

**IMPROVING THE FINANCIAL EFFICIENCY OF PENSION FUNDS IN
KENYA**

by

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ABSTRACT

Pension funds are the principal sources of retirement income for millions of people in the world. They are also important contributors to the GDPs of countries and a significant source of capital in financial markets.

The financial efficiency of Kenyan pension funds, both public and private, has however come under increased scrutiny. Research on ways to improve the efficiency of pension funds in Kenya is therefore of great importance.

The sample consists of 362 pension funds drawn from the Kenyan RBA register. The empirical results show that pension fund governance, leadership and regulations do not influence the financial efficiency of these funds. The results however reveal that fund size is the most important determinant of financial efficiency of the pension funds investigated in this study.

INTRODUCTION

Pension funds are the principal sources of retirement income for millions of people in the world (Sze 2008). They are also important contributors to the GDPs of countries and a significant source of capital in financial markets (Omondi 2008). A global pension crisis has however emerged in the past two years owing to depressed financial markets. This has eroded funds to cater for the retirement income of the ageing populations (OECD 2008). It is therefore important that pension funds be managed effectively. The present study investigates the critical success factors of the financial efficiency of pension funds. The study was conducted in Kenya and it is hoped that lessons for the pension fund industry worldwide will emerge from this study.

There were 1679 pension funds in Kenya by the close of 2007, of which 130 funds were in the public sector, 16 were individual retirement schemes and the rest had been established by private enterprises. The financial efficiency of pension funds, both public and private, has however come under increased scrutiny. It has been reported that, of the 130 plans in the public sector, 69 are grossly under-funded and need urgent measures to revitalise them (Daily Nation 2006). Research on ways to improve the efficiency of pension funds in Kenya is therefore of great importance.

PROBLEM STATEMENT

Most people depend on their pension funds as a source of income when they retire. Retirement income accounts for 68% of the total income of retirees in Kenya (Kakwani, Sun and Hinz 2006), 45% in Australia, 44% in Austria and 80% in France, while in South Africa 75% of the elderly population rely on pension income (Alliance Global Investors 2007). In the United States of America 82% of retirees depend on pension income (EBRI 2007a). Pension funds should therefore be managed efficiently to ensure higher retirement income for pensioners.

Global indices indicate that pension assets are important to any economy. According to Alliance Global Investors (2007), pension assets in Australia amount to AU\$ 1trillion (equivalent to 20% of the GDP), while in Belgium pension assets amounted to 140 billion Euro in 2004. In Kenya and South Africa, respectively, the pension assets had a value of KSH 130 billion in 2006, which accounted for 30% of the GDP (RBA Quarterly Report 2007), and ZAR 1098 billion in 2004 (Alliance Global Investors 2007). Pension funds are therefore important contributors to the GDPs of countries and should consequently be managed effectively.

The pension fund industry is a significant source of capital in the Kenyan financial markets (Omondi 2008). Pension funds invested a sum of Ksh. 223 billion in the Kenyan financial sector in 2007 of which Ksh. 77 billion (22% of the outstanding domestic debt) was invested in government securities

(Omondi 2008). Pension funds are thus significant institutional investors and must therefore be managed efficiently.

The empirical literature however suggests that there are certain research gaps regarding the efficiency of pension funds. These research gaps relate to computation of efficiency, governance, investment strategy and pension fund size.

Studies on the performance of pension funds either use financial ratio analysis (Dulebohn 1995) or compare the pension fund returns with the market indices (Stanko 2002; Bikker and Dreu 2009). The use of Data Envelopment Analysis (DEA) has been documented as a more superior technique for the analysis of efficiency (Cinca, Mal Morinero and Garcia 2002; Barros and Garcia 2006) since it permits the ranking of the institutions being evaluated and generates scores for inefficiencies. Very few studies have used DEA to measure pension fund efficiency. The present study seeks to quantify the efficiency of pension funds using DEA analysis.

Although corporate governance has attracted much attention in the recent past, focus has not shifted to pension fund governance and the credibility of the pension systems as important determinants of pension funds (Besley and Prat 2005; Carmichael and Palacios 2003; Ambatchsheer 2001). Furthermore, different authors (Asebedo and Grable 2004; Markese, 2000; Stanko, 2002) relate the investment strategy to the mix that an investor makes in the investment portfolio. A research gap has been identified as the empirical literature does not relate the investment strategy to efficiency. The present study investigates the appropriate investment strategy to maximise financial efficiency.

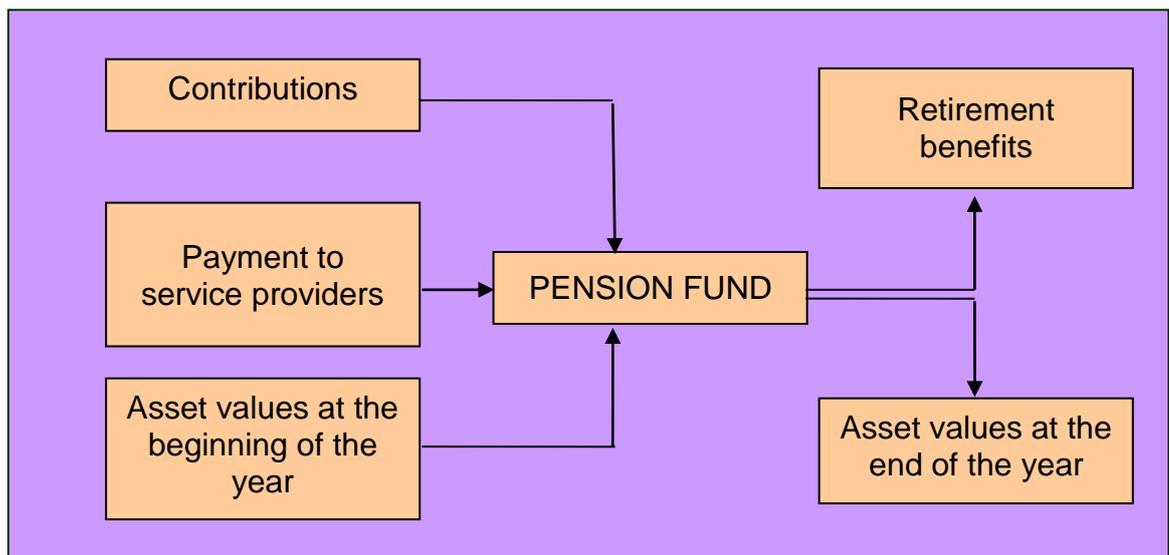
The literature on the relationship between size and efficiency reveals mixed findings. Studies that report on the absence of such a relationship include Cicotello and Grant (1996), Droms and Walker (2001) and Grinblatt and Titman (1994). Contradictory results on the same proposition are included in Gallagher and Martin (2005) and Cheong (2007). In terms of risk, Droms and

Walker (2001) noted that portfolios of smaller funds are more risky than larger funds but found that smaller funds were outperforming the larger funds. Malhotra and McLeod (2000) found contradicting results on the same issue. The contradictory findings of the empirical studies have left a research gap on the optimum fund size. The present study attempts to determine the influence of fund size on the financial efficiency of pension funds.

