Karmann, Koetter (2006), in measuring the cost efficiency of banks, one should compare observed cost and output-factor combinations with optimal

combinations determined by the available technology (efficient frontier). The method to implement this analysis could be either stochastic or deterministic. The former allows random noise due to measurement errors. The latter, on the contrary, attributes the distance between an inefficient observed bank and the efficient frontier entirely to inefficiency. A further distinction is made between parametric or non-parametric approaches. A parametric approach uses econometric techniques and imposes a priori the functional form for the frontier and the distribution of efficiency. A non-parametric approach, on the contrary, relies on linear programming to obtain a benchmark of optimal cost and production-factor combinations.

According to Rudi (2000), it is asserted that there may be differences between specialized and non-specialized banks with respect to the degree of operational efficiency. To test this conjecture, Rudi (2000) estimated a cost function for the different types of banks. Cost efficiency provides a measure of how close a bank's actual cost is to what a best-practice institution's cost would be for producing an identical output bundle under comparable conditions. The measure is usually derived from a cost function in which costs (C) depend on the prices of inputs (p) [Such as interest expenses, non-interest expenses, funds and deposits, and labour costs], the quantities of outputs (y) [such as net interest income, non-interest income, and profit before tax], or other factors that may affect performance (z) [such as exposure to risks], and an error term ε. The function can be algebraically written as shown in equation (1)

$$C = f(p, y, z) + \varepsilon \quad \ldots\ldots (1)$$

In equation (1), ε is treated as a composite error term represented as shown in equation (2);

$$\varepsilon = \mu + v \quad \ldots\ldots (2)$$

Where v represents standard statistical noise and μ captures inefficiency.

In the parametric methods, a bank is labeled inefficient if its costs are higher than a best-practice bank after removing random error. The methods differ in the way μ is disentangled from the composite error term ε.

Aigner, Lovell, and Schmidt (1977) proposed stochastic cost frontier in analysis of cost efficiency of commercial banks. In general, the non-parametric methods are less suitable because they assume away noise in the data and luck. As Berger and Mester (1997a) observed, these methods cannot compare firms that tend to specialize in different inputs or outputs because it is impossible to compare input and output configurations without the benefit of relative prices. Moreover, Berger and Mester (1997a) used the distribution-free approach as well as the stochastic frontier approach for both the translog and the Fourier specification of the cost and profit function. They concluded that the empirical findings in terms of either average industry efficiency or ranking of individual bank are similar across methods.

In equation (2), the random error term (v) is assumed to be normally distributed and the inefficiency term (μ) is assumed to be a half-normal distribution. Either of the approaches (the half-normal and the exponential distribution approaches) can be used with similar results being reported in both cases. The model below has focused on the half-normal distribution. The inefficiency factor (μ) incorporates both allocative inefficiencies from failure to react optimally to changes in relative input prices, and technical inefficiencies from employing too much of the inputs to produce the observed output bundle. The log-likelihood function is given arithmetically by equation (3). The model can be estimated using maximum likelihood techniques.

$$\ln L = \frac{N}{2}\ln\left(\frac{2}{\pi}\right) - N\ln\sigma - \frac{1}{2\sigma^2}\sum_{i=1}^{N}\varepsilon_i^2 + \sum_{i=1}^{N}\ln\left[\phi\left(\frac{\varepsilon_i\lambda}{\sigma}\right)\right] \quad \text{..... (3)}$$

Where:

$\varepsilon_i = \mu_i + v_i$

$\sigma^2 = \sigma_u^2 + \sigma_v^2$

$\lambda = \frac{\sigma_u}{\sigma_v}$

N = the number of banks and

$\Phi(.)$ = the standard normal cumulative distribution function

Inefficiency measures are calculated using the residuals after the model is estimated. For the half-normal case, an estimate of the mean inefficiency is given by

$$\hat{E}(\mu_i) = \left(\frac{2}{\pi}\right)^{1/2} \hat{\sigma}_\mu \quad \ldots\ldots (4)$$

Where σ_* is the estimate of σ_μ. Since the distribution of the maximum likelihood estimates is known, the approximate standard error of $\left(\frac{2}{\pi}\right)^{1/2} \hat{\sigma}_*$ can be easily computed.

Previously, Jondrow et al. (1982) had showed that a bank-level measure of inefficiency is usually given by the mean of the conditional distribution function of μ_i given ε_i. For the normal-half-normal stochastic model, the conditional distribution of μ_i given ε is a normal distribution $N(\mu_*, \sigma_*^2)$ truncated at Zero, where $\mu_* \equiv \frac{\varepsilon \sigma_\mu^2}{\sigma^2}$ and $\sigma_*^2 \equiv \frac{\sigma_\mu^2 \sigma_v^2}{\sigma^2}$. This can be seen by adapting for the cost function the equation for the production function derived in Jondrow et al. (1982). The density function is algebraically illustrated in Equation (5)

$$f(\mu_i/\varepsilon_i) = \frac{\frac{\sigma}{\sigma_\mu \sigma_v} \phi\left[\frac{\sigma}{\sigma_\mu \sigma_v}(\mu_i/\varepsilon_i) - \frac{\varepsilon_i \lambda}{\sigma}\right]}{1 - \Phi\left(-\frac{\varepsilon_i \lambda}{\sigma}\right)} \quad , (\mu_i/\varepsilon_i) \geq 0 \quad \ldots\ldots (5)$$

As Mester (1996a, 1996b) and Greene (1991) observed, the conditional mean $E(\mu/\varepsilon_i)$ is an unbiased but inconsistent estimator of μ since regardless of the number of observations, the variance of the estimator remains non-zero. The mean of the conditional distribution of Equation (5) is as shown in equation (6).

$$E(\mu_i/\varepsilon_i) = \left(\frac{\sigma_\mu \sigma_v}{\sigma}\right)\left[\frac{\phi\left(\frac{\varepsilon_i \lambda}{\sigma}\right)}{\Phi\left(\frac{\varepsilon_i \lambda}{\sigma}\right)} + \frac{\varepsilon_i \lambda}{\sigma}\right] \quad \ldots\ldots (6)$$

A Farrell-type measure of operational efficiency can then be calculated as $CEFF = e^{-u}$. A CEFF score of 0.8 would mean that the bank is using 80% of its resources efficiently

or alternatively wastes 20% of its costs relative to a best-practice bank. For the functional form of C = f (p,y,z) a standard translog or the Fourier-flexible specification (McAllister and McManus 1992; Mitchell and Onvural 1996; Berger and Mester 1997b) may be applied. The Fourier functional form augments the translog by including Fourier trigonometric terms. It is a global approximation because the sine and cosine terms are mutually orthogonal, so that each term aids in fitting the function closer to the true path of the data. But while formal tests indicate that the Fourier terms are jointly significant, the statistical fit, and both the average levels of measured efficiency and their dispersion are very similar for both functional forms.

2.4.2. Application of DEA Technique to Evaluate Cost and Scale Efficiency

Data Envelopment Analysis (DEA) is a linear programming technique where the set of best-practice or frontier observations are those for which no other decision making unit or linear combination of units has as much or more of every output (given inputs) or as little or less of every input (given outputs) . Developed by Charnes, Cooper, and Rhodes (1978), DEA was originally intended for use in public sector and not-for-profit settings where typical economic behavioral objectives, such as cost minimization or profit maximization, may not apply. Thus, DEA could be used even when conventional cost and profit functions that depend on optimizing reactions to prices could not be justified. The DEA frontier is formed as the piecewise linear combinations that connect the set of these best-practice observations, yielding a convex production possibilities set. As such, DEA does not require the explicit specification of the form of the underlying production relationship.

DEA involves the use of linear programming methods to construct a non-parametric piecewise surface (or frontier) over the data, so as to be able to calculate efficiencies relative to this surface. Coelli (1996) developed a DEAP® computer programming for performing DEA. The computer program can consider a variety of models. The three principal options are: i) Standard constant returns to scale (CRS) and variables return to scale (VRS) DEA models that involve the calculation of technical and scale efficiencies (where applicable). These methods are outlined in Fare, Grosskopf and Lovell (1994); ii) the extension of the CRS and VRS models to account for cost and allocative efficiencies.

These methods are also outlined in Fare et al (1994); and, ii) the application of Malmquist DEA methods to panel data to calculate indices of total factor productivity (TFP) change; technological change; technical efficiency change and scale efficiency change. These methods are also discussed in Fare, Grosskopf, Norris and Zhang (1994).

The Malmquist index is the geometric mean of two productivity indices that use output distance functions for the alternative base periods t and (t + 1) as indicated by the D-superscripts in equation (7) below

$$M(x_{t+1}, y_{t+1}; x_t, y_t) = \left[\frac{D^t(x_{t+1}, y_{t+1}) D^{t+1}(x_{t+1}, y_{t+1})}{D^t(x_t, y_t) D^{t+1}(x_t, y_t)} \right]^{1/2} \quad \ldots\ldots\ldots\ldots \quad (7)$$

The first index relates the input - output combinations observed in the two time periods (t and t + 1) to the period t technology frontier, and the second index relates the same input - output combinations to the period (t + 1) technology frontier. The terms in the numerator are the inputs used and outputs generated by firms i in period t + 1, and those in the denominator represent the corresponding quantities observed for period t.

Following Fare et al. (1995), manipulation of the Malmquist index makes it possible to distinguish between efficiency changes and productivity changes:

$$M = \frac{D^{t+1}(x_{t+1}, y_{t+1})}{D^t(x_t, y_t)} \left[\frac{D^t(x_{t+1}, y_{t+1}) D^{t+1}(x_{t+1}, y_{t+1})}{D^t(x_t, y_t) D^{t+1}(x_t, y_t)} \right]^{1/2} = \Delta E \times \Delta T \quad \ldots\ldots \quad (8)$$

The first term represents the change in technical efficiency (ΔE), and the expression in square brackets represents technological change (ΔT). Values greater than one for the Malmquist index indicates an improvement in productivity, and values less than one signal deterioration. The same interpretation applies to the numerical values obtained for the efficiency and technology indices. Formally, there is no presumption that the three indices must always move in the same direction. For instance, an improvement in productivity is entirely compatible with opposite improvement in technical efficiency or technology, provided the deterioration in one component is more than offset by an improvement in the other to generate a value of M greater than 1.

