Economic and Financial Review

Volume 51 | Number 3 Article 3

9-2013

Does Gender Inequality Retard Productivity in Nigeria?: A Search for Evidence

P. D. Golit
Central Bank of Nigeria, pdgolit@cbn.gov.ng

O. Adesanya
Central Bank of Nigeria, oadesanya@cbn.gov.ng

Does Gender Inequality Retard Productivity in Nigeria? A Search for Evidence

Golit P. D. and O. Adesanya*

Abstract

The paper adopted the bounds test and autoregressive distributed lag approach to evaluate the impact of gender inequality in education on real productivity in Nigeria using quarterly data from 1985 to 2011. Empirical evidence to establish the rejection of the null hypothesis of no cointegration among the variables was provided . The empirical results suggest that gender inequality in education depresses real productivity, with an output elasticity of -0.1 per cent per quarter. Further empirical evidence indicates that higher school enrolment of males enhances real productivity in Nigeria, while the influence of female school enrolment was not affirmative owing to some socio-cultural factors that tend to inhibit female participation in economic activities. The paper, thus, recommends the implementation of deliberate policies to improve female participation in economic activities besides strengthening the policy on affirmative action for women in Nigeria.

Key words: *Gender Inequality, Real Productivity, Bounds Test*

JEL Classifications: J16, C32

Authors Email: pdgolit@cbn.gov.ng; oadesanya@cbn.gov.ng

I. Introduction

Promotion of gender equality, being one of the key Millennium Development Goals (MDGs), has gained increased prominence in public policy discourse, particularly with respect to developing countries. This is against the backdrop of the perceived adverse effect of discrimination against women on real productivity in several developing countries. Zahid *et al.,* (2012) noted that women in Pakistan do not only have less access to education, health and employment opportunities but enjoy very limited ownership rights, thereby inhibiting their contributions to economic and development activities. Gender equality is, thus, not seen as an end in itself but as an essential catalyst for economic transformation. It is in realisation of this that governments and non-governmental organisations are intensifying efforts towards empowering women through the advancement of women's rights in addition to facilitating their access to resources and education.

Gender equality enhances women participation in the national workforce, thereby expanding labour supply with enormous potentials to enhance productivity in the affected countries. Moreover, women empowerment enables

*Golit P. D. and O. Adesanya are Senior Economists in the Research Department, Central Bank of Nigeria. The usual disclaimer applies.

progress by ensuring a balanced population and alleviating poverty through enhancement in income levels to supporting improvements in living standards and providing for the proximate future. Gender equality, on the other hand, enables women to have equal voice and better influence in family and national decisions towards enhancing the well-being of disadvantaged groups and enabling them to contribute more to economic development.

Gender disparities in Nigeria range from literacy to labour participation and wage/income gaps. These disparities are widespread in Nigeria cutting across levels of government and sectors of the economy. Despite the enormity of the implications of such disparities, empirical study on the impact of gender inequality on real productivity in Nigeria is still relatively scanty. Against this backdrop, this study investigates the impact of gender inequality in education on Nigeria's real productivity with a view to proffering appropriate policy recommendations to address the problem.

The study employed the bounds test and autoregressive distributed lag (ARDL) models to investigate the impact of gender inequality on real productivity in Nigeria using quarterly data spanning 1985:q1 to 2011:q4. The choice of the ARDL was in view of its flexibility in analysing the dynamic behaviours of non-stationary multivariate time series. Thus, real gross domestic product (rGDP) was regressed on a constructed index of gender inequality, and some control variables (investment rate, population growth rate and openness) with a view to determining the interactions between gender inequality and real productivity in Nigeria. In addition, the study sought to determine whether male or female school enrolments influenced the level of real output.

The paper was structured as follows: Section I provided background information on the study, while Section II reviewed theoretical framework and empirical literature. Section III provided the methodology, including data sources and techniques. The empirical results were analysed in Section IV, while the conclusion and policy suggestions formed Section V.

