Original Article

Pensions and pension reform in Nigeria

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ABSTRACT Welfare systems have been undergoing reform in most developing countries, and this is a major component of the International Monetary Fund/World Bank structural reform programme for developing economies. Unexpected change will occur in the relationship between people and those administering this welfare security scheme, in terms of the gains provided and financing, which will be a result of the change in the structure of the economy in countries where the state is expected to provide welfare assistance 'from cradle to grave'. However, pension schemes in transition economies were used to alleviate the effect of output loss on certain strata of the population and the increased income inequality that pervaded the economies. In Nigeria, the government has claimed to be using the pension system to lessen and the suffering of its retired public workers, so that they will not have to suffer after disengagement from public office. It is against this backdrop that we evaluate the effect of public pension reform on civil servants in Nigeria using the error correction model.

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INTRODUCTION

Pensions as a form of social security against old-age poverty and other uncertainties have attracted great interest virtually everywhere in the world, both in developed and developing countries, in recent times. Pension programmes, especially those that are publicly financed and administered, have become an issue of concern to economists, policymakers and the general public. This is not only because such programmes are central to the well-being of pensioners and the elderly, but also because the majority of pension programmes are not actuarially balanced (that is they are not financially stable), and as such they are run at

deficits, thus making the present values of their future liabilities to be enormous.¹ To this end, an overview of what a pension programme/scheme entails is needed for a general understanding of this form of social security service.

A pension scheme is a transfer programme that serves as a channel for redistributing income to the elderly or retirees, after a stipulated number of service years. A pension is usually a regular payment made by the government or by private companies or organizations to their retirees as a form of social security against old-age risks and uncertainties. In some countries, especially those that are economically advanced, pensions are usually extended to other categories of people apart from retirees, such as widows, orphans, disabled people (in the form of disability pensions), and the elderly or the aged.

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Pension programmes are usually put in place to serve as protection for the elderly and retirees against old-age risks, poverty and other uncertainties. In addition, they are also used to promote a 'saving culture' among current employees, and this stimulates savings.^{2,3}

As pointed out earlier, pension programmes have attracted the attention of the general public because of their inherent problems. Nigerian pensioners are suffering badly from the stings of the problems of the public pension scheme, which was largely governed by Pension Decree No. 102 of 1979 and was a non-contributory scheme that was largely unfunded. It has featured persistent problems in recent times, especially in the civilian regime. Various problems can be identified that serve as costs to the pension scheme. These include the dependency of the pension scheme and the erratic budgetary allocation to the Federal Government; the untimely release of pension schemes; the untimely release of pension funds, which affects the payment of pension benefits and other retirement benefits; and a huge accumulation of pension liabilities, among several others. As a result of these problems, the majority of retirees and pensioners do not feel the impact of this social security service put in place by the government. The public pension scheme has failed in achieving its aims, and every day pensioners voice their grievances to the government and to anyone else who cares to listen.

The Nigerian post-reform public pension scheme, which itself was reformed under Pension Decree No. 102 of 1979, has been unfavourable to most current pensioners. In spite of the benefits that were supposed to accrue to pensioners, it has also succeeded in breeding numerous costs, which are being dealt with by both the government and the pensioners themselves. Despite the wealth of Nigeria, especially through the bulk of her oil revenue, there still exist very large pension deficits and actuarial imbalance between the pension contributions and benefits, which have led to huge pension liabilities over the years. This clearly shows that the Federal Government is

not showing the readiness or eagerness to meet the obligation of financing the pension scheme as deemed necessary. The inadequacy and inefficiency of the government's public pension system have resulted into deteriorating well-being for pensioners in Nigeria. Yet, for many years the government did not seem perturbed enough by this development to find a lasting solution to the falling standard of living of pensioners, until last year, when it reformed the existing pension scheme with the aim of providing a solution to the pension problems.

For many pensioners, the benefits that accrue to them from the public pension scheme are bittersweet in nature, as there are also several costs associated with the scheme. To start with, pensioners' benefits are to be paid as and when due; some of them have not even been able to lay their hands on their entitlements after many years of retirement either owing to inadequate pension funds for payment for to the total omission of their names from the pension beneficiary list. Even when they are to be paid their benefits, many die in the queue owing to fatigue and failing health while waiting for the payment of their pension. Thus, the state of pension in Nigeria over the years has continued to baffle many Nigerians, both young and old. With all these developments, younger workers are becoming more and more sceptical about their prospects as future pensioners, as the failure of the Nigeria's public scheme has undermined Nigerians' popular trust in the system, and the pension policies in the future will continue to give Nigerians problems if not properly addressed.