DEA methodology requires solving a series of linear programming problems. Consider the input and output vectors represented by equations (9) and (10) respectively, where s banks are producing m outputs by using n inputs.

$$x_{i,t} = (x_{1i,t}, \ldots\ldots\ldots, x_{ni,t}) \in \Re^n_+ \quad \ldots\ldots\ldots (9)$$

$$y_{i,t} = (y_{1i,t}, \ldots\ldots\ldots, y_{mi,t}) \in \Re^m_+ \quad \ldots\ldots\ldots (10)$$

The CRS output distance functions for bank k can be calculated as algebraically represented by the system of equation (11)

$$[D^t(x_{k,t}, y_{k,t})]^{-1} = \underset{\theta,\lambda}{Max}\,\theta \quad \ldots\ldots\ldots (11)$$

Such that:

$$\theta y_{m(k,t)} \le \sum_{i=1}^{s} \lambda_{i,t} y_{m(i,t)} \qquad m = 1, \ldots\ldots\ldots, M \ldots (12)$$

$$\sum_{i=1}^{s_t} \lambda_{i,t} x_{n(i,t)} \le x_{n(k,t)} \qquad n = 1, \ldots\ldots\ldots, N \ldots (13)$$

$$\lambda_{i,t} \ge 0, \qquad i = 1, \ldots\ldots\ldots, S_t \quad (14)$$

Where t indexes the time period. λ is a column vector of intensity variables ($\lambda \in \Re^{s_t}_+$). The output distance functions required for constructing the VRS frontier can be calculated by including $\sum_i \lambda^{it}$ as an additional constraint to the linear programming problem represented by the system of equations (11). Distance functions must be calculated for all banks in the sample for each period (t and t + 1) separately. The remaining distance functions needed to compute Malmquist indexes require the solving of mixed period linear programming problems (Coelli et al., 1998)

2.5. Post Merger Characteristics of the combined firms

Surjit Kaur (2002) compared the pre and post-takeover performance for a sample of 20 combined companies during 1997-2000, using a set of eight financial ratios, during a 3-

year period before and after merger, using t-test. The ratios used were Modified Net Profit Margin, Return on Capital Employed (ROCE), Debt-Equity Ratio, Assets Turnover Ratio, Current Ratio, Cash Flow to Sales, and Market Price to Book Value (MP/BV). The study concluded that both profitability and efficiency of targeted companies declined in post- takeover period, but the change in post-takeover performance was statistically not significant. Beena (2004) analyzed the pre and post-merger performance of a sample of 115 combined firms in the manufacturing sector in India, between 1995-2000, using a set of financial ratios and t-test. The financial ratios used were Price - Cost Margin (Profit after Tax / Net Sales), Rate of return (Profit Before Tax /Total Capital Employed), Shareholders' Profit (Profit After Tax /Net Worth), Dividend per equity (Dividend Per Share / Earnings Per Share), Debt-equity ratio, Export intensity (Export/Gross sales), R&D intensity (R&D expenditure/Gross sales) and Capacity utilization (Net Sales/Total Assets). The study could not find any evidence of improvement in the financial ratios during the post-merger period, as compared to the pre-Merger period, for the combined firms.

Pawaskar (2001) analyzed the pre-merger and post-merger operating performance of 36 combined firms during 1992-95, using ratios 5 of profitability, growth, leverage, and liquidity, and found that the combined firms performed better than industry average in terms of profitability. Regression analysis however, showed that there was no increase in the post-merger profits compared to main competitors of the combined firms. Thus, empirical testing of corporate performance following mergers of Indian companies has been quite limited so far, with some studies that were focused on mergers in manufacturing sector, and study of mergers during short time intervals.

Mantravadi and Reddy (2008) undertook a study to test whether the industry type has an impact on the outcome of merger for the merging firm, in terms of impact on operating performance. The results from the analysis of pre- and post-merger operating performance ratios for the combined firms in the sample showed that there was a differential impact of mergers, for different industry sectors in India. Type of industry

does seem to make a difference to the post-merger operating performance of combined firms.

A study by DeLong (2001) found that bank mergers increase shareholder (acquirer and target) wealth by 3.0% on average, but only if they focus the bank in terms of both activity and geography. The findings indicated that all other mergers types do not increase shareholder wealth. Houston and Ryngaert (1994) found that, on average, bank mergers do not change the overall wealth of all shareholders in the transaction. Target shareholders experience wealth gains, which are offset by combined shareholder losses. Rhoades (1994) presented a summary of event studies results from 1980 to 1993. In general, he reported positive returns to target firm shareholders, but inconclusive results for combined firm shareholders.

In addition, Rhoades (1994) also provided a summary of the studies gauging changes in operating performance following a bank acquisition for the period 1980 – 1993. He noted that some studies, such as Cornett and Tehranian (1992), may show an improvement in one performance measure while finding no change in others. His overall finding from the time period studied is that banking acquisitions did not result in improved operating performance. Berger, Demsetz and Strahan (1999) in a survey of bank consolidation research indicated studies of performance effects of financial institution mergers, in particular efficiency effects, indicated some increased profit efficiency and diversification benefits, but little or no cost efficiencies. Later on, studies started focusing on X-efficiencies within the banking industry. These studies tend to focus on a bank's expense ratios as measures of efficiency rather than return on assets or return on equity as used in prior studies of operating performance. The results of most of these studies find minimal cost efficiencies to be associated with bank mergers. For example, Peristiani (1997) and DeYoung (1997) found little to no improvement in X-efficiency following a bank merger. Berger, Demsetz, and Strahan (1999) provided a comprehensive overview of banking X-efficiency studies.

Frydman (2002) examined whether financial buyers are more likely to initiate takeovers of inefficient firms. The findings showed that they indeed are and thus conclude that takeovers by financial buyers play a potentially beneficial role in the allocation of corporate assets in the U.S. economy. The analysis of determinants of takeovers initiated by financial buyers used an application of the methodology developed in Trimbath, Frydman and Frydman (2001). As a significant improvement over the earlier approaches that had utilized probit and logit analysis, Frydman (2002) methodology employed the Cox regression model, which is particularly appropriate for the study of a time-varying risk profile. The Cox model is a dynamic technique that incorporates time-dependent covariates and estimates the hazard rate of takeover at any time during the study period as a function of these covariates. Using this methodology, the findings showed that the most significant determinant of a firm's risk of takeover by a financial buyer is its relatively inefficient use of resources. These results were consistent with the earlier results obtained in Trimbath, Frydman and Frydman (2001) for the Fortune 500 firms.

Hunter and Wall (1989) used cluster analysis on a sample of mergers from 1981 to 1986. They found that acquired banks had higher profitability as measured by Return on Equity (ROE), faster growth in core deposits and total assets, and higher loans to assets. Hannan and Rhoades (1989) used a sample of 201 Texas banks acquired between 1970 and 1982. A multinomial logit model was used to estimate the relationship between the likelihood of acquisition and the characteristics of the target firm. Firms with low capital/asset ratios were relatively likely to be acquired while firms with low profits or low growth were not. Meric et al. (1991) used a sample of interstate commercial banks and multivariate analysis of variance. They found that combined banks were purchasing banks with high-deposits and low-loan ratios.

2.6. Chapter Summary

The literature suggests that there is a substantial potential for efficiency improvements from mergers of banks. Most recent analyses find unexploited scale economies even for fairly large bank sizes (Berger and Mester, 1997; Berger and Humphrey, 1997). The prospects for scale efficiency gains appear to be greater in the 1990s than in the 1980s.

This finding is usually ascribed to technological progress, regulatory changes and the beneficial effect of lower interest rates (Berger et al., 1999). In addition, there is evidence that the banking industry exhibits substantial X-inefficiencies, on the order of about 20-25% of total costs (Berger and Humphrey, 1997). This evidence suggests that M&As may substantially improve the cost efficiency when relatively efficient banks acquire relatively inefficient banks. This study hypothesized that the combined firms should demonstrate improved efficiency after conclusion of the merger, take over, or stock swap. This hypothesis is based on the argument that the newly formed merger is highly capitalized and brings together a pool of technically equipped workforce, besides the infrastructure. To answer the above question, the study will measure the operating efficiency of each distribution utility over a period of time that brackets any merger or acquisition. The efficient-merger hypothesis implies that the target firm's pre-merger efficiency should be below the norm established by non-merging firms (and certainly below the combined firm's efficiency level), but that post-merger, the combined firm should show improved efficiency. The buying firm should have pre-merger efficiency above the norm, as it seeks to exploit its superiority through merger or acquisition involving a relatively poor performing firm.

CHAPTER THREE

3.0. RESEARCH METHODOLOGY

3.1. Introduction

This chapter presents an outline of the research methodology used in the study. Section 3.2 describes the study population; Section 3.3 describes the sample; Section 3.4 outlines the data collection procedures and sources; and Section 3.5 describes the data analysis tools and the research model applied.

3.2. Population

The commercial banking sector in Kenya is comprised of 41 banks (see Appendix I). These banks formed the population of the study.

3.3. Sample

The sample comprised of 25 commercial banks which had a merger, a take over, or a stock swap between January 1994 and June 2009 (See Appendix II). The sample was chosen because the documented mergers in the banking industry date back to 1994, hence the need to consider a sample whose historical data was available. The sample commercial banks are listed in Appendix II.

3.4. Data Collection

The study applied data from secondary sources. The data for the banks was extracted from the banks' annual reports and financial statements for the fifteen-year period 1994-2009. These were obtained from the NSE library, the respective banks' company secretaries, or the banks supervision department at the Central bank of Kenya. Wherever possible, the observations were centered on a five year period before merger and five year period after merger, takeover, or stock swap.

3.5. Data Analysis

In assessing the effects of mergers on the cost and scale efficiency of the combined firms, a Data Envelopment Analysis (DEA) model was used (Charnes, Cooper, and Rhodes, 1978). This approach was used since "recent research studies have suggested that the kind of mathematical programming procedure used by DEA for efficient frontier estimation is comparatively robust" (Seiford and Thrall, 1990; Coelli, 1996). DEA analysis will be performed using DEAP® Version 2.1: A Data Envelopment Analysis (Computer) Program using the procedures outlined by Coelli (1996). The equations for the DEA are algebraically presented in equations (9) through to (14) in Chapter two.

The study was based on two specific objectives. First, to determine the effect of mergers and acquisitions on cost efficiency of the combined firms; and secondly, to determine the effect of mergers and acquisitions on scale (profit) efficiency of the combined firms. The first step in the analysis was the measurement of bank performance. Following Bhattacharya et al. (1997), performance has been associated with technical efficiency (hereafter refereed to as 'efficiency'). It is the ability to transform multiple resources into multiple financial services. The efficiency was calculated using variable returns to scale (VRS) input oriented model of the DEA methodology.

To measure efficiency as directly as possible, that is, management's success in controlling costs and generating revenues (that is, cost-efficiencies), two input and two output variables, namely, interest expenses, non-interest expenses (inputs) and net interest income and non-interest income (outputs) were used (hereafter refereed to as Model A). A second DEA analysis was run with deposits and staff numbers as inputs and non-interest income as output (hereafter refereed to as Model B).

In the Model B, where a less direct approach was taken to measure efficiency, Funds & Deposits replaced interest expense, staff numbers replaced non-interest expenses and profit before tax replaced both the net interest income and non-interest income. Model B was thus be a representative model of bank scale efficiency, indicating how well the combined bank transforms its inputs into profit. The two models (in Table 3.2) were used

to show how efficiency scores differed when inputs and outputs are changed The strength of the DEA technique is that it reveals which of the input-output variables need to be closely monitored by the combined bank's management to improve efficiency (Avkiran, 1999).