A CONCEPTUAL MODEL TO IMPROVE PENSION FUND EFFICIENCY

Pension funds, like many other organisations, can be viewed as open systems which receive inputs, convert these inputs into outputs and deliver these outputs to stakeholders. Pension funds receive inputs (scarce financial resources in the form of contributions and investment funds) and convert these inputs to outputs (pension fund value and retirement benefits) (Davis 2005) A pension fund would be regarded as efficient if it succeeds in maximising financial outputs by the efficient use of the financial resources (inputs) (Chansarn 2005).

FIGURE 1: SYSTEM THEORY VIEW OF PENSION FUNDS

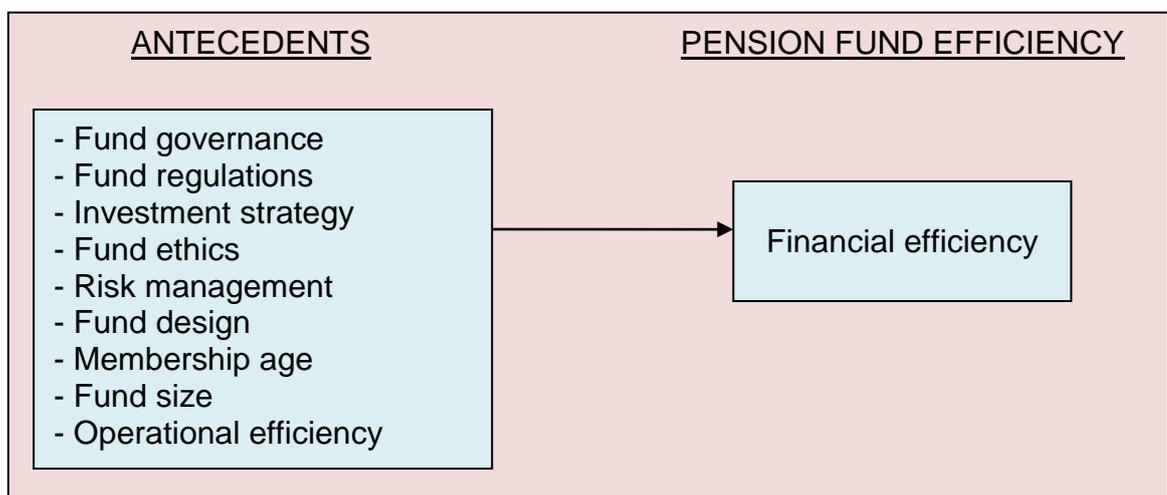


Source: Authors' own construction

In the present study, pension funds are conceptualised as systems that transform financial inputs (asset values at the beginning of a financial year, contributions and payments for inputs) into gains or outputs (retirement benefits and asset values at the end of the financial year) for members. Efficiency is regarded as a function of internal management. An efficient pension fund should operate at the lowest possible cost and maximise its returns on investments and benefits payable to the retirees.

More specifically, the present study conceptualises financial efficiency, using the Data Envelopment Analysis (DEA) approach, as the end result of effective governance, adherence to pension fund regulations, implementation of an effective investment strategy, adhering to fund ethics, managing pension fund risk, choosing the appropriate pension fund design, operational efficiency and managing the age profile of the members as well as the size of the pension fund. This conceptual framework is graphically illustrated in Figure 2.

FIGURE 2: CONCEPTUAL MODEL TO INCREASE FINANCIAL EFFICIENCY



Source: Authors' own construct

RESEARCH OBJECTIVES

The primary objective of the study is to investigate ways of enhancing pension fund efficiency by establishing the determinants of such efficiency. More

specifically, the study explores the effects that governance, regulations, investment strategy, fund ethics, risk management, design, size and the age profile of members have on the financial efficiency of pension funds.

THE HYPOTHESISED RELATIONSHIPS

The following hypothesised relationships are investigated in the study.

The relationship between pension fund governance and financial efficiency

Pension fund governance has direct implications for pension efficiency as it influences the administrative efficiency and investment strategies of pension fund use (OECD 2009; Carmichael and Palacios 2003; Husted 2008). Pension fund performance is strongly correlated with governance indicators such as cheaper operating costs and the timely payout of benefits (Steele 2006).

It is therefore hypothesised that:

H1: Pension fund governance exerts a positive influence on the financial efficiency of pension funds.

Relationship between fund regulations and financial efficiency

The major reason why many developing countries fail to optimise pension fund efficiency is the existence of many laws to which pension funds are obliged to subscribe (World Bank 2005). The multiplicity of fragmented laws increases compliance costs and reduces the pension benefits (Asher and Nandy 2006). On the other hand, Hu, Stewart and Yermo (2007) reported that, in China, pension regulations on investments and governance resulted in more robust risk control mechanisms, better investor protection, more transparent information disclosure and subsequent stability of the pension funds.

Eijffinger and Shi (2007) attributed the pension crisis in the European Union to regulatory failure. They therefore suggested that pension laws be created in licensing, governance, asset restrictions, financial information disclosures and guarantees. The general view is therefore that pension funds need regulations to ensure they deliver on their pension benefit promises (Blome, Fachinger, Franzen, Scheuenstuhl and Yermo 2007; Odundo 2008).

It is therefore hypothesised that:

H2: Adherence to fund regulations exerts a positive influence on the financial efficiency of pension funds.

Relationship between investment strategy and financial efficiency

The OECD (2009) states that pension funds with a clear statement of investment principles perform better than those without. Increased pension fund returns are dependent on the active management of the investment portfolios (Stanko 2002). Markese (2000), for example, found that pension funds that invest more in equity stocks perform better than those that invest more in bonds and other fixed securities.

According to Asebedo and Grable (2004), investment diversification leads to average performance but minimises losses during periods of poor stock market performance. Through proper investment strategy risk is avoided and timing is enhanced (Hebb 2006). Against this background, it is hypothesised that:

H3: Proper investment strategy exerts a positive influence on the financial efficiency of pension funds.

