IMPACT OF RETIREMENT BENEFITS REGULATIONS ON THE

COST EFFICIENCY OF RETIREMENT BENEFITS SCHEMES IN
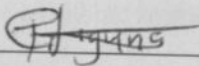
KENYA

BY:

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A MANAGEMENT RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF DEGREE OF MASTER OF BUSINESS ADMINISTRATION, SCHOOL OF BUSINESS, UNIVERSITY OF NAIROBI

DECLARATION

This research project is my original work and has not been submitted for a degree in any other university.
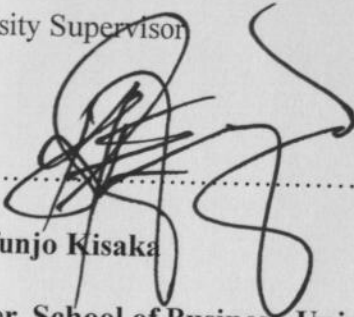
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This research project has been forwarded for examination with my approval as the University Supervisor

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DEDICATION

I dedicate this research work to my family and friends who stood by me throughout this programme and inspired me immensely.

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ABSTRACT

The purpose of this study is to investigate whether the introduction of Retirement Benefit Act of 1997 increased the cost efficiency of retirement benefits schemes in Kenya. The objective of the study was to examine the impact of Retirement Benefits Regulations (2000) on the cost efficiency of retirement benefit schemes in Kenya. The study compared cost efficiency between the two periods: pre and post introduction of regulations. The population was 2176 occupational retirement benefit schemes registered with Retirement Benefits Authority in Kenya as at January 2010. A random sample of 30 retirement benefits schemes was selected for the purpose of this study. Preferences were given to those pension schemes that have been in operation since 1991. The study period was from the year 1991 to 2009.

To measure cost efficiency level of schemes in Kenya, the Stochastic Econometric cost function which involves the estimation of the cost function and the derivation of the cost efficiency estimate based on the deviation from the efficient frontier was used and analysis of data was done through correlation and regression analysis.

Pearson correlation results indicate that is high positive correlation between cost efficiency and pension paid out to members and regulation dummy indicating Cost efficiency is determined by pension paid out to members and regulation dummy. Graphical representation of cost efficiency shows that that cost efficiency in pension scheme sector has been increasing steadily from 1991 to 2009. Therefore, it can be concluded that the introduction of regulation increased the cost efficiency among the pension schemes. Comparative test between the two periods pre and post introduction of

regulation indicates that the two periods are weakly correlated. The paired samples t-test statistics is 9.028 and significance indicating the two periods are not related and are independent of each. This result shows that there is slight improvement in cost efficiency after introduction of retirement benefit scheme regulation.

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ABBREVIATIONS

Cap   Chapter

CEO   Chief executive Officer

RBA   Retirement Benefit Authority

RBS   Retirement Benefits Schemes

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Although pension systems are capable of affording social benefits, administrative costs are necessary for managing them effectively. However, if operational expenses to maintain pension schemes are excessive relative to the benefits accruing to the insured from them, their significance will be reduced to a great extent (Kim et al. 1996). Thus, options for enhancing the efficient and effective management of public pension schemes need to be searched for by measuring their managerial efficiency.

Cost efficiency is a key concept for financial institutions (Circa et.al 2002) It has direct relationship with profitability, competitiveness and solvency of financial institutions. It helps in benchmarking and also in evaluation of the impact of various regulations on these institutions.

There have been a few previous studies on administrative costs of public pension schemes such as Kim et al. (1996), Mitchell et al. (1994), Mitchell (1996), James and Palacios (1995), Yoon et al. (1999a). However, the stochastic cost frontier model, which measures inefficiency as the deviation of actual cost from minimal feasible cost by using a stochastic cost function including multiple outputs and multiple input prices, has been used scantly to assess the operational efficiency of public pension s c h e m e s .

The need for efficiency is paramount for all industries including the pensions industry. Generally, efficiency refers to the relationship between outputs of a given system and the corresponding inputs used in their production. Efficiency is a relative measure which

reflects the deviations from the maximum attainable output for a given level of input (Kwanand and Eisenbes, 1996).

The efficiency of an administrative organization means the ratio of outputs to inputs required for producing a particular service and its operational efficiency can be defined as the extent that a particular organization can achieve the missions assigned to it using minimal resources (Yoon et al., 1999).

The operational efficiency of a public pension scheme indicates the ability of a public pension corporation to obtain maximal outputs from a given set of inputs or to minimize a set of inputs, given the level of outputs. Basically, operational efficiency is based on Farrell's (1957) productive efficiency that is composed of technical efficiency, which reflects the ability of a firm to obtain maximal outputs from a given set of inputs, and allocative efficiency, which reflects the ability of a firm to use the inputs in optimal proportions, given their respective prices and the production t e c h n o l o g y If the stochastic production frontier model is used, operational efficiency is calculated by technical efficiency, while if the stochastic cost frontier is employed, it is measured by cost efficiency.Generally speaking, a pension scheme is likely to aim at minimizing input costs to accomplish the given level of outputs by restructuring its organization, replacing human resources, and utilizing physical capital in a more efficient manner. If a pension corporation has excessive personnel or spends too much overhead expenses relative to the optimal size of its services, its managerial efficiency is reduced. Cost efficiency needs to be enhanced by minimizing input costs necessary for producing a given amount of outputs in order to improve operational efficiency (Kim et al., 1996).This study focuses on the cost minimization of inputs to be used for producing a

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given level of outputs of a public pension corporation and measures the operational cost efficiency of retirement benefits schemes. Here the deviation of observed cost from minimal feasible cost is regarded as cost inefficiency and cost efficiency is measured by the ratio of minimal feasible cost to actual cost.

Most studies on the efficiency of financial institutions have addressed the issue of efficiency either in terms of scale, scope or in term of cost efficiency or both. Scale efficiency refers to the economy brought about by joint operations i.e the cost of providing joint firm's services is less than the sum of firms stand alone operations (Kwanand and Eisenbes, 1996).

Scale efficiency refers to the economies brought about by providing joint operations i.e. the cost of providing joint operations is less than stand alone operations. According to Limam (2001), scale efficiency addresses the question whether a firm is operating at the minimum of its long run average cost curve. Scope efficiency on the other hand is measured by the difference between the cost of joint production and the sum of producing the different outputs individually. Scope efficiency refers to the number of different types of services offered by firms and their effect on cost of production and ability to raise revenue (Berger et.al, 2001)

Cost efficiency stems from technical efficiency .Cost efficiency refers to how close a firm's actual costs are to the costs of the best practice firm producing same outputs. Cost inefficiency occurs when a business uses more input than necessary for a given level of output (technical inefficiency) or because they employ an input mix that does not minimise costs for a given input price vector (locative inefficiency) (Berger, 2000).

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Technical efficiency measures the extent to which banks could reduce input costs for given levels of output (input orientation) or expand output for given levels of output (output orientation). Technical efficiency could be deterministic or stochastic and gives the maximum output that can be attained for a given level input or minimum cost for a given level of output and input prices (Garcia, 2007).

Cost efficiency attempts to measure the degree of waste and friction in the production process. Allocative efficiency measures whether the right levels of various inputs have been used to produce a given level of output. Firm efficiency measures vary depending on the cost definitions and the estimation methodology. Emphasis has been given to the comparison of alternative frontier cost efficiency methodology (Cummins et.al 1997) which can be classified as econometric studies and mathematical techniques.

In this study, cost efficiency will be used i.e the extent to which pension funds management companies usually incur minimum costs in their operations to produce a given level of output. Firms total cost will be modelled to deviate from the cost efficient frontier due to random noise and possibly cost inefficiency. Pension schemes must obey regulations. Thus, the competent authority has powers to obtain regularly the statement of investment policy principles, the annual accounts and the reports and all documents necessary for the supervision (Varian, 1987).

This study analysed the impact of retirement benefits sector regulation on the cost efficiency of pension schemes using Stochastic Efficient Frontier Approach. The study covered the period 1991 to 2009 to determine whether or not the regulations have improved the cost efficiency of Kenyan Pension funds management firms. Measurement

of cost efficiency of pension funds was used to benchmark against best practice and secondly it helped to evaluate the impact of various policy measures on the efficiency and performance of these institutions

1.1.1 Overview of Pensions Sector in Kenya

The provision of the Retirement Benefits sector dates back to the colonial period mainly after World War II when the Pensions Act (Cap 189) of 1946 came into place. Even with this Act, there were no formal pension plans as those that existed were discriminatory alongside racial lines and largely operated from England (Omondi 1988). After independence, discrimination witnessed during the colonial era came to an end ushering in more formal pension plans. However, provident funds predominated pension plans (Omondi 1988.)