The Nigerian government put in place its pension scheme to benefit pensioners such that they are protected against old-age poverty and other risks and uncertainties, but the prevailing situation in the country has revealed that there are as many costs as there are benefits to the old pension scheme. The central objective of this article is therefore to evaluate the impact of the Nigerian post-reform public pension scheme on pensioners' well-being, bringing out the costs and the benefits along the way.

The remainder of this article is organized as follows. This introductory section is followed by

the second section, which presents a review of the literature on public pension schemes. The third section reviews the theoretical issues, while the fourth section deals with the empirical issues. The fifth section discusses the pension scheme in Nigeria and the sixth section examines the 2004 pension reform scheme and the welfare of pensioners in Nigeria. The research methodologies are discussed in the seventh section, while eighth section contains the empirical findings. The conclusion and policy implications are present in the ninth section.

REVIEW OF THE LITERATURE

In recent years, pensions and related issues have characterized public discourse, and have been the focus of attention of policymakers, economists and the general public. This is a result of the fact that it is a social security and welfare package for the old, aged and retired public and private workers, against poverty and impoverishment in their years of labour inactivity. Thus, a pension is a mechanism by which employers of labour agree to alleviate the sufferings, impoverishment and dependency of its employees in the long run by putting in place a welfare package that would take care of them when they are labour-inactive, retired or have changed jobs. Olaniyan⁴ takes pension to be a systematic plan by an employer to give benefits to their employees when they decide to leave the job either through retirement or change of job. Pension programmes were introduced as a way to improve living standards among the elderly, and to target the group that is by and large out of the labour force.⁵

There are two types of pension scheme: private and public. A public pension scheme is a social welfare security payment made to the retired, elderly and those that have changed jobs in the public sector of the economy. According to Heller,⁶ the aim of a public pension programme is not to raise the savings rate, but rather to provide income security, or at least a minimum income for the elderly. A private pension scheme is a social security scheme managed and administered by the private sector in order to provide succour and relief to elderly and retired employees at a time when they are

not economically active. This scheme is defined benefit in nature, as employees save part of their income to receive it with the returns of its investment by the time they have retired or changed jobs. Nearly half of all private sector employees participate in a retirement plan, and the pension costs are approximately 55 per cent of payroll for the sponsoring firms.⁷

Different classifications had been given to pension systems in the pension literature; however, basically, pension systems ought to be between defined benefit and defined contribution (DC) systems. Kotikoff⁸ takes pension systems to be between Pay-As-You-Go (PAYG) and DC fully funded (FF) pension programmes. A distinction was also made between PAYG, FF and Notional Defined Contribution Accounts by MacGreenvey.⁹ However, a broader perspective was brought to this classification by Lindbeck and Persson.¹⁰ They classified pension systems as being between DC and defined benefit, funded and unfunded, and actuarial and non-actuarial pension systems.

Due to these different classifications of pension systems, countries move from one regime of classification to another in a quest for a suitable and appropriate pension scheme for its employees. Thus, the adjustment, movement and change from one pension system to another in order to satisfy weak, aged and economically inactive employees is known as pension reform. Therefore, pension reform is an act of adjusting the present or current pension system by making it more cost-effective, cost-efficient, target-efficient and cost-beneficial for the beneficiaries.

Whereas private pension programmes have not undergone reform, many reforms have taken place in the public pension scheme. Public pension reform tends to attract great interest virtually everywhere in the world. Chang and Jaeger¹ opined that it is generally accepted among the members of the Organization for Economic Cooperation and Development (OECD) that existing pension regimes may be financially unstable, and that as the population ages they require substantial reform to forestall the emergence of large public sector deficits and reductions in national savings. The reform of the

public welfare system has been an important ingredient of the structural reform process in developing economies. In developing countries such as Nigeria, where the state had been expected to provide social assistance 'from the cradle to grave', the shift to a market economy necessarily involves dramatic changes in the relationship between citizens and the social security system, this in respect to both the benefits provided and their financing. The reform is usually aimed at expanding the scope of the pension system, removing inequality and providing adequate and sustainable retirement benefits. Lindbeck and Persson¹⁰ believe that pension reform is a result of concern over the long-term financial viability of existing government-operated pension systems.

Thus, the aim of any reform is to correct the imbalances and distortion that may characterize the previously adopted pension system, and to further improve the pension system and therefore the welfare conditions of the beneficiaries. According to Ojetunde,¹¹ the PAYG public pension system can have significant effects on economic behaviour, and hence on relative prices and macroeconomic aggregates. She concludes with the fact that the introduction of a public pension system can reduce aggregate savings, income and wages and increase interest rates, and that a significant part of the distortion caused by a public pension plan can result from the fact that the benefits are not explicitly linked to contributions, and that creating such a linkage can reduce the distortions associated with wage tax that funds the contributions to the plan.