II. Theoretical Framework and Empirical Review

II.1 Theoretical Framework

There are three main channels identified in the literature through which gender inequality affects the level of output namely; the selection distortion factor, the environment effect and the demographic transition effect (Klasen, 1999).

Under the selection distortion factor, the argument is as follows: If both genders

have identical inherent abilities, then it presupposes that gender inequality in education occurs when less brilliant boys are able to acquire formal education. Hence, the proficiency of those who eventually receive education would be lower than when everyone (male and female) is given equal educational opportunity. This distortion in the selection of who should be educated would adversely impact on the productivity of the workforce; reduce profit and investment rates and leads to eventual decline in output. From the environment effect perspective, the diffusion of female education tends to be higher since it is anticipated that when a female is educated her offspring's may likely receive qualitative education, thus the gap between the educated males and females would be reduced overtime, thereby improving the intellectual environment. In the converse case, the gender gap would continue to widen and gender inequality in education would negatively affect national productivity. Several studies have been conducted to examine the causal link between female education and fertility. The demographic transition effect assumes that there is a negative correlation between years of schooling and the number of children born. It further proposes that educated women tend to get married late and space their pregnancies leading to substantial drop in fertility rates and dependency ratios. With the declining fertility rates, there would be increased saving, higher investment rates and enhanced productivity.

II.2 Empirical Review

Attempts had been made to examine the relationship between gender inequality and economic growth in both developed and developing countries with mixed results (Barro and Lee, 1994; Galor and Weil, 1996; Schultz, 1997; Dollar and Gatti, 1999; Knowles, Lorgelly and Owen, 2002; Klasen, 1999; 2002; Lagerlöf, 2003; Klasen and Lamanna, 2009 and Esteve-Volart, 2009). However, the consensus reached in most of the studies is the existence of a negative relationship between gender inequality and growth. In reality, these studies established that contracting the gender inequality gap spurs economic growth due to varied savings-consumption behaviours between the gender classes which arises from differences in access to social safety nets and the need to smoothen income (Seguino, 2006). Some studies have claimed that increased women participation in the labour force enhances national productivity, since women have a higher propensity to save than their male counterpart (Löfström, 2009).

Klasen (1999; 2002) employed cross-country/panel regressions and found that gender inequality in education and unemployment significantly influenced the level of economic productivity and that the responsiveness is sensitive to model

specifications and the extent of endogeneity bias. He further established that gender inequality in education directly affected the level of economic activity through its effect of reducing the quality of human resources and indirectly through its effect on investment and population growth. Moreover, the analysis revealed that per capita income would have grown by 0.5 to 0.9 per cent annually between 1960 and 1992 in South Asia and Sub-Saharan Africa supposing they had achieved gender equality in education; the regions would have grown rapidly as the East Asian economies. For Africa, this would imply an almost doubling of per capita income growth.

Dollar and Gatti (1999) assessed the linkages between gender inequality in education and growth on 127 countries from 1975-79 to 1990 using the ordinary least squares (OLS) and Two-Stage Least Square (2SLS) techniques. They found that gender inequality in education is inimical to economic growth. They also revealed that more female secondary education exerts higher growth rates, although the contrary effect holds for more male secondary education, implying that lower growth rates would be witnessed in economies with less investment in female education. They equally found a strong positive association between GDP per capita and gender equality. Furthermore, they established a convex relationship between income and female attainment, inferring an infinitesimal improvement in the transition of economies from extremely poor to lower-middle income, and further transition to more developed economies.

Knowles et al., (2002) examined the effects of educational gender gaps on development as well as the impact of female education on labour productivity in both developed and developing countries. They regressed both female and male education as independent explanatory variables on output per worker using cross-sectional data. The OLS, 2SLS and Generalised Method of Moments (GMM) techniques were employed using data spanning 1960 to 1990. The variables employed were similar to those utilised by Barro and Lee (1996) that included the average age of schooling of the population aged 15 and over (disaggregated by gender), life expectancy, income per worker, share of physical capital investment in national income, growth rate of labour force and a proxy for technical efficiency. The point estimates revealed that in most countries female education contributes more to labour productivity than male education.