Regulations of the retirement benefits sector for along time has been under numerous Acts of Parliament according which lacked harmony according to Thumbi (1996) and Raichura, S. and A.Mureithi (2000). Those numerous Acts include The Trustee Act (cap 167), The Provident Fund Act (cap 191) and the NSSF Act (Cap 258). In spite of these Acts there still existed cases of funds misappropriation poor investment of member's funds, denial and delay of payments to members and beneficiaries and unfunded schemes. Thus, the Retirement Benefits Authority was enacted in 1997 principally to establish a Retirement Benefits Authority for the regulation, supervision and promotion of development of the Retirement Benefits sector and became operational in 2000 (RBA News 2000)

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1.1.2 Types of Retirement Benefit Schemes

There are two types of retirement benefit schemes in Kenya:- Benefit Schemes

Occupational Retirement Benefit Schemes

This is an arrangement where the employer establishes to provide retirement benefits for its employees .Such an employer is referred to as the sponsor or founder.

Individual Retirement Benefit Schemes

They are normally established and run by insurance companies and are available to any member of the public who may be self employed or persons though employed do not belong to an employer sponsored retirement benefit scheme

Private retirement benefit schemes may further be classified into pension schemes or provident schemes. In both, members make contributions into the fund during the period they are employed. However, the difference comes in the manner in which benefits are paid. Pension scheme benefits are paid out in the form of periodic payments while the ones in a provident fund are paid in form of a single lumpsum amount. Also, there are hybrid pension schemes where a lumpsum is paid and the remainder is paid as part monthly pension.

Pension schemes can further be divided into defined benefits and defined contributions. In defined benefits, members' benefits will be paid based on certain criteria taking into account a retiring member's final salary and depending on the number of years he has worked. In defined contribution schemes, a member is responsible for the eventual pension benefit that he will receive and the benefits received depends on the

contributions that the member has made into the fund during his working life and investment earnings thereof.

1.2 Statement of the Problem

With RBA Act in place, both positive and negative consequences have been experienced. In particular, fee structures must be changed along with the operating and regulatory framework both of which generate high costs for fund operators and individual affiliates. This necessitates the study of X- efficiency of Kenya's retirement benefit schemes.

Although retirement benefit schemes are capable of affording social benefits, administrative costs are necessary for managing them effectively. However, if operational expenses to maintain retirement benefits schemes are excessive relative to benefits accruing to them , their significance will be reduced to a great extent.The Study of cost efficiency of pension schemes has been done globally: Kim et.al.(1996), Mitchell et.al.(1994), Mitchell (1996), James and Palacious (1995), Yoon et al (1999) and Yoo (2002). These, prior studies have been conducted with reference to the economies of scale and scope in social insurances, the administrative costs associated with public and private retirement systems, the ratio of administrative costs to social security benefit expenditures, and the determinants of administrative costs in public pension schemes. Research that focuses on measuring the cost efficiency of schemes and assessing the impact of regulatory systems is scant and most studies have focussed on pension fund management companies.

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Locally, various studies on regulations have been done. Wanyama (2001), Wanjuki (2004) and Kusewa (2007). Wanyama (2001) conducted a surveyed on compliance to regulations by investment managers and concluded that most firms did not comply leading operational inefficiencies.Wanjuki (2004) studied the impact of regulations on management practices of insured firms and concluded that regulations have both positive and negative effect. Kusewa (2007) studied the impact of regulations on financial performance of RBS and concluded that there was a positive impact on their financial performance.

In Kenya, various studies have covered on the impact of retirement benefits sector regulations on investments, financial and management practices but to the researchers knowledge no study on the impact the regulations have on cost efficiency have been done. This is the research gap filled by this study. The study answered the question: Has the introduction of Retirement Benefit Act of 1997 increased the cost efficiency of pension fund management companies in Kenya?

The expectation of my study was that the retirement benefit sector regulations have led to an increase in cost efficiency since they restrict firm's discretionary power and influences adoption of efficient procedures. This study contributes further evidence on retirement benefit regulations by identifying their impact on cost efficiency of pension funds management companies in Kenya.

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1.3 Objective of the Study

To examine the impact of Retirement Benefits Regulations (2000) on the cost efficiency of retirement benefit schemes in Kenya

1.4 Importance of the Study

Being the body that enforce regulations, the government of Kenya would be interested to know whether the regulations have so far achieved the objectives for which they were put in place. Further, pensions schemes have become one of the largest institutional investors and their performance would impact on the performance of the financial markets in general. Thus, the government ought to ensure that regulation, accounting and governance is adequate in these funds so as to safeguard both the provision of adequate retirement incomes for its citizens and to ensure enhanced efficiency in operations and costs. Also, there have been reforms undertaken in the sector of strengthening and thus the government would be interested both in justifying the efforts and resources put into the regulation of the sector.

This study provides insight to the scheme administrators when making operational decisions. Optimal allocation of resources, optimal input mix can be understood so as to help them obtain maximum output from minimal cost. This increases operational efficiency

The stakeholders in the industry namely RBA, Commissioner of Insurance and Capital Markets Authority are able to know the positive and negative effects on management of the firms. This provides information on opportunities for performance improvement and

helps develop a framework that can enhance competition in the industry through benchmarking.

Findings of this study are useful to provide information to professional organisations that provide advisory or consultancy services on cost efficiency to the regulators. These organisations can also get useful data for further research and also academicians who may be interested in conducting further research.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of the literature related to the subject of the study as prescribed by various scholars, researchers, analysts and authors. The chapter is organised as follows: Section 2.2 describes efficiency of pension schemes; Section 2.3 describes retirement benefit sector regulations Kenya in Africa, section 2.4 details cost estimation methods; 2.5 describes the empirical studies and section 2.6 presents a summary of the study.

2.2 Efficiency of pension schemes

The evidence available are the average performance of pension funds relative to external benchmark has been disappointing (Ippolito et al). On the other hand, pension funds seem to follow similar investment strategies, so that identifying performance significantly above mean is difficult (Thomas and Tonics 2001). Recent evidence taking performance persistent into consideration suggests that these appear to be a role for active fund management a pension funds (Tonks 2003). However, no allowance was made for costs of fund management.

According to Stanko (2002) the rate of return on pension systems was much lower than the rate of inflation in Poland. He demonstrated that the investment skills of fund managers were positive and concluded that it is the design of the system and its operational costs that contribute to low efficiency.Stanko (2002) further argue that many pension schemes are not costs effective and that the incentives produced by the fees and the peer based performance measurement frameworks have a detrimental impact an

active investment management. He argues that considerable cost improvements can be obtained by immediate corrections but fundamental changes in the regulatory system ought to be changed in particular, the fee structure should be rearranged to create better motivation for active management and this can be achieved if only the penalty institution of minimal required rate of return is abandoned.

Feldstein (1980) argues that the level of charges is driven by the level of competitors (profit margin for financial institutions) and by the environment designed by the state. The costs are shouldered on the insured though not directly. In general, the cost structure of the retirement system consists of two main sub-systems. The first represents the financial intermediaries' operational costs which mainly covers starts up investments record keeping and communication expenses, treatment costs and marketing expenditure. To a certain extent their actions are restricted by existing legislation and regulatory framework. The biggest item is related to marketing expenditure. The second group consists of mandatory costs and is of more interest as it is the state that defines the costs and at what level they must be borne. The main positions include fee for the central collected (social insurance institution, system guarantees, supervision, information disclosure and opportunity costs of minimum required rate of return.

James et al (2000) observes that small accounts result in higher costs per assets and lower net returns and therefore lower pensions. Small accounts are inevitably suffering form relatively high or even economically prohibitive transaction costs (Lucas 2001).

Regulatory systems in pension fund create a stable and predictable demand for treasury bills, from institutional investors and maker financing of the state deficit cheaper and

operational. However, the cost of indirectly by citizens especially the young enforced investment in safe instruments lowers the expected rate of return of their pension portfolio and in effect endangers future pensions. The potential benefits of lower taxes due to the reduced costs of financing the state deficit debt are quite illusionary as the state taxes and expenses are usually difficult to moderate. In addition the cost of asset management becomes higher in relation to the overall risk profile managed portfolio of pension fund, James (2000)

Miranda (1996) states that the estimated measures of technical efficiency provide evidence on the performance of the pension fund management market over time, the limits on competition and the effects of fees regulation pension fund managers. He concludes that potential technical efficiency in the market are significant and that there is no evidence of a sustained upward trend in cost efficiency overtime.

The design of pension plans in Chile encourages an individual choice of pension fund manager as a means of ensuring that competitive forces prevail. In order to facilitate this choice pension products are standard, fees are uniform for all affiliates and secondary products are closely regulated. Pension plan participants in Chile are expected to compare rates of return, fees and services quality between the different pension fund managers and to transfer their accounts to the one with the best deal. The number of transfers would seem to indicate a healthy measure of competition but the variation in the number of transfers over time is largely explained by regulatory changes. (Berger 1993).

Although there funds are not directly comparable some evidence highlights the developments of certain important patterns. The costs including operating and investment

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management costs are higher for small funds than for large funds in compassion to defined contribution funds (Hannah, et al 1986). The costs of personal pension funds are much higher than those of company plans, given the lack of economies of scale, advertising experience commission costs and market power of providers (Hurd 1990, Black 1994).

