

Trustee Related Determinants of Scheme Design in Occupational Defined Contribution Schemes in Kenya

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Abstract

This paper aims to provide an understanding of trustee related determinants of scheme design in occupational defined contribution schemes (ODCS) in Kenya. ODCS involve no promises about the size of the benefits and no risk to the employer. The risk of ending up with low or no benefits falls entirely on the scheme members. It is necessary therefore, that determinants of scheme design are carefully considered in establishment and review of defined contribution schemes to deliver adequate benefits to members. Based on modern portfolio and the life cycle theories, the study investigated the key trustee related determinants of scheme design in ODCS in Kenya. Primary data were collected using a questionnaire administered to scheme administrators in the sample. Descriptive statistics were used to profile respondents, describe sample characteristics and a logistic econometric model was applied to evaluate the trustee related determinants of scheme design. The study showed that the key trustee related determinant of scheme design was investment strategy. From the findings, it was recommended that trustees should in addition consider investment returns, target pension, charges by service providers and annuity rates in designing schemes. This would guarantee members a reasonable standard of living after retirement.

Keywords: Scheme Design, Occupational Defined Contribution Schemes, Trustees.

1. Introduction

The level of attention paid to the provision of adequate retirement benefits for workers around the world has continued to increase. The emerging consensus around the world has been a shift away from dominant state provision towards private funded schemes in a competitive environment (Nyagah, 2000). Given the three main objectives of retirement income systems of redistribution, saving and insurance, an ideal system should build around the three pillars of old age security. First pillar, being government providing some minimum income to all workers at retirement and if possible income to the elderly whether previously employed or not. A second pillar, of properly regulated occupational schemes, which when added to the first pillar, target an income replacement rate adequate for employees to maintain their standard of living after retirement. Lastly, a third pillar of well regulated, individual retirement schemes in which workers can make additional savings to supplement their retirement savings or for those without access to occupational schemes.

The history of formal pension schemes in Kenya is closely associated with the social, economic and political developments towards an industrial society that the country witnessed after the Second World War (Marwa, 1992). The earliest insured pension plans in Kenya were mainly administered from England and were exclusively for the whites. Such plans were informal and discriminatory. It was only in the late 1950s that the colonial government set up a social security scheme along the lines of one existing in England as well as encouraging the development of occupational pension plans (Angima, 1985). The period after independence saw a steady growth in the number of pension plans owing to the social, economic and industrial growth in the country.

The earliest retirement benefits schemes to be established in Kenya were insured plans providing guarantees to members on the level of benefits (Angima, 1985). With time the insured plans gave way to Defined Benefit (DB) schemes which guaranteed a pension based on an actuarial formula targeting a replacement ratio. Since then, many schemes have converted from DB to defined contribution (DC). For instance in the year 2001, DC schemes constituted 84 percent of all occupational schemes and by 2005 the proportion had risen to 87 percent (Retirement Benefits Authority, 2005). DC plans have become the primary retirement savings vehicle for many employees in Kenya and the DC design continues to grow in importance. However, DC plans, unlike DB plans, involve no promises about the size of the pension and no risk to the employer with entire risk borne by scheme members. Therefore, a DC scheme should be based upon a design that will deliver adequate benefits to members.

DC schemes in Kenya have not been well-designed as a single integrated financial product by the three key

players namely; employer, trustees and regulator. In addition, there are no legislative guidelines and standards for design of DC schemes to guarantee adequate benefits to members. These, coupled with lack of periodic reviews of DC scheme design, compromise the benefits to members. The consequence of failure in scheme design is members getting low or no benefits when leaving service or on retirement. The risk of ending up with a low or no benefits falls entirely on the scheme members. A natural measure of this risk is the probability of falling short of the pension available from a fully-funded DB plan.

While some studies have been carried out in the area of retirement benefits such as conversion of DB schemes to DC schemes (Chirchir, 2010); pension choices (Cocco and Lopes, 2004) and effect of insufficient knowledge on retirement savings (Lusardi, 2003). In Kenya, Njuguna (2011) carried out a study on the determinants of pension fund corporate governance while Ngetich (2012) carried out a study on determinants of the growth of individual pension schemes. There has been no specific study exploring the trustee related determinants of scheme design in ODCS in Kenya and is what this study explored.