Lagerlöf (2003) discussed the link between gender equality, economic growth and employment in the European Union (EU) member states by utilising an overlapping-generations framework in which males and females with identical

abilities may possibly turn out with different levels of human capital. He used three different indexes to capture gender equality which includes; the United Nations Gender-related Development Index (UN-GDI), the World Economic Forum Global Gender Gap Index (WEF-GGG) and the European Union Gender Equity Index (EU-GEI). Overall, the study found a strong positive association between GDP per capita and gender equality and thus, established that the sharing of power between the genders was a precondition for the execution of sustainable gender equality policies.

In a cross-sectional study by Klasen and Lamanna (2009), they focused on determining the magnitude of change in economic growth as a result of gender gaps in education and employment, especially in economies with significantly high gender gaps, such as the Middle East and North Africa (MENA), sub-Saharan Africa and South Asia during 1960–2000 by using panel regression. The regressors utilised in their study included real GDP per capita; average investment rates; population growth rates; life expectancy; number of years of schooling (total population, growth in male and female years of schooling, female–male ratio), labour force participation measured by female share of the total labour force as well as economic activity rates (total population, male and female economic activity rate, female–male ratio). Their findings revealed that gender inequality in education had significantly larger impact on growth than gender inequality in employment. This difference in growth arising from gender inequality in education accounted for a growth gap ranging between 0.2 and 1.4 percentage points in South Asia. Conversely, the impact of gender inequality in employment on growth was higher than that of education in the MENA region; this is attributable to the social, cultural, and ideological barriers (Klasen and Lamanna, 2009). Moreover, Esteve-Volart (2009) alluded to psychological, sociological and religious reasons for gender discrimination against women. It has been noted that these social-cultural barriers tend to limit the active participation of women in the workforce and their appeal to potential employers (Boserup, 1986). Generally, their findings support the negative impact of gender inequality in employment on economic growth.

In assessing the implication of gender discrimination on growth in India between 1961 and 1991, particularly entry to the labour market and decision-making positions, Esteve-Volart (2009) employed panel regressions and instrumental variables techniques to control for endogeneity. The empirical specification controlled for female-to-male managers, female-to-male workers, female/male literacy rates, population growth rate, ratio of urban to total population, ratio of

capital to labour, scheduled tribes and the percentage of scheduled population, total work force, election dummy, election turnout, political competition, state effects and year effects, all of which determined per capita GDP. From the empirical analysis, the study found significant negative influence of gender discrimination in employment and managerial positions on economic growth, which ensued in lower GDP per capita and misallocation of talent. The findings revealed that an anticipated 10.0 per cent increase in the female-to-male managers result in 2.0 per cent growth in GDP, whereas 10.0 per cent rise in the female-to-male workers would induce 8.0 per cent growth in GDP.

There are empirical evidences to confirm that gender inequality positively influenced economic growth, although these evidences were few. The positive hypothesis had been proven by Seguino (2000) and Mitra-Kahn and Mitra-Kahn (2008). Seguino (2000) empirically investigated gender inequality and economic growth using cross-country analysis for semi-industrialised export-oriented economies between 1975 and 1995 and established a positive connection between growth and gender wage inequality, thus inferring that gender inequality induced expansion in economic output. Hence, the lower the earnings of the female workforce in export-oriented economies, the higher the rate of economic growth, particularly growth induced by higher investments and surplus in external trade. The author concluded that discrimination against women in the initial phases of economic development was growth-enhancing. Mitra-Kahn and Mitra-Kahn (2008) further confirmed the inferences obtained by Seguino (2000).

III. Data and Methodology

III.1 Data

The paper uses quarterly data for the period 1985q1 to 2011q4. The choice of the period was motivated by the availability of the relevant data required for the work. The period was also considered adequate to capture both the short- and long-run dynamics in the model. The data were obtained from various editions of the Central Bank of Nigeria (CBN) Statistical Bulletin, CBN Annual Report and Statements of Account, the National Bureau of Statistics (NBS) database, the World Development Indicators and Global Development Finance of the World Bank. The variables included real productivity (GDP), Investment Rate (IVR), Degree of Openness (DOP), Female School Enrollment Index (FEw), Male School Enrollment Index (MEw) and Population Growth Rate (PGR).

