

Replacement Ratio of the Provisions of the Nigerian Pension Reform Act 2004

Raphael Onyechefule Akalonu
Department of Financial Studies, Redeemer's University, Redemption City, Ogun State, Nigeria
Email: ronyeakalonu@yahoo.com

Professor Reuben Adeyemi Ipinyomi
Department of Statistics, University of Ilorin, Kwara State, Nigeria.
E-mail: ipinyomira@yahoo.co.uk

Abstract

As a defined contribution (DC) pension scheme, it is important to be able to compare its benefit at retirement with those of other pension schemes in other countries. Replacement ratio is measured by the percentage of a person's annual income at retirement divided by his/her annual income just before retirement. The global minimum level is about 67%. The Federal government of Nigeria has eight different salary groups for different categories of workers. Salaries of three groups- the Federal Public Service, Academic Staff of Universities and Tertiary Institutions which includes Non Academic Staff – were used to get three different ratios. These were tested using the Chi Square test and found not being significantly different at both 95% and 99% levels of significance. The average of the three showed 59.4% replacement ratio. With this figure, additional 2.5% increase in the contribution rate will be required to achieve the global minimum ratio of 67%.

Keywords: Replacement ratio, Significance level, Chi square.

1. Introduction

Pension reforms have become a major global policy aimed at enhancing pension benefits and increasing the retirement income security of workers both in the formal and informal sectors, and also ensuring improved living standards of retirees.

The government of Nigeria carried out a Pension Reform which was signed into law in 2004. According to James, Edwards and Iglesias (2010), the model which Nigeria copied and signed into law in 2004 was adopted by Chile in 1981 as a replacement for a social security model that it (Chile) introduced and operated from the 1920s. However, in 2008, barely four years after the Nigerian Government signed the model into law, the Government of Chile, after about 26 years of intense research as stated by Berstein, Castañeda, Fajnzylber and Reyes (2009) introduced a new model which, according to Butler (2011) has been acclaimed as “a model for the world”.

Today, different Labor Unions, including the academia, have expressed strong feelings that the benefit which the level of contributions enshrined in the 2004 Pension Reform Act will provide, after 35 years of service, may be grossly inadequate to provide a reasonable standard of living in retirement. Adequacy, according to the National Pensions Regulatory Authority of Ghana (2012) is normally measured as the ratio of an employee's retirement income to the level of his or her earnings just prior to retirement; this ratio being referred to as “income replacement ratio”. The global standard for income replacement ratio is about 67%. Currently, the Nigerian Pension Commission has submitted a bill to the National Assembly for a review of the Pension Reform Act 2004.

1.1 Replacement Ratio (RR)

Investopedia (2014) described “Replacement Rate” as the percentage of a worker's pre-retirement income that is paid out by a pension program upon retirement. It went further to state: “In pension systems where workers get substantially different payouts due to their differing incomes, replacement rate is a common measurement which can be used to determine the effectiveness of the pension system”. In their 2008 Replacement Ratio Study, Aon Consulting referred to replacement ratio as “A measurement Tool For Retirement Planning” and went on to define it as “a person's gross income after retirement divided by his or her gross income before retirement”. Finnish Centre For Pensions states: “The concept of ‘replacement ratio’ is usually used to compare the starting pension to the earnings received prior to retirement” and introduces the concept of gross and net replacement ratio. The paper defines gross replacement ratio as “the starting pension in relation to the person's own last wage. In this case the ratio is calculated on the basis of the pension and the wage from which no taxes or contributions have been deducted”. The Center adds that “net replacement ratio refers to the pension in hand in relation to the person's own last wage from which taxes and contributions have been deducted”. Tudor Colomeischi (2012) states, “The gross rate of pension revenues replacement is usually defined as the report between the gross retiring pension and the last wage taken before the retirement. Such report shows how the revenues offered at the

retirement by the pension systems will replace the revenues earned before the retiring”. The OECD (2008) writing on Pensions in Asia/Pacific stated: “A key indicator of pension systems is the ‘replacement rate’. This shows the value of the pension for specific individuals as percentage of their earnings when working”.

