The Empirical Analysis of Cash Balance Pension Scheme Implementation in Nigeria

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Abstract

The study tested the equality of the expected mean retirement outcomes of the cash balance, defined contribution and defined benefit pension plans in three workplace scenarios in Nigeria that differed only on how monthly wages of employees are computed at entry into the schemes but contingent on employee's experience and desirable skills. The analyses are based upon the values obtained from the actuarial valuation models that incorporate assumptions that satisfy Nigerian pension statutory requirements. The results show that the cash balance mean gratuity and the cash balance mean pension are individually higher than those of the traditional schemes in all the three cases studied. We therefore conclude that cash balance plan offers the most rewarding retirement benefits to participants, and thus it deserves introduction into the Nigerian pension market.

Keywords: cash balance plan, defined benefit plan, defined contribution plan, gratuity, pension, pension replacement rate.

JEL Classification: G22, G23

Introduction

The strategic importance of market structures whose potentials to either create or destroy pension outcomes necessitates credible and robust pension systems that guarantee irreducible minimum level of benefits for the stakeholders (Villa, 2015). The evolution of pension system over time has been trailed by such issues as scheme cost minimization for sponsors, imbalance in risk-ownership structure, and maximization of pension outcomes to the beneficiaries. These do not preclude value creation for other stakeholders such as the regulator, administrator and the society at large.

Defined benefit (DB) and defined contribution (DC) pension plans have dominated the pension landscape over time, but recent trends worldwide suggest the ascendant of hybrid pension (HP) plans like cash balance (CB), target benefit (TB), pension equity (PE) plans in United States; Riester plans in Germany; non-financial DC plans in Sweden etc. that combine desirable features of both schemes. Essentially, DB pension scheme guarantees a specified retirement income to an employee based on an actuarial formula that considers his final or average salary at retirement, and the length of time spent in the scheme; and it is funded by the employer. On the other hand, DC pension structure provides a retirement benefit that depends on an employee's prior contributions into the scheme, the investment earnings, and how much pension the accumulated assets can purchase at retirement. Structurally, both plans differ in terms of how benefits are determined, cost of sponsorship, portability, regulatory controls, and risk ownership structure.

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However, CB plan has emerged as the most prominent hybrid pension offshoot from the traditional plans in the United States. Its ascendant to prominence started with its introduction by the Bank of America in 1985. CB plan grew from 1,337 (2001) to 14,629 (2014) – an 850% increment in 13 years with the plan assets rising to $952 billion as at the end of 2013. Its growth drivers include the small and mid-size firms with recorded 89% of CB plans instituted in firms with less than 100 employees; and also the recent statutory allowance for the broadening of its investment options. The popularity of CB plan is not impaired by economic uncertainty as it grew by 43% between 2008 and 2013; while the factors mediating in the CB plan's growth include rising taxes, hybrid pension plan appeal, legal clarifications on some knotty issues (e.g., 2006 Pension Protection Act; 2010 IRS Cash Balance Regulations; 2014 Final IRS Cash Balance Regulations), retirement savings crisis, cost and tax efficiency, and asset protection (Source: National Cash Balance Research Report, 2015).

CB is a DB hybrid plan whose expression of its benefits is more reflective of a DC structure with the stated hypothetical accounts for the participants. It can be contrasted with the TB plan, a DC hybrid plan with the appearance of a DB plan that creates a target benefit for the participant using the DB actuarial formula to determine the employers' contributions that will suffice to attain the target benefit. TB plan benefits are not guaranteed, and eventually are conditional upon the real balances of the participants' individual accounts. On the other hand, CB plan is guaranteed and structured to earn from its investments a fixed rate of return or an index-linked variable rate of return (e.g., linkage to the Treasury bill rate) for each period of time such as from year to year. In other words, the participant's account has two sources for its credits, employer's contributions (salary credit) and the interests (interest credit) from investment assets.

Locally, the Nigerian public pension system statutorily started with the Colonial administration enactment of the Pension Ordinance of 1951 with retroactive commencement effect put at 1946 (Ogunsola, 1984). In 1961, the private pension system was also introduced through the establishment of the National Provident Fund (which later metamorphosed into National Social Insurance Trust Fund in 1993). However, the evolution of the public pension system witnessed numerous legislations, enactments and amendments through the instrumentality of the federal government of Nigeria. Importantly, some challenges in the administration of the then pension system, which Abdulaziz (2014) suggests include funding, political control, pension defaults, improper record-keeping, tardiness in pension disbursement, and the politics of reform process necessitated the enactment of the Pension Reform Act No. 2 of 2004 (PRA 2004) which merged both the DB private pension model and the pay-as-you-go public pension model into a uniform DC pension system for both private and public sectors in the country. Currently, the system is regulated by the Pension Reform Act 2014 (PRA 2014) an offshoot of PRA 2004 with similar DC policy thrusts but slight modifications in the coverage of participants, applicable rates of contribution, earnings covered, closure of contracted-out pension plans, and regulatory control.