An index of gender inequality (GINw) was constructed by averaging the female-to-male primary and secondary school enrolment ratios and attaching weights in

the ratio 40:60 for primary and secondary school enrolments, respectively in line with our expectation of higher productivity from more educated school leavers. To ensure the robustness of the results, two separate measures of gender inequality were adopted – the weighted average of female primary and secondary school enrolment and the weighted average of male primary and secondary school enrolment. The DOP is measured as the ratio of total trade to GDP while IVR is the rate of change in the level of investment. PGR is the rate of change in total population.

III.2 Methodology

The paper employs bounds test for cointegration and autoregressive distributed lag (ARDL) models to establish the short- and long-run relationships among the variables of interest. According to Pesaran and Shin (1998), the bounds testing approach enables us to draw robust inference regardless of whether the underlying variables are entirely *I*(0) or *I*(1) or a mix of *I*(0) and *I*(1). The time-series properties of the variables was investigated using the Augmented Dickey-Fuller (ADF) and the Phillips Perron (PP) tests of unit root.

After specifying the models, the order of integration of the variables was verified before testing for cointegration in alternate specifications using the bounds test. Then, the ARDL models was estimated with error correction mechanisms to correct for disequilibrium and to distinguish between the long- and short-run interactions of the variables.

III.3 Model Specification

The functional forms of the econometric models are expressed as follows:

Model 1: $$GDP_t = f(GINw_t, IVR_t, PGR_t\ DOP_t) \quad (3.1)$$
(-) (+) (+/-) (+)

Model 2: $$GDP_t = f(FEw_t, IVR_t, PGR_t\ DOP_t) \quad (3.2)$$
(+) (+) (+/-) (+)

Model 3: $$GDP_t = f(MEw_t, IVR_t, PGR_t\ DOP_t) \quad (3.3)$$
(+) (+) (+/-) (+)

Model 3: $$GDP_t = f(FEw_t, MEw_t, IVR_t, PGR_t\ DOP_t) \quad (3.4)$$
(+) (+) (+) (+/-) (+)

Where: the variables are as earlier defined; the subscript *t* denotes time period and

the signs in parenthesis signify the *apriori* expectations.

The ARDL representations of (3.1 - 3.4) gives rise to equations 3.5 - 3.8 as expressed below:

Model 1
$$DLGDP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i}\, DLGDP_{t-i} + \sum_{i=0}^{n} \alpha_{2i}\, DGINw_{t-i} + \sum_{i=0}^{n} \alpha_{3i}\, DIVR_{t-i} + \sum_{i=0}^{n} a_{4i}\, DPGR_{t-i} + \sum_{i=0}^{n} \alpha_{5i}\, DDOP_{t-i} + \beta_1 LGDP_{t-i} + \beta_2\, GIN_{t-i} + \beta_3\, IVR_{t-i} + \beta_4\, PGR_{t-i} + \beta_5\, DOP_{t-i} + e \quad (3.5)$$

Model 2
$$DLGDP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i}\, DLGDP_{t-i} + \sum_{i=0}^{n} \alpha_{2i}\, DFEw_{t-i} + \sum_{i=0}^{n} \alpha_{3i}\, DIVR_{t-i} + \sum_{i=0}^{n} a_{4i}\, DPGR_{t-i} + \sum_{i=0}^{n} \alpha_{5i}\, DDOP_{t-i} + \beta_1 LGDP_{t-i} + \beta_2\, FEw_{t-i} + \beta_3\, IVR_{t-i} + \beta_4\, PGR_{t-i} + \beta_5\, DOP_{t-1} + e_t \quad (3.6)$$