Apart from other forms of pension established in Nigeria, the military in power in 1979 instituted the Pension Decree 102 of 1979 which was a defined benefit (DB) form of pension. Several reasons were adduced for the failure of that scheme and on which basis the Federal Government enacted the Pension Reform Act of 2004 to replace that of 1979. The 2004 Pension scheme is a defined contribution scheme in which employer and employee contribute 7.5% of the employee’s salary each to the employee’s retirement savings account monthly. The Act provides that 25% of the pot of contributions and accumulated interest at retirement of the employee will be used for payment of gratuity (lump sum) to the employee on retirement while the balance of 75% will be used to purchase a monthly, quarterly or annual annuity to provide pension to the retiring employee. The extent to which this level of contributions (15% of employee’s salary) will provide a reasonable level of standard of living at retirement is the major concern or worry to most labor unions and is, therefore, the focus of this research to determine.

1.1.1 Investment Return in a DC Pension Plan

Regarding the level of benefit from a defined contribution (DC) plan, Mensah (2013) states “One of the most significant variables affecting the benefit outcome under a DC Scheme is the investment return achieved. This is reflected in the fact that at the end of a typical career of 30–40 years, as much as two-thirds (67%) of the member’s final retirement account could be made up of accumulated investment returns, with just one-third (33%) made up of total contributions paid”. He concluded that DC schemes succeed when investment returns are adequate and that this is a major challenge of privately managed schemes.

In the Nigerian 1979 Pension Act, the pension benefit scale provided after 35 years of service (which was the maximum number of years of service) was 80% of the total earnings prior to retirement. This percentage compares very favorably with the international minimum standard of 67% replacement ratio. In contrast, it is widely believed that the benefit provisions from the 15% contribution of the 2004 Pension Reform Act may not match up the minimum replacement ratio of 67%; and estimating this rate is the focus of this research.

2. Calculating the Replacement Rate of the Pension Reform Act 2004

Information available to this researcher so far has no data on the replacement rate of the current pension (the Pension Reform Act 2004) in Nigeria. To compare the benefits of the pension with those of other countries in the world, there is need to calculate the replacement rate; this being the focus of this research.

2. Assumptions

2.1 Mortality Table: The mortality table used in the calculation of annuity in this paper is the American Commissioners 1958 Standard Ordinary usually referred to as ‘1958 CSO Mortality Table’.

2.1.1 Pension Contribution Rate: The Pension Reform Act 2004 stipulates that a total of 15% (employee contributes 7½% and employer contributes 7½%) of employee’s salary be paid monthly into the employee’s retirement savings account, RSA, during his/her working life. At retirement, 75% of the accumulated savings in the RSA will be used to purchase a life annuity with 5 years certain period as pension.

The deductions from the employee’s salary are invested through his/her Pension Fund Administrator, PFA, and expected to attract a rate of return. It is assumed that a minimum net interest rate of return of 7.5% per annum will be achieved and credited to the RSA. We will denote this long-term yield expected to be earned on the investment during the long future period of employment by i

2.1.2 Salary to be used: Nigeria has different salary structures for the different working groups. According to the National Salaries, Income and Wages Commission, they include:

1. Consolidated Top Federal Public Office Holders’ Salary Structure (CONTOPSAL)
2. Consolidated Public Service Salary Structure (CONPSS)
3. Consolidated Research and Allied Institutions Salary Structure (CONTAISS)
4. Consolidated Tertiary Institutions Salary Structure (CONTISS II) which also covers the Non-Academic Staff of Universities
5. Consolidated University Academic Salary Structure (CONUASS)
6. Consolidated Health Salary Structure (CONHESS)
7. Consolidated Judicial Salary Structure (CONJUSS)

By a circular dated July 1, 2010 signed by the Chairman of the National Salaries, Incomes and Wages Commission and which took effect the same date, there were upward reviews of some of the different salary structures. Only the latest salary structures as at July 1, 2010 will be used. Replacement rates will be calculated for three salary groups only: the Federal Public Service, the Academic Staff of Universities and the Tertiary Institutions, as these will cover a greater majority of the working population.