Importantly, the recent reforms in Nigeria (including PRA 2004) addressed the funding challenges by making employees share in this responsibility; and also in the process creating and unlocking a stream of pension assets that are invaluable for investments in critical infrastructure development. In effect, there has been a widespread public optimism notably in the forms of increased level of participation

from 1.5 million subscribers (2006) to over 6.8 million subscribers (2017), increased amount of pension contributions from N15.6 billion (2005) to N358.91 billion (2015), and portfolio growth from N815.19 billion (2007) to over N6.5 trillion (2017). Public euphoria in pension reforms is however dampened by factors such as governance and investment risks[1] which have inflicted serious damages on the value of the pension outcomes such that, for example, the market value of the pension assets depreciated from N1.257 trillion (3rd Quarter, 2014) to N0.81 trillion (4th Quarter, 2016) (Source: NSE Factsheets, PRA 2014).[2]

In other words, market structure plays significant roles in expected retirement outcomes. This is vividly captured by Villa (2015) who suggested that "pensions are not a zero-sum game between employer and employee. There is a third player – the market, which can either create or destroy value – and where there is a third player, it is possible to create a win-win situation for employee and employer where a minimum level of benefit is guaranteed and both gains and losses are shared. That solution can then be engineered by improving the robustness of the structure and by maximizing value creation."

Retirement outcome, like the market price of an article, reflects the available information on pension schemes such that the plan with the best expected outcome will always be the preferred choice of an economic agent. Thus, the robustness and attraction of pension schemes can be enhanced through embedded options, which Buchen (2011) suggests can be driven either by the behaviour of employees (e.g., option offering early retirement), or by the underlying economic phenomena (e.g., equity performance, interest and inflation rates).

Nigeria with its potentially wide pension market is under-explored in terms of empirical studies on: national pension system adequacy, operational efficiency of the available pension schemes; and on the dynamics, consistency and effectiveness of regulatory policies over time. Thus, this study provides an empirical basis for exploring the expected performance of CB pension scheme if implemented in the Nigeria environment by comparing its expected retirement outcomes with those of DB and DC pension plans within three scenarios where experience and desirable skills determine the monthly salary of the employees in the pension schemes.

The results show that in all the scenarios, CB plan is superior to each of the two traditional plans in mean gratuity and mean pension. This result is also validated by CB plan's superiority in the pension replacement rate over the two despite its singular provision for the health insurance premium at retirement age. Consequently, we propose the introduction of the CB plan in Nigeria.

The remainder of the paper is as follows. The next section is on the methods adopted in the study; the third presents the empirical results; the fourth section is on the discussion of findings; and lastly, the fifth section is on conclusions and policy recommendation.

Method

First, the study uses the pension actuarial valuation model with modifications that conform with the Nigerian pension statutory requirements (see Notes in the Appendix)[3] to determine the expected retirement outcomes for the three pension schemes in each of the three workplace scenarios that differed only on how the salaries of employees are calculated with respect to their ages at inception. We use for our datasets 26 hypothetical employees aged (= 25, 26, …, 50 years) and with the remaining length of service (= 35, 34, …, 10 years) in the three cases[4]. We then compute the summary statistics on three outcome

1 Shifts in pension risks from employers to the employees manifest as: shifts from traditional plans to hybrid plans, de-risking techniques that provide lump sum payments to the employees and also unload pension liabilities to third parties like insurance companies, and shifts to DC plans from traditional DB plans (Turner, 2014).

2 The market value of pension assets are as measured by the NSE Pension Index (Source: NSE Factsheets).

variables: gratuity, pension, and pension replacement rate in each of the three scenarios under study as explained below (Tables 1, A1 & A2).

Scenario 1: It models a workplace where employee's experience is assumed to increase with age such that monthly salary increases with the age of the employee at inception into the scheme. Thus, the monthly salaries of the 26 employees increase from N50,000 for a live aged 25 years, to N60,000 for a live aged 26 years, …, and lastly to N300,000 for a live aged 50 years.

Scenario 2: It models a working environment where employee's desirable skills (e.g. technical skills) are assumed to decrease with age such that monthly salary decreases with age of the employee at inception into the scheme. Thus, the monthly salaries of the 26 workers decrease from N300,000 for a live aged 25 years, to N290,000 for a live aged 26 years, …, and lastly to N50,000 for a live aged 50 years.

Scenario 3: It typifies a workplace where employee's experience and desirable skills are assumed equal for all ages such that monthly salary is the same for all employees irrespective of their different ages. Thus, the monthly salaries of the 26 workers are N100,000 for a live aged 25 years, N100,000 for a live aged 26 years, …, N100,000 for a live aged 50 years.