Relationship between fund ethics and financial efficiency

Failure to abide by the acceptable ethical standards in pension funds results in suboptimal decision-making that compromises their financial results and

trust bestowed on them (Clark and Urwin 2007; OECD 2007). Proper ethical behaviour in pension fund management minimises compliance costs and ensures that the risks taken by the trustees are acceptable and within the appropriate thresholds as prescribed in the investment policy, thus improving efficiency (Gifford 2004). Moreover, ethical behaviour in the pension fund industry contributes to the maximisation of the beneficiary's welfare, reduced chances of litigation, improved governance and better investment performance, which increases efficiency (OECD 2009).

It is therefore hypothesised that:

H4: Fund ethics exert a positive influence on the financial efficiency of pension funds.

Relationship risk management and financial efficiency

Pension funds should provide proper risk management to ensure that the retirement income of their members is safeguarded (Davis 2000). To do this, pension funds should have appropriate risk management policies that safeguard the replacement rate, investment safety and time-based risks such as inflation (Davis 2000). According to Galer (2009), risk management by pension funds should link directly to portfolio objectives and should maintain a balance between assets and liabilities in the context of funding, immunisation and the use of derivative securities. There is general agreement that proper risk management results in better financial results for pension funds as it focuses on a proactive approach to losses (Thompson 2008; Brunner, Hinz and Rocha 2008; Odundo 2008).

Against this background it is hypothesised that:

H5: Proper risk management exerts a positive influence on the financial efficiency of pension funds

Relationship between fund design and financial efficiency

Literature sources suggest that defined contribution (DC) pension funds outperform the defined benefit (DB) funds for the following reasons:

- DB funds are more cost effective than DB funds because the benefits payable are not tied to the contributions made (Brady 2009; Crane, Heller and Yakoboski 2008; Faktum 2009);
- They involve members more in decision-making (Hess and Impavido 2003; Choi, Laibson and Madrin 2006);
- the investment risk is borne by the members and not the sponsor so that members take all possible measures to avoid loss (Brady 2009);
- there is less sponsor influence since the sponsor does not nominate the majority of the members (Yang 2005);
- there is more transparency in decision-making and communication to members (Nyce 2005; Clark and Mitchell 2005); and
- default risk from the members is less (Yang 2005).

It is therefore hypothesised that:

H6: Fund design exerts an influence on the financial efficiency of pension funds

Relationship between age of members and the financial efficiency of pension funds

The age of employees determines the pension promises that their employers will make to them since younger employees have a longer time horizon to invest compared with the older employees (Friedberg and Webb 2004; Lusardi and Mitchell 2007), which in turn influences the type of pension fund design on which to anchor the pension fund.

Studies point to a negative relationship between the age of members and pension fund efficiency and found that the age of the members influences the investment strategy to adopt (Charles, McGuinan and Kretlow 2006).

Whereas pension funds with younger members will be robust in their investments, while those with older members will tend to be conservative, thus limiting their returns on investments (Charles et al. 2006).

It is therefore hypothesised that:

H7: The age of members exerts a negative influence on the financial efficiency of pension funds

Relationship between fund size and financial efficiency

Empirical findings with regard to the relationship between size and the financial efficiency of pension funds are inconclusive. A negative relationship between financial performance and fund size is reported in Cicotello and Grant (1996), Droms and Walker (2001) and Grinblatt and Titman (1994). On the other hand, a positive relationship between the same variables is reported in Gallagher and Martin (2005).

It is reported that larger pension funds can achieve numerous benefits brought about by economies of scale in administration (Cheong 2007; Mahon and Donohoe 2006; Chon, Hong, Huang and Kubik 2004). Similar findings were reported by Bikker and Dreu (2009) and Ardon (2006).

As more studies indicate a positive relationship between the two variables, it is hypothesised that:

H8: Fund size exerts a positive influence on the financial efficiency of pension funds

Relationship between operational efficiency and financial efficiency

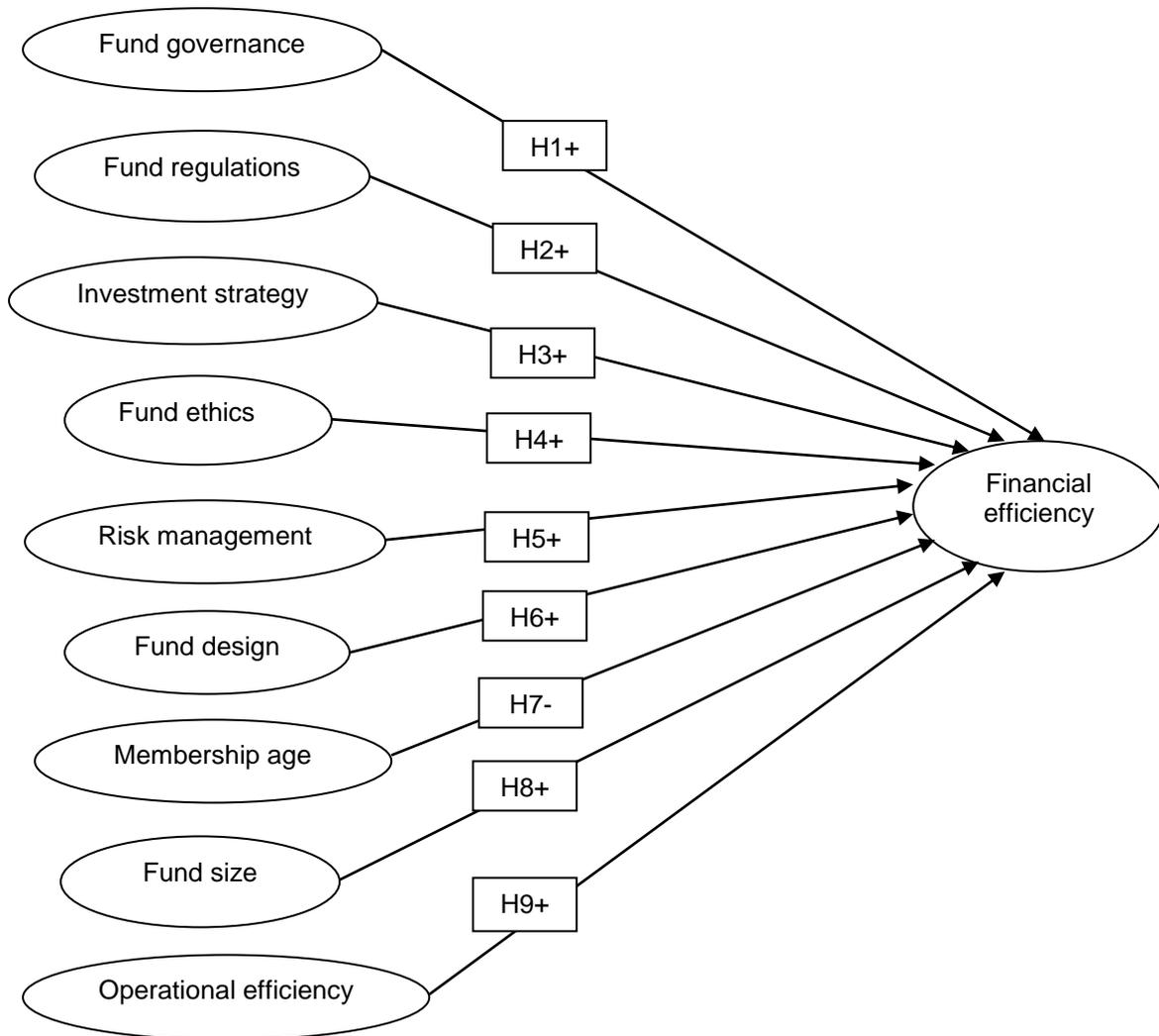
Operational efficiency aims at combining people, processes and technology to add value to pension fund activities and consequently reduce costs (Harris, 2006). Financial efficiency on the other hand is conceptualised as the financial efficiency brought about by the balance between costs and benefits of operation (Cinca et al. 2002; Barros and Garcia 2006; Serrano and Mar

