

Pension Reform And Financial Market Development Nexus: Evidence From Nigeria

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Abstract

It is generally assumed that Chilean type of pension reform helps in developing the financial market wherever the reform is adopted. However, this assertion is not clear cut especially in developing areas faced with problems of underdevelopment. Using the Error Correction Model (ECM) approach this study examines if pension reform advances the development of financial market in Nigeria. Time series data were compiled and a functional relationship was established using the OLS technique. Statistical significance of the error correction term confirmed the existence of an equilibrium relationship among the variables. The performance analysis of all the variables indicated that the reform period generates long-term contractual savings and stimulates the development of securities market.

Keywords: Pension reform, financial market development, error correction model, contractual savings, securities market.

1. Introduction

The Chilean pension reform of 1981 by which a shift from an unfunded to a funded pension system was affected is seen to have special attraction for other emerging economies of the world as this is considered to have contributed to the country's excellent economic performance (Holzmann, 1997). According to Holzmann (1997), the fundamental claim about the effects of this pension reform, echoed globally, is its contribution to financial sector development (see IMF, 1995). However, recently, growing criticism has continued to trail the World Bank's recommended pension reform programmers. An example is the assessment of the World Bank's Independent Evaluation Group (IEG, 2006) of the various pension reform programmers initiated in many countries of the world. Among their various criticisms the IEG study noted that the Bank pushed ahead with pension privatization in several countries of Central Eastern Europe and Central Asia despite lacking sound financial system. The report mentions three Latin America countries – Dominican Republic, Ecuador and Nicaragua -, which enacted Bank recommended pension privatization without sound financial sector, in Nicaragua, the Bank finally had to accept to put the reform on hold (IEG, 2006).

Nevertheless, the Nigerian government saw the Chilean reform as an example to be emulated, and launched a new pension system in 2004. The move shifted employees to a defined contribution plan from the existing non-contributory defined benefit scheme, thereby shifting the risk of retirement financing from government to individuals. However, Nigeria was seen by the World Bank (2005) (see Dostal et al., 2010) as lacking a financial sector strong enough to support a multi-pillar pension system and thus advised against reform of the sort being planned or undertaken. The Bank described the country's financial sector as "characterized by high margins, low level of intermediation, and a few financial products or services". The International Monetary Fund (IMF, 2005) in its assessment of Nigeria's financial sector considered it to be exceedingly risky citing unstable macroeconomic environment as the major cause and concluded that it has not fostered stability, or supported investment and economic development. It termed the whole banking system "unsound" (Dostal et al., 2010).

Although, considerable number of studies looking at the impact of financial development on economic growth, have cited the possibility that pension reform may have an additional advantage through a positive impact on capital market development (see Valdes and Cifuentes, 1990; Arrau, 1994; Fontaine, 1996; Singh, 1996; Blommestein, 1997; Burtless, 1997; Holzmann, 1997; Uthoff, 1997; Blake and Orzag, 1998; Camus and Sanchez, 1998; Walker and Fernando, 2002). Blake (2003) opined that the presence of a well developed financial market is a feasibility precondition for the creation of a strong pension system. Following these arguments, this study aims to empirically determine whether the reform of a country's pension system is the catalyst to the development of the financial market or whether the contrary is the case, that is, if development of the financial market is the forerunner of a pension reform.

The remainder of the paper is organized as follows: section 2 discusses the main link between pension reform and financial market development. Section 3 describes the data, the methodology and time series evidence. Section 4 presents the results and discussion and section 5 concludes.

2. Literature Review

2.1 Pension Reform and Financial Market Development

Over the years, the link between pension reform and capital market development has been a subject of interest among researchers (see Holzmann, 1997; Vittas, 1999 and 2000; Walker et al., 2002 and Blake, 2003). It is often argued that the creation of funded pension plans has major long-term implications for the functioning and growth of financial markets (see for example, Poterba et al., 1996; Coronado, 1998; Hachette, 1998; Vittas, 2000 etc.). Though, as noted by Vittas (1999) that a notable salient feature of funded pension plans, which is the steady build up of long-term financial resources, will affect the composition of financial savings, which in turn may increase total savings. Noticeably, the magnitude of the consequence of pension fund reform on the financial market development will depend on definite feature of the reform. According to Vittas (2000), the question of the links between pension reform and financial markets has two aspects. One concerns the preconditions in terms of financial sector

development for the successful implementation of pension reform, while the other refers to the long-term impact of pension reform on the development of financial markets. He argued that pension reform and the promotion of private pension funds requires a small core of sound, prudent and efficient financial institutions, such as banks and insurance companies, but does not depend on the prior existence of well-developed securities markets but he opined that private pension funds and insurance companies may have a beneficial impact on financial market development once they reach critical mass and provided they operate in a conducive regulatory environment.