Therefore, going by the literature it can be easily deduced that reform to any pension scheme can bring about adjustment, modification and efficiency. And for a developing country like Nigeria, to have a sound reform to her pension system there should be a mechanism by which all waste and inefficiencies in the pension system can be eliminated, so that the desired welfare status for the beneficiaries can be achieved both in the short and long run. However, for the country to achieve this improved welfare for pensioners, there should be an adjustment to the present pension system, and this why in this article we

are advocating a guided fully funded defined contribution system (FF-DC) with Tax-Exempt-Exempt (TEE) approach. The FF-DC is a mechanism whereby there is a mandatory savings scheme for the contributors, and upon retirement or disengagement they receive in return what they have saved and the accrued interest on the savings. The approach to be followed in disbursing this fund should be that no tax is imposed on the contributions to retirement (savings), the returns on the contributions (interest) and the pension entitlement to the beneficiaries.

THEORETICAL ISSUES

Most economists believe that consumer consumption patterns follow the broad criteria set out in the lifecycle hypothesis (LCH), and that this hypothesis set the benchmark for analyzing spending decision in relation to pensions. The rate at which a pension regime affects savings depends mainly in its basic structure and the forces and influences that motivate savings by individuals. Thus, the LCH of consumption has become the standard theory for analyzing the savings decision, though it carries some extreme assumptions and implications. This hypothesis was associated with Modigliani and Brumberg¹² and Ando and Modigliani.¹³ The theory posited that consumption is a function of lifetime wealth and that this is not affected by changes in the pattern of income over time, as long as the wealth, defined to include not only financial and real assets, but also the expected value of future income from human capital wealth, does not change, and neither should the pattern of consumption overtime. However, given the fact that consumption has little or no fluctuation with disposable income, the propensity to save from this disposable income will vary over an individual's life.

Nevertheless, the consumption pattern would be affected only if the pension reform changes the wealth of the participants in a pension plan, and might affect the distribution of saving among/between private and public sector, but not its total amount. This is why the LCH is known for its designing of the pension system.

This hypothesis stated that pension reform can affect the savings rate by affecting the average wealth of plan participants; redistributing wealth between different age groups that have different propensities to save; and redistributing wealth between members of the same age group with different propensities to save.

EMPIRICAL STUDIES

Many studies have been carried out to show the effect of different pension schemes on the welfare of employees. Evidence has shown that public pension plan design has the potential to affect the rate of savings. Mackenzie, *et al*¹⁴ provide some moderately strong evidence that the introduction and development of the public pension plan in the US economy have depressed private sector savings, although it is difficult to estimate such an effect.

However, the most important and highly debatable issue relates to the extent to which people form expectations about the level of future benefits. It was assumed that people expect the proportion of average replacement to be constant.¹⁵ Feldstein reaches similar conclusions in the later version of his work,^{16,17} and concludes that the social security programme reduces private savings by close to 605 per cent. Leimer and Lesnoy¹⁸ refined the work of Feldstein through actuarial work on the demographic and labour market assumptions required to construct social security wealth (SSW), and thus concluded that pensions have no statistically discernible influence on savings.

Hu¹⁹ empirically examined pension reform, economic growth and financial development. The study used panel data analysis to find a negative relationship in the short run and a positive relationship in the long run, although the results for OECD countries are not very statistically robust. Another empirical test focused on pension fund assets and economic growth. A positive relationship between these two variables is found by the standard economic growth specifications; in addition, evidence exists that pensions are a good predictor of economic growth. The panel Granger causality test corroborated with this result. The final test deals with the relationship

between pension assets and financial development. Thus, the panel correction model and panel Granger causality test suggest that pension fund growth leads to financial development, although some sub-group estimations are not strong.

Berkel and Borsch-Supan²⁰ investigated the effect of pension reform on retirement decisions in Germany, and focused in particular on the long-term implication of the changes implemented in pension legislation since 1992 and the reform discussed by the Germany Social Security Reform Commission. The results of the simulations indicate that the early retirement pension adjustment factors introduced by the 1992 pension reform will, in the long run, raise the average effective age of retirement for men by somewhat less than 2 years. The across-the-board, 2-year increase in all the relevant age limits proposed would raise the effective average age of retirement of men by approximately 8 months. If the actual adjustment factor is increased from 3.65 to 65 per cent per year, the effective average retirement age rises by approximately 2 years; thus, the effects are considerably weaker for women.

Jaag, Keuschnigg and Keuschnigg²¹ investigated the impact of four often-proposed policy measures for sustainable pension: strengthening the tax benefits link, moving from wage to price indexation of benefits, lengthening calculation periods, and introducing more actuarial fairness in pension assessment. The study provided some analytical results and used a computational model to demonstrate the economic and welfare impact of recent pension reform in Australia.