An ODC scheme that is well designed will be a single, integrated financial product that delivers at a reasonable cost to the scheme member a pension that provides a high degree of retirement income security. The pension should provide an adequate replacement income for the remaining life of the member or partner and remove the risk that the member outlives the resources. The main trustee related determinants of scheme design in ODCS in the literature reviewed composed of; investment returns, investment strategy, target pension, charges by service providers and annuity rates.

2. Research Methodology

The study adopted a cross-sectional descriptive design. A descriptive study was used because the purpose was to describe the trustee related determinants of DC scheme design, make specific recommendations and evaluate factors influencing the design. The population comprised of 1339 ODCS as published in the Retirement Benefits Authority Annual Report for the financial year 2011 – 2012 (RBA, 2012).

2.1 The Model

A logit model was used to examine the trustee related determinants of scheme design in ODCS in Kenya. This was appropriate since the dependent variable was categorical with binary response. The regressand (scheme design) was a binary variable taking 1, if the design was good or 0 if poor. The model was adopted from that of Nzuki (2012) with modification. The decision on scheme design depended on the level of benefits expected, which was equivalent to maximization of expected utility. The trustees, therefore strived to maximize utility while employers sought to maximize profits. The scheme administrators were assumed to be risk neutral and therefore preferred good designs to poor designs. Good design results when the objective function is realized or closely mirrors the actual results, poor design results in low benefits.

If the dependent variable (scheme design), $Y=1$, meaning that the scheme design is good, then:

$$P_i = E(Y=1 | X_i) = \beta_0 + \beta_1 X_1 + \dots + \beta_i X_i + \varepsilon_i \dots \dots \dots (1)$$

Where: $Y=1$ means the scheme has a good scheme design, otherwise zero, and X_1, \dots, X_i are independent variables,

$E(Y=1 | X_i)$ means a function in which the regressand and regressors are Y and X_i respectively

β_0 is a constant, $\beta_1 \dots \beta_i$ are regression coefficients

P_i is the probability of a good design and ε_i is the error term

Since the probability of a good design is P_i , then the probability of a poor design is $(1-P_i) = 1/(1+e^{z_i})$, hence the ratio of the probability that a scheme will have a good design to the probability that it will be poor is as follows:

$$P_i / (1-P_i) = (1+e^{z_i}) / (1+e^{-z_i}) = e^{z_i} \dots \dots \dots (2)$$

Therefore;

The natural logarithm of (2) is:

$$L_i = \ln (P_i / (1-P_i)) = Z_i \\ = \beta_0 + \beta_1 X_1 + \dots + \beta_i X_i + \varepsilon_i$$

The study evaluated trustee related determinants of scheme design, thus, the model specification was:-

$$\ln (P_i / (1-P_i)) = Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon_i$$

Where;

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$ and β_5 were the parameters to be estimated

X_1, X_2, X_3, X_4 and X_5 = investment strategy, investment returns, target pension, charges by service providers and annuity rates at retirement.

2.2 Sampling Technique and Sample Size

According to Sekaran (2003), in order to enhance research ability to draw generalizations on the whole

population, the sampling process and sample selection should consider the properties of the population. The selection of the sample was based on stratified random sampling technique. The population was first divided into mutually exclusive groups that were relevant, appropriate and meaningful in the context of the study (Sekaran, 2003). Thus, the schemes were selected according to three different scheme sizes; small, medium and large schemes. Small schemes were those with a membership of 50 or less, medium schemes with a membership between 51 upto 100 and large schemes with a membership above 100. Tracing the differences in the parameters of the subgroups within a population would not have been possible without the stratified random sampling procedure (Frankfort-Nachmias, *et al.*, 1992). Once the population had been stratified, simple random sampling was used to draw schemes whose administrators were to respond to questionnaires. Since this study involved a survey (questionnaires) and on the basis of the past research on pensions involving schemes as the unit of the analysis (Blake, 2004), a sample of 200 was chosen. A sample of 200 schemes representing 15 percent of the population was extracted. The justification for the sample size was that 15 percent was adequately representative and allowed reliable generalizations on the population of study.