Table 3.2: Proposed research models

Model	Inputs (Before & after acquisition)	Outputs (Before & after acquisition)
A (cost efficiency)	- Interest expenses - Non-interest expenses	- Net interests income - Non-interest income
B (Scale efficiency)	- Funds and Deposits - Number of full-time staff	- Profit Before Tax

3.6. Diagnostic Test

The t-test was used to test the changes in efficiency scores between the pre-merger and post merger periods. The T-test was based on the one-way analysis of variance techniques which compares changes in observations between groups or periods.

CHAPTER FOUR

4.0. DATA ANALYSIS AND DISCUSSION OF FINDINGS

4.1. Introduction

This chapter presents the data analysis, interpretation, and discussion of the research findings. The data was collected from 14 commercial banks whose data could be available for five-year periods both on pre-merger and post-merger era. The chapter is organized as follows: Section 4.2 presents the analysis cost efficiency estimates (Model A); Section 4.3 presents the analysis scale efficiency estimates (Model B); and Section 4.4 is a comparison of cost and scale efficiency estimates for combined banks.

4.2. Analysis Cost Efficiency Estimates (Model A)

Cost efficiency (CE) measures the possible reductions in cost that can be achieved if the combined bank is technically and allocatively efficient (Elyasiani and Mehdian, 1990). A bank is said to have technical efficiency (TE) if it operates on the efficient frontier and allocative efficiency (AE) if it is properly choosing the correct mix of inputs given the input prices. TE can be decomposed into pure technical efficiency (PTE) and scale efficiency (SE). Pure technical inefficiency results from using more inputs than necessary (input waste), while scale inefficiency occurs if the bank does not operate at constant returns to scale. Table 4.1 indicates the firm averages for CE for the sampled combined banks based on the analysis of pre-merger and post-merger periods. To assess whether there were significant differences in the cost efficiency of the combined bank during the pre-merger and post-merger periods, t-test was applied. The differences in pre-merger and post-merger CE averages were tested based on the null hypothesis that there is no significant change in combined bank's CE estimates before merger and after merger. The t-tests for the differences were conducted for each sample bank at 95% level of confidence. The findings indicates one half of the sample showed a significant change in the CE averages while the other half demonstrated non-significant changes in the CE. The failure to demonstrate changes in the averages of CE among multinational banks such as the Standard Chartered Bank (STANCHART), the Barclays Bank (BBK), the

Kenya Commercial Bank (KCB), and Citibank (CITI) was mainly because some of the mergers analyzed involved takeovers of firms that would have otherwise be regarded as subsidiaries. For example, Barclays Bank of Kenya Ltd had merged with Barclays Merchant Finance Ltd. while Standard Chartered Bank merged its operations with Standard Chartered Financial Services. The CBA merger was also a merger between CBA Financial Services and Commercial Bank of Africa Limited. This leads to the findings that mergers involving subsidiaries have no significant changes in the cost efficiency of the combined bank

Table 4.1 Model A - DEA Cost Efficiency Scores for Firm Averages

	Cost Efficiency Mean Estimates			
Firm	**Before merger**	**After Merger**	**T-statistic**	**Decision**
CBA	0.934	0.767	1.559	Accept H_0
STANCHART	0.829	0.820	0.132	Accept H_0
GUARDIAN	0.876	0.811	0.690	Accept H_0
BBK	0.884	0.856	0.569	Accept H_0
KCB	0.840	0.761	0.748	Accept H_0
CITIBANK	0.761	0.747	0.084	Accept H_0
COOP	0.919	0.847	0.610	Accept H_0
NIC	0.873	0.762	1.974*	Reject H_0
GIRO	0.586	0.797	2.053*	Reject H_0
DTB	0.528	0.853	2.304*	Reject H_0
NBK	0.485	0.894	2.866**	Reject H_0
HABIB	0.843	0.667	1.9828*	Reject H_0
UNIVERSAL	0.544	0.885	2.523**	Reject H_0
I&M	0.718	0.978	2.072*	Reject H_0

*** denotes significance at 5% level (P-values < 0.05); Critical values = 1.96 (at 5%)**
**** denotes significance at 1% level (P-values < 0.01); Critical values = 2.57 (at 1%)**
H_0: There is no significant change in combined bank's CE estimates before merger and after merger
H_1: There is a significant change in combined bank's CE estimates before merger and after merger

Notes: Scale assumption: Variable Return to Scale (VRS)
Source: Field Data (2010)

4.3. Analysis of Scale Efficiency Estimates (Model B)

Model B was designed to assess the combined banks' ability to transform inputs of borrowed funds and deposits and labour into profit. Table 4.2 indicates the firms averages for PE (profit efficiency) for the sampled combined banks selected for the study based on pooled data. The findings indicate that a majority of the sampled combined banks reported a change in their scale efficiency after the merger or takeover. The findings also indicate that some of the banks that did not show a significant change in the level of cost efficiency after merger also showed no significant change in the level of profitability. These were the banks that took over their former subsidiaries (e.g. STANCHART, BBK, and HABIB). In the banking industry in Kenya had showed overall decline in levels of profitability between 1996 and 2002 and this is the period when most mergers and takeovers took place within the industry.

To assess whether there were significant differences in the profit efficiency of the combined bank during the pre-merger and post-merger periods, t-test was applied. The differences in pre-merger and post-merger SE averages were tested based on the null hypothesis that there is no significant change in combined bank's SE estimates before merger and after merger. The t-tests for the differences were conducted for each sample bank at 95% level of confidence. The findings in Table 4.2 indicate a mix of results for a number of sampled banks. While some of the banks exhibited a significant decline in profitability after merger (CBA, NIC, DTB, KCB, CITIBANK, and COOP), only four demonstrated a sharp rise in the levels of profitability (GIRO, NBK, UNIVERSAL, and I&M). When compared to the results presented in Table 4.1 above, the findings indicate that a decline (or no change) in CE does not necessarily translate to profit efficiency for the combined bank. The staff who are responsible for bringing new business are not able to generate revenues to offset their expenses which are fixed and this affects both the cost efficiency and profit efficiency. Combined commercial banks also restructure their lending terms during the post-merger period in a bid to harmonize the practices to suit the clients of the two previously independent institutions. During this period, most of the combined institutions opt for the lower risk government securities which have a lower

yield thus reducing the profit efficiency, while striving to stabilize the cost efficiency levels.

Table 4.2 Model B - DEA Scale Efficiency Scores for Firm Averages

Firm	Scale Efficiency Mean Estimates			
	Before merger	After Merger	T-statistic	Decision
STANCHART	0.724	0.712	0.843	Accept H_o
BBK	0.688	0.546	0.947	Accept H_o
HABIB	0.511	0.577	0.053	Accept H_o
GUARDIAN	0.512	0.565	0.977	Accept H_o
CBA	0.621	0.528	2.509*	Reject H_o
NIC	0.655	0.527	1.983*	Reject H_o
GIRO	0.487	0.702	2.960**	Reject H_o
DTB	0.551	0.460	3.109**	Reject H_o
NBK	0.200	0.400	2.084**	Reject H_o
UNIVERSAL	0.295	0.643	2.903**	Reject H_o
KCB	0.360	0.200	2.066*	Reject H_o
CITIBANK	0.684	0.390	2.592**	Reject H_o
COOP	0.480	0.200	2.643**	Reject H_o
I&M	0.480	0.824	2.762**	Reject H_o

*** denotes significance at 5% level (P-values < 0.05); Critical values = 1.96 (at 5%)**

**** denotes significance at 1% level (P-values < 0.01); Critical values = 2.57 (at 1%)**

H_o: There is no significant change in combined bank's Scale Efficiency estimates before merger and after merger

H_1: There is a significant change in combined bank's Scale Efficiency estimates before merger and after

Notes: Scale assumption: Constant Return to Scale (CRS)

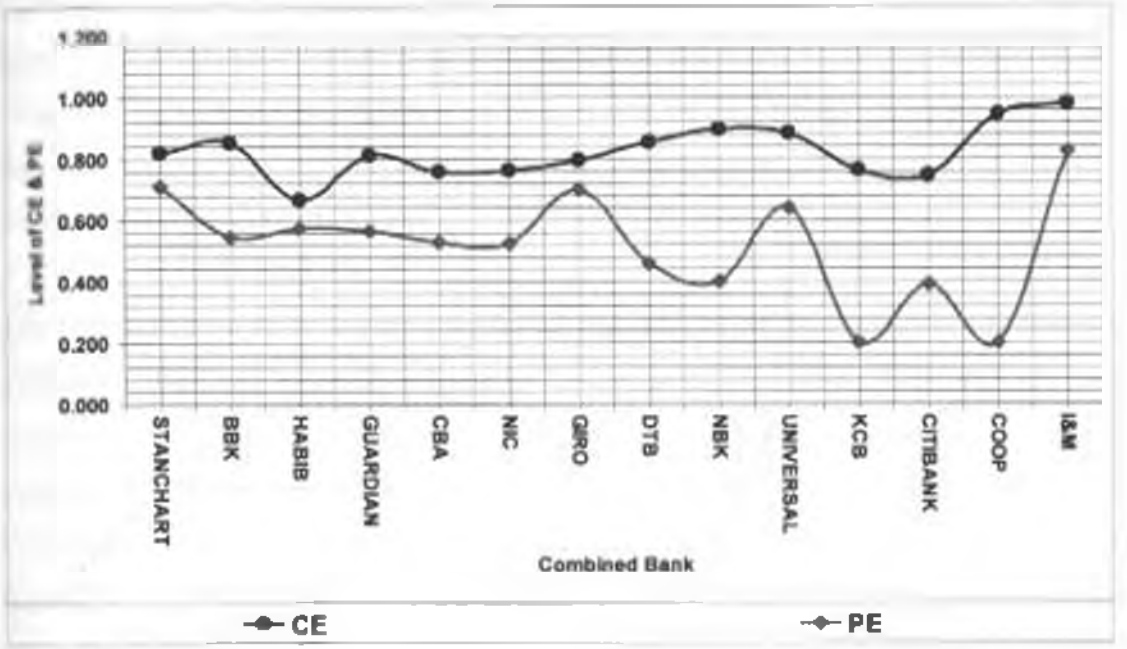
Source: Field Data (2010)

4.4. Comparison of Cost and Scale Efficiency Estimates for Combined Banks

Figure 4.1 below presents a comparison of the CE and PE firm averages in the post merger periods based on the findings derived from Tables 4.1 and 4.2 above. Graphically, the chart illustrates that all the sampled combined banks were operating on a higher cost frontier than they were on the profitability (scale) frontier. This is occasioned by

increased level of administrative and operational expenses occasioned by the combination.