Molinero 2001). It is contemplated that to achieve financial efficiency, organisations must be operationally efficient. This assertion leads to the following hypothesis:

H9: Operational efficiency exerts a positive influence on financial efficiency

The hypothesised model is depicted in Figure 3 below.

FIGURE 3: HYPOTHESISED MODEL TO IMPROVE FINANCIAL EFFICIENCY



METHODOLOGY OF THE STUDY

The sample

The population from which the sample was drawn consisted of 1679 pension funds in the RBA register by 31 December 2008. Pension funds that were licensed before 2001 were omitted due to a lack of coherent data. This condition narrowed the population of interest down to 749 pension funds. A questionnaire was sent to one trustee of all the 749 pension funds. Only 362 usable questionnaires were returned, which resulted in a response rate of

48.3%. Trustees form the board of management of a pension fund and are believed to be best informed about pension fund management issues.

The sample comprised 316 trustees (42.2%), 10 chairpersons of the boards of trustees (1.3%), 23 members who were former trustees (3.1%) and 13 trust secretaries (1.7%). The sample size was considered adequate since for the purposes of applying structural equation modelling, the sample size needs to be at least 100 per respondent per model (Hair, Anderson, Tatham and Black 1995: 637).

Table 1 depicts the demographical composition of the sample. Most of the respondents were male (81.8%) and between 30 to 39 years old. Most of the respondents were also middle level managers (96.5%) operating in predominantly defined contribution pension funds (84.5%).

Most of the respondents (87.3%) were normal trustees, while the number of members belonging to a pension fund ranged from 50 to 500. Pension funds in Kenya can thus be described as pension funds operated on defined contribution design with membership ranging from 50 to 500 and members aged between 21 and 50 years.

The measuring instruments

Except for financial efficiency, instruments were developed to measure the variables investigated in the study. It was important to develop instruments that reflect the pension fund environment of Kenya. The instruments included fund ethics, fund governance, risk management, fund regulations and investment strategy.

TABLE 1: DEMOGRAPHIC COMPOSITION OF THE SAMPLE

Variable	n	%
Gender: Male	296	81.8
Female	<u>66</u>	<u>18.2</u>
	362	100.0
Age of respondents:		
20-29 years	17	4.7
30-39	261	72.1
40-49	54	14.9
50-59	26	7.2
60 >	<u>4</u>	<u>1.1</u>
	362	100.0
Occupational position:		
Chairperson	10	2.8
Member	23	6.4
Trust secretary	13	3.5
Trustee	<u>316</u>	<u>87.3</u>
	362	100.0
Occupational level:		
Top management	13	3.5
Middle management	349	96.5
Lower management	<u>0</u>	<u>0.0</u>
	362	100.0
Fund design: Defined contribution	306	84.5
Defined benefit	<u>56</u>	<u>15.5</u>
	362	100.0
Fund size: <100 members	82	22.7
101-200	95	26.2
201-300	72	19.9
301-400	58	16.0
401-500	41	11.3
500>	<u>14</u>	<u>3.9</u>
	362	100.0
Age of members:		
21-30 years	35	9.7
31-40	293	80.9
41-50	19	5.2
51-60	<u>15</u>	<u>4.1</u>
	362	100.0

The Data Envelopment Analysis (DEA) technique was used to measure financial efficiency. The concept of data envelopment was first developed by Charnes, Cooper and Rhodes (1978) to calculate the relative efficiency of objects (decision-making units) using a variety of inputs and outputs. Charnes et al. (1978:430) conceptualised DEA as the mathematical identification of the most efficient decision-making unit from the observed inputs and outputs. Efficiency in DEA is thus defined as the ratio of the weighted sum of outputs to the weighted sum of inputs (Sofianopoulou 2006:).

The results of the DEA models produce the efficiency value of every decision-making unit, with the highest value being 100% (Mostafa 2007). The firms with efficiency values of 100% can be classified as efficient and can be role models to those with lesser scores (Mostafa 2007).

A self-constructed instrument used to measure fund ethics captured the extent to which pension funds ensure confidentiality in all pension fund management issues; reject inappropriate requests from sponsors; honestly share information with trustees and members; manage conflict with service providers; and properly utilise trustees' authority. These indicators were also anchored to a five-point scale ranging from (1) strongly disagree to (5) strongly agree.

The fund governance instrument measured, among others, the importance of the following: board of trustees having members in active employment; CEO leadership; continuous finance education to trustees; using competitive bidding in appointing service providers; avoiding conflict of interest in decision-making and maintaining an effective performance management system. The five-point anchoring scale for these indicators ranged from (1) not important at all, to (5) a great deal important.

The risk management instrument captured elements such as, among others, exposure to default risk from the sponsor and employees, the absence of strategies to counter stock market risk, negative influences from industry changes of employees, exposure to high volatility in order to earn higher

return on investments and tolerating risk beyond the guidelines of the RBA. These indicators were anchored to a Likert-type scale ranging from (1) strongly disagree to (5) strongly agree.

An instrument was constructed to capture the important fund regulations with which Kenyan pension funds need to comply. The respondents were asked to indicate the importance of these regulations in the governance and regulatory environment of pension funds in Kenya. These regulations, among others, include: compliance cost regulation by the RBA; limiting the number of trustees to 10, regardless of the size of the scheme; the regulation of fees charged by service operators; tax on non-exempt incomes of pension fund members; risk tolerance levels. The five-point anchoring scale for these indicators ranged from (1) not important at all to (5) a great deal important.