The study used questionnaires in which the respondents were subjected to structured and unstructured questions. In this study, the indicators for measuring the trustee related determinants of scheme design had a high content validity since the development of the measurement items was based on an extensive review of the literature, detailed evaluations and validation by earlier studies (Blake, 2004). According to Sekaran (2003) the external or internal reliability depends on consistency. Reliability is essentially a synonym for consistency and replicability over time, over instruments and over groups of respondents while validity is what it purports to measure (Cohen *et al.*, 2000). There are four methods, which can be used for assessing reliability: (i) the test-retest method, (ii) the alternate-form method, (iii) the split-halves method, and (iv) the internal consistency method (Nunnally, 1978). Of these four methods, internal consistency reliability is the most commonly used in assessing survey instruments and scales and hence used for this study. Internal consistency is an indicator of how well the different items measure the same concept. This is important since a group of items purporting to measure one variable should indeed be clearly focused on that variable (Nunnally, 1978). The Cronbach's alpha (α) is a reliability coefficient that indicates how well the items in a set are positively correlated to one another (Sekaran, 2003). Generally, reliability coefficients of 0.70 or more ($\alpha \geq 0.70$) are considered good (Nunnally, 1978) and was the benchmark used for this study.

The trustee related determinants had Cronbach's alpha of 0.797 and was considered good. None of the items could be deleted since this could have led to lowering of the coefficient and reliability. There are three popular methods to evaluate the validity of scales. These are content validity, criterion-related validity, and construct validity (Hair *et al.*, 1998). This study used content validity where every single item of the trustee related determinants of scheme design questionnaire was item analyzed by experts in pensions and also by academicians.

2.3 Data Analysis

Since this study was inferential in nature, data analysis started with testing for the statistical significance. The primary purpose of the inferential statistics was to estimate or predict the trustee related determinants of scheme design from a selected sample of cases. A logit model which is a specialized regression model of binomial response variables was used. Logit models use the inverse of the standard normal cumulative distribution function and assume the categorical dependent reflects an underlying quantitative variable. Since the explanatory variables were categorical, dummy variables were used to contrast the different categories. For each variable, the baseline (reference) category was chosen as very important and was contrasted with all remaining categories. Since the explanatory variables had four categories, utmost three dummy variables were created to investigate all the differences in the categories with respect to the dependent variable. The model was used to predict the probability of a good design based on the predictors. The model established the trustee related determinants of scheme design in Kenya, the significance level used was 0.05.

Multicollinearity issues were considered because in multivariate models, it is desirable for each independent variable to be highly correlated with the dependent variable, but not among the independent variables. The study used the guide that 0.80 is a more acceptable threshold level and severe multicollinearity existed if the coefficient was more than 0.8. Also the omnibus tests of model coefficients were performed to check that the model (with explanatory variables) was an improvement over the baseline model (with no explanatory variables). This was determined through differences in the -2 log-likelihoods by use of chi-square tests. Cox & Snell and Nagelkerke R squares were used to establish the proportion of variation in scheme design explained by the model. The Hosmer and Lemeshow tests were used to assess the goodness of fit of the model to the data. Lastly, the classification table of logit model was used to determine the proportion of the outcome that was correctly classified relative to the null model. The Odds Ratios were used in the interpretation of the significant coefficients in the equations. The tests and first logit were analysed using SPSS. Since marginal effects could not be computed in SPSS, these were run in Stata and predicted the probability of achieving a good

design.

3. Trustee Related Determinants of Scheme Design

This section presents results and discusses the trustee related determinants of scheme design for occupational defined contribution schemes.

3.1 Descriptive Statistics of the Trustee Related Determinants of Scheme Design

Table 3.1 presents the results of the descriptive statistics of the trustee related determinants.