In addition, Stensnes and Stolen²² studied the effects of pension reform on fiscal sustainability, labour supply and equity in Norway. The study used Statistics Norway's dynamic micro-simulation model MOSART. The results showed that the reform will simulate labour supply and improve public budgets, but will also lead to an increase in inequality in received pension benefits. In the same vein, Fisher and Keuschnigg²³ evaluated the effects of pension reform on labour market incentives. They also

showed parametric reform in a PAYG pension with a tax benefit link affects retirement incentives and work incentives of prime-age workers in the presence of a tax benefit link thereby creating a policy trade-off in simulating aggregate labour supply. The article shows how several popular reform scenarios are geared either towards young or old workers, or indeed both groups under appropriate conditions. They also provide a strong characterization of the excess burden of pension insurance and show how it depends on the behavioural supply elasticities on the extensive and intensive margins and the effective tax rates implicit in contribution rates.

Bonin²⁴ surveyed the state of the German pension system after a sequence of reforms aimed at achieving long-term sustainability. He argued that in principle the latest reforms have moved pension provision in Germany from a defined benefit to a DC scheme, and that this move has stabilized pension finances to a great extent. The article further argued that the real economic consequences of the global financial crisis pose threats to the core success factors of the reforms, which are cutting pension levels and raising the mandatory pension age. Finally, the article discussed possible reform measures, including the option to install a fourth pillar providing income in retirement through working after pension age.

Bruinshoofd and Grob²⁵ studied how changes in pension incentives affect retirement in the Netherlands. The study used a stated rather than a reviewed preference approach, and conducted a field survey questionnaire in the Dutch De Nederlandsche Bank (DNB) Household survey to derive empirical estimates of pension adjustment and pension wealth effect. They found that retrenchments of pension arrangement to the effect of rising the standard retirement age by 1 year induced people to postpone retirement by approximately half a year on average. Retirement postponement varies across people, depending prominently on earnings and non-pension wealth; wealth through earlier retirement whereas they readily accept a lower benefit in case of decrease in pension wealth.

Borsch-Supan, Ludwig and Winter²⁶ used a multi-economic simulation model to show the

relationship among ageing, pension reform and capital flows. In order to quantify the effects, the study developed a computational general equilibrium model by feeding a multi-country overlapping generation model with detailed long-term demographic projection for seven world regions. The outcome of the simulation indicates that capital flows from fast-ageing regions to the rest of the world will initially be substantial, but that the trend is reversed decumulated savings. They concluded that closed economic models of pension reform missed quantitatively important effects of international capital mobility.

Salen and Stahlberg²⁷ studied the reason why the Swedish pension reform was able to be successively implemented. They argued that governments that do not reform PAYG pension systems will eventually face a pension crisis. In a democracy, reform requires majority support. The problem is that pensions require today's generation to bear the burden for tomorrow's generation. Sweden recently passed pension legislation that specifies a gradual transition from a public defined-benefit plan to a DC plan. They found that a political-economic perspective helps to solve this problem that there are more winners who would vote in favour of the reform than non-winners who would vote against it. The net effect (present value of expected benefits minus present value of remaining contributions) of the new and old system contributions of the working generations (age < 53 years) are reduced by more than expected benefits.

Finseraas²⁸ analyzed pension policies in 21 OECD countries in the period 1994–2003, using the OECD's reform intensity score in the area of early retirement with the old-age pension scheme as the dependent variable. The importance of left strength parliament, institutional veto points and corporation is assessed through the use of scatter plots based on ordinary least squares regression. The empirical results show that reform intensity is driven by initial conditions rather than political and institutional variables. Thus, the political elites appear to be able to overcome obstacles to reform and implement necessary changes when there is sufficient pressure for reform.

PENSION REFORM IN NIGERIA

Before the introduction of the pension scheme in Nigeria, there had been traditional ways of protecting and caring for the elderly. These were a result of the extended family system, whereby people in the family made sure that older people were adequately taken care of in terms of what they ate, clothing and their health. However, as a result of modernization and so-called Western civilization, the system broke down. Thus, in order to guarantee the well being of the elderly who are economically inactive and those who have given meritorious service for a given period of time, the government introduced a pension scheme in the early 1970s. However, owing to complaints about and criticisms of the public pension scheme, there was adjustment of the old pension scheme, thereby leading to the introduction of the New Public Service Pension Scheme, which was backed and governed by the provisions of Pension Decree No. 102 of 1979 as amended. This decree provided for a pension scheme that was unfounded and non-contributory. Its benefits were largely related to earnings and relied on the replacement ratio. This meant that the pension benefits and gratuities were functions of the number of pensionable years and the income earned while in service. The government paid pension benefits from the consolidated revenue fund. The 1979 Pension Decree increased the retirement age to 60 years or 35 years in service, subject to 3 months notice in writing or payment of 3 months' salary in lieu of notice. Here, consideration is given to those in the higher institutions of learning, as there retirement age was increased to 65 years or 35 years in service.