Miranda (1996) states that the estimated measures of technical efficiency provide evidence on the performance of the pension fund management market over time, the limits on competition and the effects of fees regulation pension fund managers. He concludes that potential technical efficiency in the market are significant and that there is no evidence of a sustained upward trend in cost efficiency overtime.

Pension fund management industry reacts to competition by trying to increase the efficiency of input usage. One procedure adopted for improving competitiveness is benchmarking which results form research carried out into industry's best practices and is based on the data that the widespread application of these practices can lead to improved performance throughout the whole industry (Berge et al 2001).

The evidence available are the average performance of pension funds relative to external benchmark has been disappointing (Ippolito et al). On the other hand, pension funds seem to follow similar investment strategies, so that identifying performance significantly above mean is difficult (Thomas and Tonics 2001). Recent evidence taking performance persistent into consideration suggests that these appear to be a role for active fund management a pension funds (Tonks 2003). However, no allowance was made for costs of fund management.

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Boussifiane et al, (1991) states that a production unit will use a variety of resources to produce a unit of output of standard quality. Ideally, one would want to include all inputs and all outputs by the firm in measuring cost efficiency but in practice the selection of inputs and outputs should be restricted to those that can be measured with accurately. The selection of inputs and outputs is restricted by the one of the sample of the units observed. He further suggests that the product of the number of inputs and outputs is a reasonable indicator of the minimum number of units needed to prevents a distortion of the efficiency measures. A further issue with the selection of inputs and outputs refers to the under lying conceptualization of production in financial services. The issue here is to identify what it is that financial provides produce. Related literature applying DEA to the banking sector has identified two different approaches (Ferner and Lovell 1990). One approach stresses the intermediation function of financial providers between saves and borrowers. Within this approach the output of the baking sector can be identified as and measured by the value of loans extended. A second approach, the production approach identifies outputs with baking services and products measured by the value of accounts and transactions. In many respects, pension fund managers resemble banks but of the two approaches mentioned the intermediation approach is inappropriate especially given the dedicated nature of retirement savings accounts, the restricted liquidity of retirement savings and the investment regulations. The production approach is preferable. Pension fund managers employ labor services, use capital equipment and buildings and employee marketing services to attract and retain affiliates.

Regulatory systems in pension fund create a stable and predictable demand for treasury bills, from institutional investors and maker financing of the state deficit cheaper and

operational. However, the cost of indirectly by citizens especially the young enforced investment in safe instruments lowers the expected rate of return of their pension portfolio and in effect endangers future pensions. The potential benefits of lower taxes due to the reduced costs of financing the state deficit debt are quite illusionary as the state taxes and expenses are usually difficult to moderate. In addition the cost of asset management becomes higher in relation to the overall risk profile managed portfolio of pension fund, James (2000)

An important issue in regard to reforms implementation is dead accounts. Many of the participant in Poland applied to more than one fund as a result of malpractice during the enrolment campaign. Others signed contracts unaware that they simply could not join the system. In effect pension fund accounts decreased since many accounts never received any contribution. This caused the cost of inactive accounts to rise (Wojclechowski, 2002). One more problem observed during the reform period by Poland pension funds was concentration of their investments in the stock market. A steady requirement for far assets from the funds can, in light a foreign investment restrictions distort the supply and demand balance in the long run.

According to Balake (2000) barriers to foreign investment are not only constituted by investment ceiling. The costs of overseas operations costs are borne by the fund administrators while the domestic operation costs are transferred to the fund, themselves such a situation created a strong distinctive to opening position in foreign instruments. In addition, regulations do not offer clear regulations and ways to heat the exchange rate risk.

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2.3 Retirement Benefit Sector Regulations in Kenya

2.3.1 Pre – Regulation

Before the enactment of retirement benefit act of 1997 and the subsequent retirement benefits authority became operational within the constraints imposed by various acts of parliament, which at times caused confusion within the sector. These Acts were: Trustee Act, Pensions Act (Cap 189),Provident Fund Act (Cap 19) and NSSF Act (Cap 258)

Trustee Act (Cap 167)

This act relates to Trustee, it was enacted in 1929 and implies that a trustee could invest in any securities authorized by law of England given by a city or municipal council. Also investments could be made in shares subjects to trust and also in shares of a building society. Other provisions exist with regard to maintenance and advancement of trustee and personnel representative and powers of the court.

Pensions Act (Cap 189)

This was enacted in 1952 and provides for the grant and regulatory of pensions and gratuities. The ct requires that the Minkler shall grant all pension gratuities and allowance. The Act also provides regulations regularly retirement on abolition of office, termination of service, compulsory retirement and the maximum pension to be paid. In terms of termination of services, an individual who terminates service in public interest does not have a pension gratuity or allowance granted to him or her. There also exist a provision that of a person is sentenced to imprisonment, the pension or allowance ceases. The Act also cites provision for pensions and allowances during bankruptcy and during

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the death of an individual. It is however noteworthy that these prosperous are not exhaustive of what is contained in the Acts themselves.

Provident Fund Act (Cap 1991)

This was enaction in 1951, it was meant to cater for certain categories of employees. The objective of the Act was to establish a provident fund for certain employees and to provide for contribution to the fund by those employees. The Act provide that the deposits in the fund should mainly be government employees. Legislation regarding the amount of deposit is included in the Act. There is also provision or payment in care of death of a depositor.

NSSF Act (Cap 258)

This was enacted in 1965 and revised in 1987 to make NSSF a state corporation. The fund was set to provide modalities for contributions by both employees and employees towards the benefits payable to the employee attaining age or in the case of death of such employee to the beneficiaries. The reference toward employer implies government of Kenya. This Act sets rule sand regulations to govern the Administration of the fund as well as the investment of the contributions paid to the fund which is managed by a board of trustees.

In spite of the Acts, misappropriation of scheme fund, poor investments of members funds, delay/denied in benefits/payments to members and unfunded schemes existed. Thus, the government of Kenya in 1997 embarked on an overhaul of the retirement funds industry, previously plagued with mismanagement and appropriation of pension schemes assets. This led to the enactment of RBA Act aimed at specifically regulatory a market

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which lacked a harmonized structure (RBA press 2000) the absence of specific Retirement Benefit Regulations allowed schemes to adopt different styles of operations. In most cases sponsors dominated the operations of the industry while members were marginalized. Poor records were kept and hence benefits could not be determined well in time of retirement. Odudo 2005 CEO of RBA states that what led to enactment of Retirement Benefit Act was the global acceptance that state provided pension was inadequate and unsustainable in the long run and the realization that a well managed retirement benefit industry was imperative for enhanced mobilization of domestic benefit industry at the time.

Due to lack of proper investment policies there lacked proper management of costs and risk (Gitu 2002). Also, poor record keeping and different style of operations. Rocha et al (2001) argue that clear rules in the board composition, voting rights and duties and responsibilities of board members can help improve and minimize agency costs and risks. Stringent regulations for trustees are essential since they are the linch pin of schemes (Raichura S and A Mureithi 2000). They are responsible for among others ensuring the scheme is of all times managed in accordance with the act, retirement benefit regulations scheme rules and any directives given by the CEO of RBA so as to improve efficiency of the funds.

2.3.2 Regulations

The government decided that the retirement benefit sector out to be regulation in the interest of public good and governance and thus RBA was an integral part of the ongoing financial reform process in Kenya. Beset by problems in retirement benefit sector, Kenya

enacted the Retirement Benefit Act (1997) and Retirement Benefit Regulations (2000) to lay a solid foundation for the industry in the country (RBA, Annual Report, July 1999-June 2000). According to Retirement Benefit Authority, main problems of concerns were denied or delayed payments, diversion of system funds into sponsors business and questionable investments.

The Act and Regulations of the Retirement Benefits Sector has various provisions: It requires the establishment of a Retirement Benefit Authority which will help eliminate the problems that predominated the sector when the Acts were in operation.

The retirement benefit schemes and managers ought to be to be registered as per section 22 and imposes a fine for failure to abide to the requirement. The aim of this registration was to have all schemes established under an irrevocable Trust and the funds maintained separately from any other funds thus protect interest of members. Also, fund managers are required to be registered as per section 25 where the company should be limited Liability company and has minimum paid capital.

Trustees are supposed to be competent as per section 26 to help improve fund governance and help minimise agency costs. Section 32 (1) of Act requires every scheme except one funded out of the consolidated fund to have a scheme fund into which all contributions, investment earnings income and all other moneys are payable under the scheme rules or the provisions of the Act be paid. Section 38(1) stipulates the restrictions on use of scheme funds to make direct or indirect loan to any person. The Act place responsibility of proper maintenance books of accounts and records on trustees who will ensure among others that audited accounts are furnished to RBA four months after end of each financial

year to ensure transparency and accountability. Section (37) requires every scheme to have a prudent investment policy which is to be implemented subject to the provisions of any regulations made by the Minister of Finance as empowered in section 55 (RBA annual report, July 1999-June 2000).A levy on contributions made to scheme funds is also imposed by RBA. Failure of payment of this levy attracts a penalty of 5% of amount due each month. Also, regular actuarial valuation of schemes assets is required to be done and this attracts valuation fee. With these regulations in place, the pension industry would enhance harmony and greater efficiency within the sector.