However, Walker and Fernando (2002) believed that the creation of a fully funded, privately managed pension system may accelerate the process of financial market development, thereby improving growth and welfare. The general hypothesis is that the rising investment needs of the pension funds, the instruments thereby created, and the competitive set-up of the privately management pension funds will make the financial market deeper, more liquid, and more competitive (Holzmann, 1997). Blake (2003) observed that for effective delivery of pension, financial instrument and investment strategies are more germane than the nature of either the financial markets (i.e. their depth, breadth, resilience and microstructure) or the financial institutions (fund managers and life assurers respectively). According to Walker and Fernando (2002), there are many paths through which pension reform may heighten the development of financial markets. For example, there are many concomitant conditions to the process of pension reform that may support or limit the positive effect on financial market development. In attempt to clarify the rationale behind the link from pension reform to financial market development, Walker and Fernando (2002) argued these links through three sets of economic phenomena. They summarized these phenomena into processes that are induced by the accumulation of pension funds, concurrent conditions to the process of pension reform and the consequences on economic growth. For more incise analysis, see the works of Valdes and Cifuentes (1990); Diamond and Valdes-Prieto (1994); Bodie (1989); Blommestein (1997, 1998); Iglesias (1998); Vittas (1996, 1998, 1999, 2000); Lanoo (1998); Blake and Orszag (1998); Prowse (1998).

In economic policy discussions, national savings are generally claimed to be positively influenced by deepening of the financial market induced by pension reform (IMF, 1995). Empirically, this reforms effect is considered to be ambiguous (See Coronado, 1997; Levine and Zervos, 1998 and Walker and Fernando, 2002). However, further theoretical considerations and international empirical evidences have suggests either way (see Holzmann, 1997; Coronado, 1999 and Schmidt-Hebbel, 1998). Arguably the effect of pension fund reform on savings will depends on substantial characteristics of the reform and the economy. A major argument for fully funded pension systems is that it necessitates the pooling of long-term financial savings which results to the reduction in the cost of funds for firms that support financial market development (see Iglesias, 1998; Vittas, 1996). Walker et al. (2002) pointed out the incompleteness of these arguments; they argued that if pension funds merely act to substitute other sources of private savings, why would this imply a lower cost of capital? They relate this to the effects that are usually attributed to capital market integration (see Bekaert and Harvey, 1998). They concluded that, there are three possibilities for this; lower direct cost of issuing

securities, lower term premia and lower risk premia. Whatever the case, studies has shown downward trend in equity premium (For example, Fama and French, 2001). Accordingly, the fact that pension funds manage other people's money and the likelihood of an increment in the average market' risk tolerance, a lower equity risk premium could be implied which may possibly lowers the average cost of capital for firms. This study tends to examine the conjectured link between pension reform and financial market development.

3. Material and Method

3.1 Data

The study relies heavily on time series data from the CBN statistical bulletin and CBN annual report and statement of accounts. The data set consists of financial market development indicators; financial deepening, credit to the private sector, and exchange rate, interest rate and total savings . The data collected are at yearly intervals from 1981 to 2009 documented at the Central Bank of Nigeria (CBN, 2009).

3.2. Model Specification

$$M2GDP = \sum_{j=1}^n \delta_j X_t + \sum_{j=1}^n \varphi_j PENREF + \varepsilon_t \quad (1)$$

$$CRDTGDP = \sum_{j=1}^n \alpha_j X_t + \sum_{j=1}^n \beta_j PENREF + \mu_t \quad (2)$$

where M2GDP and CRDTGDP stand for individual indicators of financial development defined as the ratio of broad money supply to GDP and financial sectors' credit to the private sector as a ratio of the GDP respectively; PENREF is pension reform (Dummy Variable: years before the pension reform = 0 and 1 for pension reform years); X is a set of control variables; $\delta_j, \varphi, \alpha_j$ and β_j are the parameters to be estimated, and ε_t and μ_t is the error term.

3.3. Model Estimation Technique

This study employed a time series econometric technique to ascertain the nexus between pension reform and financial market development. Guided by the literature, Granger causality tests were used to examine whether one way causality or a feedback mechanism exists between the two variables. Following Engle and Granger (1987) assertions that time series econometric models are associated with stationary problem, this study used the error correction model (ECM) which has been developed to address the problem associated with the non-stationary nature of time series data. The ECM ascertains the stationary or otherwise of the time series data. A non-stationary series requires differencing to become stationary, hence the need to assess the order of integration of both the dependent and independent variables in the model. A stationary series is a I(0) series while non-stationary series are I(1). X_t is integrated of order D_x or $X_t \sim I(D_x)$, if it is differentiated D_x to achieve stationary (Dickey and Fuller, 1981).