Model 3
$$DLGDP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i}\, DLGDP_{t-i} + \sum_{i=0}^{n} \alpha_{2i}\, DMEw_{t-i} + \sum_{i=0}^{n} \alpha_{3i}\, DIVR_{t-i} + \sum_{i=0}^{n} a_{4i}\, DPGR_{t-i} + \sum_{i=0}^{n} \alpha_{5i}\, DDOP_{t-i} + \beta_1 LGDP_{t-i} + \beta_2\, MEw_{t-i} + \beta_3\, IVR_{t-i} + \beta_4\, PGR_{t-i} + \beta_5\, DOP_{t-1} + e_t \quad (3.7)$$

Model 4
$$DLGDP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i}\, DLGDP_{t-i} + \sum_{i=0}^{n} \alpha_{2i}\, DFEw_{t-i} + \sum_{i=0}^{n} \alpha_{3i}\, DMEw_{t-i} + \sum_{i=0}^{n} \alpha_{4i}\, DIVR_{t-i} + \sum_{i=0}^{n} a_{5i}\, DPGR_{t-i} + \sum_{i=0}^{n} \alpha_{6i}\, DDOP_{t-i} + \beta_1 LGDP_{t-i} + \beta_2 Few_{t-i} + \beta_3\, MEw_{t-i} + \beta_4\, IVR_{t-i} + \beta_5\, PGR_{t-i} + \beta_6\, DOP_{t-1} + e_t \quad (3.8)$$

Where: in the alternate specifications, D is the first difference operator, the prefix *L* shows log-transformation, α_0 is the drift component, and e_t the error term. The β_is represents the long-run coefficients while α_1 to α_6 represent the short-run coefficients

IV. Empirical Analysis and Results

IV.1 Unit Root Test

The unit root tests using the ADF and PP procedures are reported in Table 1.1. The ADF results showed that the log of real GDP, gender inequality index, female school enrolment index, male school enrolment index and population growth rate are non-stationary at levels, *I*(1) while the investment rate and degree of openness are stationary at levels, *I*(0).

However, the PP results showed that the log of real GDP, gender inequality index and female school enrolment index are non-stationary at levels, *I*(1), while the male school enrolment index, investment rate, population growth rate and degree of openness are stationary at levels, *I*(0). Overall, the non-stationary series were all stationary after taking their first differences.

Table 1.1: Results of Unit Root Test

Variables	Augmented Dickey-Fuller		Order of Integration	Phillips-Perron		Order of Integration
	Test Statistic	Critical Value		Test Statistic	Critical Value	
LGDP	-3.140	-2.889**	*I (1)*	-7.908	-3.493***	*I (1)*
GINw	-9.398	-3.495***	*I (1)*	-9.398	-3.495***	*I (1)*
FEw	-3.812	-3.495***	*I (1)*	-6.558	-3.493***	*I (1)*
MEw	-3.922	-3.495***	*I (1)*	-2.856	-2.888**	*I (0)*
IVR	-10.543	-3.492***	*I (0)*	-10.629	-3.492***	*I (0)*
PGR	-3.587	-3.499**	*I (1)*	-8.892	-3.492***	*I (0)*
DOP	-3.012	-2.888**	*I (0)*	-2.983	-2.888**	*I (0)*

Note: The notations: ***, ** and * denotes level of significance at 1.0, 5.0 and 10.0 per cent, respectively

IV.2 Bounds Test Analysis

The bounds testing approach for cointegration is based on Pesaran *et al.* (2001). In the bounds test, the calculated F-statistic is compared to the lower and upper bounds asymptotical critical values. There is cointegration when the calculated F-statistics exceeds the upper bound critical value and when it is below the lower bound critical value there is absence of cointegration among the variables. The result becomes inconclusive when the calculated F-statistics falls between the two set of critical values. Assuming an unrestricted intercept, the test for cointegration using the bounds testing approach is performed, under the joint null of $H_0: \beta_1 = \cdots = \beta_q = 0$. The null hypothesis states that there is no cointegration among the variables.

