

UNEMPLOYMENT RATE, GENDER INEQUALITY AND ECONOMIC GROWTH IN NIGERIA “A SHORT-RUN IMPACT ANALYSIS”

Dennis Brown Ewubare¹ and Anuli Regina Ogbuagu²

¹Department of Agriculture and Applied Economics/ Ext, Rivers State University of Science and Technology, Port Harcourt, Nigeria

²Department of Economics and Development Studies, Federal University, Ndufu -Alike Ikwo, Ebonyi State

ABSTRACT: *This paper examines the short-run impact of gender inequality (proxy by primary and secondary school enrollment) and economic growth (real gross domestic product) on unemployment rate in Nigeria, and also the study determines how much of the forecast error variance of unemployment can be explained by exogenous shocks from variables (gender inequality, economic growth, and population growth rate). Thus, the study using Engel Granger Error Correction Model and Dynamic Stochastic Variance Decomposition Model on a time series data collected from Central Bank of Nigeria Statistical Bulletin. The error correction results in both model 1 and model 2 are robust and consistent with their signs; the impact of gender inequality is positive in both short run models, but significant only in model 1 before the control variables were introduced. Again, the variance decomposition result indicates that gender Inequality emits the highest impulse on the rate of unemployment at 34.735% on average of the ten periods. While economic growth has a negative impact on the rate of unemployment for the two models and exerted only 8.438% impulse on average. The variance decomposition results also showed that unemployment rate transmitted on average of 78.453% impulse on itself for the 10 periods under review. Exchange rate, inflation rate, and gross capital formation emitted 28.68%, 10.78%, and 6.81% respectively on average on unemployment rate. Finally, population growth rate transmitted 5.59% impulse on unemployment. There is a long run relationship between the variables and the speed of adjustment towards equilibrium is 52%. Thus, we conclude that gender inequality is a strong factor of unemployment and policy makers and government should embark on developing laws that will reduce/eradicate gender disparity in Nigeria.*

KEYWORDS: Unemployment, Gender Inequality, Economic Growth, Error Correction Model, Variance Decomposition.

INTRODUCTION

Unemployment is one of the developmental problems that face every developing country in the 21 century and globally. A cursory view of the unemployment problem in Nigeria which has been high and rising in the face of declining economic growth, increasing population rate that is most times divided along gender lines is a case of great economic concern. In Nigeria, the labour market is characterized by high rate of unemployment, low wages and poor working condition. The incident of unemployment rate in Nigeria is alarming, the population of unemployed Nigerian increased by 518 000 to over 1.45million from 2015 to 2016 (National Bureau of Statistic 2016) and among the causes are epileptic electric power supply, poor quality of education, lack of skills, negligence of Agriculture as a source of income and corruption

among others. These situations have a ripple effect on the aggregate economy; it has caused an increase in crime rate, threat to peace and stability, reduction in investment and migration, and most importantly decline in economic growth and its determinants.

The relationship between unemployment and economic growth cannot be over emphasized and when x-rayed it involves a direct relationship with the factors of growth, the determinants of economic growth have been widely debated in developed and developing countries and the conclusion have been dissenting among economic theories and policy makers. The most significant and conventional theory developed by Harrold - Domar stresses that economic growth depends on the level of national savings and the productivity of capital investment (known as the capital-output ratio). To avoid the limitation of this model, an exogenous model developed by Solow – Swan emerged and incorporated new term productivity (technical progress). The Solow – Swan affirmed that growth is determined by changes in the capital investment, labour force growth and depreciation in the short run while in the long run, growth is achieved through technical progress. Another group of theorist, Arrow (1962), Uzawa (1965), Romer (1986), Lucas (1988) and Rebelo (1991) argued that the factors of growth are endogenously determined and investment in human capital, innovations, and knowledge are significant and relevant for growth to take place, while emphasizing on the externalities and spill-over effects of a knowledge based economy and macro-policies that encourages subsidies for research and development in the education of the labour force. Here education becomes the key to empowerment of the labour force on skill and knowledge to reduce unemployment rate.

Again, the classical theorist maintain that the economy is always capable of achieving the natural level of real GDP or output when the economy's resources are fully utilized, there exists a gap and flexibility of wage rate that keeps the labour market. Keynesian theory, stress that change in aggregate demand whether anticipated or unanticipated have their greatest short-run effect on real output and employment, not on prices. While Okun's law investigates the statistical relationship between unemployment rate and economic growth rate of its economy with the intentions of revealing how much of a country's GDP may be lost when the unemployment rate is above natural rate and established that there is a negative relationship between unemployment and output (conditional on the labour force). In the same vein, many research have been conducted to ascertain the correlation between economic growth and unemployment: (Moosa 1996, Ahmed and Abdelaziz 2002, Geldenhuys 2007) found positive correlation between unemployment and growth, while Iran et al (2010) and Tirelli (2001) found no relationship between the variables. Li (2001) indicate that the link between growth and unemployment depends on the labour market institution and Brecher et al (2002) also affirm that labour market forces may reduce unemployment rate.

The puzzle here is can gender disparity be a factor of unemployment. Gender equality is a key factor in contributing to the economic growth of a nation especially in developing nations where women contributions in informal sector is unbeatable, while gender inequality holds back growth of individuals, development of countries, to the disadvantage of men and women. The discrimination against women remains a common occurrence today and serves to hinder economic prosperity. According to report by the National Bureau of Statistic 2015, women constitute roughly half of Nigerian's population; the percentage population of women against men is 49.4% (female) to 50.6% (male). And half of the population of work force in Nigeria consists of female workers. However, the type of work as well as the condition under which women work and access opportunities for improvements differs from men. Women are often disadvantaged in access to employment opportunities, access to finance and conditions of work

based on their family functionalities. Also, women are disadvantage in education, for example; the literacy rate of male population is 69.17% while that of female is 49.68%. And it is recorded that the illiterate rate of male is 17,549.004 against a high rate of female illiterate 27,677.301.