An analysis of Thumbi findings on the investment of pension and provident find shows mixed effects in the regulations. In his critique of pension management in Kenya, Thumbi (1996) highlighted the following major shortcoming; that most trustee had wide powers than trustee act allowed and could thus invest scheme funds the way they deem fit an act that definitely puts scheme funds at risk and that self administered schemes faced numerous problem. Abolition of in house management of scheme funds by Act and requiring schemes to appoint professional managers will address the problem.

Since the coming into effect of retirement benefit Act and regulations, the pension funds become more structured and organized (Keizi 2006) leading to increased operational efficiency. This is because they require fund from the schemes to be invested by professional managers and be held by independent custodians vetted and approved by retirement benefit authority. The introduction of retirement benefit Act brought about major changes in the administration of Retirement Benefit scheme. One of the changes is clear division of tasks among the participants in the sector. Such as custodian and fund

managers (RBA) News/ Sept 2001). The RBA require a split in the administration

investment and custodial services. This enhanced efficiency during the period.

Other aspects that have emerged with enactment is compliance. However, according to

Mutua (2003) only 10% of retirement benefit schemes had as at the end of 2002 compiled

with all the requirements of the Act. Thus the regulations had not had a direct impact of

most funds.

2.3.3 Post Regulation

Generally, regulation of retirement benefit sector is expected to have led to an

improvement in cost efficiency of pension funds. However following from the theory of

economic regulation could have a negative effect on the industry, Stigler (1971).

Regulation of the retirement benefit sector in Kenya has brought about some limitations

on the operations of pension schemes e.g. entity of new players into the sector is

controlled by the requirement for registration with retirement benefit authority in

accordance with section 23 of Retirement Benefit Act. In order to register pension funds

are required to have established scheme rules that adequately protect the interests of

sponsors and members. Regulations has also led to increase in administration costs of

retirement benefit a schemes (Kusewa 2007).

Entry requirements for pension fund managers include a minimum capital requirement

and fit and proper licensing. The evolution in the number of pension fund managers

suggest that market entry is not too difficult and that aggressive marketing from new

entrants can secure some market share initially. This increases costs i.e. marketing costs

and also heavy set up costs for these funds (RBA news 2002). Most pension fund

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managers began to reinsure against disability and survivor liabilities which is reflected in a step change in their cost structure. This accelerates the operational costs of these companies.

2.4 Review of Models

The idea of measuring a firm's performance in respect to the best practice frontier goes back to the 1950's. The theoretical framework will be based on various studies of literature capturing mathematical and econometric models.

2.4.1 Models of the industry

Two competing models of efficiency exist in literature; the strategic group theory (Cave and Porter, 1997) explain, differences in efficiency scores as being due to differences in the structural characteristics of units within an industry which in turn lead to differences in performance. In the case of pension scheme units with similar asset configurations pursue similar strategies with similar results in terms of performance (Porter, 1979). As these are different sectors of an industry, because of mobility impediments not all option are available to each pension funds management company, causing a spread in the efficiency scores of the industry.

By contrast resource based theory (Burney, 1991; Remult 1991; Wenerfelt, 1984) accounts for different efficiency scores in terms of heterogeneity efficiency scores in terms of heterogeneity of resources and capabilities on which retailers base their strategies. These may not be perfectly mobile across the industry resulting in a competitive advantage for the best performing retailers .Purchasable assets cannot be considered to represent sources of sustainable efficiency. Indeed, critical resources are

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not available in the market. Rather they are built up and accumulation on the pension

funds Management Company (Teece et al, 1997)

2.4.2 Risk Rating

The Base II accord advocates the use of the risk rating as an alternative way to captive

basic efficiency. One measure used under this approach is value at Risk which is defined

as the loss to an investment. Portfolio due to an adverse market move (Saidenburg and

Schurmann 2003). If is a scalar means and army not incorporate all different aspects of

the highly dimensional problems that it summarizes. Risk Rating also capture credit risk

concentration risk, interest rate risk and operational risk. Operational risk is defined as

the risk of direct or indirect loss resulting from inadequate or failed internal processes

people, systems or from external events thus capturing X-efficiency.

2.4.3 Accounting Ratios

This method use accounting data to measure scheme management costs and value for

fund. They include Return of Assets, Return on Capital Employed, and Return on

Investment among others. However, the model measures efficiency on basis of structural

components yet there are differences in capital structure business mix and accounting

standard which may affect the industry and firm accounting information hence it is not a

good measure.

2.4.4 Data Envelopment Analysis

Data Envelopment Analysis (DEA) is a non parametric technique which has been used to

compare the technical efficiency of relatively homogenous sets of production units.

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Initially it was developed to compare technical efficiency of public sector and not for profit production units (Chames, Cooper et al, 1978) but more recently it has been applied successfully to the financial sector (Fields and Murphy 1989).

DEA compares the amounts of inputs used to produce a given level of output so as to establish efficiency in production process (Barr, 1999) DEA is a linear programming technique that enables management to benchmark the best practice decision making units (DMU) in this case pension schemes, by calculating scores denoting their efficiency (Berger et al 2004). Furthermore, DEA provides estimates of the potential improvement that can be made by inefficient DMUs.

However DEA does not take account of prices and can thus only account for technical efficiency i.e. using too many inputs of producing too few outputs. (Weill 2003) it does not also account for allocative inefficiency and it is not suitable for firms that specialize in different inputs and outputs since it does not take into account relative prices (Well 2003)

2.4.5 Stochastic Frontier Model

This approach was first proposed by Farel (1957), came into prominence in the late 1970s, as a result of the work of Algner et al (1977) Batese and Corra (1977) and Meesen and Van (1977). In this method a funds observed total costs is modeled to deviate from the cost efficient frontier due to variation noise and possibility cost inefficiency. A firm is labeled inefficient if its costs or profits are lower than best practice pension fund after removing random error. The frontier is estimated econometrically and the difference between the inefficient units and the frontier is measured by residual. This technique

assumes that inefficiencies follow an asymmetric normal distribution and that both are orthogonal to the cost function exogenous variable. The advantage of this model is that it attempts to distinguish the effects of risk from effect of inefficiency and that it allows easier control of the influence of variable, in the structure of cost frontier than the DEA (well 2003). However, it imposes more structure on the shape of the frontier by specifying a function/ from of the cost function.

Due to the advantages of the stochastic cost efficient frontier models in respect to other models discussed, my study will use it to measure cost efficiency as it will help distinguish the effect of risk from effect of inefficiency.

2.5 The theory of Economic Regulation

Government intervention in the market is what we may call "Economic Regulation," Posner (1974) properly defined, the term refers to taxes and subsidies of all sorts as well as to explicit legislative and administrative controls over later entry and other facets of economic activity. Two main theories of economic regulation have been purposed. One is the "public interest" theory, bequeathed by a previous generation of economists to the present generating of lawyers. It holds that regulation is supplied in response to the demand of the public for the correction of inefficient or inequitable market practices. The second theory is the capture theory backed by an odd mixture of welfare state liberals, Marxists and free market economists. The theory holds that regulation is supplied in response to the demand of interest of groups struggling among themselves to maximize the incomes of their members the economists version is more promising.

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According to Posner, two assumptions seem to have typified thought about economic policy. One assumption was that economic markets were extremely fragile and apt to operate very inefficiently if left alone and the other was that government regulation was virtually costless. However, if this theory of regulation was correct, we would find regulation imposed mainly in highly concentrated industries (where the danger of monopoly is greatest) and in industries that generate substantial external costs or benefits which is not the case.

What is now called the economic theory of regulation was however proposed by George Stigler (1971). Stigler observed that the state or government with its machiner and power, was a potential resource or threat to every industry in the society. With its power to prohibit of compel, to take or give money, the state or government could selectively help or hurt a vast number of industries. The most important element of the theory of economic regulation is its integration of the analysis of political behavior with the larger body of economic analysis. Peltzman (1976), this means that interest groups can influence the outcome of the regulatory process by providing financial or other support to politicians or regulation.

According to Stigler the central tasks of the theory are to explain who will receive the benefits of burdens of regulation, what form regulation will take, and the effects of regulation upon the allocation of resources.

Stigler gave two view views of regulation that are widely held. First, that regulation is instituted primarily for the protection and benefit of the public at large or some large subclass of the public. Second that essentially, the political process defies rational

explanation and that there are regulations whose net effects upon the regulated industry are erroneous i.e. some regulations have a negative effect on the industry.