Table 3.1: Descriptive Statistics for Trustee Related Determinants

	N	Minimum	Maximum	Mean	Std. Deviation
Expected investment returns	186	1	4	3.88	.466
Targeted pension	186	1	4	3.69	.647
Charges by service providers	184	1	4	3.51	.947
Annuity rates at retirement	181	1	4	3.66	.652
Investment strategy	185	1	4	3.49	.841
Valid N (listwise)	176				

Source: Survey Data, 2014

From table 3.1, the mean scores were used to gauge the overall position of respondents. The determinants were ranked in terms of their mean scores, from not important to those considered very important. A score of 1 represented not important, 2 least important, 3 important and 4 very important. A mean score of 3 and above captured the important determinants. Respondents generally agreed that; expected investment returns (3.88), target pension (3.69), annuity rates at retirement (3.66), charges by service providers (3.51) and investment strategy (3.49) were very important determinants. There was a general agreement among the respondents that all the five were important trustee related determinants of ODCS. Expected investment return was considered the most important determinant. The findings were consistent with those of Blake (2007) who reported that investment performance was important in designing an occupational defined contribution scheme. However, it was established that it was impossible to achieve consistently superior net investment performance in the longrun.

3.2 Regression Results for Trustee Related Determinants of Scheme Design

Since a logistic model was used for the analysis, test for multicollinearity was important. Given that the explanatory variables did not have high correlation (>0.8) they were all considered good for model. The Omnibus Tests of Model Coefficients were used to check that the model (with explanatory variables included) was an improvement over the baseline model (without explanatory variables). The inclusion of the determinants reduced the -2 log likelihood by 53.188 with 15 degrees of freedom. The -2 log likelihood (deviance) measured how well the model explained variations in scheme design. The p value for the result was 0.000 which was less than usual cut off significance level of 0.05. Hence it was concluded that the addition of the determinants to the model explained the variations in scheme design. Further, the model with a Cox & Snell and Nagelkerke R Square of 0.263 and 0.379 respectively, explained between 26.3 and 37.9 percent of the variation in scheme design. In addition, the Hosmer & Lemeshow test of the goodness of fit showed that the model was a good fit to the data as $p=0.986$ (>.05). The null hypothesis that the model does not fit was thus rejected. Lastly, the classification table of the logit model for trustee related determinants, correctly classified the outcome for 81.0 percent of the cases compared to 71.8 percent in the null model (without explanatory variables), providing improvement in the prediction. Table 3.2 presents the results of the first logit regression estimating trustee related determinants.

Table 3.2: Logit Regression Results for Trustee Related Determinants of Scheme Design

Variable	B	S.E.	Wald	Df	Sig.	Odds Ratio
Investmen returns			2.414	3	.491	
Investment returns(Not Important)	4.550	32079.165	.000	1	1.000	94.680
Investment returns(Least Important)	62.676	27031.748	.000	1	.998	16585261260.991
Investment returns(Important)	2.380	1.531	2.414	1	.120	10.800
Target pension			.145	3	.986	
Target pension(Not Important)	-17.503	14877.345	.000	1	.999	.000
Target pension(Least Important)	.088	1.376	.004	1	.949	1.092
Target pension(Important)	-.262	.722	.132	1	.717	.769
Charges			1.574	3	.665	
Charges(Not Important)	19.805	14877.345	.000	1	.999	399195157.311
Step 1 ^a Charges(Least Important)	-22.896	44770.506	.000	1	1.000	.000
Charges(Important)	.733	.584	1.574	1	.210	2.081
Annuity			1.031	3	.794	
Annuity(Not Important)	-17.397	14877.345	.000	1	.999	.000
Annuity(Least Important)	-42.915	20659.636	.000	1	.998	.000
Annuity(Important)	.589	.581	1.031	1	.310	1.803
Investment strategy			7.178	3	.046	
Investment strategy(Not Important)	-1.743	1.918	.826	1	.363	.175
Investmentstrategy(Least Important)	2.464*	1.077	5.228	1	.022	11.746
Investment strategy(Important)	.401	.622	.415	1	.519	1.493
Constant	-1.736	.271	40.928	1	.000	.176

*Implies the Coefficient is Significant at 0.05 and ** implies it is significant at 0.01

Source: Survey Data, 2014

Table 3.2 presents the regression coefficients (β), the Wald statistic (to test the statistical significance) and the Odds Ratio for each trustee related determinant category (ranking). The results showed that the coefficient for investment strategy was significant (Wald=7.178, df=3, p<.050). Therefore the variable investment strategy was making a positive contribution to the predictive power of the model. The coefficient for investment strategy (ranked, least important) was significant and positive, indicating that an increased ranking of investment strategy was associated with increased odds of achieving a good scheme design. The Odds Ratio shows that, respondents that ranked investment strategy as least important were twelve (12) times more likely than those ranking it as very important (reference category) to achieve a good scheme design, holding other determinants constant. The table that follows presents the results of the marginal effects after the first logit regression results.