Figure 4.1: Comparison of Combined Banks' CE and PE Firm Averages



Source: Field Data (2010)

4.5. Comparison of Cost and Scale Efficiency Estimates for Combined Banks

The chapter was motivated by a desire to benchmark combined commercial banks and evaluate their respective efficiencies. DEA provides relative efficiency scores of the individual units and informs managers of the source of inefficiency. DLA results are also important in that they can suggest areas of future managerial focus to make inefficient banks more efficient. As the analysis has shown, DEA determines 100 percent cost and profit efficient banks and provides information on how to improve input utilization and output for the inefficient banks. The variables were selected within a resource dependent perspective, in particular, in relation to return on assets. In addition, the attempt to measure the impact of mergers on efficiencies was done by including banks with recent merger activities and whose data could be available.

In regard to cost efficiency, CE efficiency scores were generally found to be higher than the PE scores both on the pre-merger and post-merger periods for all the sampled combined banks. The findings indicated that firm which engaged in take-over of subsidiaries had no significant changes in levels of their cost efficiency. It was therefore prudent to conclude that the main source of cost inefficiencies in the combined banks is most likely attributable factors such as overstaffing due to the combined workforce, the long learning curve of management on how to best use technology to reduce costs, and increase operational costs occasioned by the integration of operations from the two previously independent institutions.

The findings on profit efficiency established that decline (or no change) in CE does not necessarily translate to profit efficiency for the combined bank. The staff who are responsible for bringing new business are not able to generate revenues to offset their expenses which are fixed and this affects both the cost efficiency and profit efficiency. Combined commercial banks also restructure their lending terms during the post-merger period in a bid to harmonize the practices to suit the clients of the two previously independent institutions. During this period, most of the combined institutions opt for the lower risk government securities which have a lower yield thus reducing the profit efficiency, while striving to stabilize the cost efficiency levels. Furthermore, commercial banks in Kenya are able to continue to realize profits against declining cost efficiency and relatively low profit efficiency because they are key players in lending to the government through the low risk treasury bonds and bills, from which they realize good returns.

CHAPTER FIVE

5.0. SUMMARY AND CONCLUSIONS

5.1. Introduction

This chapter presents the summary, conclusions and recommendations derived from the findings of the study. Section 5.2 is a brief summary of the study. Section 5.3 provides the conclusions. Section 5.4 presents the limitations of the study. Section 5.5 provides the recommendations.

5.2. Summary

The broad objective of the study was to determine the effect of mergers and acquisitions on efficiency of the combined commercial banks in Kenya. The study further sought to determine the effect of mergers and acquisitions on cost efficiency of the combined firms, as well as effect of mergers and acquisitions on scale efficiency of the combined firms. The study hypothesized that the combined firms should demonstrate improved efficiency after conclusion of the merger, take over, or stock swap. This hypothesis was based on the argument that the newly formed firm (post-merger) is highly capitalized and brings together a pool of technically equipped workforce, besides the infrastructure. In achieving the above objective, the study applied secondary data obtained from the audited financial statements of the commercial banks for the period 1994-2009. Data were obtained from the Banks Supervision Department at the Central Bank of Kenya. In order to measure the cost and profit efficiency of the listed banks, the study employed the Data Envelopment Analysis (DEA) technique.

The key findings of the study are as follows. First, the findings indicated that firm which engaged in take-over of subsidiaries had no significant changes in levels of their cost efficiency after mergers. However, some of the firms that merged with other banking institutions demonstrated significant declines in their cost efficiency that would most likely be attributable factors such as overstaffing due to the combined workforce, the long

learning curve of management on how to best use technology to reduce costs, and increase operational costs occasioned by the integration of operations from the two previously independent institutions. Secondly, it emerged that a decline (or no change) in CE does not necessarily translate to profit efficiency for the combined bank. This is because the staff who are responsible for bringing new business are not able to generate revenues to offset their expenses which are fixed and this affects both the cost efficiency and profit efficiency. Thirdly, the findings showed that after the mergers and takeovers, the combined commercial banks continued to realize profits against declining cost efficiency and relatively low profit efficiency because they are key players in lending to the government through the low risk treasury bonds and bills, from which they realize good returns.

5.3. Conclusions

As noted earlier, the overall level of cost efficiency was higher than the level of profit efficiency (Figure 4.1). This indicates that on the average combined banks did not operate at constant returns to scale and did not efficiently select their input combinations. The findings indicate that although some of the Kenyan banks have become much bigger as a result of industry-wide consolidation that occurred in the late 1990s and early 2000s, size alone is not a sufficient condition to guarantee efficiency in terms of economies of scale and success. This would be consistent with prior studies that found medium-sized banks being slightly more scale efficient than large banks (Mester, 1987; Humphrey, 1990; Berger, Hunter and Timme, 1993). These banks may still be suffering from post-merger blues and may have fallen short of sound management planning resulting in the conditions mentioned above. This implies that bank mergers in general are a complex proposition and may result in disruptions rather than construct competence within the short term. For example, problems may emerge such as systems and staff integration, staff cuts and bank branches closure, rejuvenating confidence and refocusing on business. The issue of human capital is rather crucial in the first stages of merger and often redundancies lead to interruption of services, which is usually followed by public backlash. According to Central Bank of Kenya, effect of the merging exercise during the late 1990s and early 2000s led to closure of some branches, whilst other branches were

relocated and a significant number of staff left the banking industry as a result of the overall decline in profitability that was being experienced in the industry as at then.

5.4. Limitations of the Study

The computation of cost and revenue efficiency did not put into consideration other determinants of efficiency other than the financial variables specified as inputs and outputs in the key models applied. Previous studies have indicated that the structure of regulation and organization, risk management practices, and competition may affect efficiency by influencing a financial institution's ability to transform inputs to maximum profits at minimal costs. These and other determinants of combined banks' efficiency were excluded from key models due to the associated measurement. Secondly, the study covered a partly 14 institutions out the 35 initially targeted as per the design due to inadequate documentation of financial variables for the years under study as well as some of the institutions. However, the results obtained in this research provide insight into the operating status of combined banks and suggest a future approach for measuring relative efficiencies in this field

5.5. Recommendations

Since performance is a relative measure, the comparison of the productivity growth among the banks proves to be useful in enhancing competition in the banking industry especially after the progress achieved in the restructuring and consolidation of the banking system. This research framework can be expanded by including more commercial banks or financial institutions that were excluded due to deficiency of documented data. The study can also be extended to other industries that are experiencing robust merger activities such as manufacturing, telecommunication, and hospitality.

References

Aigner, D., Lovell, K., & Schmidt, P., (1977) "Formulation and estimation of stochastic frontier production function models", Journal of Econometrics, 21-37

Allen F., and Santomero M.A. (1996) The Theory of Financial Intermediation: The Wharton Financial Institutions Center

Banerjee, A., and Eckard E.W., (1998) "Are mega-mergers anticompetitive? Evidence from the first great merger wave", Rand Journal of Economics, 29: 803-827.

Barr, R., & Siems T., (1994) "Predicting bank failure using DEA to quantify management Quality", Federal Reserve Bank of Dallas, Financial Industry Studies Working Paper No. 1-94

Bauer P., Berger A., Ferrier G., & Humphrey D., (1998) "Consistency Conditions for Regulatory Analysis of Financial Institutions: A Comparison of Frontier Efficiency Methods", Journal of Economics and Business, 50, 85-114.

Beena P. L., (2004) "Towards Understanding the Merger Wave in the Indian Corporate Sector – a Comparative Perspective", Working Paper 355, February, CDS, Trivandrum, pp 1-44

Berger, A., & DeYoung R., (1997) "Problems loans and cost efficiency in commercial banks" Journal of Banking and Finance 21, 849-870.

Berger, A. N., (2000), "The Integration of the Financial Services Industry: Where are the Efficiencies?", FEDS Paper No. 2000-36.

Berger, A. N., Demsetz R. S., & Strahan P.E., (1999) "The consolidation of the financial services industry: Causes, consequences, and implications for the future," Journal of Banking & Finance 23, 135-194.

Berger, A.N., Hunter, W.C and Timme, S.G., (1993), "The Efficiency of Financial Institutions: A Review and Preview of Research Past, Present, and Future", Journal of Banking and Finance, Vol 17, pp. 221-249.

Berger, A. N., & Mester, L. J., (1997a), "Inside the black box: What explains differences in the efficiencies of financial institutions", Journal of Banking and Finance, July, (21)7, 895-947

Berger, A.N., & Mester, L. J., (1997b), "Efficiency and Productivity Change in the U.S. Commercial Banking Industry: A Comparison of the 1980s and 1990s", Working Paper No. 97-5, A paper presented at the Conference on Service Sector Productivity and the Productivity Paradox, Centre for the Study of Living Standards, Ottawa, Ontario, April 11-12, 1997.

Berkovitch, E., and Narayanan M. P., (1993) "Motives for Takeovers: An Empirical Investigation", Journal of Financial and Quantitative Analysis 76(1), 347-362.

Bhattacharya, A., Lovell, C.A.K., and Sahay, P. (1997). "The impact of liberalization on the productive efficiency of Indian commercial banks", European Journal of Operational Research, 98, 332-345.

Black, B., (1989), "Bidder Overpayment in Takeovers", Stanford Law Review Vol. 41, No. 3, 597-660, Feb., 1989.

Carney, William J., (2000) Mergers and Acquisitions: New York: Foundation Press

Cartwright, S., & Schoenberg, R., (2006). "Thirty Years of Mergers and Acquisitions Research: Recent Advances and Future Opportunities", British Journal of Management 17 (S1): S1–S5.

Cates, D.C. (1985) "Bank Risk and Predicting Bank Failure" Issues in Bank Regulation 9, 16-20

Cefis, E., S. Rosenkranz, and U. Weitzel, (2008) "Effects of coordinated strategies on product and process R&D", Journal of Economics, DOI 10.1007/s00712-008-0041-7

Central Bank of Kenya (2005) Banking Supervision Annual Report 2005; Nairobi: CBK

Charnes, A., Cooper, W.W., & Rhodes, E., (1978) "Measuring efficiency of decision making units", European Journal of Operations Research 2: 429-44

Chatterjee, S., (1986) "Types of Synergy and Economic Value: The Impact of Acquisitions on Merging and Rival Firms", Strategic Management Journal 7, 119-139.

Chesang C.J., (2002) "Merger Restructuring and Financial Performance of Commercial Banks in Kenya" Unpublished Dissertation, School of Business, University of Nairobi

Coelli, T., (1996) "A Guide to DEAP# Version 2.1, A Data Envelopment Analysis (Computer) Program", CEPA Working Paper 96/08.

Coelli, T.; D. S. P. Rao; and G. E. Battese., (1998) An Introduction to Efficiency and Productivity Analysis. Boston, MA: Kluwer Academic Publishers.

Cornett, M. M., & Tehranian H., (1992). "Changes in Corporate Performance Associated with Bank Acquisitions." Journal of Financial Economics 31, 211-234

DePamphilis, D., (2008). Mergers, Acquisitions, and Other Restructuring Activities. New York: Elsevier. Academic Press. pp. 740

DeLong, G. L., (2001) "Stockholder gains from focusing versus diversifying bank mergers," Journal of Financial Economics 59, 221-252.