The tests for the existence of a long-run relationship among the variables of interest in the four ARDL models specified are reported in Table 1.2. In model 1, the null hypothesis was rejected since the calculated F-Statistic (5.425) exceeds the upper bound critical values (4.781) at 1.0 per cent level of significance. It was therefore, concluded that the linear combination of real GDP, gender inequality, investment rate, population growth rate and degree of openness are cointegrated in the long-run. Similarly, we rejected the null hypothesis in models 2 and 4 were rejected and concluded that the variables are cointegrated in the long-run. However, it was impossible to establish cointegration among the variables in model 3, as the calculated F-statistics fell within the inconclusive region, at all relevant levels of significance, respectively.

Table 1.2: Bounds Testing for Cointegration

Equation	Lag order	Calculated F- statistics
F (*LGDP/GINw, IVR, PGR, DOP)*	2	5.425***
F (*LGDP/FEw, IVR, PGR, DOP)*	2	3.498*
F (*LGDP/MEw, IVR, PGR, DOP)*	2	2.968
F (*LGDP/FEw, MEw, IVR, PGR, DOP)*	2	5.577***

Note: The bounds critical values were obtained from Pesaran and Pesaran (1997) and the critical values of the F-statistics for the 5 variables (LGDP, GINw, IVR, PGR and DOP) with unrestricted intercept and no trend (Case III) are 2.262 - 3.367 at a 10.0 per cent significance level, 2.649 - 3.805 at a 5.0 per cent significance level and 3.516 - 4.781 at 1.0 per cent significance level, respectively. The critical values of the F-statistics for the 6 variables (LGDP, FEw, MEw, IVR, PGR and DOP) with intercept and no trend are 2.141 - 3.250 at a 10.0 per cent significance level, 2.476 - 3.646 at a 5.0 per cent significance level and 3.267 - 4.540 at 1.0 per cent significance level, respectively. The notations ***, ** and * denotes 1.0, 5.0 and 10.0 per cent significance level, respectively.

IV.3 ARDL Model Analysis

From the results presented in table 1.3, the estimated coefficients of the lagged error correction terms, ECM1(-1) to ECM4(-1), were found to be statistically significant and correctly signed. Thus, the shocks generated by the explanatory variables can be corrected to restore equilibrium and the adjustment process demonstrates the dynamics existing between real productivity and the included regressors.

The coefficients of the lagged error correction terms (-0.012, -0.013, -0.012 and -0.014) corresponding to models 1 to 4 further validate the claim about the existence of long-run equilibrium relationships among the variables. The

coefficients, however, are quite small suggesting a slow adjustment process towards the restoration of equilibrium as approximately 1.2, 1.3, 1.2 and 1.4 per cent, respectively of the long-run disequilibrium would be corrected each quarter from the error shocks generated. For instance, in model 1, 1.2 per cent of the disequilibrium of the previous quarter's shock adjusts back to equilibrium in the current quarter.

From Model 1, we can infer that there is a significant negative relationship between the contemporaneous real productivity and gender inequality, thus fulfilling the *apriori* expectation. This implies that gender inequality in education hinders real productivity in Nigeria. The output elasticity of -0.110 signifies that a unit expansion in gender inequality depresses real output by 0.1 per cent per quarter. Therefore, gender disparity in school enrolment at both the primary and secondary levels plays an important role in the determination of real productivity in Nigeria.

Further analysis reveals a contemporaneous negative impact of female school enrolment on the level of real output (model 2) with an output elasticity of -0.086 which does not conform to *apriori* expectation. This suggests that female school enrolment does not stimulate real productivity in Nigeria, although this outcome is not surprising given that many educated females are often restricted from participating in economic activities owing to some socio-cultural barriers.

On the contrary, model 3 revealed that male school enrolment enhances the level of real productivity in line with the *apriori* expectation. The result indicates that a unit increase in male school enrolment would stimulate real productivity by 0.06 per cent per quarter.

Model 4 further confirms the results of models 2 and 3 that male school enrolment enhances productivity while female school enrolment retards it. The results agree with the conclusions by Boopen (2006) and Baliamoune-Lutz and McGillivray (2007) that reducing gender inequality yields productivity gains, but differs from their findings that female education has greater influence on the level of output.