Table 3.3: Marginal Effects of Trustee Related Determinants: $Y = \Pr(\text{Good design}) = .25462754$

Variable	dy/dx	Std. Err.	z	P> z	[95% C.I.]	X
Investment return(Important)	.2970761	.17979	1.76	0.486	.144688 .849464	.082873
Target pension(Not Important)	.3344337	.25087	1.33	0.182	-.157259 .826126	.022099
Target pension(Least Important)	-.1292304	.14868	-0.87	0.385	-.420645 .162184	.038674
Target pension(Important)	.1206668	.11779	1.02	0.306	-.110204 .351537	.171271
Charges(Important)	.1301623	.13651	1.13	0.407	-.132144 .240216	.042362
Annuity(Least Important)	.1014125	.10222	1.21	0.517	-.142345 .212348	.193456
Investment strategy(Not Important)	.1477935	.29438	0.50	0.616	-.42918 .724767	.033149
Investmentstrategy(Least Important)	.344688*	.16301	1.50	0.006	-.074814 .56419	.099448
Investment strategy(Important)	.1693883	.11379	1.49	0.137	-.053636 .392413	.187845

*Implies the Coefficient is Significant at 0.05 and ** implies it is significant at 0.01

Source: Survey Data, 2014

From table 3.3, the predicted probability of achieving a good design was 0.25 for administrators of occupational

defined contribution schemes. Marginal effects and discrete changes were listed under dy/dx column. For a unit increase in the ranking of investment strategy for those ranking it as least important than very important, the predicted probability of achieving a good design increased by 34.47 percent, holding other determinants constant at the reference points. It was concluded that investment strategy was the most important trustee related determinant of scheme design for ODCS.

This was consistent with the findings of Cairns *et al.* (2006) that stochastic lifestyling, an investment management strategy that hedges productivity risk and inflation risk during the accumulation stage and interest rate and annuity risk at the point of retirement was important. The results were also consistent with those of Blake *et al.* (2004) whose results reported that key differences between outcomes depend on the strategic asset allocation strategy chosen (and hence on the rate of return on assets in relation to the growth rate in earnings). Dispersion could be reduced by adopting a 'deterministic lifestyle' (or age phasing) investment strategy which reduces the volatility of the pension fund's value as the retirement date approaches (Samuelson, 1989, 1991 and Blake *et al.* 2001) With this strategy, the contributions were initially invested entirely in equities, but the assets were systematically switched over to bonds and or treasury bills over a pre-set period (for instance, 5 years) leading up to the retirement date. However, the results of this study showed that expected investment returns, target pension, charges by service providers and annuity rates at retirement were largely disregarded in the design of occupational defined contribution schemes.

4. Conclusion

Though ODCS involve no promises about the size of the benefits and no risk to the employer, they expose members to the risk of ending up with low or no benefits at retirement. The scheme is supposed to be designed as a single integrated financial product to guarantee adequate benefits to members. Trustees gave consideration to investment strategy as an important determinant in scheme design. However, they largely disregarded investment returns, target pension, charges by service providers and annuity rates at retirement.

5. Recommendations

Trustees should constantly review fund managers' investment performance relative to that of competing fund managers. Monitoring the investment returns declared by the fund manager each year. The investment should be within a clear investment strategy set by trustees within regulatory guidelines. They should also aim to target a particular pension level, for instance a replacement ration of two thirds. In addition the charges by service providers must be contained since they lower benefits. Also the annuity rates at retirement should be considered, offering an income drawdown during periods of poor annuity rates in the market. Trustees therefore need to blend all the determinants without placing overreliance on one of them. This is important because results demonstrated that trustees only considered investment strategy as important in scheme design, largely disregarding other factors which led to the ranking of most scheme designs as poor by administrators.

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