The theory of regulation notes four benefits that the state or government can provide to an industry. The most obvious contribution that a group may seek of the governmental industry with power to obtain government is a direct subsidy of money. An industry with power to obtain governmental favors will usually not use this power to get a direct subsidy of money. This is because a direct subsidy of money. This is because unless the list of beneficiaries can be acceptable device, whatever amount of sussidies the industry can obtain will be shared among of growing number of rivals. The second benefit the state or government can provide is control over entry of new rivals. There is considerable discussion in economic literature of the rise of peculiar price policies, vertical integration and similar devices to retard the rate of entry of new firms into oligopolistic industries the general hypothesis given by the economists was that every industry or occupation that has enough political power would seek for control of entry.

In addition, the regulatory policy would be fashioned as to retard the rate of growth of new firms. The third general set of powers of the state that will be sought by an industry are those which affect substitutes and complements. The fourth is directed to price fixing i.e. even the industry that has achieved entry control will often want price controls administered by a body with coercive powers. If the number of firms in the regulated industry is even moderately large price discrimination will be difficult to maintain in the absence of public in support. Where there are no diseconomies of large scale for the individual firm, price control is essential to achieve more than competitive rates of return.

However, these various political benefits are not obtained by the industry in a pure profit maximizing form. The regulation theory further notes that the political process effects certain limitations upon the cartel policies by an industry. First, the distribution of control of the industry is changed. In an unregulated industry, each firms influence upon price and output is proportional to its share of industry output. Political decisions take account also of the political strength of the various firms, so small firms have a larger influence than they would possess in an unregulated industry. The second limitation upon political benefits is that procedural safeguards required of public processes are costly. The delays are dictated by both law and bureaucratic thoughts of self survival can be large. Finally, the political process automatically admits powerful outsiders to the industry's councils. In conclusion, Stigler emphasizes that these limitations upon political benefits are predictable and they must enter into calculus of the profitability of an industry.

2.6 Empirical Evidence on the cost Efficiency of Pension Scheme

2.6.1 Empirical Evidence around the World

The major previous research on administrative costs of public pension schemes includes Kim et al. (1996), Mitchell et al. (1994), Mitchell(1996), James and Palacios (1995), and Yoon et al (1999a). Kim et al.(1996) analyzed the economies of scale and scope in the Medical Insurance, The National Pension, and the Industrial Accident Compensation Insurance in Korea using 1996 budget data on these social insurances. They estimated the economies of scale in social insurances with the loglinear regression model that relates a dependent variable, total cost proxied by general administrative expenses covering personnel and overhead expenses, to an independent variable, the size of operation

proxied by the number of insured persons or establishments. The empirical results showed that all social insurances such as the National Pension, the Medical Insurance, and the Industrial Accident Compensation Insurance all have economies of scale, regardless of whether the size variable is the number of insured persons or the number of establishments, suggesting that the coverage of local offices in each social insurance needs to be expanded further. They also assessed the economies of scope using a translog cost function with relation to the cash and medical care benefit affairs of the Industrial Accident Compensation Insurance, the benefit and collection affairs of the Industrial Accident Compensation Insurance, the benefit and workers management affairs of the Industrial Accident Compensation Insurance,and the individually and workplace-based insured persons management affairs of the National Pension. The empirical results indicated that there are no economies of scope for all affairs of the Industrial Accident Compensation Insurance, while there are economies of scope for those of the National Pension.

Mitchell et al. (1994) examined administrative costs as a percentage of social security benefit expenditures around the world from almost fifty developed and developing countries, finding that their mean of countries in the Organization for Economic Cooperation and Development (OECD) is 3.12%, whereas that of the developing nations of the Latin American and Caribbean region (LAC) is 27.78%. This implies that there is a great difference between administrative costs of OECD and LAC countries.

Mitchell (1996) compared administrative costs associated with the US public and private retirement systems with data from national systems in other countries, finding that administrative costs of publicly run social security systems vary a great deal across

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countries and institutional settings. She also suggested that a key factor affecting public old age program costs is the system's scale.

James and Palacios (1995) found that external factors, such as the country's per capita income and the number of workers covered by pension plans, are major determinants of administrative costs, suggesting that even though private decentralized pension plans are sometimes more expensive to administer than centralized public pensions, the resulting benefits, in terms of improved quality and higher investment returns, may outweigh the costs.

Yoon et al. (1999a) used a pooled time series analysis for the panel data from 1989 to 1998 to analyze the determinants of administrative costs in public pension,government Employees Pension and the Private School Teachers Pension.They used the log-linear model that regresses a dependent variable, administrative costs, on independent variables such as the number of insured persons, the number of beneficiaries, the number of cases for paying benefits, contributions, benefit expenditures, the number of workplaces, the number of individually insured persons, the amount of the pension reserve fund, and the number of employees. In addition, to control for the impact of the size of each public pension system on administrative costs they adopted administrative costs relative to contributions, benefit expenditures, the sum of contributions and benefit expenditures, the number of insured persons, and the number of beneficiaries, respectively, as a dependent variable. The empirical results showed that the random effects model is accepted against the fixed effects model and that factors influencing administrative costs are the number of insured persens, the number of cases for paying benefits, contributions, benefit expenditures, the amount of the pension reserve fund, and the number of employees.

They also found that administrative costs of the three public pension schemes are inclined to increase over time.

Braberman et al. (1999) analyzes Argentinean pension schemes with the aid of a Cobb-Douglas cost frontier model, based on quarterly data from the second quarter of 1997 to the first quarter of 1998. A changing number of pension schemes are used in the analysis. Operating costs are regressed on three independent variables: the number of members/participants; the positive transferences/turnover (i.e., participants switching from one management institution to another) corrected in accordance with the proportion of participant employees of the schemes and the profitability of the scheme. This is clearly an ill-specified empirical cost function without the price of factors of production (labor and capital) (Varian, 1987). Two dummy variables were included to take into account the changes in regulations after November 1997. They found that regulation increased total costs but did not significantly affect relative efficiency.

In an article that is more closely related to the present one, Barrientos and Boussofiane (2005) analyze Chilean pension schemes with the use of a two- stage procedure. In the first stage, they calculate DEA-CCR and DEA-BCC efficiency scores, and, in the second stage, they regress the efficiency scores obtained in the first stage or contextual variables. The inputs and outputs used in the DEA stage were based on the production approach used in banking (Ferrier and Lovell, 1990). The authors used two outputs: total revenue and the number of contributors, and three inputs: marketing and sales costs, office personnel and executive pay, and administration and computing costs. In the second stage, they estimate a regression of the CCR scores on a constant term, market share, sales, the ratio of contributors to affiliates, and revenue. They conclude that there is no

continuous trend toward an improvement in cost efficiency. Analysis of the determinant

of efficiency showed that an increase in market share contributes technical efficiency.

Sales and marketing costs are detrimental. The use of regression model in the second

stage is a caveat of this article; since the efficiency scores are censored at one, a Tobit

model should have been used to allow for the censored observations (Coelli, Rao, and

Battese, 1998). Moreover, the DEA literature indicates that the efficiency scores obtained

in the first stage are correlated with the explanatory variables used in the second stage, so

that the second-stage estimates will be inconsistent and biased (Simar and Wilson,

1999,2000). A bootstrap procedure is needed to overcome this problem (Efron, 1979).

2.6.2 Empirical Evidence in Kenya

Wanyama (2001) conducted a survey to identify the investment portfolio composition of

pension schemes and provident funds and prior and after period of regulation and sought

to determine level of conformity with investment guidelines by surveying companies of

fund management and insurance companies that had life departments managing pension

funds. He concluded that only 30% of the funds were compliant and this led to depressed

properly market, illiquidity of equity market and of narrow range of corporate

instruments.

Wanjuki (2004) surveyed the effect of RBA act (No. 3 of 1997) on the management of

insured retirement benefit scheme in Kenya. He surveyed 19 insurance companies

underwriting retirement benefit schemes and 3 brokerage firm. The results by the

respondents agreed that enactment by retirement Benefit Authority Act brought about

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major positive changes. However, one of the most negative aspects of the Act was increased in costs of settling up and operating schemes.

Mutua (2003) studied the extent of compliance with the Retirement Benefits Act by retirement benefits schemes in Kenya. The objective of her study included finding out the extent of compliance identifying difficulties faced by schemes that had not fully complied and finding out the relationship between the extent of compliance and the financial performance of pension schemes. Mutua used fund values from the years early 2000 and 2001 to measure the financial performance of schemes. She analyzed these against compliance parameters including the extent of submission of investment management agreement, annual audited accounts and actuarial report. Findings from her study indicated that the relationship between the extent of compliance and financial performance of retirement benefits schemes was positive but weak.

Kusewa (2007) investigated whether the enactment of regulations has had a significant impact on the financial performance of pension schemes. A sampled of thirty occupational retirement benefit schemes was selected from data obtained from scheme administers each scheme in the sample was analyzed for each of the five years prior to and the five years after year 2000. Using the paired t-test, findings indicated that there was a significant positive impact in the financial performance of the popularity of occupational retirement benefit schemes in the period in which the regulations have been in place.

Other studies in Kenya on the retirement benefit sector regulations include Ndirangu (2002); Impact of RBA act (1997) in investment performance of provident pension funds,

Kinya (2008); A survey of the impact of the retirement benefit Act 1997 on pension funds investment portfolio. Whereas a number of studies have been conducted on the issue of retirement benefit sector regulations, such studies have focused mainly on financial performance investment, and compliance. No research as per the knowledge of the researcher has been conducted on cost– efficiency in this sector.