Second, we hypothesize for gratuity and pension benefits in each scenario that:

- The CB mean gratuity is equal to the DC mean gratuity;
- The CB mean gratuity is equal to the DB mean gratuity;
- The CB mean pension is equal to the DC mean pension;
- The CB mean pension is equal to the DB mean pension.

Third, we show the cumulative distributions of the gratuity and pension outcomes with respect to CB, DC, and DB pension plans in the three scenarios (Figures 1, A1 & A2); and finally we compare the rates of changes in accumulated assets over varying lengths of service (5-year, 10-year, …, 35-year) periods for a single live aged 25 years in the three scenarios (Fig. 2).

Empirical Results

The section comprises of summary statistics, the cumulative distributions of outcome variables for the three pension plans, and graphs of changes in accumulated assets over time.

First, we show the summary statistics on three retirement outcome variables (gratuity, pension, and pension replacement rates) for the CB, DC and DB pension plans for scenario 1 only (Table 1); and for scenarios 2 & 3 (Tables A1 & A2).

In scenario 1 where the employee's salary increases with age, indicating that required job experiences increases with age as shown in Table 1: for the pension, the CB mean pension (= N352,491) is highest, next is the DC mean pension (= N310,595),while the DB mean pension (= N182, 508) is the least; for the gratuity, the CB mean gratuity (= N4,012,680) is the highest, followed by the DC mean gratuity (= N921,847), and the least is the DB mean gratuity (= N839,607); and lastly for the pension replacement rate, the CB mean replacement rate (= 0.2523) is highest, followed by the DC mean replacement rate (= 0.2314) and least is the DB mean replacement rate (= 0.1274). In spite of the embedded provision for the Health Insurance Premium (= N865,800), the t-test of equality of mean outcomes show the superiority of CB mean pension (p-value 0.00) and CB mean gratuity (p-value 0.00) over those of the two traditional pension plans, and these suggest that CB plan

3 Actuarial valuation model that uses assumptions that comply with Nigerian pension statutory requirements is the most appropriate in the circumstance to compute the expected retirement outcomes used in the comparative analysis of the three pension plans in each of the three study scenarios. 4 Our data set is limited to 26 employees in compliance with the Nigerian statutory requirements of retirement age at 60 years, and minimum of 10 years length of service to qualify for retirement; and since our consideration is based on age at entry which is set at a minimum of 25 years. Thus, the employees with ages ranging from 25, …50 years are the only subjects available to be used.

will be most rewarding to the Nigerian employees. In addition, a similar test on the equality of mean pension replacement rates is also confirmatory of the thesis of the best

into the scheme, suggesting that employee's experience and desirable skill sets are assumed equal at entry.

Pension Plan		Pension		Gratuity		Pension Replacement Rate	
	n	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
		N'000	N'000	N'000	N'000	%	%
Defined Benefit	26	182.508	95.662	839.607	200.701	0.1274	0.0977
Defined Contribution	26	310.595	144.456	921.847	428.745	0.2314	0.2143
Cash Balance*	26	**352.491**	141.219	**4,012.680**	1,954.483	**0.2523**	0.2126

Mean Monthly Salary (same) = N175,000; Mean Length of Service (same) = 22.5 years;

*= Cash Balance (Extra Health Insurance Premium Provision = 865.800)

Table 1: Salary increasing with age (= required experience increases with age)

performing pension plan for the CB scheme (p-value 0.00).

Similar results as above were obtained in scenario 2 where the employee's salary decreases with age, typifying that desirable skill sets decrease with age; and in scenario 3 where salary is equal at all ages at inception

Second, Fig. 1 show the cumulative distributions for the retirement outcomes – gratuity and pension – for the CB, DC and DB pension plans in scenario 1 only; and for scenarios 2 and 3 (see Figures A1 & A2).

For the gratuity outcomes, the cumulative distributions for CB gratuity are consistently higher than those for the traditional DC and DB

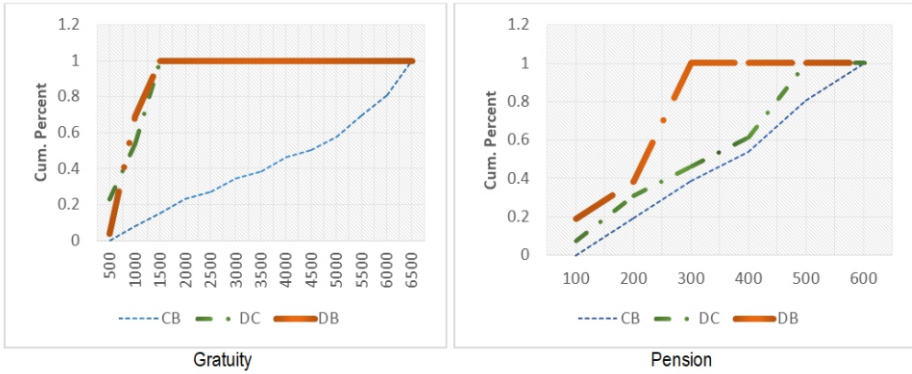

Fig. 1: Cumulative Distribution of Gratuity and Pension Outcomes in Scenario 1

plans; and with the DB plan's gratuity cumulative distributions slightly lower than those for the DC in all the three scenarios.