Engle and Granger (1987) provided appropriate test procedure for stationary of individual series, which includes the estimation of the Dickey-Fuller (DF) and the Augmented Dickey-Fuller (ADF) statistics. The DF and ADF are tests for the null hypothesis that the variable of interest is non-stationary. Thus,

H_0 : The variables are not stationary at their levels, i.e. I(1)

H_a : The variables are stationary at their levels, i.e. I(0)

The test procedure is usually indicated in the following type of equation:

$$\text{For DF test,} \quad \Delta X_t = \alpha_0 + \delta X_{t-1} \quad (3)$$

$$\text{For ADF test,} \quad \Delta X_t = \alpha_0 + \delta X_{t-1} + \sum_{i=1}^k \Delta X_{t-i} + e_t \quad (4)$$

H_0 is rejected is rejected against the one-sided alternative if the t-statistic is more than the critical value in absolute terms. In order to generate the error correction model, a test of co-integration was carried out to examine the existence of any meaningful long-run (equilibrium) relationship among the non-stationary time series using the augmented Engle and Granger (1987) two step test. The ADF framework is utilized in the test procedure. Co-integration is accepted when the residuals from the linear combination of non-stationary I(1) are themselves stationary. Co-integration is accepted if the critical value of the ADF, which is negative, is greater than the ADF t-statistic value of the individual variables. Engle and Granger (1987) linked the long run relationship derived from the co-integrating relationship with the short term dynamic process by associating co-integration with error correlation model. Obviously, the error correlation model specification is the trail through which the short-run observed behavior of variables is associated with their long-run equilibrium growth paths.

Sequel to the prior testing of the data, we include EXTR (exchange rate), INTR (interest rate) and SAVGDP (ratio of total savings to GDP) as the control variables. The control variables are included because study has found them to be significant determinants of economic growth in Nigeria. Moreover, extant literature posits that there are links between exchange rate, interest rate, total savings and financial development (Dollar, 1992; Levine and Zervos, 1994 and Walker and Lefort, 2002). Considering the fact that security markets intermediate funds from different sources, non-distorted fundamental prices such as price levels, real exchange rates and real interest rates are expected to play a crucial role.

4. Result and Discussion

The result of granger causality test is presented in Table 1. The existing causal relationship between pension reform and financial development is examined using pair wise Granger causality test proposed by Engle and Granger (1987). The result shows that financial development when measured either by ratio of broad money supply to gross domestic product (M2GDP) or by ratio of credit to private sector to gross domestic product (CRDTGDP) does not granger cause pension reform. On the other hand, pension reform granger causes financial development at 5% level of significance when the latter is measured by ratio of broad money

supply to gross domestic product (M2GDP) and at 1% level when measured by ratio of credit to private sector to gross domestic product (CRDTGDP). This implies that there is only a uni-directional relationship between pension reform and financial development and this direction comes from pension reform to financial development and not otherwise.

Table 1 : Pairwise Granger Causality Tests (N = 28)

Null Hypothesis:	F-Statistic	Probability
M2GDP versus PENSION	0.28172	0.60026
PENSION versus M2GDP	4.77635	0.03843
SAVGDP versus PENSION	0.95468	0.33789
PENSION versus SAVGDP	9.51513	0.00492
EXTR versus PENSION	7.55524	0.01095
PENSION versus EXTR	1.72252	0.20129
INTR versus PENSION	0.27715	0.60321
PENSION versus INTR	0.35499	0.55666
CRDTGDP versus PENSION	0.17272	0.68126
PENSION versus CRDTGDP	11.5734	0.00226
SAVGDP versus M2GDP	0.07053	0.79274
M2GDP versus SAVGDP	0.29731	0.59041
EXTR versus M2GDP	1.17581	0.28856
M2GDP versus EXTR	1.43888	0.24157
INTR versus M2GDP	0.35375	0.55734
M2GDP versus INTR	0.00465	0.94616
CRDTGDP versus M2GDP	5.33322	0.02947
M2GDP versus CRDTGDP	3.41610	0.07643
EXTR versus SAVGDP	2.77418	0.10828
SAVGDP versus EXTR	2.11793	0.15803
INTR versus SAVGDP	1.17377	0.28897
SAVGDP versus INTR	0.02684	0.87117
CRDTGDP versus SAVGDP	11.1943	0.00259
SAVGDP versus CRDTGDP	3.41352	0.07653
INTR versus EXTR	0.39885	0.53342
EXTR versus INTR	0.04238	0.83857
CRDTGDP versus EXTR	0.68757	0.41484
EXTR versus CRDTGDP	4.54494	0.04303
CRDTGDP versus INTR	0.26412	0.61182
INTR versus CRDTGDP	0.29004	0.59496