2.7 Summary

Generally, regulations and reforms of the retirement benefit sector are supposed to have a positive impact on operational and technical efficiency of pension fund management firms. This is due to requirements in investment practices, proper schemes administration, regulations for custodial and fund management and trusteeship. However, from the theory of economic regulation, some regulations could have negative effect on the industry (Stigler,1971).

From the discussion above, literature on impact of retirement benefit sector regulations on efficiency of pension fund management firms show mixed reactions. Globally, some studies show that though regulations led to increased costs it did not lead to increased technical efficiency of pension fund management firms. On the other hand, some show that regulations lead to an increase in technical efficiency. The evidence available on the average performance of pension funds relative to external benchmark is also scant. Also, performance of fund management companies has been seen in the context of portfolio management. Locally, no study has been done in this area.

Cost efficiency may be one of the benefits of improved quality and thus it is the main objective of this study. This study emphasises on establishing the impact of retirement

benefit sector regulations on the cost efficiency of pension fund management companies so as to fill the gap on the studies done on this area but focussing mainly on investments and also lay a foundation for further studies. Also, this study will enable benchmarking in the country and also with other countries like Poland, Chile and Argentina whose pension systems have been in place for longer periods.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents methodology to be used in the study. Section 3.2 describes research design, section ,section 3.3 target population and sample size, section 3.4 data collection and section 3.5 data analysis.

3.2 Research Design

This study adopted a quasi experimental research design. The research study examined whether introduction of the retirement benefits regulation, 2002 led to cost efficiency among pension fund management firms for the period prior and after the enactment of regulations. The study compared cost efficiency between the two periods: pre and post introduction of regulations.

3.3 Target Population and Sample Size

The population was 2176 occupational retirement benefit schemes registered with Retirement Benefits Authority in Kenya as at January 2010. A random sample of 30 retirement benefits schemes was selected for the purpose of this study. Preferences were given to those pension schemes that have been in operation since 1991. This was important so as to get sufficient data for the cost efficiency prior to enactment for comparison with cost efficiency after enactment of the regulations.

3.4 Data Collection

The data set used consisted of secondary data of the audited financial statements of retirement benefit schemes included in the sample. Specific data used was: Outputs (return on investments, and pension paid out), Inputs (contribution received and capital

which included investment properties which are tangible and financial assets which are intangible assets).The unit input prices were calculated by dividing the contribution received with administration expenses while the unit capital price was calculated by dividing the capital management expenses with the value of assets. This data was obtained from the Kenya Revenue Authority Income Tax Department, in the division that deals with tax compliance of pension schemes. The study period was from the year 1991 to 2009.

3.5 Data Analysis

3.5.1 The Conceptual Model

The basic model of a stochastic cost frontier analysis as proposed by Aigner et al. (1977) assumes that total cost deviates from the optimal cost, i.e., the cost frontier by a random noise $vi\,t$ and an inefficiency component $ui\,t$ (Aigner et al., 1977; Allen and Rai, 1996). Thus, the panel data cost frontier model of the cost function as specified in the panel data form is given as equation (1):

$$\ln C = \ln C(yi\,t,\,pi\,t;\,) + vi\,t, \qquad\qquad (1)$$

In the stochastic cost frontier model, the entire excess of observed cost over minimal feasible cost, i.e., the cost frontier is attributed to cost inefficiency, and the measure of cost efficiency $C\,Ei\,t$ is given by the ratio of minimal cost to observed cost. If the cost frontier is specified as being stochastic, the appropriate measure of cost efficiency is defined as equation(2):

$$C\,Ei\,t = C\,(yi\,t,\,pi\,t;\,)\,\exp vi\,t\,/\,Ci\,t \qquad\qquad (2)$$

where C_i t is the observed cost of production for the i-th organization at the t-th time period; y_i t is a vector of the output quantity for the i-th organization at the t-th time period; p_i t is a vector of the input prices for the i- t h organization at the t-th time period; is a vector of unknown parameters to be estimated; v_i t is a random error, assumed to be independent and identically distributed. $[C(y_i\ t, p_i\ t;) e x p \{v_i\ t\}]$ is the stochastic cost frontier, which is composed of a deterministic part $C(y_i\ t,\ p_i\ t;)$ common to all organizations and an organization-specific random part exp $\{v_i\ t\}$ capturing the effects of random shocks on each organization. Equation (2) defines cost efficiency as the ratio of minimal cost attainable in an environment characterized by $\exp\{v_i\ t\}$ to actual cost or expenditure. $C\ E_i\ t$ is bounded between zero and one with C Ei t $=1$ if and only if $=$ C Ei t$=$ C (y_i t, p_i t;)e x p \{v_i t

3.5.2 Analytical Model

To specify the functional form of the cost frontier above, the standard multiproduct translog cost function will be used. A stochastic Translog cost function with two input prices (Unit contribution received, unit capital price i.e., tangible assets and financial assets), and two outputs in the sample (pension paid out and return on investment). Retirement Benefits Sector Regulations is a dummy variable which takes a unit value for period before regulations and zero for period after regulations. The efficient translog cost frontier model specification, Brown et al. (1979) is the following:

$Ln(C) = \alpha_O + B_1 ln(Y_1) + B_2 ln\ (Y_2) + B_1 ln(W_2) + B_2 lnW_1 + 1/2r_{11}\ ln\ (Y_1)\ ln(Y_2) + 1/2\acute{O}ln(W_1)$

$ln(W_2) + \alpha_{011} ln(Y_1) ln(W_1) + \alpha_{012} ln(w_2) + \alpha_0 ln(Y_c) + dummy + Vit$ (3)

Where

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1) Costeffi=dependent variable is cost efficiency which is the ratio of minimum costs among the entire pension divided by actual/observed costs in each period (this take the value of 1 or 0 (1=most efficient, 0=most inefficient). Here, pensions total operational/administration costs will be used as proxy

2) Independent variables are inputs and output in each period as defined above.

The equation above was used to estimate the efficient total cost C that lies on the efficient cost frontier. C represents operating minimal costs, Y1 and Y2 are outputs, W1 and W2 are inputs, and α_0 is a constant.

Cost efficiency was the ratio between the minimal costs as given by the above equation and observed costs as given by equation 1. Efficiency level takes values between 1 and infinity. The closer to 1 a firm's efficiency level is, the more efficient it is. The cost inefficiency level would be the difference between the minimal costs and the observed costs. If the observed total cost is greater than the minimal cost, then the firms are considered inefficient but if they are equal then they are considered efficient as they will be operating at the efficient cost frontier.

The second stage was to link cost efficiency to the independent variables using a regression model as shown in the equation 4 below:-

$$\ln Costeffi = \alpha + \beta_1 \ln y_1 + \beta_2 \ln y_2 + \beta_3 \ln w_2 + \beta_4 \ln w_1 + \beta_5 \ln y_1 \ln w_2) + \beta_6 \ln w_1 \ln y_2)$$
$$\beta_7 regdummy \dots\dots\dots(4)$$

Further, descriptive statistics were used to calculate the mean and standard deviation of the cost and give the average level of cost efficiency over time. To further deduce whether or not a relationship exists between regulations and cost efficiency, t test based on one way analysis of variance (ANOVA) was performed to compare the changes in the average estimates of cost efficiency before and after regulations. Pearson's Correlation Coefficient was used to determine the strength of the relationship between cost efficiency and regulations. Data analysis was done with the help of Stata Version 7, a computer program for panel data analysis.

CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION OF THE RESULTS

4.1 Introduction

This section presents the data analysis and findings of the study. Section 4.2 describes descriptive statistics of variables, section 4.3 Correlation analysis to determine relationship between cost efficiency and return on investment, pension paid out to members, contributions received from members, total capital assets and regulation dummy, section 4.4 graphical representation of cost efficiency of pension schemes, section 4.5 comparative analysis between the two periods and section 4.6 the impact of regulation on cost efficiency of pension schemes.