2.1.3 Rate of increases of salaries

The average rate of salary progression that will take into account the annual wage and promotional increases will be calculated for each of the salary groups. As already stated, the calculations will center on:

- a). the Public Service Salary Structure – CONPSS
- b). the Tertiary Institutions which includes Non-Academic Staff of Universities –CONTISS II
- c). the University Academic Salary Structure – CONUASS, and
- d). the Health Salary Structure – CONHESS

as these groups cover over 60% of the Federal employees

For the Federal Public Service, it is assumed that it will take an average of 27 years for a young graduate on step one of salary grade level 08 (L08) to attain the position of Director on grade level 16 (DL16). (Note that Level 17 is a special grade for Permanent Secretaries which is considered to be a political appointment). The same length of time is assumed for the Federal Service junior staff and all the other groups except the Academic Staff and the senior group (Medical Consultants/Professors).

For the Academic Staff of Universities, it is assumed that it will take an average of twenty one years for a newly recruited Assistant Lecturer (AL) on step one of the salary grade to attain the position of Professor (PR) on the first step of that salary grade.

Methodology

In general, consider an employee on a starting salary NX and who attains a salary of NY , his average salary progression rate, r , after t years can be denoted by the equation

$$X(1+r)^t = Y \dots\dots\dots(1)$$

From the foregoing, we have, for the Academic Staff:

$$AL_{(1)}(1+r_A)^{21} = PR_{(1)}$$

where

r_A = average rate of salary progression for the Academic Staff

$AL_{(1)}$ = first step of Assistant Lecturer's salary

$PR_{(1)}$ = first step of Professor's salary

For the Federal Public Service senior staff, we have

$$L08_{(1)}(1+r_{fs})^{27} = D16_{(1)}$$

where,

r_{fs} = average rate of salary progression for senior public service staff

$L08_{(1)}$ = first step of fresh graduate's salary

$D16_{(1)}$ = first step of Director's salary

For the Junior staff, the equation is

$$L01_{(1)}(1+r_{ff})^{27} = L07_{(1)}, \text{ where}$$

r_{ff} denotes salary progression rate for Federal junior staff.

For the tertiary institutions, we have

$$L08_{(1)}(1+r_{ts})^{27} = D15_{(1)} \text{ where}$$

r_{ts} = average rate of salary progression for tertiary institutions senior staff.

(Note that the highest salary grade level for tertiary institutions is 15)

Under the Consolidated Health Salary Structure, CONHESS, we have, for the Junior Staff who will progress from step one of Grade Level 01 (GL01) to step one Grade Level 07 (GL07)

$$GL01_1(1 + r_{hj})^t = GL07_1 \quad \text{where}$$

r_{hj} = average rate of salary progression for the Junior Staff in the Health Sector

$t = 27 \text{ years}$ is the duration to progress to the top of the salary grade.

For the Senior employees, the progression from step one of Salary Grade Level 08 (GL08₁) to the first step of Grade Level 16 (GL16₁) is assumed to last, on the average, 21 years. Hence, we have

$$GL08_1(1 + r_{hs})^t = GL16_1 \quad \text{where}$$

r_{hs} = average rate of salary progression for Senior Staff in the Health Sector, and

$t = 21$ years is assumed to be the duration to progress to step one of Salary Grade Level 16. This includes the medical consultants.