Devos, E., P.R. Kadapakkam, and S. Krishnamurthy, S. (2008) "How Do Mergers Create Value? A Comparison of Taxes, Market Power, and Efficiency Improvements as Explanations for Synergies", Review of Financial Studies. doi:10.1093/rfs/hhn019

Dickerson, A., A.H. Gibson, and E. Tsakalotos, E. (1997) "The Impact of Acquisitions on Company Performance: Evidence from a Large Panel of UK Firms", Oxford Economic Papers 49 (3), 344-361.

Dong, M., Hirschleifer D., Richardson S., and Teoh S.H., (2006) "Does Investor Misevaluation Drive the Takeover Market?" Journal of Finance 61(2), 725-762

Fare, R., S. Grosskopf, M. N., & Zhang Z., (1994) "Productivity Growth, Technical Progress, and Efficiency Changes in Industrialized Countries", American Economic Review, 84: 66-83.

Feinberg, R. M., (1985) "Sales at Risk: A Test of the Mutual Forbearance theory of Conglomerate Behaviour", Journal of Business 58, 225-241

Fiorentino E., Karmann A., Koetter E., (2006) "The cost efficiency of German banks: A comparison of SFA and DEA" Discussion Paper Series 2: Banking and Financial Studies No 10/2006

Frydman H., (2002) "Financial Buyers in Takeovers: Focus on Cost Efficiency" Managerial Finance, Vol. 28 No. 12 pp. 1-13

Genesove, D., & Mayer C., (2001), "Loss aversion and seller behavior: Evidence from the housing market," Quarterly Journal of Economics 116, 1233-1260.

Ghosh, A., (2001) "Does operating performance really improve following corporate acquisitions?" Journal of Corporate Finance 7 pp 151-178.

Goergen, M., and L. Renneboog, (2004) "Shareholder Wealth Effects of European Domestic and Cross-Border Takeover Bids", European Financial Management 10(1), 9-45.

Gugler, K., D.C. Mueller, Yurtoglu B.B., and C. Zulehner, (2003) "The effects of mergers: an international comparison", International Journal of Industrial Organization 21, 625-653.

Hannan, T.H., & Rhoades, S.A., (1989), "Rhoades acquisition targets and motives: the case of the banking industry", Review of Economics and Statistics, Vol. 69 No. 1, pp 67-74.

Harford, J., (1999) "Corporate Cash Reserves and Acquisitions", Journal of Finance 54 (6), 1969-1997.

Hasbrouck, J., (1985) "The Characteristics of Takeover Targets: Q and Other Measures", Journal of Banking and Finance 9, 351-362.

Hayward, M. L. A., and D.C Hambrick, (1997) "Explaining the premiums paid for large acquisitions: Evidence of CEO hubris", Administrative Science Quarterly, 42: 103-127.

Healy P. M., Palepu K.G., & Ruback R. S., (1992) "Does Corporate Performance Improve After Mergers?" Journal of Financial Economics, Vol. 31, pp 135- 175

Hitt, M.A., Harrison J.S., and Ireland R.D., (2001) Mergers and Acquisitions. A Guide to Creating Value for Stakeholders, Oxford University Press, Oxford

Houston, J. F., James C. M., and Ryngaert M.D., (2001) "Where Do Merger Gains Come From? Bank Mergers from the Perspective of Insiders and Outsiders" Journal of Financial Economics 60: 285-331.

Houston, J. F., & Ryngaert M D., (1994) "The overall gains from large bank mergers," Journal of Banking & Finance 18, 1155-1176

Humphrey, D.B., (1990), "Why Do Estimates of Bank Scale Economies Differ?", Economic Review, Vol.76, pp. 38-50.

Hunter, W.C., & Wall, L.D., (1989), "Bank merger motivations: a review of the evidence and an examination of key target bank characteristics", Economic Review – Federal Reserve Bank of Atlanta, September

Jensen, M. C., (1986) "Agency Costs of Free Cash Flow, Corporate Finance and Takeovers", American Economic Review, 76, 323-329

Jondrow, J., Lovell, C. A. K., Materov, I. S., & Schmidt, P., (1982), "On the estimation of technical inefficiency in the stochastic frontier production model", Journal of Econometrics, 19: 233-238

Jovanovic, B., & Rousseau P., (2002), "The Q-theory of mergers," American Economic Review 92, 198-204.

Kahneman, D., & Tversky A., (1979), "Prospect theory: An analysis of decision under risk," Econometrica 47, 263-291.

Katuu J.M., (2003) "A survey of Factors Considered Important in Merger & Acquisition Decisions by Selected Kenyan Based Firms" Unpublished Dissertation, School of Business, University of Nairobi

Kibuthu W W , (2005) Capital markets in emerging economies: A case study of the Nairobi Stock Exchange A thesis Presented to the Faculty of Law: The Fletcher School of Law and Diplomacy

Kim, E. H., and V. Singal, (1993) "Mergers and market power: Evidence from the airline industry". American Economic Review, 83: 549-569.

Klein, P. G., (2001) "Were the acquisitive conglomerates inefficient?" Rand Journal of Economics, 32: 745-761

King, D. R., Slotegraaf, R., & Kesner, I., (2008) "Performance implications of firm resource interactions in the acquisition of R&D-intensive firms" Organization Science 19 (2): 327–340.

Kiplagat E., (2006) "Effects of Mergers on Financial Performance of Companies Listed at the NSE" Unpublished Dissertation, School of Business, University of Nairobi

Kithinji Marangu (2007) "Effects of Mergers on Financial Performance of Non Listed Banks in Kenya" Unpublished Dissertation, School of Business, University of Nairobi

Lang, L., R Stulz, and R. Walkling, (1991) "A Test of the Free Cash Flow Hypothesis: The Case of Bidder Returns" Journal of Financial Economics 29(2), 315-335.

Lewellen, W., C. Loderer, and A. Rosenfeld, (1985) "Decisions and Executive Stock Ownership in Acquiring Firms", Journal of Accounting and Economics 7, 209-231.

Limam, I., (2001). Measuring Technical Efficiency of Kuwaiti Banks'. Economic Working Paper, Kuwait, Arab Planning Institute

Looney, S.W., Wansley J.W., & Lane W.R., (1989) "An Examination of Misclassifications with Bank Failure Prediction Models" Journal of Economics and Business 41, 327-336.

Luhatkin, M., (1983) 'Mergers and Performance of the Acquiring Firm', Academy of Management Review, Vol. 8, No. 2, April, pp 218-225

Maddigan, R., & Zaima, J., (1985) "The Profitability of Vertical Integration", Managerial and Decision Economics 6 (3): 178–179

Mantravadi P., & Reddy V.A., (2008) "Post-Merger Performance of Acquiring Firms from Different Industries in India" International Research Journal of Finance and Economics Issue 22 (2008)

Malmendier, U., and G. Tate, (2005) "CEO Overconfidence and Corporate Investment", Journal of Finance 60(6), 2661-2700

Manne, H.G., (1965) "Mergers and the Market for Corporate Control", Journal of Political Economy 73, 110-120.

Marris, R.L. (1963) "A Model of 'Managerial' Enterprise" Quarterly Journal of Economics 77(2), 185-209

Martynova, M., and Renneboog L., (2008) "A Century of Corporate Takeovers:What Have We Learned and Where Do We Stand?" Journal of Banking and Finance 32(10), 2148-2177.

Mester, L.J., (1996a), "A study of bank efficiency taking into account risk-preferences", Journal of Banking and Finance, July, 1025-1045

Mester, L., J., (1996b), "Measuring efficiency at U.S. Banks: Accounting for heterogeneity is important", Working Paper No. 96-11/R, Federal Reserve Bank of Philadelphia and Finance Department, The Wharton School, University of Pennsylvania.

Mester, L J, (1987), "A Multi-product Cost Study of Savings and Loans", Journal of Finance,Vol 42, pp 423-45

Motta, M., (2004) Competition Policy Theory and Practice. Cambridge University Press, Cambridge

Mueller, D.C., (1969) "A Theory of Conglomerate Mergers", Quarterly Journal of Economics 83, 643-659.

Mukherjee, T. K., Kiymaz H., and Baker H. K., (2004) "Merger Motives and Target Valuation: A Survey of Evidence from CFO's" Journal of Applied Finance 14: 7-24.

Muya C. M., (2006) "A Survey of Experiences of Mergers" Unpublished Dissertation, School of Business, University of Nairobi

Njoroge F. W., (2007) "A Survey of Mergers & Acquisitions Experiences by Commercial Banks in Kenya" Unpublished Dissertation, School of Business, University of Nairobi

Nyagah B. W., (2007) "Doctor's perception of mergers & acquisitions in the pharmaceutical industry in Kenya" Unpublished Dissertation, School of Business, University of Nairobi

Palepu, K. G., (1986) "Predicting Takeover Targets: A Methodological and Empirical Analysis", Journal of Accounting and Economics 8, 3-35.

Pawaskar V., (2001) "Effect of Mergers on Corporate Performance in India", Vikalpa, Vol.26, No.1, January – March, pp 19-32

Peristiani, S., (1997) "Do Mergers Improve the X-Efficiency and Scale Efficiency of U.S. Banks? Evidence from the 1980s." Journal of Money, Credit, and Banking 29, 326-337.

Prager, R. A., (1992) "The effects of horizontal mergers on competition: The case of the Northern Securities Company". Rand Journal of Economics, 23: 123-133.

Puranam, P., and Singh H., (1999) "Rethinking M&A for the high technology sector". Wharton School Working Paper. Presented at AOM 2000 meetings.

Rau, P.R., and Vermaelen T., (1998) "Glamour, Value and the Post-Acquisition Performance of Acquiring Firms", Journal of Financial Economics 49, 101-116.

Ravenscraft, D.J., and Scherer F.M., (1987) Mergers, Sell-offs and Economic Efficiency. The Brookings Institution. Washington,DC.

Republic of Kenya (1999) Republic of Kenya/Monopolies and Prices Commission: Annual Report, p.16

Republic of Kenya/Monopolies and Prices Commission, (1990) A Simplified Guideline to Restrictive Trade Practices, Monopolies and Price Control Act, 1988. Nairobi: Government Printers.

Rhoades, S.A., (1983) Power, Empire Building and Mergers. D.C Heath & Co. Lexington MA.

Rhoades, S. A., (1994) "A Summary of Merger Performance Studies in Banking, 1980-1993, and an Assessment of the 'Operating Performance' and 'Event Study' Methodologies." Federal Reserve Board, Staff Study 169.

Roll, R., (1986) "The Hubris Hypothesis of Corporate Takeovers", Journal of Business 59, 197-216.

Rudi V. V., (2000) Cost and profit efficiency of financial conglomerates and universal banks in Europe: Hoveniersberg: University of Ghent. Department of Financial Economics.

Sapienza, P., (2002) "The Effects of Banking Mergers on Loan Contracts". The Journal of Finance LVII: 329-367.