4.2 Descriptive Statistics of Variables

Before embarking on the details of empirical issues, it's important to examine the data which was collected and used in analysis. Table 4.1 gives the summary of the descriptive statistics of the data used in this study. The dependent variable: cost efficiency was measured as the ratio of minimal cost to observed cost of the pension scheme studied. The independent variables were inputs and outputs of the pension schemes and both are assumed to determine the cost efficiency. Cost efficiency takes the value of 1 or 0 (1=most efficient, 0=most inefficient). The two input prices used were contribution received from members and total capital assets owned by the pension scheme. The two were measured relative to expenses as total contributions/administration expenses and total assets/capital management expenses respectively. Similarly, two outputs namely pension paid out and return on investment measured as total contributions/number of members and net profits/total asset respectively were used. To determine the impact of

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introduction of regulation and a dummy variable defined as 0= pre-regulation and 1= post-regulation. The descriptive statistics of the variables are tabulated in table 4.1 below;

Table 4.1: Summary of Descriptive Statistics of Variables

Variable name	Variable measure	Variable label	Minimum	Maximum	Mean	Std. Deviation
Cost efficiency	Minimal cost/ Actual costs	costeffi	0.34	0.65	0.49	.097
Return on Investment	Increase in Net Assets /Total Asset	y1	11.45	34.40	17.35	6.06
Pension paid out to members	Total contributions/ Number of members	y2	0.81	0.99	0.92	0.06
Contributions received from members	Total Contributions/ Administration expenses	w1	0.66	5.06	2.21	1.16
Total capital assets	Total assets/ Capital management expenses	w2	0.27	1.76	0.78	0.38
Regulation dummy	0= Pre-Regulation 1= Post-regulation	dummy	0.00	1.00	0.36	0.49

Most economic data is skewed (non-normal), possibly due to the fact that economic data has a clear floor but no definite ceiling. Also it could be the presence of outliers. The Jarque-bera statistics test is used to test normality of the series. It utilizes the mean based coefficients of skewness and kurtosis to check normality of variables used. Skewness is the tilt in the distribution and should be within the -2 and +2 range for normally distributed series. Kurtosis put simply is the peakedness of a distribution and should be within -3 and +3 range when data is normally distributed. Normality test uses the null

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hypothesis of normality against the alternative hypothesis of non-normality. If the probability value is less than Jarque-Bera chi-square at the 5% level of significance, the null hypothesis is not rejected. Table 4.2 gives the normality test of the data used in this study. The normality test shows that the two input prices contribution received from members and total capital assets owned by the pension scheme and the two outputs namely pension paid out and return on investment measured and regulation dummy variable were not normally distributed while cost efficiency was normally distributed. This is likely to impair the normality of the residuals forming the long run relationship. This is likely to lead to non normality of residual series explaining the inefficiencies.

Table 4.2: Normality Test of the Data Used

Variables	Dependent Variable	Independent Variables				Impact measure
		Output		Input		
	Cost efficiency	Return on Investment	Pension paid out to members	Contributions received from members	Total capital assets	Regulation dummy
Variable description	Cost efficiency	Return on Investment	Pension paid out to members	Contributions received from members	Total capital assets	Regulation dummy
Variable Proxies/ Measure	Minimal cost/ Actual costs	Increase in Net /Total Asset	Total contributions/ Number of members	Total Contributions / Administration expenses	Total assets/ Capital management expenses	0= Pre-Regulation 1= Post-regulation
Variable label	Costeffi	y_1	y_2	w_1	w_2	regdummy
Skewness	0.756	-1.019	2.354	0.924	-1.030	0.532
Kurtosis	2.797	2.511	10.464	2.103	3.654	1.283
Jarque-Bera	3.293	6.410	113.577	6.150	6.810	5.950
Probability	0.193	0.041**	0.000*	0.046**	0.033**	0.051**

Note: **Reject hypothesis of normality at 5% level

*Reject hypothesis of normality at 1% level

The descriptive statistics among others do give guide on which of the equations is more able to yield better results and highlight on possible problems to encounter. However there is need to supplement the statistics by more incisive quantitative analysis such as the correlation analysis that is discussed in section 4.3.

4.3 Correlation Analysis to Determine Relationship between Cost Efficiency and Return on Investment, Pension Paid Out to Members, Contributions Received from Members, Total Capital Assets and Regulations Dummy.

Pearson correlation is used to evaluate the relationship between the variables. The correlation matrix is an important indicator that tests the linear relationship, between the variables. The matrix also helps to determine the strength of the variables in the model, that is, which variable best explains the relationship between cost efficiency and its determinants. This is important and helps in deciding which variable(s) to drop from the equation. Table 4.3 presents the correlation matrix of the variables in levels. The Pearson correlation coefficient between cost efficiency and two input prices: contribution received from members and total capital assets owned by the pension scheme and the two outputs: pension paid out and return on investment measured and regulation dummy is -0.148, 0.563, -0.055, -0.114 and 0.726 respectively. There is high positive correlation between cost efficiency and pension paid out to members and regulation dummy whiles there is low negative correlation between cost efficiency contribution received from members and total capital assets owned by the pension scheme and return on investment.

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Table 4.3: Pearson Correlation Co-efficient Between Variables

	Cost efficiency	Return on Investment	Pension paid out to members	Contributions members received	Total capital assets	Regulation Dummy
Cost efficiency	1					
Return on Investment	-0.148	1				
Pension paid out to members	0.563(*)	-0.311	1			
Contributions members received	-0.055	-0.134	0.607(**)	1		
Total capital assets	-0.114	-0.108	0.555(*)	0.997(**)	1	
Regulation dummy	0.726(**)	-0.227	0.655(**)	0.068	0.009	1

* Correlation is significant at the 0.05 level (2-tailed).

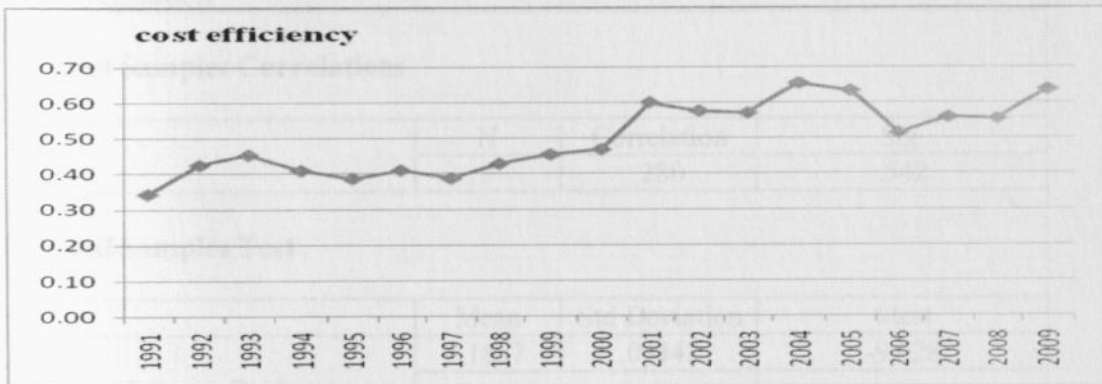** Correlation is significant at the 0.01 level (2-tailed).

The findings in table 4.3 indicate that cost efficiency is determined by pension paid out to members and regulation dummy. This is because there is significance high positive correlation between cost efficiency and pension paid out to members and regulation dummy. The next set was to find out the trend exhibited by the cost efficiency variable over the study period. Therefore, the following section reports the trends of cost efficiency in a graphical representation.

4.4 The Cost Efficiency of Pension Schemes

Cost efficiency was measured as the ratio between the minimal cost of pension scheme in industry and the observed costs in the pension scheme over the study period. Efficiency

level takes values between 1 and 0. The closer to 1 a firm's efficiency level is, the more efficient it is. The cost inefficiency level would be the difference between the minimal costs and the observed costs. If the observed total cost is greater than the minimal cost, then the firms are considered inefficient but if they are equal then they are considered efficient as they will be operating at the efficient cost frontier. Hence, entire excess of observed cost over minimal feasible cost, i.e., the cost frontier is attributed to cost inefficiency. Figure 4.1 shows that cost efficiency in pension scheme sector has been increasing steadily from 1991 to 2009. However, the graph is steeper over the post regulation period that pre regulation period. From the graphical representation below, it can be concluded that the introduction of regulation increased the cost efficiency among the pension schemes.

Figure 4.1: Graphical Representation of Cost Efficiency

4.5 Comparative Analysis Between the Two Periods: Pre and Post Introduction of Regulation

To establish the impact of introduction of retirement benefit scheme regulation on the cost efficiency of the retirement benefits schemes a comparative test between the two

periods pre and post introduction of regulation was carried out using the t-test. Table 4.4 reports the t-test results. The paired samples correlations co-efficient between two periods is 0.280. This indicates that the two periods are weakly correlated. The paired samples t-test statistics is 9.028 and significance indicating the two periods are not related and are independent of each other. This result shows that there is slight improvement in cost efficiency after introduction of retirement benefit scheme regulation.

Table 4.4: Paired t-test Reporting Comparative Test Between Pre and Post Introduction of Regulation

Paired Samples Statistics			
	Mean	Std. Deviation	Std. Error Mean
Pre regulation	.4014	.03388	.01280
Post regulation	.5871	.05314	.02008
Paired Samples Correlations			
	N	Correlation	Sig.
	9	.280	.542
Paired Samples Test			
	Mean	Std Deviation	t-test
	-.1857	.05442	-9.028
Pre regulation – Post regulation	Std error 0.0205		Sig 0.00

4.6 The Impact of Regulations on Cost Efficiency of Pension Schemes

In order to establish the impact of introduction regulation on cost efficiency, cost efficiency variable was regressed on two input prices: contribution received from members and total capital assets owned by the pension scheme, the two outputs: pension paid out and returns on investment measured and introduction of regulation dummy.