Substituting the published salary figures from the Salaries, Incomes and Wages Commission, we have the following salary progression rates:

$$\begin{aligned} r_A &= 5.62\% \\ r_{fs} &= 4.56\% \\ r_{ff} &= 3.41\% \\ r_{ts} &= 4.45\% \\ r_{tj} &= 4.92\% \\ r_{hs} &= 6.60\% \quad \text{and} \\ r_{hj} &= 5.20\% \end{aligned}$$

Maximum Service Period

Since the retirement age in academics is 65 in general (but 70 for Professors), we will assume maximum service period to extend to 40 years. The statutory retirement age in the civil service is 60 with maximum service period of 35. Apart from the Academic staff, we will assume maximum period of service of 35 years for all other salary groups which is in agreement with the Federal service rule.

Investment Return in a DC Pension Plan

Regarding the level of benefit from a defined contribution (DC) plan, Mensah (2013) states “One of the most significant variables affecting the benefit outcome under a DC Scheme is the investment return achieved. This is reflected in the fact that at the end of a typical career of 30–40 years, as much as two-thirds (67%) of the member’s final retirement account could be made up of accumulated investment returns, with just one-third (33%) made up of total contributions paid”. He concluded that DC schemes succeed when investment returns are adequate and that this is a major challenge for privately managed schemes.

In the Nigerian 1979 Pension Act, the pension benefit scale provided after 35 years of service (which was the maximum number of years of service) was 80% of the total earnings prior to retirement. This percentage compares very favorably with the international minimum standard of 67% replacement ratio. In contrast, it is

widely believed that the benefit provisions from the 15% contribution of the 2004 Pension Reform Act may not match up the minimum replacement ratio of 67%; and estimating this rate is the focus of this research.

Consider an employee on a unit (e.g. ₦1.00) of salary with an annual progression rate r and a pension contribution rate of 15% of annual salary (Pension Reform Act 2004). Assume that the 15% pension contribution is invested and earns a **net** annual rate of return, i .

The 2004 Pension Reform Act stipulates that 75% of the accumulations in individual RSA will be utilized to purchase pension in form of annuity.

Equation of Value

If, for now, the 15% and 75% are kept on hold, the equation of value, with accumulation after n-years of service will be:

$$\left\{ (1+i)^n + (1+r)(1+i)^{n-1} + (1+r)^2(1+i)^{n-2} + \dots + (1+r)^n \right\} \dots\dots\dots(1)$$

Multiplying the above expression by $\frac{(1+r)^n}{(1+r)^n}$, we obtain

$$\begin{aligned} & (1+r)^n \left\{ \frac{(1+i)^n}{(1+r)^n} + \frac{(1+r)(1+i)^{n-1}}{(1+r)^n} + \frac{(1+r)^2(1+i)^{n-2}}{(1+r)^n} + \dots + \frac{(1+r)^n}{(1+r)^n} \right\} \\ &= (1+r)^n \left\{ \frac{(1+i)^n}{(1+r)^n} + \frac{(1+i)^{n-1}}{(1+r)^{n-1}} + \frac{(1+i)^{n-2}}{(1+r)^{n-2}} + \dots + 1 \right\} \dots\dots\dots (2) \end{aligned}$$

$$\text{Let } \frac{(1+i)}{(1+r)} = (1+i'') \dots\dots\dots (2a)$$

The series expression in the big bracket in (2) can be expressed as:

$$(1+r)^n \left\{ (1+i'')^n + (1+i'')^{n-1} + (1+i'')^{n-2} + \dots + 1 \right\} \dots\dots\dots (3)$$

at a new accumulation rate, i'' , where

$$i'' = \frac{1+i}{1+r} = \frac{i-r}{1+r} \dots\dots\dots (4)$$

can be calculated easily from the above relationship since i is known (=0.075) and r has been computed for each salary group.

Therefore, the equations in (2) and (3) combine actuarially into

$$(1+r)^n S_{\overline{n}|i''} \dots\dots\dots(5)$$

where

$$S_{\overline{n}|i''} = \left[\frac{(1+i'')^n - 1}{i''} \right] \dots\dots\dots(6)$$

n = maximum length of service

and i'' is calculated as shown in (4) above for each salary group

It must be borne in mind that i will be constant with a value equal to 7.5% and the expressions in (2) and (5) simplify into

$$(1+r)^n \left[\frac{(1+i'')^n - 1}{i''} \right] \dots\dots\dots(7)$$

Equation (7) represents the total earning for an employee in any group after n years of service, with the appropriate value of i'' derived for each group.