Seballos, L.D., & Thomson J.B., (1990) "Underlying Causes of Commercial Bank Failures in the 1980s" Economic Commentary, Federal Reserve Bank of Clevelend

Shleifer, A., and R.W. Vishny, (1989) "Management Entrenchment: The Case of Manager-specific Investments", Journal of Financial Economics 25(1), 123-139.

Surjit K., (2002) "A Study of Corporate Takeovers in India", PhD Thesis Abstract, submitted to University of Delhi, pp 1-11

Trimbath, S., Frydman H., & Frydman R., (2001) "Cost Inefficiency, Size of Firms and Takeovers," Review of Quantitative Finance and Accounting, 17(4), p. 397-420.

Wesonga M., (2006) "A Survey of the Factors that Determine the Choice of Mergers & Acquisition Partners in Kenya" Unpublished Dissertation, School of Business, University of Nairobi

Weston, F.J., M L. Mitchell and H.J. Mulherin. (2004) Takeovers, Restructuring and Corporate Governance, Pearson Prentice Hall, Upple Saddle River, New Jersey.

Williamson, O. E., (1964) The Economics of Discretionary Behavior, Prentice-Hall, Englewood Cliffs: New Jersey

Yash Pal Bansal (2005) "Process & Challenges in the Merger Between Apollo & Pan Africa General Insurance Companies"

Appendix I: List of Commercial Banks in Kenya as at June 2009

1. African Banking Corporation Ltd
2. Bank of Africa Kenya Ltd
3. Bank of Baroda (K) Ltd
4. Bank of India
5. Barclays Bank of Kenya Ltd
6. CFC Stanbic Bank Ltd
7. Charterhouse Bank Ltd
8. Chase Bank Ltd
9. Citibank NA Kenya
10. City Finance Bank Ltd
11. Co-operative Bank of Kenya Ltd
12. Commercial Bank of Africa Ltd
13. Consolidated Bank of Kenya
14. Credit Bank
15. Development Bank of Kenya
16. Diamond Trust Bank Ltd
17. Dubai Bank Kenya Ltd
18. EABS Bank Ltd
19. Equatorial Commercial Bank Ltd
20. Equity Bank Ltd
21. Family Bank Ltd
22. Fidelity Commercial Bank
23. Fina Bank Ltd
24. Giro Commercial Bank Ltd
25. Guardian Bank Ltd
26. Habib Bank A.G. Zurich
27. Habib Bank Ltd
28. Imperial Bank Ltd
29. Investments & Mortgages Bank Ltd
30. K-Rep Bank Ltd
31. Kenya Commercial Bank Ltd
32. Middle East Bank Ltd
33. National Bank of Kenya Ltd
34. National Industrial Credit Bank Ltd
35. Oriental Commercial Bank Ltd
36. Paramount Universal Bank Ltd
37. Prime Bank Ltd
38. Southern Credit Banking Corporation Ltd
39. Standard Chartered Bank (K) Ltd
40. Transnational Bank Ltd
41. Victoria Commercial Bank Ltd

Source: Central Bank of Kenya (2009)

Appendix II: M&As in the Banking Industry Since 1994

	Institution	Merged with	Current name
1	Indosueze Merchant Finance	Banque Indosuez	Credit Agricole Indisueze
2	Transnational Finance	Transnational Bank Ltd	Transnational Bank Ltd
3	Ken Baroda Finance Ltd	Bank of Baroda (K) Ltd	Bank of Baroda (K) Ltd
4	First American Finance Ltd	First American Bank Ltd	First American Bank (K) Ltd
5	Bank of India	Bank of India Finance Ltd	Bank of India (Africa) Ltd
6	Stanbic Bank (K) Ltd	Stanbic Finance (K) Ltd	Stanbic Bank (K) Ltd
7	Mercantile Finance Ltd.	Ambank Ltd	Ambank Ltd
8	Delphis Finance Ltd	Delphis Bank Ltd	Delphis Bank Ltd
9	CBA Financial Services Ltd	Commercial Bank of Africa Ltd	Commercial Bank of Africa Ltd
10	Trust Finance Ltd	Trust Bank (K) Ltd	Trust Bank (K) Ltd
11	National Industrial Credit Bank Ltd	African Mercantile Banking Corp	NIC Bank Ltd
12	Giro Bank Ltd	Commerce Bank Ltd	Giro Commercial Bank
13	Guardian Bank Ltd	First National Finance Bank Ltd	Guardian Bank Ltd
14	Diamond Trust Bank (K) Ltd	Premier Savings and Finance Ltd	Diamond Trust Bank (K) Ltd
15	National Bank of Kenya Ltd	Kenya National Capital Corp	National bank of Kenya Ltd
16	Standard Chartered Bank (K) Ltd	Standard Chartered Financial	Standard Chartered Bank (K) Ltd
17	Barclays Bank of Kenya Ltd	Barclays Merchant Finance Ltd	Barclays Bank of Kenya Ltd
18	Habib A. G. Zurich	Habib Africa Bank Ltd	Habib Bank A G Zurich
19	Guilders International Bank Ltd	Guardian Bank Ltd	Guardian Bank Ltd
20	Universal Bank Ltd	Paramount Bank Ltd	Paramount Universal Bank Ltd
21	Kenya Commercial Bank Ltd	Kenya Commercial Finance Co. Ltd	Kenya Commercial Bank Ltd
22	Bullion Bank Ltd	Southern Credit Bank Ltd	Southern Credit Banking Corp Ltd
23	Citibank NA	ABN Amro Bank Ltd	Citibank NA
24	CFC Bank Limited	Stanbic Bank (K) Ltd	CFC Stanbic Bank Limited
25	Equity Bank Limited	Uganda Microfinance Limited	Equity Bank Kenya Limited

Source: Central Bank of Kenya (Various Annual Reports)

Appendix III: DEA Cost Efficiency Results

HABIB BANK

Before Merger

```
Results from DEAP Version 2.1

Instruction file = HAB1-in.txt
Data file        = HAB1.txt

 Cost efficiency DEA

 Scale assumption: VRS


 EFFICIENCY SUMMARY:

 Year      te      ae      ce
    1   0.837   0.907   0.759
    2   0.866   0.904   0.784
    3   0.968   0.870   0.842
    4   0.971   0.855   0.831
    5   1.000   1.000   1.000

 mean   0.928   0.907   0.843
```

After Merger

```
Results from DEAP Version 2.1

Instruction file = HAB2-in.txt
Data file        = HAB2.txt

 Cost efficiency DEA

 Scale assumption: VRS


 EFFICIENCY SUMMARY:

Year      te      ae      ce
    1   0.850   0.633   0.538
    2   0.850   0.629   0.534
    3   0.842   0.700   0.589
    4   0.872   0.771   0.672
    5   1.000   1.000   1.000
```

```
mean  0.883  0.747  0.667
```

Universal Paramount BANK

Before Merger

```
Results from DEAP Version 2.1

Instruction file = UNI1-in.txt
Data file        = UNI1.txt

 Cost efficiency DEA

 Scale assumption: VRS


 EFFICIENCY SUMMARY:

 Year     te     ae     ce
    1  1.000  0.400  0.400
    2  0.924  0.584  0.540
    3  0.821  0.657  0.539
    4  0.727  0.329  0.239
    5  1.000  1.000  1.000

 mean  0.894  0.594  0.544
```

After Merger

```
Results from DEAP Version 2.1

Instruction file = UNI2-in.txt
Data file        = UNI2.txt

 Cost efficiency DEA

 Scale assumption: VRS


 EFFICIENCY SUMMARY:

 Year     te     ae     ce
    1  0.938  0.930  0.872
```

```
    2  0.875  0.824  0.721
    3  1.000  0.883  0.883
    4  1.000  0.949  0.949
    5  1.000  1.000  1.000

 mean  0.963  0.917  0.885
```

Kenya Commercial BANK

Before Merger

```
Results from DEAP Version 2.1

Instruction file = KCB1-in.txt
Data file        = KCB1.txt

 Cost efficiency DEA

 Scale assumption: VRS


 EFFICIENCY SUMMARY:

 Year     te     ae     ce
    1  0.491  0.762  0.374
    2  0.493  0.768  0.379
    3  0.700  0.862  0.603
    4  0.854  0.986  0.842
    5  1.000  1.000  1.000

 mean  0.707  0.876  0.640
```

After Merger

```
Results from DEAP Version 2.1

Instruction file = KCB2-in.txt
Data file        = KCB2.txt

 Cost efficiency DEA
```

```
Scale assumption: VRS

EFFICIENCY SUMMARY:

Year      te      ae      ce
   1   0.724   0.675   0.489
   2   1.000   0.601   0.601
   3   1.000   0.715   0.715
   4   1.000   1.000   1.000
   5   1.000   1.000   1.000

mean   0.945   0.798   0.761
```

CITIBANK

Before Merger

```
Results from DEAP Version 2.1

Instruction file = CIT1-in.txt
Data file        = CIT1.txt

Cost efficiency DEA

Scale assumption: VRS

EFFICIENCY SUMMARY:

Year      te      ae      ce
   1   0.535   0.847   0.454
   2   0.582   0.761   0.443
   3   1.000   0.908   0.908
   4   1.000   1.000   1.000
   5   1.000   1.000   1.000

mean   0.824   0.903   0.761
```

After Merger

Results from DEAP Version 2.1

Instruction file = CIT2-in.txt
Data file = CIT2.txt

Cost efficiency DEA

Scale assumption: VRS

EFFICIENCY SUMMARY:

Year	te	ae	ce
1	0.608	0.829	0.504
2	0.600	0.892	0.536
3	0.729	0.952	0.694
4	1.000	1.000	1.000
5	1.000	1.000	1.000
mean	0.788	0.935	0.747

CO-OPERATIVE BANK

Before Merger

Results from DEAP Version 2.1

Instruction file = COP1-in.txt
Data file = COP1.txt

Cost efficiency DEA

Scale assumption: VRS

EFFICIENCY SUMMARY:

Year	te	ae	ce
1	0.979	0.835	0.818
2	1.000	0.888	0.888
3	0.966	0.963	0.930

```
    4  0.988  0.971  0.959
    5  1.000  1.000  1.000

 mean  0.987  0.931  0.919
```

After Merger

```
Results from DEAP Version 2.1

Instruction file = COP2-in.txt
Data file        = COP2.txt

 Cost efficiency DEA

 Scale assumption: VRS


 EFFICIENCY SUMMARY:

 Year     te     ae     ce
    1  1.000  0.908  0.908
    2  1.000  1.000  1.000
    3  1.000  1.000  1.000
    4  1.000  0.829  0.829
    5  1.000  1.000  1.000

 mean  1.000  0.947  0.947
```

I&M BANK

Before Merger

```
Results from DEAP Version 2.1

Instruction file = I&M1-in.txt
Data file        = I&M1.txt

 Cost efficiency DEA

 Scale assumption: VRS
```