The investment strategy instrument measured the elements that generally describe the investment strategies employed by pension funds. These strategies, among others, include: investment committees making investment decisions; not restricting investment in any company; covering trustees with liability insurance; increased investment in fixed interest investments (bonds and treasury bills) as opposed to equity investments; conducting independent evaluations of pension fund performance to confirm rates reported by fund administrators. These indicators were anchored to a five-point scale ranging from (1) strongly disagree to (5) strongly agree.

The operational efficiency instrument was constructed on the basis of the efficiency attributes identified in the literature on pension funds. The instrument measured for example the perceived extent to which pension funds were successful in, among others, reducing administrative costs, reducing benefit processing periods, reducing time taken to report to members, improving internal control systems, maintaining return on investment and complying with RBA regulations. These indicators were anchored to a Likert-type scale ranging from (1) strongly disagree to (5) strongly agree.

The questionnaire also included instruments to capture variables such as fund design, fund size and membership age. The fund design instrument measured what type of design a pension fund has adopted, namely (1) defined contribution (DC), (2) defined benefit (DB) or (3) a hybrid of DC and DB. Fund size, defined as the number of members belonging to a pension fund, was anchored to a six-point scale ranging (1) from less or equal to 100 to (5) more than 500. The age of members was therefore captured on a six-point scale ranging from (1) younger or equal to 20 years to (6) older than 60 years.

DATA ANALYSIS

To achieve the objectives of the study, various data analysis techniques were used. Firstly, financial efficiency scores of the pension funds were calculated by using the Data Envelopment Analysis (DEA) technique. Secondly, the instruments used to measure the latent variables were assessed for reliability and validity. Thirdly, various data analysis techniques were used to test the hypothesised relationships among the variables in the final sample, such as Pearson correlations, Sheffé tests and analyses of variance (ANOVA).

Data envelopment analysis (DEA)

The Frontier Analyst Version 4.10 (2008) computer software program was used to conduct the analysis. This analysis entails the use of linear programming principles to calculate efficiency scores that range from 0 (nil) to 100%. This calculation was done for each year starting from 2001 to 2008. The average of the eight years was then calculated for each pension fund, which was regarded as each pension fund's DEA score.

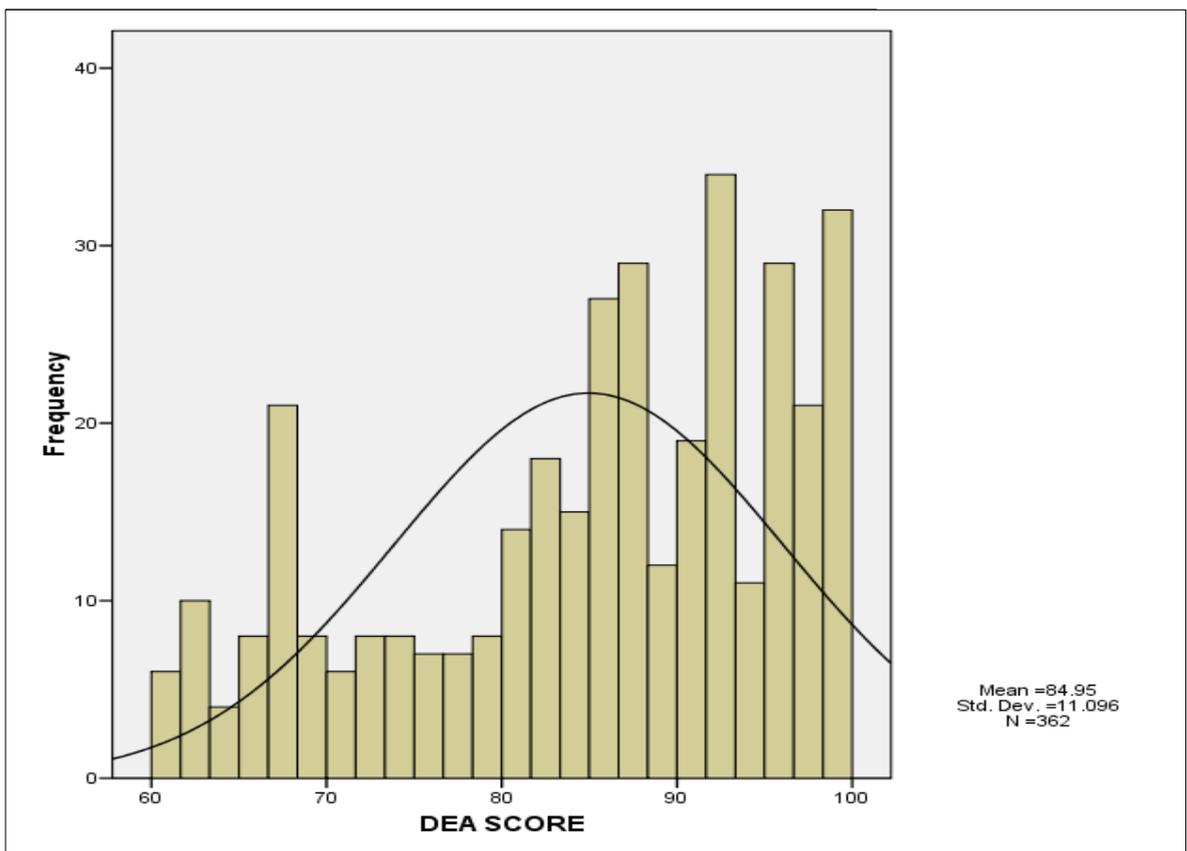
Table 2 summarises the DEA efficiency scores for the 362 pension funds. The Table depicts the minimum DEA efficiency score of 60% and the maximum 100%. The pension funds whose DEA scores were 100% were the best performers whose practices should be copied by those with lower efficiencies.

TABLE 2: DEA SCORES OF PENSION FUNDS

DEA SCORES %	n	%
60 – 69	57	15.7
70 – 79	43	11.9
80 – 89	114	31.5
90 – 99	123	34.0
100	25	6.9
Total	362	100

Figure 4 shows that the minimum DEA efficiency score was 60% and the maximum was 100% with a mean score of 84.95% and a standard deviation of 11.09%.

FIGURE 4: DEA EFFICIENCY SCORES



Source: Authors' own construct

Figure 4 shows that Kenyan pension funds have a wide disparity in DEA efficiency scores, as they range from 60% to 100%. This disparity shows that

whereas some pension funds are efficient, others are less efficient and so the efficient pension funds can act as role models for the others.

Reliability of the measuring instruments

The measuring instruments were tested for reliability. Table 3 shows that all the variables produced acceptable reliability scores that exceeded the minimum value of 0.50, which is required for basic or exploratory research (Tharenou 1993; Pierce and Dunham 1987).