The structure of this pension scheme is PAYG with defined benefit, indicating that it is mainly unfounded, given the fact that the benefits that were paid during a certain period were financed by the government from the consolidated fund and not the employees. Furthermore, the pension

scheme is non-contributory in the sense that employees do not directly contribute to the funding of the scheme, while the defined benefit plan dictates the benefit in advance as prescribed in the country's pension formula that ensures employees a certain replacement rate given their number of pensionable years. This Pension scheme does not recognize any employee not up to 15 years in service for pension and 10 years for gratuity, however it has been reduced to 5 years with effect from 1 June 1992 for the gratuity and 10 years for pension. All officers in war service are recognized as qualifying for pension and gratuity based on the number years in service. As during war service, a completed year is counted as 2 years, service less than 4 months is counted as 6 months, that above 4 months but less than 6 months, and service for 6 months is counted as a year.

The 1979 pension scheme covers professions and bodies such as the police, Federal and State Ministries and Departments, National University Commission, University Teaching Hospitals, Public Teaching Service, Local Governments and other parastatals of the government. The minimum pension payable in Nigeria over the years is presented in Table 1.

Pension benefits are earnings-related in the sense that they are calculated as a percentage of an employee's earnings over a number of reference years. The government adopted the TEE approach in relation to tax treatment of savings invested in pension. Section 173 subsection (4) of the 1999 constitution of Nigeria provides that 'pension in respect of service in the public service of the federation shall not be taxed.' In addition, section 210 subsection (4) of the same constitution provides that 'pension in respect of service in the service of a state shall not be taxed'.

On 31 December 1990, the basic salaries of employees were used to calculate retirement benefits, but with effect from 1 January 1991

Table 1: Minimum pension payable in Nigeria

Up to 31/12/87 N750 per annum	1/1/88 to 21/12/89 N1200 per annum	1/1/90 to 31/5/92 N2400 per annum	With effect from 1/06/92 to date N4000 per annum
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Source: Federal ministry of establishment.²⁹

other approved allowances such as transport and rent allowance, and later utility meals and entertainment allowances, were included.

However, despite the laudable objectives with which the pension scheme was put in place, it has not had a significantly positive impact on the welfare of pensioners. This is a result of problems such as the inflation rate, which has depleted the real value of the benefits; the high dependency ratio in the country; fraudulent activities of the top officials of the pension scheme; inadequate pension coverage, erratic budgetary allocation and so on. Owing to these problems, pensioners continuously protested to the authorities against their poor conditions and welfare, and thus called for a reform in the pension scheme. As a result of the continuous pressure on the government to review the current pension scheme, the Federal Government of Nigeria introduced a reform to the pension scheme called the '2004 Pension Reform Scheme', backed by an Act of the parliament called 'The New Pension Reform Act 2004' of the Federal Republic of Nigeria.

The introduction of the 2004 Pension Reform Scheme was aimed at improving the standard of living of pensioners in order to avoid old-age poverty. Unlike the previous pension scheme, the current reform is not primarily motivated to improve the welfare of the pensioners, but to guarantee future the financial sustainability of the scheme, as this is the core of the well-being of the pensioners.¹¹ Ojetunde argued that the reform was a result of flaws in the structure of the old pension system, erratic budgetary allocation, and the fact that it was largely funded and wholly unpredictable.

However, the fact that welfare objectives were not explicitly stated among the reasons for the reform does not mean that social welfare was ignored or even politically rejected; in fact, the new pension scheme was put in place to guarantee an adequate standard of living for all citizens.

The Pension Reform of Act 2004 makes provision for the establishment of a National Pension Commission (NPC), which is charged with the responsibility of regulating and supervising all pension schemes in Nigeria.

Members of the commission include the National Union of Pensioners, the Nigerian Labour Congress, the Nigerian Employers' Commission, the Central Bank of Nigeria, the Ministry of Finance and the Office of the Head of Service of the Federation. This Commission is empowered by the Pension Reform Act 2004 to formulate, direct and oversee all pension policy administration and related matters in the country, as well as to penalize erring officials or operators. As provided by the Act, the reform covers the Federal Civil Service, the Ministry of the Federal Capital Territory and every private enterprise employing five or more people. It is not mandatory for state and local governments to join the scheme, but whatever pension scheme they put in place must conform to the dictates, standards and supervision of the Commission.