EFFICIENCY SUMMARY:

firm	te	ae	ce
1	0.567	0.518	0.294
2	0.606	0.988	0.599
3	0.868	0.937	0.812
4	0.962	0.917	0.882
5	1.000	1.000	1.000
mean	0.801	0.872	0.718

After Merger

Results from DEAP Version 2.1

Instruction file = I&M2-in.txt
Data file = I&M2.txt

Cost efficiency DEA

Scale assumption: VRS

EFFICIENCY SUMMARY:

Year	te	ae	ce
1	1.000	1.000	1.000
2	0.960	0.932	0.895
3	1.000	1.000	1.000
4	1.000	0.998	0.998
5	1.000	1.000	1.000
mean	0.992	0.986	0.978

GUARDIAN BANK

Before Merger

Results from DEAP Version 2.1

```
Instruction file = GDN1-in.txt
Data file        = GDN1.txt

 Cost efficiency DEA

 Scale assumption: VRS


 EFFICIENCY SUMMARY:

 Year      te      ae      ce
    1   0.990   0.809   0.800
    2   0.990   0.815   0.806
    3   1.000   0.860   0.860
    4   0.997   0.919   0.916
    5   1.000   1.000   1.000

 mean   0.995   0.880   0.876
```

After Merger

```
Results from DEAP Version 2.1

Instruction file = GDN2-in.txt
Data file        = GDN2.txt

 Cost efficiency DEA

 Scale assumption: VRS


 EFFICIENCY SUMMARY:

 Year      te      ae      ce
    1   0.611   0.934   0.571
    2   0.702   0.937   0.658
    3   0.827   0.998   0.825
    4   1.000   1.000   1.000
    5   1.000   1.000   1.000

 mean   0.828   0.974   0.811
```

Barclays BANK

Before Merger

```
Results from DEAP Version 2.1

Instruction file = BBK1-in.txt
Data file        = BBK1.txt

 Cost efficiency DEA

 Scale assumption: VRS


 EFFICIENCY SUMMARY:

 Year      te      ae      ce
    1  0.961   0.888   0.853
    2  0.968   0.886   0.858
    3  0.971   0.874   0.849
    4  0.980   0.878   0.861
    5  1.000   1.000   1.000

 mean  0.976   0.905   0.884
```

After Merger

```
Results from DEAP Version 2.1

Instruction file = BBK2-in.txt
Data file        = BBK2.txt

 Cost efficiency DEA

 Scale assumption: VRS


 EFFICIENCY SUMMARY:

Year      te      ae      ce
    1  0.983   0.809   0.795
    2  0.904   0.855   0.772
    3  0.961   0.895   0.860
    4  1.000   0.854   0.854
    5  1.000   1.000   1.000
```

mean 0.969 0.883 0.856

COMMERCIAL BANK OF AFRICA

Before Merger

Results from DEAP Version 2.1

Instruction file = CBA-ins.txt
Data file = CBA-dta.txt

Cost efficiency DEA

Scale assumption: VRS

EFFICIENCY SUMMARY:

Year	te	ae	ce
1	0.857	0.982	0.842
2	0.910	0.996	0.906
3	0.948	0.995	0.943
4	0.978	1.000	0.977
5	1.000	1.000	1.000
mean	0.939	0.994	0.934

After Merger

Results from DEAP Version 2.1

Instruction file = SBA-ins.txt
Data file = SBA-dta.txt

Cost efficiency DEA

Scale assumption: VRS

EFFICIENCY SUMMARY:

Year	te	ae	ce
1	0.498	0.994	0.495
2	0.536	0.985	0.528
3	0.946	0.809	0.765
4	1.000	1.000	1.000
5	1.000	1.000	1.000
mean	0.796	0.958	0.757

DIAMOND TRUST BANK

Before Merger

Results from DEAP Version 2.1

Instruction file : DTK1-in.txt
Data file = DTK1.txt

Cost efficiency DEA

Scale assumption: VRS

EFFICIENCY SUMMARY:

Year	te	ae	ce
1	1.000	0.407	0.407
2	0.987	0.419	0.414
3	0.900	0.454	0.408
4	0.912	0.449	0.410
5	1.000	1.000	1.000
mean	0.960	0.546	0.528

After Merger

Results from DEAP Version 2.1

Instruction file = DTK2-in.txt

```
Data file          = DTK2.txt

 Cost efficiency DEA

 Scale assumption: VRS


 EFFICIENCY SUMMARY:

 Year      te      ae      ce
    1   0.631   0.993   0.626
    2   0.713   0.991   0.706
    3   1.000   0.969   0.969
    4   1.000   0.967   0.967
    5   1.000   1.000   1.000

 mean   0.869   0.984   0.853
```

GIRO BANK

Before Merger

```
Results from DEAP Version 2.1

Instruction file = GIR1-in.txt
Data file        = GIRO1.txt

 Cost efficiency DEA

 Scale assumption: VRS


 EFFICIENCY SUMMARY:

 Year      te      ae      ce
    1   1.000   0.540   0.540
    2   0.855   0.573   0.490
    3   1.000   0.518   0.518
    4   0.914   0.418   0.382
    5   1.000   1.000   1.000

 mean   0.954   0.610   0.586
```

After Merger

```
Results from DEAP Version 2.1

Instruction file = GIR2-in.txt
Data file        = GIRO2.txt

 Cost efficiency DEA

 Scale assumption: VRS


 EFFICIENCY SUMMARY:

 Year      te      ae      ce
    1   0.846   0.822   0.696
    2   0.926   0.787   0.728
    3   0.949   0.796   0.755
    4   0.895   0.900   0.805
    5   1.000   1.000   1.000

 mean   0.923   0.861   0.797
```

NATIONAL BANK

Before Merger

```
Results from DEAP Version 2.1

Instruction file   NBK1-in.txt
Data file          = NBK1.txt

 Cost efficiency DEA

 Scale assumption: VRS


 EFFICIENCY SUMMARY:

 Year      te      ae      ce
```

```
    1  0.995  0.343  0.341
    2  0.974  0.342  0.333
    3  0.977  0.381  0.372
    4  1.000  0.379  0.379
    5  1.000  1.000  1.000

 mean  0.989  0.489  0.485
```

After Merger

```
Results from DEAP Version 2.1

Instruction file = NBK2-in.txt
Data file        = NBK2.txt

 Cost efficiency DEA

 Scale assumption: VRS


 EFFICIENCY SUMMARY:

 Year     te     ae     ce
    1  0.742  0.942  0.699
    2  1.000  0.964  0.964
    3  1.000  1.000  1.000
    4  0.840  0.958  0.805
    5  1.000  1.000  1.000

 mean  0.916  0.973  0.894
```

NIC BANK

Before Merger

```
Results from DEAP Version 2.1

Instruction file = NIC1-in.txt
Data file        = NIC1.txt

 Cost efficiency DEA
```

Scale assumption: VRS

EFFICIENCY SUMMARY:

Year	te	ae	ce
1	1.000	1.000	1.000
2	0.955	0.998	0.954
3	0.946	0.995	0.941
4	0.972	0.999	0.971
5	1.000	1.000	1.000
mean	0.975	0.998	0.973

After Merger

Results from DEAP Version 2.1

Instruction file - NIC2-in.txt
Data file = NIC2.txt

Cost efficiency DEA

Scale assumption: VRS

EFFICIENCY SUMMARY:

Year	te	ae	ce
1	0.360	0.998	0.360
2	0.832	0.914	0.761
3	0.793	0.993	0.788
4	0.919	0.984	0.904
5	1.000	1.000	1.000
mean	0.781	0.978	0.762

STANCHART BANK

Before Merger

```
Results from DEAP Version 2.1

Instruction file = SCB1-in.txt
Data file        = SCB1.txt

 Cost efficiency DEA

 Scale assumption: VRS


 EFFICIENCY SUMMARY:

 Year      te      ae      ce
    1   0.975   0.798   0.778
    2   0.957   0.820   0.784
    3   0.967   0.815   0.788
    4   0.984   0.808   0.795
    5   1.000   1.000   1.000

 mean   0.977   0.848   0.829
```

After Merger

```
Results from DEAP Version 2.1

Instruction file = SCB2-in.txt
Data file        = SCB2.txt

 Cost efficiency DEA

 Scale assumption: VRS


 EFFICIENCY SUMMARY:

 Year      te      ae      ce
    1   1.000   0.836   0.836
    2   0.955   0.830   0.793
    3   0.907   0.802   0.728
    4   0.876   0.850   0.745
    5   1.000   1.000   1.000

 mean   0.948   0.864   0.820
```

Appendix IV: DEA Scale Efficiency Results

HABIB BANK

Before Merger

```
Results from DEAP Version 2.1

Instruction file = HAB1-in.txt
Data file        = HAB1.txt

 Scale efficiency DEA

 Scale assumption: CRS


 EFFICIENCY SUMMARY:

 Year      te      ae      pe
    1   0.200   0.843   0.169
    2   0.400   0.775   0.310
    3   0.600   0.827   0.496
    4   0.800   0.723   0.578
    5   1.000   1.000   1.000

 mean   0.600   0.834   0.511
```

After Merger

```
Results from DEAP Version 2.1

Instruction file   HAB1-in.txt
Data file        = HAB1.txt

 Scale efficiency DEA

 Scale assumption: CRS


 EFFICIENCY SUMMARY:

Year      te      ae      pe
    1   0.233   1.000   0.233
```

2	0.400	0.939	0.376
3	0.600	0.836	0.502
4	0.800	0.968	0.775
5	1.000	1.000	1.000
mean	0.607	0.949	0.577

Universal Paramount BANK

Before Merger

Results from DEAP Version 2.1

Instruction file = UNV1-in.txt
Data file = UNV1.txt

Scale efficiency DEA

Scale assumption: CRS

EFFICIENCY SUMMARY:

Year	te	ae	pe
1	0.247	0.506	0.125
2	0.488	0.342	0.167
3	0.706	0.177	0.125
4	1.000	1.000	1.000
5	1.000	0.060	0.060
mean	0.688	0.417	0.295

After Merger

Results from DEAP Version 2.1

Instruction file = UNV1-in.txt
Data file = UNV1.txt

Scale efficiency DEA

Scale assumption: CRS

EFFICIENCY SUMMARY:

Year	te	ae	pe
1	0.200	0.706	0.141
2	0.400	1.000	0.400
3	0.800	1.000	0.800
4	0.873	1.000	0.873
5	1.000	1.000	1.000
mean	0.655	0.941	0.643

Kenya Commercial BANK

Before Merger

Results from DEAP Version 2.1

Instruction file = KCB1-in.txt
Data file = KCB1.txt

Scale efficiency DEA

Scale assumption: CRS

EFFICIENCY SUMMARY:

Year	te	ae	pe
1	0.200	0.000	0.000
2	0.400	0.000	0.000
3	0.600	0.000	0.000
4	0.800	1.000	0.800
5	1.000	1.000	1.000
mean	0.600	0.400	0.360