Incorporating the fact that 15% of the value in (6) represents the total contribution to pension out of which 75% of the 15% goes for purchase of annuity or scheduled withdrawal, the value in the retiring employee's Retirement Savings Account, RSA, for purchase of annuity is given by:

$$(0.15)(0.75)(1+r)^n \left[\frac{(1+i'')^n - 1}{i''} \right] \dots\dots\dots(8)$$

The estimated salary in the year of retirement is given by

$$(1+r)^n \dots\dots\dots(9)$$

where r is as defined and computed for each salary group: $r_A, r_{fs}, r_{ff}, r_{ts}, r_{tj}, r_{hs}, r_{hj}$

For each salary group, therefore, the **replacement rate** is given by: the value of equation (8) divided by the value of equation (9) and multiplied by 100, thus:

$$\frac{(8)}{(9)} \times 100 \dots\dots\dots(10).$$

The corresponding results are:

- Academic Staff: 66.89% (or 67%)
- Federal Public Service: 67.6% (or 68%) for senior, and 85.4% or (85%) for junior
- Tertiary Institutions: 69.1% (or 69%) for senior and 63% for junior, and
- Health Institutions: 54.93% (or 55%) for seniors and 60.2% (or 60%) for the juniors

Test of Significance

To find out if these results are significantly different from the internationally recommended minimum percentage of 67, with the Null Hypothesis that the results of the different salary groups are equal and that any observed

$$\sum_{j=1}^n \frac{(O_j - e_j)^2}{e_j}$$

variation is due to chance, we apply the Chi-Square test using a p-value of 1%, i.e.

With six degrees of freedom, ($\nu = 6$), $\chi^2_{0.01} = 16.8$ while $\chi^2_{0.05} = 12.6$ are all greater than $\chi^2_{cal} = 8.09$. Thus, the null hypothesis that there are no significant differences in the replacement rates cannot be rejected i.e. it is therefore accepted.

We consequently use the average of these replacement rates as a single replacement rate for Nigeria

Inference

On the basis of the last result of the test of significance at 1% and 5%, the average of the seven rates which is 66.71% (or 67%) can be accepted as the replacement rate of the benefits of the Nigerian Pension Reform Act 2004.

References

Investopedia (<http://www.investopedia.com/terms/r/replacement-rate.as>) retrieved on 22 Feb, 2014.
 OECD (2008). Pensions in Asia/Pacific: Ageing Asia must face its pension problems.
 Colomeischi, T. (2012). Evaluating the Retiring Pensions by Simple Replacement Rates and Current Values of the Retiring Pensions, *IJRRAS* 12(2), 173-178

- Aon Consulting (2008). Replacement Ratio Study: A measurement Tool for Retirement Planning.
- Lee, E. M. (1986). An Introduction to Pension Schemes, London: Institute of Actuaries & the Faculty of Actuaries.
- The World Bank (2012). Africa Social Protection Policy Briefs: Pensions.
- Federal Government of Nigeria (2009). National Salaries, Incomes & Wages Commission.
- James, E., Edwards, A. C. & Iglesias, A. (2010). Chile' New Pension Reforms. National center for policy analysis, Policy report No. 326; Dallas, Texas
- Berstein, S., Castañeda, P., Fajnzylber, E., & Reyes, G. (2009). Chile 2008: A second generation pension reform. Superintendence of Pensions
- Pension Reform Act (2004). The Federal Republic Of Nigeria Official Gazette. Lagos: Government Press

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:

<http://www.iiste.org>

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: <http://www.iiste.org/journals/> All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: <http://www.iiste.org/book/>

Academic conference: <http://www.iiste.org/conference/upcoming-conferences-call-for-paper/>

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digital Library, NewJour, Google Scholar