TABLE 3: INTERNAL RELIABILITY OF THE INSTRUMENTS

Variables	Cronbach alpha
Fund regulations	0.51
Fund governance	0.60
Operational efficiency	0.63
Fund risk management	0.55
Investment strategy	0.69
Fund ethics	0.88

Validity of measuring instruments

The discriminant validity of the measuring instruments was assessed. For this purpose three sets of exploratory factor analyses were conducted, using the STATISTICA Version 9.0 (2009) statistical software package. Principal Component Analysis was specified as the method of factor extraction and Varimax rotation of the original factor matrix was used in all instances.

TABLE 4: ROTATED FACTOR LOADINGS – EMPIRICAL RESULTS

	FACTOR 1*	FACTOR 2*	FACTOR 3*	FACTOR 4*
	Operational efficiency	Fund leadership	Fund governance	Fund regulations
EFFC1	0.846	0.007	0.079	0.019
EFFC5	0.895	0.049	0.037	-0.029
EFFC11	0.845	-0.013	-0.052	0.087
EFFC13	0.871	0.082	0.013	0.010
ETHC1	0.460	0.027	-0.235	-0.030
ETHC2	0.832	-0.026	0.018	-0.088
ETHC3	0.918	-0.031	-0.030	0.045
ETHC5	0.921	-0.019	0.025	-0.045
ETHC6	0.858	0.132	0.005	0.004
ETHC7	0.833	0.004	0.045	-0.058
ETHC8	0.689	0.153	0.054	0.124
GOVN14	0.628	0.097	0.027	-0.029
REGU10	0.469	-0.115	0.091	0.256
RISK1	0.565	0.111	-0.136	0.073
RISK11	0.587	-0.059	0.026	-0.037
ETHC4	0.019	0.454	0.157	0.186
GOVN2	-0.024	0.571	0.098	-0.159
GOVN12	0.054	0.650	-0.015	0.081
REGU5	0.182	0.514	0.044	0.229
REGU8	-0.038	0.484	-0.192	0.195
STRAT8	0.101	0.431	0.137	0.012
EFFC2	-0.073	0.212	0.429	0.188
GOVN3	0.048	-0.036	0.546	0.170
GOVN6	0.093	0.125	0.437	-0.146
GOVN7	-0.072	-0.030	0.482	-0.037
GOVN10	-0.060	-0.128	0.411	0.116
REGU3	0.092	-0.063	0.508	0.261
RISK4	-0.059	0.295	0.579	0.130
STRAT10	0.051	-0.079	0.408	-0.096
GOVN9	-0.074	0.274	0.106	0.509
REGU1	0.115	0.387	0.192	0.539
REGU2	-0.027	0.076	0.135	0.635
REGU6	-0.017	-0.194	0.151	0.439
RISK5	0.085	0.054	0.058	0.690
STRAT7	0.053	-0.071	-0.126	0.603
Eigen values	8.901	3.325	1.785	1.619
Cronbach alpha	0.94	0.56	0.52	0.61

Note: * = Loadings greater than 0.40 were considered significant

The extraction of six factors, namely operational efficiency, fund ethics, fund regulations, fund governance, risk management and investment strategy, was specified. It was expected that each of the four variables modelled was a separate and distinct construct. The resultant empirical evidence did not,

however, support this contention. After considering various options ranging from four to seven factor solutions, it had to be concluded that the instrument used to measure the above-mentioned factors did not demonstrate sufficient evidence of discriminant validity. Four, instead of six, distinctly separate variables could be identified. The most interpretable factor structures for these variables are reported in Table 4.

Table 4 shows that four items, which were originally regarded as measures of operational efficiency (EFFC), load on factor 1. Seven ethics (ETHC1, 2, 3, 5, 6, 7 and 8), one fund governance item (GOVN14), one fund regulation item (REGU10) and two fund risk items (RISK 1 and 11) also load on factor 1. It appears that all these items are related to operational efficiency, for example “remunerating trustees properly” (GOVN14), “not exposing the fund to default risk from sponsors (RISK1) and “not limiting investments in real estate to 5% of fund value” (REGU10). It also appears that the respondents did not distinguish between operational efficiency and fund ethics. They regard the two as being the same. A subsequent EFA on operational efficiency and fund ethics items confirmed that the two were not separate factors. All the above-mentioned variables were therefore regarded as measures of operational efficiency.

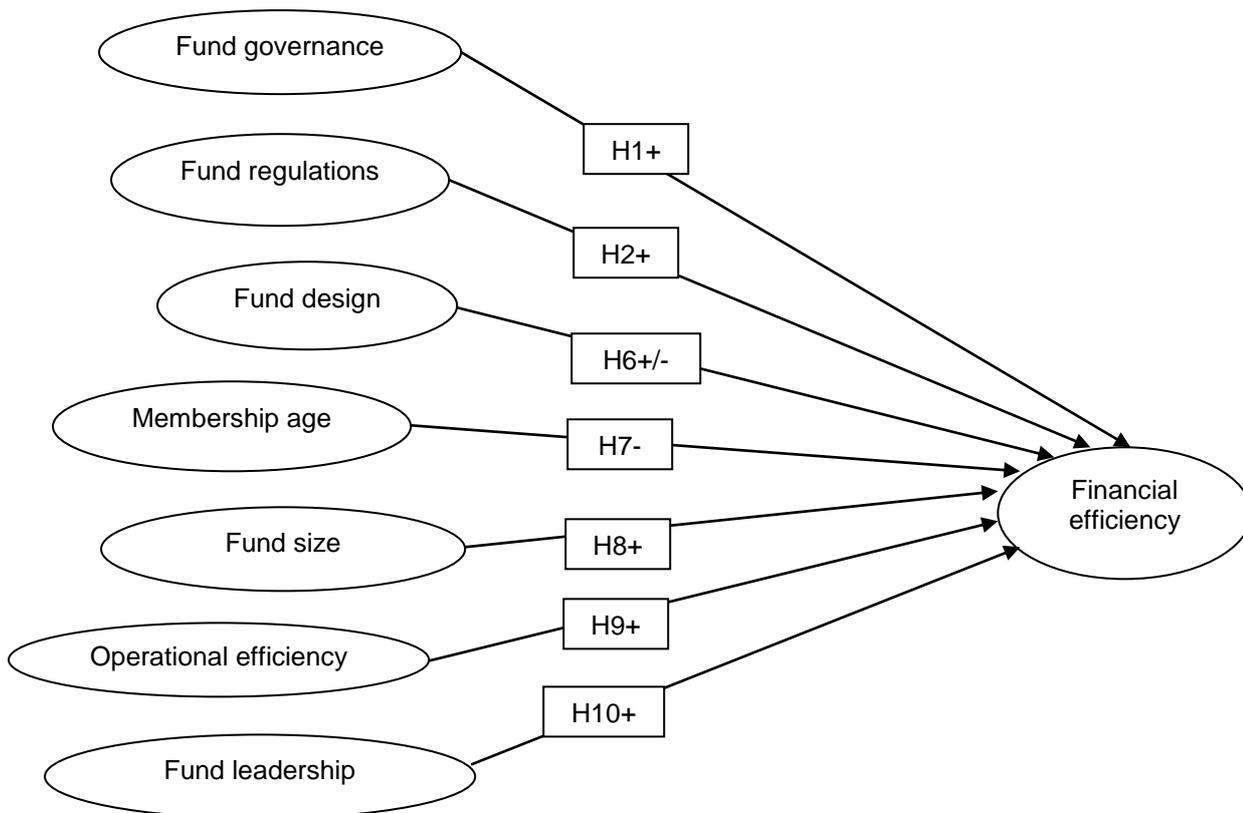
Table 4 further shows that two of the earlier envisaged governance items (GOVN2 and GOVN12), two regulation items (REGU5 and REGU8), one ethic item (ETHC4) and one strategy item (STRAT8) load on factor 2. The items are honesty when sharing information with trustees and members (ETHC4), CEO leadership of the pension fund (GOVN2), maintaining an effective performance measurement system (GOVN12), compliance with the pension law (REGU5), effective financial reporting practices (REGU8) and giving wide discretion to external investment managers (STRAT8). It appears that all these items are related to fund leadership and are therefore regarded as measures of that variable.