After Merger

Results from DEAP Version 2.1

Instruction file = KCB1-in.txt
Data file = KCB1.txt

Scale efficiency DEA

Scale assumption: CRS

EFFICIENCY SUMMARY:

Year	te	ae	pe
1	0.427	0.000	0.000
2	1.000	1.000	1.000
3	0.826	0.000	0.000
4	1.000	0.000	0.000
5	1.000	0.000	0.000
mean	0.851	0.200	0.200

CITIBANK

Before Merger

Results from DEAP Version 2.1

Instruction file = CIT1-in.txt
Data file = CIT1.txt

Scale efficiency DEA

Scale assumption: CRS

EFFICIENCY SUMMARY:

Year	te	ae	pe
1	0.251	1.000	0.251
2	0.437	0.991	0.433
3	0.749	1.000	0.748
4	1.000	1.000	1.000
5	1.000	0.985	0.985
mean	0.687	0.995	0.684

After Merger

```
Results from DEAP Version 2.1

Instruction file = CIT1-in.txt
Data file        = CIT1.txt

 Scale efficiency DEA

 Scale assumption: CRS


 EFFICIENCY SUMMARY:

Year      te      ae      pe
    1   0.229   0.556   0.127
    2   0.411   0.374   0.154
    3   0.666   0.486   0.323
    4   1.000   1.000   1.000
    5   1.000   0.346   0.346

 mean   0.661   0.552   0.390
```

CO-OPERATIVE BANK

Before Merger

```
Results from DEAP Version 2.1

Instruction file = COP1-in.txt
Data file        = COP1.txt

 Scale efficiency DEA

 Scale assumption: CRS


 EFFICIENCY SUMMARY:

 Year      te      ae      pe
```

```
    1   0.200   0.000   0.000
    2   0.400   0.000   0.000
    3   0.600   1.000   0.600
    4   0.800   1.000   0.800
    5   1.000   1.000   1.000

 mean   0.600   0.600   0.480
```

After Merger

```
Results from DEAP Version 2.1

Instruction file = COP1-in.txt
Data file        = COP1.txt

 Scale efficiency DEA

 Scale assumption: CRS


 EFFICIENCY SUMMARY:

Year      te      ae      pe
    1   1.000   1.000   1.000
    2   0.762   0.000   0.000
    3   1.000   0.000   0.000
    4   1.000   0.000   0.000
    5   1.000   0.000   0.000

 mean   0.952   0.200   0.200
```

I&M BANK

Before Merger

```
Results from DEAP Version 2.1

Instruction file = I&M1-in.txt
Data file        = I&M1.txt

 Scale efficiency DEA
```

Scale assumption: CRS

EFFICIENCY SUMMARY:

Year	te	ae	pe
1	0.200	0.362	0.072
2	0.400	0.449	0.180
3	0.600	0.894	0.536
4	0.800	0.765	0.612
5	1.000	1.000	1.000
mean	0.600	0.694	0.480

After Merger

Results from DEAP Version 2.1

Instruction file = I&M1-in.txt
Data file = I&M1.txt

Scale efficiency DEA

Scale assumption: CRS

EFFICIENCY SUMMARY:

Year	te	ae	pe
1	1.000	1.000	1.000
2	0.837	0.914	0.765
3	0.975	0.901	0.879
4	1.000	0.892	0.892
5	1.000	0.582	0.582
mean	0.962	0.858	0.824

GUARDIAN BANK

Before Merger

```
Results from DEAP Version 2.1

Instruction file = GDN1-in.txt
Data file        = GDN1.txt

 Scale efficiency DEA

 Scale assumption: CRS


 EFFICIENCY SUMMARY:

 Year      te      ae      pe
    1   0.260   1.000   0.260
    2   0.400   0.929   0.371
    3   0.600   0.722   0.433
    4   0.800   0.619   0.495
    5   1.000   1.000   1.000

 mean   0.612   0.854   0.512
```

After Merger

```
Results from DEAP Version 2.1

Instruction file = GDN1-in.txt
Data file        = GDN1.txt

 Scale efficiency DEA

 Scale assumption: CRS


 EFFICIENCY SUMMARY:

Year      te      ae      pe
    1   0.248   1.000   0.248
    2   0.400   0.929   0.371
    3   0.600   0.929   0.557
    4   0.800   0.813   0.650
    5   1.000   1.000   1.000

 mean   0.610   0.934   0.565
```

Barclays BANK

Before Merger

```
Results from DEAP Version 2.1

Instruction file - BBK1-in.txt
Data file        = BBK1.txt

 Scale efficiency DEA

 Scale assumption: CRS


 EFFICIENCY SUMMARY:

 Year      te      ae      pe
    1  0.271   1.000   0.271
    2  0.524   1.000   0.524
    3  0.739   1.000   0.739
    4  0.904   1.000   0.904
    5  1.000   1.000   1.000

 mean  0.688   1.000   0.688
```

After Merger

```
Results from DEAP Version 2.1

Instruction file = BBK1-in.txt
Data file        = BBK1.txt

 Scale efficiency DEA

 Scale assumption: CRS


 EFFICIENCY SUMMARY:

 Year      te      ae      pe
    1  0.229   0.828   0.190
    2  0.474   0.886   0.420
    3  0.630   0.717   0.452
    4  1.000   1.000   1.000
```

5	1.000	0.669	0.669
mean	0.667	0.820	0.546

COMMERCIAL BANK OF AFRICA

Before Merger

Results from DEAP Version 2.1

Instruction file = CBA-ins.txt
Data file = CBA-dta.txt

Scale efficiency DEA

Scale assumption: CRS

EFFICIENCY SUMMARY:

Year	te	ae	pe
1	0.200	0.876	0.175
2	0.417	1.000	0.417
3	0.658	1.000	0.658
4	0.854	1.000	0.854
5	1.000	1.000	1.000
mean	0.626	0.975	0.621

After Merger

Results from DEAP Version 2.1

Instruction file = CBA-ins.txt
Data file = CBA-dta.txt

Scale efficiency DEA

Scale assumption: CRS

EFFICIENCY SUMMARY:

Year	te	ae	pe
1	0.200	0.721	0.144
2	0.400	0.696	0.279
3	0.600	0.699	0.419
4	0.800	1.000	0.800
5	1.000	1.000	1.000
mean	0.600	0.823	0.528

DIAMOND TRUST BANK

Before Merger

Results from DEAP Version 2.1

Instruction file = DTK-ins.txt
Data file = DTK-dta.txt

Scale efficiency DEA

Scale assumption: CRS

EFFICIENCY SUMMARY:

Year	te	ae	pe
1	0.200	0.876	0.175
2	0.417	1.000	0.417
3	0.658	1.000	0.658
4	0.854	1.000	0.854
5	1.000	1.000	1.000
mean	0.626	0.975	0.621

After Merger

```
Results from DEAP Version 2.1

Instruction file = DTK-ins.txt
Data file        = DTK-dta.txt

Scale efficiency DEA

Scale assumption: CRS


 EFFICIENCY SUMMARY:

 Year      te      ae      pe
    1   0.224   0.489   0.110
    2   0.404   0.421   0.170
    3   1.000   1.000   1.000
    4   1.000   0.602   0.602
    5   1.000   0.417   0.417

 mean   0.726   0.586   0.460
```

GIRO BANK

Before Merger

```
Results from DEAP Version 2.1

Instruction file = GIR-ins.txt
Data file        = GIR-dta.txt

Scale efficiency DEA

Scale assumption: CRS


 EFFICIENCY SUMMARY:

 Year      te      ae      pe
    1   0.267   1.000   0.267
    2   0.400   0.889   0.356
    3   0.600   0.615   0.369
```

```
    4   0.800   0.552   0.441
    5   1.000   1.000   1.000

 mean   0.613   0.811   0.487
```

After Merger

```
Results from DEAP Version 2.1

Instruction file = GIR-ins.txt
Data file        = GIR-dta.txt

Scale efficiency DEA

Scale assumption: CRS


 EFFICIENCY SUMMARY:

 Year      te      ae      pe
    1   0.388   1.000   0.388
    2   0.660   1.000   0.660
    3   0.660   1.000   0.660
    4   0.800   1.000   0.800
    5   1.000   1.000   1.000

 mean   0.702   1.000   0.702
```

NATIONAL BANK

Before Merger

```
Results from DEAP Version 2.1

Instruction file = NBK-ins.txt
Data file        = NBK-dta.txt

Scale efficiency DEA

Scale assumption: CRS
```

EFFICIENCY SUMMARY:

Year	te	ae	pe
1	0.200	0.000	0.000
2	0.400	0.000	0.000
3	0.600	0.000	0.000
4	0.800	0.000	0.000
5	1.000	1.000	1.000
mean	0.600	0.200	0.200

After Merger

Results from DEAP Version 2.1

Instruction file = NBK-ins.txt
Data file = NBK-dta.txt

Scale efficiency DEA

Scale assumption: CRS

EFFICIENCY SUMMARY:

Year	te	ae	pe
1	0.333	1.000	0.333
2	0.667	1.000	0.667
3	1.000	1.000	1.000
4	0.872	0.000	0.000
5	1.000	0.000	0.000
mean	0.774	0.600	0.400

NIC BANK

Before Merger

Results from DEAP Version 2.1

```
Instruction file = NIC-ins.txt
Data file        = NIC-dta.txt

Scale efficiency DEA

Scale assumption: CRS


 EFFICIENCY SUMMARY:

 Year      te      ae      pe
    1   0.257   1.000   0.257
    2   0.481   1.000   0.481
    3   0.692   1.000   0.692
    4   0.843   1.000   0.843
    5   1.000   1.000   1.000

 mean   0.655   1.000   0.655
```

After Merger

```
Results from DEAP Version 2.1

Instruction file = NIC-ins.txt
Data file        = NIC-dta.txt

Scale efficiency DEA

Scale assumption: CRS


 EFFICIENCY SUMMARY:

 Year      te      ae      pe
    1   0.200   0.639   0.128
    2   0.400   0.865   0.346
    3   0.600   0.818   0.491
    4   0.800   0.836   0.669
    5   1.000   1.000   1.000

 mean   0.600   0.831   0.527
```

STANCHART BANK

Results from DEAP Version 2.1

Instruction file = SCB-ins.txt
Data file = SCB-dta.txt

Scale efficiency DEA

Scale assumption: CRS

EFFICIENCY SUMMARY:

Year	te	ae	pe
1	0.279	1.000	0.279
2	0.577	1.000	0.577
3	0.802	1.000	0.802
4	1.000	1.000	1.000
5	1.000	0.960	0.960
mean	0.732	0.992	0.724

After Merger

Results from DEAP Version 2.1

Instruction file = SCB-ins.txt
Data file = SCB-dta.txt

Scale efficiency DEA

Scale assumption: CRS

EFFICIENCY SUMMARY:

Year	te	ae	pe
1	0.313	1.000	0.313
2	0.506	1.000	0.506
3	0.744	1.000	0.744
4	0.999	1.000	0.999
5	1.000	1.000	1.000
mean	0.712	1.000	0.712