The Act recognizes the existence of both Pension Fund Administrators (PFAs) and Pension Assets Custodians (PACs), which are directly under the control of the NPC. The PFA must own a limited liability company with a paid-up capital share of at least N150 million, and should be able to open and manage a Retirement Savings Account (RSA) for each employee. The PFA invests and manages the RSA so as to distribute benefits to employees upon retirement, as employers are required to send 155 per cent of basic salary, transport and housing allowances to their RSA, that is, 7.55 per cent from employees and the remainder to be contributed by employers. The PAC is a licensed financial institution operator with a minimum net worth of N15 billion and N125 billion in balance sheets. The PAC accepts money directly from the employers on behalf of the PFA by holding pension fund assets in safe custody for the beneficiaries of the retirement benefits. The PAC invests the funds in his trust on behalf of the PFA in a profitable venture with little or no risk. Examples of such investments include bonds, debentures and other preference shares listed on the Nigerian Stock Exchange.

The 2004 Pension Reform Scheme is a FF-DC, as both the employer and the employees contribute to the funding of the RSA (Table 2). In addition, apart from the benefits that were

Table 2: Structure of the 2004 reformed pension scheme

Structure	Earnings related	Coverage	Contribution rates	
			Employers (%)	Employees (%)
A fully funded, defined contributory scheme	Basic salary, housing and transport allowance	Government ministries and agencies	7.5	7.5
			12.5	2.5

Source: Own compilation based on the information from the Nigerian New Pension Act 2004.³⁰

attached to the old pension plan, the new pension reform has added transparency and efficient management of pension funds.

REVIEW OF 2004 PENSION REFORM SCHEME

The aim of the Pension Reform Scheme of 2004 is to ensure that an individual who has worked either in the public or private sector receives his retirement benefits as and when due. This scheme aims to provide assistance to indigent people by ensuring that they save to cater for their livelihood during old age; to establish a uniform set of rules and regulations for the administration and payment of retirement benefits in both the public and private sectors; and to stemming the growth of outstanding pension liabilities.³¹

This pension scheme enables workers to choose their PFA, which will allow them to evaluate various PFAs with which they will entrust their deposits. Since the inception of this scheme, several workers have registered with different PFAs. By the second quarter of 2006 over 0.9 million workers had registered with the scheme (see Table 3). However, by the end of 2007, approximately 3 million workers had registered for the pension scheme. The increasing trend of registered workers for the 2004 Pension Scheme continued in 2008, as it recorded 3.4 million participants in the scheme. The first quarter of 2009 has 3.5 million registered workers in the scheme (Table 3).

Despite the tremendous success recorded in the implementation of the 2004 Pension Scheme, there is still much to be desired if the social security gaps in the country are to be filled. According to *Businessday*,³¹ approximately 705 per cent of the country's population is not yet

covered in the present pension scheme, owing to the fact that the informal sector of the economy is not covered. Thus, for this pension scheme to be effective as a social security measure, there must be a mechanism by which the informal sector must be incorporated, or else the scheme will remain far from meeting its social security needs.

However, like any other legislation, there are always drawbacks and loopholes. The shortcomings of this pension scheme have been identified by policy makers, researchers and members of the National Assembly, and these have made them commence the review of the Act. Recently, the Senate Committee on Establishment and Public Service and the House of Representatives Committee on Pensions and the NPC held a conference to review the Pension Reform Act 2004. This provided an avenue for the participants to make contributions towards what they believe will spur change and ensure the full implementation of the scheme.

RESEARCH METHODOLOGY

This study set up an econometric model to test the long-run relationship among employees' welfare and pensions, gratuity and years of service (gross national per capita income is used to measure public employees' welfare). The majority of the macro-economic time series are characterized by a unit root so that their first difference is stationary;³² Nelson and Plosser³³ and Ahmed and Harnhirun³⁴ opined that if a statistical test such as co-integration establishes co-movements in these time series, then the residuals from the regression can be used as error correction terms in the dynamic first-difference equation. Thus, given two time series that are integrated in order 1, that is, $I(1)$, and

Table 3: Registered workers for the 2004 pension reform scheme

Serial no.	Period	Year	Registered workers	Three quarter MA*
1	Second quarter	2006	932 435	—
2	Third quarter	2006	1 331 035	—
3	Fourth quarter	2006	1 677 330	1 313 600
4	First quarter	2007	2 002 890	1 679 118
5	Second quarter	2007	2 364 352	2 023 557
6	Third quarter	2007	2 630 988	2 341 443
7	Fourth quarter	2007	2 784 273	2 593 204
8	First quarter	2008	2 969 226	2 794 829
9	Second quarter	2008	3 135 888	2 963 129
10	Third quarter	2008	3 349 897	3 151 670
11	Fourth quarter	2008	3 465 764	3 317 183
12	First quarter	2009	3 546 084	3 453 915

*Moving average.