In using the co-integration model, co-integration among the variables that were themselves non-stationary were looked for in the two estimating equation to establish whether there is long run relationship between the dependent variables and their fundamentals. This was carried out as a condition for accepting the ECM model. The ADF test was also used to test for

co-integration. Table 2 shows the result of the Augmented Engle-Granger tests. (The augmented Engle-Granger test is carried out by conducting Augmented Dickey Fuller test on the residual generated from the long run equation estimate).

Table 2: Results of the co-integration tests of the residual of the time series

	<u>M2GDP</u>		<u>CRDTGDP</u>	
ADF Test statistics		-3.269085*		-2.689524**
Critical Value:	1%	-3.689194		-3.689194
	5%	-2.971853		-2.971853
	10%	-2.625121		-2.625121

*significant at 5%, **significant at 10%

The result shows that the absolute value of the ADF test statistic was greater and statistically significant at 5 per cent and 10 per cent than its corresponding critical value for M2GDP and CRDTGDP respectively, so co-integration was not rejected. The ADF test showed that there is a long-term equilibrium relationship between financial development and its independent variables. Since there is a long run relationship, it shows that there is no spurious estimation. Long-run relationships are the relationship that occurs between variables when they are trending upward in a stochastic manner and this can only take place over time. The long-run co-integrating equation of financial development on pension reform is estimated and presented in table 3 and 4.

Table 3: Long-run Co-integrating Equation of Financial Development on Pension Reform by Ratio of Broad Money Supply to Gross Domestic Product (M2GDP)

Variable	Coefficient	Standard error	t-statistic	Probability
PENSION	-3.658065**	1.510441	-2.421852	0.0234
SAVGDP	1.654835*	0.103853	15.93446	0.0000
EXTR	0.026176*	0.011721	2.233291	0.0351
INTR	-0.184778*	0.089164	-2.072329	0.0491
CONSTANT	10.22079*	2.499449	4.089216	0.0004

Adjusted R² = 0.93 SC= 4.7

*, ** indicates significance at 1% and 5% probability level

Two equations are estimated here based on the result from granger causality test; the first equation is where M2GDP is the dependent variable while the other is where CRDT serves as the dependent variable. Other independent variables included in the equation are ratio of total savings to gross domestic product (SAVGDP), exchange rate (EXTR) and interest rate (INTR). The first estimation where financial development is measured by M2GDP indicates that pension reform (PENSION), at 5% level, has a significant effect on financial market development. The coefficient of this variable indicates a decrease in financial market development by 3.7% from a

percentage increase in reform. Ratio of saving to gross domestic product (SAVGDP) and exchange rate (EXTR) contribute positively to financial market development. From 1% increase in SAVGDP, financial market development will increase by 1.65% while 1% increases from exchange rate raises financial market development by 0.03%.

The second estimation considered ratio of credit to private sector to gross domestic product as a measured of financial market development (also known as financial deepening). The consideration given to CRDTGDP is based on the fact that PENSION was found to granger caused this variables at 1% as against 5% for M2GDP. The result of this estimation is presented in table 4. PENSION though was not statistically significant but show to have a positive effect on financial market development. SAVGDP and EXTR as in the first estimation, have significant and positive effect on financial market development. Effect of exchange rate is not different as observed in the previous analysis while that of SAVGDP only differ by 0.38%.

Table 4: Long-run Co-integrating Equation of Financial Development on Pension Reform by Ratio of Credit to Private Sector to Gross Domestic Product (CRDTGDP)

<i>Variable</i>	<i>Coefficient</i>	<i>Standard error</i>	<i>t-statistic</i>	<i>Probability</i>
PENSION	2.314347	2.068550	1.118826	0.2743
SAVGDP	1.274942*	0.142226	8.964180	0.0000
EXTR	0.032654***	0.016051	2.034359	0.0531
INTR	-0.069162	0.122111	-0.566389	0.5764
CONSTANT	1.454954	3.422997	0.425053	0.6746

Adjusted R² = 0.83 SC= 5.4

*, *** indicates significance at 1% and 10% probability level

The existence of co-integration among the dependent variables and their determinants necessitated the specification of ECM for pension reform as well as its estimation in this study. The previous estimations measure the long-run effect of pension reform on financial market development however although long run relationship may exists between the variables, in the short run such relationship may not exist and it is therefore necessary to estimate the speed of adjustment in the short run for long run equilibrium. This led to the estimation of Error Correction Model. The parsimonious estimate of this model is presented in Tables 5 and 6.