Non-gender factors like population growth rate and own lag of trade openness were also found to negatively affect the level of Nigeria's real productivity. However, the own lag of real productivity, investment rate and the openness index all showed positive relationships with the dependent variable in line with the *apriori* expectations.

Table 1.3: ARDL Model

Regressors	(A) Model 1	(B) Model 2	(C) Model 3	(D) Model 4
DLGDP(-1)	0.772***	0.728***	0.726***	0.800***
	(0 .069)	(0.075)	(0.075)	(0.067)
DIVR	0.0003	0.0003	0.0004***	0.0003***
	0.00006	0.00007	0.00007	(0.00006)
DPGR	-0.013	0.016*	-0.015*	-0.013
	(0.008)	(0.009)	(0.009)	(0.008)
DPGR(-1)	0.018**	0.022**	0.020**	0.019**
	(0.008)	(0.009)	(0.009)	(0.008)
DDOP	0.001	0.001	0.002	(0.0006)
	(0.003)	(0.003)	(0.002)	(0.003)
DMEw			0.064**	0.156***
			(0.029)	(0.036)
DMEw(-1)			-0.064**	-0.151***
			(0.028)	(0.035)
DDOP(-1)	-0.007**	0.007**		-0.007**
	(0.003)	(0.003)		(0.003)
DFEw		-0.086**		-0.199***
		(0.035)		(0.043)
DFEw(-1)		0.077**		0.187***
		(0 .035)		(0.045)
DGINw	-0.110***			
	(0.026)			
DGINw(-1)	0.096***			
	(0.025)			
ECM1(-1)	-0.012*			
	(0.005)			
ECM2(-1)		-0.013**		
		(0.006)		
ECM3(-1)			-0.012*	
			(0.006)	
ECM4(-1)				-0.014**
				(0.006)
Adjusted R-Squared	0.729	0.663	0.665	0.756
AIC	450.11	438.67	438.12	454.20
SBC	431.60	420.16	422.26	431.72
F-Stat.	32.350 [0.000]	23.98 [0.000]	25.71 [0.000]	30.47 [0.000]
DW-statistic	2.259	2.252	2.220	2.296

Note: numbers in parenthesis are standard errors while the notations ***, **, *denotes levels of significance at 1.0, 5.0 and 10.0 per cent, respectively.

V. Conclusion and Policy Recommendations

The paper explored the impact of gender inequality in education on real productivity in Nigeria from 1985q1 to 2011q4, using the bounds testing approach

to cointegration and the ARDL approach. It also investigated the independent impacts of female- and male- school enrolment ratios on real productivity. It further highlighted the relationships between real output and gender inequality in conjunction with some control variables that capture the dynamics in the level of real output during the period.

The empirical results provided vital insights into the real income determination process in Nigeria. The bounds tests rejected the null hypothesis of non-existence of long-run equilibrium relationships among the variables, implying that gender inequality and the included regressors had positive effects on real productivity in Nigeria.

It is instructive to note from the results that gender disparities in education have serious implications for the level of productivity in Nigeria and that increasing primary and secondary school enrolment for male would help in stimulating economic activities. However, female school enrolment was not found to stimulate real productivity in Nigeria owing to some socio-cultural barriers affecting the active participation of educated females in economic activities.

There is, therefore, need for equal opportunities for female and male participation in economic activities. It is also appropriate to further strengthen policy actions geared towards the full implementation of the affirmative action for women to minimise the impact of gender disparity on the level of productivity in Nigeria.

References

Baliamoune-Lutz, M. and M. McGillivray (2007). "Gender Inequality and Growth in Sub-Saharan Africa and Arab Countries", *International Centre for Economic Research Working Papers*, Number 25, pp. 1-27.

Barro, R. J. and J. W. Lee (1996). "International measures of schooling years and schooling quality", *American Economic Review,* 86, pp. 218 -223.

Barro, R.J and J. W. Lee (1994). "Sources of Economic Growth", Carnegie-Rochester Conference Series on Public Policy, 40, pp. 1–46.