Source: Culled from *Businessday*.³¹

co-integrated, then Granger causality exists in at least one direction in the $I(0)$ variables,³² and thus a VAR model can be set up with an error-correction term for doubled co-integrated $I(0)$ time series to cover the short-run dynamics and to decrease the chance of observing ‘Spurious regression’ in terms of the level of data or their first difference. Therefore, after estimating the multiple regression models, the study will test for the stationary, co-integration and error correction model (ECM) so as to know the long-run reliability of the model.

What we will first do under the methodology is specify the multiple regression model that shows the effect of pension reform on employees’ welfare (here we use number of years in service, percentage paid as gratuity and that of pensions to measure the reform in the pension scheme). This study draws from that of Feldstein,¹⁵ who tried to incorporate the effect of pensions into an estimable version of the life-cycle model for the United States through a SSW variable. Mackenzie *et al*¹⁴ also show empirically the extent to which participation in pension plans affects aggregate savings.

Therefore, this study specifies the following multiple regression equation using aggregate data for the natural logarithm of the variables.

$$\ln W_t = \beta_0 + \beta_1 \ln SY + \beta_2 \ln PNS + \beta_3 \ln GRAT + e_t \quad (1)$$

where W is the employees’ welfare, $\ln SY$ is the natural logarithm of employees’ service years,

$\ln PNS$ is the natural logarithm of pensions and $GRAT$ represents the natural logarithm gratuity. β_0 is the constant and β_1 , β_2 and β_3 are the coefficients, while e_t is the stochastic or error term.

The *a priori* expectation of the model is that the number of years in service (SY) and the amount that is paid as pensions and gratuity should have a positive relationship with the welfare of the employees. In addition, the study will test for the order of integration of the variables, that is, the stationarity or otherwise of the natural logarithm of the variables. The Augmented Dickey–Fuller (ADF) test for stationarity is applied to determine the order of integration of the variables in the model. We specify the ADF test as follows:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \alpha \sum_{i=1}^m \Delta Y_{t-i} + e_t \quad (2)$$

where e_t in the four equations is assumed to be an identical independently distributed random variable. The null hypothesis for the test is that $\delta = 0$ or $P = 1$, that is, a unit root exists. This test enables us to determine whether the variables that were used followed a particular trend. After performing the stationarity test, we will go further and test for the co-integration of the model using the Johannes’s Trace and Max-Eigen statistic estimation approach.^{35,36} This co-integration test indicates whether the variables used in the model could still combine

to produce a reliable result after their trend pattern is known.

Furthermore, another test involved the treatment of error term in the test above as equilibrium error, thus it uses this error term to tie the short run behaviour of the W_t to its long-run value. This test is called the ECM, and was popularized by Engel and Granger.³² The specification goes thus:

$$\Delta W_t = \alpha_0 + \alpha_1 \ln SY_{t-1} + \alpha_2 \ln PNS_{t-1} + \alpha_3 GRAT_{t-1} + \alpha_4 ECT_{t-1} + e_t \quad (3)$$

where Δ is the first difference, ECT_{t-1} is the error correction term lagged by one period and e_t is the error term.

EMPIRICAL FINDINGS

The estimation of the multiple regression, stationarity and co-integration tests is based on time series data, and these are obtained from African Development Indicators, Federal Republic of Nigeria Official Gazette and the Federal Office of Statistics. The ADF test is used to determine the unit root of the variable both at level and first difference. According to Kareem,³⁷ either the first or second differenced terms of any variable shall be stationary.

Thus, the result shown in Table 4 (multiple regression estimates) shows that there is an inverse relationship between the gratuities paid to government employees ($\ln GRAT$) and their welfare, given the coefficient of -8.0901 , which is statistically significant. This negates *a priori* expectation of the positive effect of gratuity on workers' welfare. The same result is obtained for pension payment, as it is negatively related to the level of employees' welfare, though statistically significant, but shows that for 15 per cent increase in the pension rate, there are usually -1.1856 decreases in employees' welfare. This outcome also contradicts the *a priori* expectation of the model, while the SY is statistically positively related to the welfare of employees and thus conforms to the *a priori* expectation. For every 1 year added to the SY , there would be 0.2755 rises the level of workers' welfare.

The coefficient of determination (R^2) indicates that over 88 per cent of changes in the employees welfare are determined by years in service, pension and gratuity. This model, as specified, is statistically significant given that its F -test is 45.7733. Thus, in order to show the reliability of the result, we present the ADF test in Table 5. The result shows that (Table 5) $\ln PNS$ and $\ln SY$ are stationary at levels, that is, they are integrations of order zero, $I(0)$, while both $\ln W_t$ and $\ln GRAT$ are integrated at the first difference, $I(1)$ (Table 5).