Table 5: Results of Parsimonious ECM model for Financial Development on Pension Reform (M2GDP)

Variable	Coefficient	Standard error	t-statistic	Probability
D(M2GDP(-1))	0.223068	0.107214	2.080578	0.0550
D(M2GDP(-2))	0.791202	0.280761	2.818058	0.0130
D(PENSION)	-1.419490	1.894102	-0.749426	0.4652
D(SAVGDP)	1.412153	0.180977	7.802938	0.0000
D(SAVGDP(-2))	-1.142378	0.487776	-2.342013	0.0334
D(EXTR)	0.027433	0.026089	1.051514	0.3097
D(EXTR(-1))	-0.076528	0.037272	-2.053232	0.0579
D(INTR)	-0.426127	0.120616	-3.532926	0.0030
D(INTR(-2))	0.218439	0.097096	2.249733	0.0399
ECMM2GDP(-1)	-1.310042	0.303265	-4.319789	0.0006
CONSTANT	0.110749	0.398850	0.277671	0.7851

Adjusted R² = 0.94 SC= 4.7

From table 5, the adjusted R² value implies that about 94% of the variations in financial market development is accounted for by the variable. The co-efficient of pension reform is negative. This suggests a negative effect on financial market development or cause decrease in development as its magnitude increase.

Table 6: Result of Parsimonious ECM model for financial Development on Pension Reform (CRDTGDP)

Variable	Coefficient	Standard error	t-statistic	Probability
D(CRDTGDP(-1))	0.265877	0.247432	1.074544	0.3008
D(PENSION)	-1.458894	2.296186	-0.635355	0.5354
D(PENSION(-1))	-6.138045**	2.261347	-2.714331	0.0168
D(PENSION(-2))	-3.609338	2.245639	-1.607266	0.1303
D(SAVGDP)	1.462150*	0.194373	7.522400	0.0000
D(SAVGDP(-1))	-0.540212	0.364570	-1.481777	0.1606
D(EXTR)	0.017407	0.034821	0.499882	0.6249
D(INTR)	-0.037072	0.119881	-0.309236	0.7617
D(INTR(-1))	-0.363760**	0.129292	-2.813482	0.0138
D(INTR(-2))	-0.158179	0.122629	-1.289902	0.2180
ECMCRDTGDP(-1)	-0.731685*	0.239954	-3.049266	0.0087
CONSTANT	0.539007	0.475449	1.133680	0.2760

Adjusted R² = 0.79 SC= 5.0

*, **, indicates significance at 1% and 5% probability level

In table 6, the test statistic revealed that the dummy variable for pension reform, interest rate were significant at the 5% level in the parsimonious ECM model. The short run effect of pension reform was negative. The ECM produced the negative sign and the estimate was statistically significant at 1% level. In the previous time period, a 1% increase in pension reform will lead to decrease in financial market by 6.14%. SAVGDP contributes positively to financial market development in the short run. It has effect of about 1.46% from a 1% change. The effect of exchange rate was positive but not significant. Previous value of CRDTGDP has positive effect but not significant also. Interest rate (INTR) has a significant negative effect on financial deepening in the short run. A previous value of INTR with increase of 1% will result to 0.36% decrease in financial development. The coefficient of error correction variable (ECM(-1)) shows that the speed of adjustment in financial development in the short run to disequilibria from the long-term values of the independent variables is 73.2%. Moreover the adjusted R^2 value indicates that 79 % of the variations caused in financial market development is explained by the independent variables.

6. Conclusion

The study examined the conjectured link effects of pension reform and financial market development. The techniques used are the multiple regression and error correction mechanism. The performance analysis of all the variables indicated that the reform period generate long-term contractual savings and stimulate the development of securities markets. The R^2 values suggest that financial market development is well accounted for by the variations in pension reform, exchange rate, interest rate and saving investment ratio.

Arising from the preceding analysis, certain inferences can be drawn from this study. Earlier specifications and estimations of financial market development model without any prior examination of the time series nature of the data will most probably yield spurious results. The study findings underscored the application of the ECM model. Statistical significance of the error correction terms validated the existence of an equilibrium relationship among the variables. It is interesting to note that the co-efficient of the ECM captured the short-run impact, which is tied to the long-run relationship between co-integrating variables through the feedback mechanism. This study has demonstrated the import of examining the time series characteristics of the available data. Altogether, possibly one of the advantageous effects is enhancement in fund allocation for investment purpose which should culminate into better resource allocation.

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