The items that loaded on factor 3 include EFFC2 (decrease in benefits processing period), GOVN3 (continuous education to trustees), GOVN6 (maintaining an effective internal control system to document and monitor the pension fund's activities), GOVN7 (open communication to members), GOVN10 (clearly defining the roles of the trustees), REGU3 (regulation of fees charged by service providers), RISK4 (bankruptcy of the fund if the sponsor ceases to exist) and STRAT10 (basing investment strategies on market findings). This variable was labelled fund governance (FGOVN).

Factor 4 had six items that loaded onto it. These items were GOVN9 (monitoring performance of the service providers), REGU1 (regulation of compliance costs), REGU2 (limiting the size of the board of trustees), REGU6 (regulatory meetings held by the board of trustees), RISK5 (separation of pension fund management from the sponsor's business) and STRAT7 (maintaining an effective investment policy). This variable was labelled fund regulations (FREGU).

The Cronbach alpha reliability coefficients of constructs as they emerged from the factor analyses were then re-calculated to confirm their internal consistency. Based on the factor analysis results and Cronbach alphas, certain latent variables were reconstructed and another removed from the hypothesised model. Owing to inadequate discriminant validity, the fund ethics, fund risk and investment strategy variables were removed from the final theoretical model while the governance variable was re-defined as was the leadership variable. Table 4 indicates that all the re-calculated Cronbach reliability coefficients were above the 0.500 cut-off point needed for basic research (Tharenou 1993; Pierce and Dunham 1987). All the final scales mentioned in Table 4 were therefore regarded as reliable for inclusion in the final hypothesised model.

FIGURE 5: REVISED HYPOTHESED MODEL TO IMPROVE FINANCIAL EFFICIENCY



The revised hypothesised model

The original hypothesised model was revised after the omission and reconstruction of the various variables in the model. Only the latent variables shown in Table 4 and their corresponding measuring items were included in the revised model (see Figure 5) to improve the financial efficiency of pension funds.

Owing to the emergence of the new variable, fund leadership, from the factor analysis, the following additional hypothesis had to be formulated:

H10: Fund leadership exerts a positive influence on the financial efficiency of pension funds.

All subsequent analyses are based on the above-mentioned revised hypotheses.

EMPIRICAL RESULTS

The relationship between membership age, fund design, fund size and financial efficiency

Main effects ANOVA was conducted to test the relationship between membership age, fund design and fund size, on the one hand, and financial efficiency (DEA) of pension funds, on the other hand. The results of these analyses are reported in Tables 5, 6 and 7.

TABLE 5: THE RELATIONSHIP BETWEEN FINANCIAL EFFICIENCY, MEMBERSHIP AGE, FUND DESIGN AND FUND SIZE – MAIN EFFECTS ANOVA

Independent variable	F-value	p-value	Partial eta-squared
Fund size	38.20	0.000*	0.301
Fund design	1.63	0.203	0.005
Membership age	0.91	0.403	0.005
Degrees of freedom error = 354			

Note: * = significant at $p < 0.01$ level

TABLE 6: THE RELATIONSHIP BETWEEN FINANCIAL EFFICIENCY, MEMBERSHIP AGE, FUND DESIGN AND FUND SIZE – MEANS AND STANDARD DEVIATIONS

Independent variable	Category	N	Mean	Standard deviation
Fund size	< 100	82	4.35	0.72
	101 – 200	94	3.85	0.90
	201 – 300	72	3.07	1.02
	301 – 400	58	3.08	0.96
	401+	56	2.62	1.06
Fund design	Defined benefit	306	3.46	1.12
	Defined contribution	56	3.66	1.06
Member age	<20 years	0	0	0
	21 – 30	35	3.89	0.93
	31 – 40	293	3.44	1.11
	41+	34	3.58	1.18

TABLE 7: THE RELATIONSHIP BETWEEN FINANCIAL EFFICIENCY, MEMBERSHIP AGE AND FUND SIZE – SCHEFFÉ TEST

FUND SIZE (as measured by number of members)					
	< 100	101 – 200	201 – 300	301 – 400	401+
< 100		0.014*	0.000**	0.000**	0.000**
101 – 200	0.014*		0.000**	0.000**	0.000**
201 – 300	0.000**	0.000**		1.000	0.109
301 – 400	0.000**	0.000**	1.000		0.133
401+	0.000**	0.000**	0.109	0.133	
MEMBERSHIP AGE (in years)					
	21 – 30	31 – 40	41+		
21 – 30		0.075	0.502		
31 – 40	0.075		0.787		
41+	0.502	0.787			

Note: * = significant at 0.05; ** = significant at 0.01

The results (Table 5) show that only the fund size is related ($F = 38.10$, $p < 0.01$) to financial efficiency. Pearson correlation coefficients were calculated for this relationship, which show a negative relationship between these two variables ($r = -0.54$, $p < 0.05$). This means that pension funds with fewer members are perceived to be more financially efficient than larger pension funds. Based on these results, the hypothesis H8 is not supported.