Table 4.5 below summarizes regression results. Analysis of Variance shows that f-calculated is 4.281 and significance at 5% level. This implies that the regression cost efficiency model used was well specified. As indicated in the regression statistics R-squared was 0.522. This means that the two input prices: contribution received from members and total capital assets owned by the pension scheme, the two outputs: pension paid out and returns on investment measured and introduction of regulation dummy explains 52% of cost efficiency. However, 48% not explained is the cost inefficiency. To establish the impact of introduction regulation on cost efficiency the study calculated the co-efficient of the regulation dummy.

Table 4.5: Summary of Regression Analysis Results

Output of Regression – Co-efficient			
Predictor- Independent Variable	Coefficients	Standard Error	t -Statistics
(Constant)	3.336	1.154	2.891*
Return on Investment	-0.011	-0.030	0.372
Pension paid out to members	4.209	2.175	1.935**
Contributions received from members	-1.435	-0.716	2.004*
Total capital assets	-5.313	-7.836	0.678
Interaction between return on investment and total capital assets	1.258	0.636	1.078
Interaction between pension paid out and contributions received from members	1.764	-0.840	1.101
Regulation dummy	0.02	0.001	2.001*

Note: * significance at 1%,   ** significance at 5%

Table 4.5 above represents the regression results for the existence of a short run relationship among the variables. In particular, the coefficient of introduction regulation on cost efficiency is 0.02 and statistically significance at 1%. This indicates that there is a positive effect of introduction regulation on cost efficiency. Therefore, introduction of regulation increased the cost efficiency by 0.02%.

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the findings of the study, conclusion and suggests some recommendations. Section 5.2 describes the summary of findings and conclusions, section 5.3 limitations of the study and 5.4 suggestions for further research.

5.2 Summary of the Findings and Conclusions

This study examined the impact of Retirement Benefits Regulations (2000) on the cost efficiency of retirement benefit schemes in Kenya. First, according to Pearson correlation results indicate that the relationship between cost efficiency and two input prices: contribution received from members and total capital assets owned by the pension scheme and the two outputs: pension paid out and return on investment measured and regulation dummy is -0.148, 0.563, -0.055, -0.114 and 0.726 respectively. There is high positive correlation between cost efficiency and pension paid out to members and regulation dummy indicating cost efficiency is determined by pension paid out to members and regulation dummy. Graphical representation of cost efficiency shows that that cost efficiency in pension scheme sector has been increasing steadily from 1991 to 2009. However, the graph is steeper over the post regulation period that pre regulation period. Therefore, it can be concluded that the introduction of regulation increased the cost efficiency among the pension schemes. Comparative test between the two periods pre and post introduction of regulation was carried out using the t-test. The paired samples correlations co-efficient between two periods is 0.280. This indicates that the two periods are weakly correlated. The paired samples t-test statistics is 9.028 and

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significance indicating the two periods are not related and are independent of each. This result shows that there is slight improvement in cost efficiency after introduction of retirement benefit scheme regulation.

In order to establish the impact of introduction regulation on cost efficiency, cost efficiency variable was regressed on two input prices: contribution received from members and total capital assets owned by the pension scheme, the two outputs: pension paid out and returns on investment measured and introduction of regulation dummy. The regression statistics R-squared was 0.522. This means that the two input prices: contribution received from members and total capital assets owned by the pension scheme, the two outputs: pension paid out and returns on investment measured and introduction of regulation dummy explains 52% of cost efficiency. However, 48% not explained is the cost inefficiency. To establish the impact of introduction regulation on cost efficiency the study calculated the co-efficient of the regulation dummy. The coefficient of introduction regulation dummy on cost efficiency is 0.02 and statistically significance at 1%. This indicates that there is a positive effect of introduction regulation on cost efficiency. Therefore, introduction of regulation increased the cost efficiency by 0.02%.

From the finding of the study, it can be concluded that cost efficiency among retirement benefit schemes is explained or determined by input prices such as contribution received from members and total capital assets owned by the pension scheme and outputs such as pension paid out and returns on investment measured and introduction of sector regulations. The coefficient of introduction of regulations on cost efficiency is 0.02 and

statistically significance at 1%. Therefore, introduction of regulation increased the cost efficiency by 0.02%. Therefore, it can be concluded that the introduction of regulation increased the cost efficiency among the pension schemes.

From the findings of this study it is evidence that regulation of retirement benefit sector is expected to have led to an improvement in cost efficiency of pension funds. Therefore it is recommended that regulator of the sector ensure the regulation are adhered to by practitioners in the sector. There is need to introduce established scheme rules that adequately protect the interests of sponsors and members.

5.3 Limitations of the Study

The study is confined to retirement benefit schemes. The study used macroeconomics time series data for the period 1991-2009. This means that only 19 observations were included in the analysis. A longer period with 50 and more observations is more appropriate when working with macroeconomics data; however collection of such data was not possible. All the limitations of the analysis tool of time series data using Eviews are applicable to this study. Example is that it was not possible to carry out diagnostics test of the model estimated.

Further, due to confidentiality reasons and the tedious work involved in getting data for the 19 year period covered for the study, the study was only conducted for 30 schemes only representing only 1.4% of the population. Analysis of a larger sample would have shown a closer representation to the population.

Also Besides regulations, the cost efficiency of pension schemes is also influenced by other factors. For instance, members' contribution will also be influenced by the salaries paid by the sponsor i.e. most members and employees contributions are paid on gross basic salary paid. Hence, an increase in salaries will lead to increase in contributions.

5.4 Recommendation for Further Research

This study examined the impact of Retirement Benefits Regulations (2000) on the cost efficiency of retirement benefit schemes in Kenya. However, there is need for further research geared to establishing other determinants for example scale, size and plan design i.e whether defined benefits, defined contribution, private or public schemes have an impact on cost efficiency in pension schemes. In addition, a similar study can be extended to fund management firms in the country.

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Appendix 1: Primary Data Collection Tool

From each person the following data needs to be collected

Variables	Output			Input	Impact measure
	Return on Investment	Pension paid out to members	Customer base received over members	Total capital assets	Regulation dummy
	Increase in Net Assets/Total Assets	Total contributions/ Number of members	Total Contributions/ Administration expenses	Total assets/Capital management expenses	0= Pre-Regulation 1= Post regulation
Portable level		M	M	M	regdummy
1991					0
1992					0
1993					0
1994					0
1995					0
1996					0
1997					0
1998					0
1999					0
2000					
2001					
2002					
2003					1
2004					
2005					

APPENDICES

Appendix I: Primary Data Collection Tool

From each pension the following data need to be collected

	Output		Input		Impact measure
Variables	Return on Investment	Pension paid out to members	Contributions received from members	Total capital assets	Regulation dummy
Proxies	Increase in Net Assets/Total Asset	Total contributions/ Number of members	Total Contributions/ Administration expenses	Total assets/Capital management expenses	0= Pre-Regulation 1= Post regulation
variable label	y_1	y_2	w_1	w_2	*regdummy*
1991					0
1992					0
1993					0
1994					0
1995					0
1996					0
1997					0
1998					0
1999					0
2000					1
2001					1
2002					1
2003					1
2004					1
2005					1
2006					1
2007					1
2008					1
2009					1

Appendix II: Summarized Primary Data Used in the Analysis

Year	costeffi	y1	y2	w1	w2	y1w2	y2w1	Dummy
1991	0.34	20.66	0.91	2.80	1.03	21.38	2.54	0
1992	0.42	16.71	0.91	1.16	0.43	7.26	1.05	0
1993	0.45	16.17	0.96	5.06	1.76	28.50	4.87	0
1994	0.41	18.18	0.92	1.47	0.54	9.75	1.36	0
1995	0.39	18.71	0.98	4.60	1.58	29.48	4.50	0
1996	0.41	18.00	0.84	1.43	0.56	10.10	1.20	0
1997	0.39	18.77	0.83	1.79	0.70	13.22	1.49	0
1998	0.43	17.42	0.82	0.66	0.27	4.70	0.54	0
1999	0.45	15.69	0.81	0.72	0.29	4.52	0.58	0
2000	0.47	15.48	0.91	2.08	0.75	11.60	1.90	1
2001	0.60	13.66	0.97	2.53	0.87	11.90	2.45	1
2002	0.58	31.07	0.89	1.63	0.60	18.59	1.46	1
2003	0.57	34.40	0.94	1.75	0.61	21.12	1.65	1
2004	0.65	11.52	0.98	1.78	0.60	6.91	1.74	1
2005	0.63	11.45	0.98	1.36	0.48	5.51	1.33	1
2006	0.51	13.04	0.99	3.00	1.01	13.13	2.96	1
2007	0.56	12.58	0.99	2.65	0.89	11.21	2.62	1
2008	0.55	13.02	0.99	2.87	0.97	12.57	2.83	1
2009	0.64	13.19	0.98	2.83	0.96	12.65	2.76	1

In the table above, cost efficiency, y1, y2, w1, w2, y1w2 and y2w1 are average figures

for the 30 schemes used.