Regarding the pension outcomes, both the cumulative distributions of the DC and DB plans are consistently lower than that of CB pension plan; and with the DB plan's distribution lowest in Fig. 1. While in both Figures A1 and A2, the cumulative distributions of the DB plan are consistently lowest among the three pension schemes, while those of the CB plan are consistently slightly higher than those for the DC plan.

the retirement outcome of a pension plan remains the best indicator of the inherent value of any pension structure, particularly to the employee. Thus, with the supporting evidence from the United States of the industry preference for CB plan over the traditional pension plans, and the empirical validation given in the Nigerian pension environment by our results that CB plan outperforms other traditional plans; the adoption of CB pension scheme in Nigeria holds a high beneficial value to the various pension stakeholders.

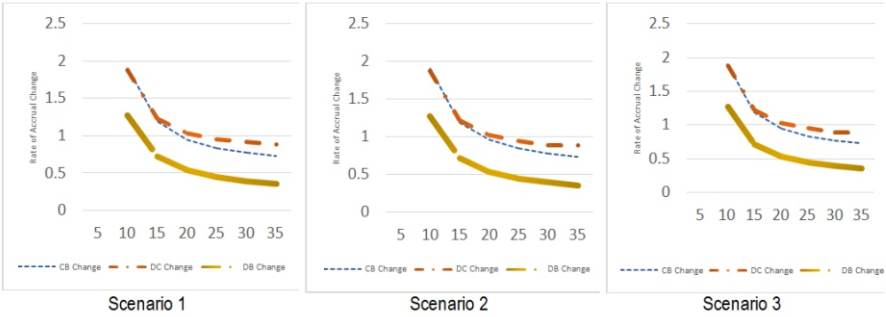

Fig. 2: The Rates of Changes in Accumulated Assets by Varying Lengths of Service

Finally, in Fig. 2 we show the rates of change in the accumulated assets over varying length of service (5-year, 10-year, …, 35-year) periods for a single live aged 25 years in each of the three scenarios. In particular, the monthly salary for the participant is N50,000 (scenario 1), N300,000 (scenario 2), and N100,000 (scenario 3). In all the three scenarios, the graphs are similar but with those for the DB plan clearly different from those for the CB and DC plans.

Discussion of Findings

Many factors exist that impact on pension schemes with varying degrees of influence, but

First, it provides a "win-win" situation for both sponsors and participants thereby improving industrial peace and harmony. Firms implementing such schemes become more competitive due to reduction in pension costs, and the resulting savings that could otherwise have been used as reserves for pension liabilities can be re-channelled to more productive and innovative projects that can create added value to the society such as employment for job seekers. While young employees gain through the employment flexibility obtainable in CB pension structure which allow them to move across firms for better job opportunities.

Second, CB scheme holds the ace for an increased quantum of accumulated pension assets which can be utilized for the financing of more infrastructure projects across the country thereby increasing economic activities and growth, as the attractive features in the scheme will draw into the pension system otherwise sceptic stakeholders, and also increase pension contributions from the stakeholders that are already within the pension landscape.

Third, the attractive superior pension outcomes in CB schemes ensure that at retirement age and afterwards, the beneficiaries have more money to cater for their personal needs and obligations, rather than to become dependants to their relations and government.

Lastly, the implementation of CB pension scheme will create innovative approach to pension system administration in Nigeria as it enhances boom in pension business.

Conclusions and Policy Recommendations

Empirically, we conclude that CB pension scheme is currently the best structure for the Nigerian environment; and it should be adopted into the Nigerian pension environment.

First, we recommend that the regulatory authority should initiate practical proactive measures to implement CB scheme and other beneficial hybrid pension schemes into the Nigerian pension system without delay. This can be achieved through the creation of a pool of experts that will facilitate the planning, transition and implementation phases of such a project.

Second, we recommend that pension statutory requirements that prescribe uniformity in pension schemes for all sectors in Nigeria are obsolete, anti-competitive, and deter innovative ideas from coming to fruition; and consequently should be expunged from the Nigerian statutes and laws.

Lastly, we recommend the inclusion of embedded options into the pension schemes in Nigeria, particularly those that are driven by the underlying economic forces.

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