Table 4: Multiple regressions

Variable	Coefficient	T-statistic	Probability	$R^2=0.8841$
β_0	47.2605	6.3424	0.0000	Adj. $R^2=0.8648$
$\ln SY$	-8.0901	-2.8569	0.0105	SE=0.2313
$\ln PNS$	-1.1856	-0.3279	0.7468	F-stat.=45.7733
$\ln GRAT$	0.2755	3.6345	0.0019	D.W.Stat.=1.2918

Source: Authors' computation.³⁸

Table 5: Augmented Dickey-Fuller test for unit root

Variable	Level	First difference	Integration	Order
$\ln W_t$	-2.3338	-3.5864	$I(1)$	—
$\ln SY$	-8.5593	—	$I(0)$	—
$\ln PNS$	-4.4634	—	$I(0)$	—
$\ln GRAT$	-2.4543	-28.4778	$I(0)$	—

Notes: The 5% critical value for Augmented Dickey-Fuller statistic is approximately -3.6450 for levels and -3.0810 for first difference.

Source: Author's computation.

Table 6 shows Johansen's co-integration test result based on the trace and maximum eigenvalue statistics. Both test statistics indicate that they are above the critical value of 55 per cent at two levels, meaning that we have two co-integrating vectors at the 55 per cent level of significance, and this implies that given the fact that the variables are co-integrated, there would be no loss of information, and that long-run relationship exists between employees' welfare and years of service, pension and gratuity (Table 6).

The parsimonious result shows that the short-run changes in $\ln SY$ and $\ln GRAT(-1)$ have a significant negative effect on welfare (W_t), whereas $\ln PNS$ has a significant positive effect. Thus, the coefficient is $ECT(-1)$, which is the degree of adjustment, indicating that approximately -0.8474 of the differences between the actual and the long-run, or equilibrium, value of welfare (W_t) is eliminated or adjusted each period. However, the speed of adjustments from disequilibrium to equilibrium in the present period is approximately 85 per cent and this is statistically significant, which justifies the use of an ECM in the study.

CONCLUSION AND POLICY IMPLICATIONS

The principal aim of this article is to test the effect and show the long-run relationship that

exists between pension scheme reforms and employees' welfare using panel data. The co-integration test has been applied in order to show the long-run relationship between the selected variables.

We discovered that different reforms had been made to Nigeria's pension scheme over the years, but not all have been able to meet the expectations of the employees in terms of social security and risk aversion in old age. Many countries have adopted different pension plans that have resulted in increased social security and wealth of retired and aged employees, but that of Nigeria has been problematic owing to the inadequate disbursement of pension funds and the corruption of government officials.

We found that there has been an inverse relationship between pensions and the welfare of employees, and that the same negative relationships exist between years of service of employees and employees and welfare. However, the gratuity paid to public sector employees has a direct relationship with employees' welfare; we also discovered that a long-run relationship exists between pension reform and employees' welfare. Hence, there is a high speed of adjustment of employee's welfare to the pension reform in Nigeria.

Thus, we conclude that the pension scheme that has been adopted by Nigeria is not a

Table 6: Results of Johansen's co-integration test

Hypothesis	Maximum eigenvalue	Trace test statistic
Null alternative	Statistic critical value 5%	Statistic critical values at 5%
$R=0$ $r=1$	39.6111 31.46	84.9147 62.99
$R \leq 1$ $r=2$	25.7930 25.54	45.2936 42.44
$R \leq 2$ $r=3$	11.9388 18.96	19.5006 25.32
$R \leq 3$ $r=4$	7.5618 12.25	7.5618 12.25

Source: Author's computation.

Table 7: Parsimonious error correction model

Variable	Coefficient	t-statistic	Probability	$R^2=0.7852$
α_0	6.1899	0.5738	0.5741	Adj. $R^2=0.7473$
$\ln SY$	-12.3981	7.2486	0.0000	SE=0.3049
$\ln PNS$	22.0280	3.4840	0.0028	Akaike=0.6320
$\ln GRAT(-1)$	-8.2962	-2.1303	0.0480	Schwarz=0.8309
$ECT(-1)$	-0.8474	-6.1287	0.002	—

Source: Author's computation.

welfare-enhancing scheme, and that there should be an adjustment to the scheme in terms of its implementation, administration and coordination.

In order to correct this explicit shortcoming of the old pension scheme, the government should make sure that the new reform of the person scheme in Nigeria does not go the same way as previous schemes. Government should as a matter of policy make sure that those firms to be entrusted with pension funds are competent and have the dexterity to do the job without fear or favour, and their selection should not be politicized. To guarantee social security and retirement benefits, pensioners must be active in terms of their savings to the scheme and must not be irrational in savings for the scheme or in expenditure.

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