The results (Table 5) further show that fund size explains 30% of the variance in financial efficiency (DEA scores). The Scheffé test (Table 7) reveals that the DEA mean score (Table 6) for the category of pension funds with a membership of fewer than 100 is significantly different from the DEA mean score of pension funds exceeding 100.

Fund design and membership age (Table 5) are not significantly related to financial efficiency and the DEA mean scores do not differ significantly between the two fund designs as well as the membership age categories. The hypotheses H6 and H7 are not supported. This means that defined benefit (DB) pension fund designs are not more financially efficient than defined contribution (DC) designs and vice versa. The results show however that there were more DB (306) than DC (56) pension funds in the sample.

The relationship between fund governance, regulations, leadership and financial efficiency

One-way Anova was used to test the relationship between fund governance, regulations, leadership and financial efficiency. The results are reported in Table 8.

TABLE 8: THE RELATIONSHIP BETWEEN FUND GOVERNANCE, REGULATIONS, LEADERSHIP AND FINANCIAL EFFICIENCY

Independent variable	F-value	p-value
Fund governance	1.25	0.307
Fund regulations	0.93	0.458
Fund leadership	1.11	0.364
Degrees of freedom error = 38		

Note: * = significant at $p < 0.01$ level

The results show that fund governance, regulations and leadership are not significantly related to financial efficiency. This means that the importance that managers of pension funds attach to fund regulations and how the fund is governed and led does not play a role in achieving financial efficiency. Based on the empirical results the hypotheses H1, H2 and H10 are not supported.

The relationship between operational and financial efficiency

One-way ANOVA was conducted to test the relationship between the operational and the financial efficiency of pension funds. The results of this analysis are reported in Table 9.

TABLE 9: THE RELATIONSHIP BETWEEN OPERATIONAL AND FINANCIAL EFFICIENCY

Independent variable	F-value	p-value
Operational efficiency	0.93	0.458
Degrees of freedom error = 38		

Note: * = significant at $p < 0.01$ level

The results show that the operational efficiency is not significantly related to the financial efficiency. Hypothesis H9 is therefore not supported. This means that operational efficiency, as measured in this study, does not impact on financial efficiency.

DISCUSSION OF RESULTS AND MANAGERIAL IMPLICATIONS

The most important finding of this study is that smaller funds are more efficient compared with the larger funds. The reasons for this finding lie in the fact that large pension funds experience diseconomies of scale (Dahlquist, Engstrom and Soderlind 2000). These diseconomies result from excessive administration costs incurred in communicating to the members, fund administration and regulatory levies (Gallagher and Martin (2005; Chan, Faff, Gallagher and Looi 2004). According to Odundo (2008) and Nyakundi (2009), one of the issues that contribute to the inefficiency of the National Social Security Fund in Kenya is the estimated membership of 800 000 members who are dispersed across the country. This increases the costs associated with the administration of members' accounts and record keeping.

Pension funds with more members are expected to have a higher value in contributions and assets compared with smaller ones (Chan et al. 2004). The funds therefore receive sizable contributions that may result in inefficiency in investments (Dahlquist et al. 2000). Thus the larger pension funds have large sums of money at their disposal that they tend to invest in less profitable ventures as opposed to smaller pension funds with smaller financial resources

that force them to allocate the money judiciously to the most profitable opportunities. Moreover, the larger pension funds with huge investments in the stock market are exposed to more risk as opposed to the smaller funds (Bikker and Dreu 2009). With the bearish financial markets in the past three years (2007-2009), bigger pension funds lost more than the smaller pension funds owing to the low values of stock market investments. Managers must therefore guard against their pension funds becoming too big.

The empirical results showed that the fund governance, leadership and regulations do not influence the financial efficiency of Kenyan pension funds. While these results contradict the findings of previous studies as discussed in the hypothesised relationships above, they are congruent with the pension fund environment in Kenya. For example, in a communicative validation exercise (Kelly 2006:381) with 24 pension fund trustees after the study, it was learnt that (1) the indicators of fund governance in the present study were lacking in Kenya, (2) Kenyan pension fund laws are very rigid, allowing little room to think beyond the RBA regulations, and (3) leadership performance measures as tested in the present study are absent in Kenyan pension funds. Fund governance, leadership and regulations will therefore not have a significant effect on financial efficiency.

The empirical result also showed that membership age does not influence the financial efficiency of pension funds in Kenya. The participants (trustees) participating in the communicative validation exercise found this finding surprising, as their experiences indicate that membership age influences investment strategy. Older members prefer investments in guaranteed funds, while the middle-age group (31 to 40 years) prefer a dynamic investment strategy. The participants also suggested that this and other surprising findings (for example, the non-significant relationship between operational and financial efficiency) could have been caused by the fact that not all trustees are experts on pension fund management issues. Trustees are elected by members through a popular vote, while the sponsor nominates the others.

Finally, the empirical results revealed that fund design does not significantly

influence the financial efficiency of pension funds. This finding is inconsistent with conclusions of previous studies which indicated that defined contribution (DC) pension funds are preferred over defined benefit (DB) ones owing to their better decision-making transparency and member involvement; their more cost competitive nature; and their reduced default risk for members (see H5 in the hypothesised relationship section). It appears that Kenyan pension funds already follow the trend of favouring DC funds (306 of the participants in this study were DC funds), possibly making this issue a non-issue.

CONCLUSION

Despite the important contributions of the study, there were limitations and thus areas for improvement. Firstly, due to the absence of existing instruments to measure the variables investigated in this study, particularly as far as pension funds are concerned, self-constructed instruments were used. Some of these instruments produced low reliability coefficients, for example fund leadership ($\alpha = 0.56$) and fund governance ($\alpha = 0.52$). In addition, the instrument used to measure the operational efficiency of pension funds could have been inadequate in capturing what the respondents would have regarded as operational efficiency. This could have led to the insignificant relationship found between operational and financial efficiency. Improved results could therefore be achieved by improving the measuring instruments used in this study.

Secondly, it appears that the trustees were not the most knowledgeable persons on pension fund management as was originally thought. Improved results could emerge if a similar study is done on a sample of executive managers.

In conclusion: the main contribution of this study is the revelation that smaller pension funds are more financially efficient than larger ones owing to the bigger ones sitting on large sums of money and inefficiently investing it. Smaller pension funds have smaller financial resources which they have to invest more judiciously. Furthermore, larger pension funds with huge

investments in the stock market are exposed to more risk compared with smaller funds. Smaller pension funds might be more financially efficient than larger ones, but financial efficiency does not necessarily translate into profitability. The link between financial efficiency and profitability was not investigated in this study, which is a limitation that should be explored in further research

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