Boopen, S. (2006). "Are there Gender-Separate Education Effects on Growth? A Dynamic Time Series Analysis", *Mimeo*, School of Public Sector Policy and Management, University of Technology, Mauritius.

Boserup, E. (1986). "Woman's Role in Economic Development", Gower, Brookfield, VT.

Dollar, D. and R. Gatti (1999). "Gender Inequality, Income and Growth: Are Good Times Good for Women?", *Policy Research Report on Gender and Development World Bank Working Paper*, No. 1, Washington, D.C.

Esteve-Volart, B. (2009). "Gender Discrimination and Growth: Theory and Evidence from India", *Mimeo*, York University, Toronto.

Galor, O. and D. N. Weil (1996). "The Gender Gap, Fertility and Growth", *American Economic Review* 86(1), pp. 374–387.

Klasen, S. (1999). "Does Gender Inequality Reduce Growth and Development? Evidence from Cross-Country Regressions", *Policy Research Report on Gender and Development,* World Bank Working Paper Series, No. 7.

Klasen, S. (2002). "Low Schooling for Girls, Slower Growth for All? Cross-Country Evidence on the Effect of Gender Inequality in Education on Economic Development", *World Bank Economic Review* 16, pp. 345–373.

Klasen, S. and F. Lamanna (2009). "The impact of gender inequality in education and employment on economic growth: New evidence for a panel of countries". *Feminist Economics*, Vol.15 (3), pp. 91–132.

Knowles, S., P. Lorgelly and D. Owen (2002). "Are educational gender gaps a break on economic development?", *Oxford Economic Papers* 54, pp. 118–149.

Lagerlöf, N. P. (2003). "Gender equality and long-run growth", *Journal of Economic Growth* 8, pp. 403–426.

Löfström, A. (2009). "Gender equality, economic growth and employment", Swedish Ministry of Integration and Gender

Equality, available at
http://www.se2009.eu/polopoly_fs/1.21862!menu/standard/file/Presentation%20by%20%C3%85sa%20L%C3%B6fstr%C3%B6m.pdf

Mitra-Kahn, B. H. and T. Mitra-Kahn (2008). "Gender wage gaps and growth: What goes up must come down", Manuscript submitted for publication.

Pesaran, M. H. and Pesaran B. (1997). "*Microfit 4.0* (Window Version)", New York: Oxford University Press.

Pesaran, H., and Y. Shin (1998). "An Autoregressive Distributed Lag Modeling Approach to Cointegration Analysis", forthcoming in *Centennial Volume of Ragner Frisch*, ed. by S. Strom, A. Holly, and P. Diamon (Cambridge: Cambridge University Press).

Pesaran M. H., Y. Shin, and R. J. Smith (2001). "Bounds Testing Approaches to the Analysis of Level Relationships", *Journal of Applied Econometrics*, Vol.16, No.3, pp 289-326.

Schultz, P. T. (1997). "Demand for Children in Low-Income Countries", In: Rosenzweig M., Stark O., editors. *Handbook of population and family economics,* Elsevier; Amsterdam.

Seguino, S. (2006). "Gender and Economic Growth in Sub-Saharan Africa", available at http://siteresources.worldbank.org/INTGENDER/Resources/SeguinoNairobiGenderGrowthMay29.pdf

Seguino, S. (2000). "Gender Inequality and Economic Growth: A Cross-Country Analysis", *World Development* 28, pp. 1211-1230.

Seguino, S. (2000). "Gender Inequality and Economic Growth: A Cross-Country Analysis". *World Development* 28(7), pp. 1211–1230.

Seguino, S. and M. S. Floro (2003). "Does Gender have any Effect on Aggregate Saving? An Empirical Analysis", *International Review of Applied Economics*. 17(2), pp. 147–166.

Zahid P., I. C. Muhammad, A. J. Sajjad and R. C. Amatul (2012). "Gender Inequality and Economic Growth: A Time Series Analysis for Pakistan", *Munich Personal RePEc Archive (MPRA)* Paper No. 37176, pp. 1-14.