Besides, despite significant progress in female labour force participation over the past decades, there exist pervasive and persistent gender differences across different sectors of the economy; the Labour Force Participation Rate (LFPR) of age 15 – 64 years for women was 65.1% against 71.4% for men in 2015. There are obvious labour segregation, inequality due to under investment in human capital (schooling and training), differential income roles, and comparative biological advantages in entry level, entry barriers, preferences and prejudices in Nigeria labour sector. Gender equality through empowerment of women is the primary factors that promote economic growth and there is a decline in growth, when women are not fully participating in labour force in Nigeria only half of the able population is being utilize and thus economic resources are not fully utilized and there is a decline in productivity and this result to unemployment.

Therefore, this paper seeks to answer obvious questions; (a) is there short run relationship between unemployment rate, gender inequality and economic growth in Nigeria, (b) What is the response of unemployment to unit external shocks to gender inequality, economic growth and gross fixed capital formation?

The prime objectives of this study are; (a) to ascertain the short run impact of gender inequality and economic growth on unemployment rate in Nigeria from 1980 to 2014, (b) to check the response of unemployment to external shocks from gender inequality, economic growth and gross fixed capital formation.

LITERATURE REVIEW

Concept of Unemployment

International Labour Organization (ILO) defined unemployment as the number of the economically active population who are without work but available and seeking work, including people who have lost their jobs and those who have voluntarily left work. Unemployment is defined by the Bureau of Labour Statistics (BLS) as people who do not have a Job, or people who have actively looked-for work in the past four weeks, and are currently available for work. Unemployment is a phenomenon that transpires when a person who is actively searching for employment is unable to find work. It is calculated by dividing the number of people who are unemployed by the total work force and represented as a percentage. It is often used as a measure of the health of the economy. The ILO categorized the unemployment as the number of persons who are either out of work, want a job, and are actively searching for work in the last

four weeks and are available to start work in the next two weeks or are out of work, have found a job, and are waiting to start it in the next two weeks.

There are three classes of unemployment which include: cyclical unemployment, structural and frictional unemployment. Cyclical unemployment is the type of unemployment that occurs due to business cycle downturn. The main cause of the cyclical unemployment is a fall in aggregate demand or decline on the total spending in an economy (Egunjobi 2012). Cyclical

unemployment is a factor of overall unemployment that relates to the cyclical trends in growth and production and it has direct relationships with business cycle fluctuation. It always presents in economic recession or period of very low productivity, when there is insufficient aggregate demand.

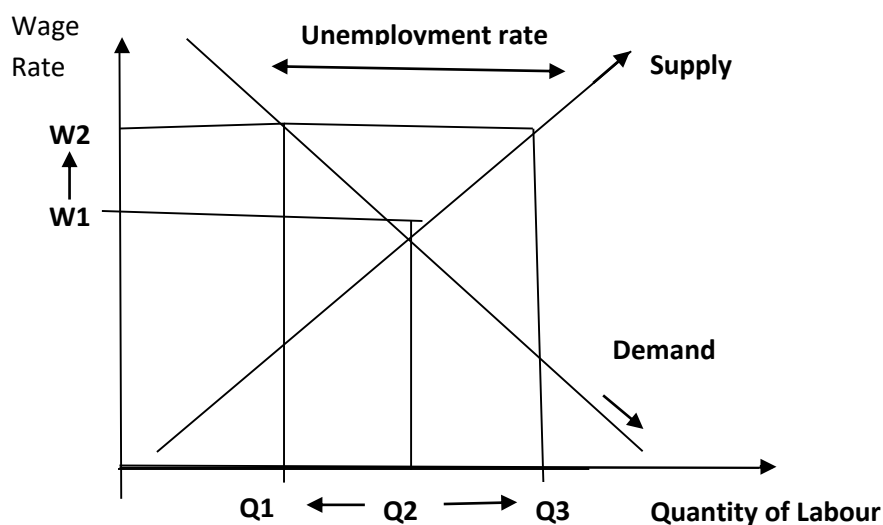
Structural Unemployment is usually referred to as long-term unemployment, which arises due to changes in the structure of the economy and technology advancement. It is due to insufficiencies in the labour market, it can also occur due to mismatch in skill or geographical location. For example, structural unemployment could be due to occupational immobility, geographical and technological changes. While Frictional Unemployment results from lack of information and changes in the supply of labour when wage rates are flexible. This type includes the unemployment of persons who temporarily lose jobs or decide to change job as well as new entrants into labour market. There is always likely to be frictional unemployment in an economy as people take time to find a job that is suited to their skills. Other concepts of unemployment include seasonal unemployment, this type occurs in seasonal trading or weather/climates changes. Also, we have disguised /hidden unemployment and voluntary unemployment.

Theories of Unemployment

Classical Theory of unemployment

Theoretically there are fundamental ideas by the classical and the Keynesian on what causes unemployment in an economic system. In the classical view, unemployment occurs when real wage is kept above the market clearing wage rate, leading to a surplus of labour supplied. Here unemployment is also known as real wage unemployment. It is because of the real wage being too high in an economy; firms cannot profitably engage labour as a result of increase in the wage rate.

Figure 2.1; Shows the Classical model of unemployment



Source: Author's design 2017

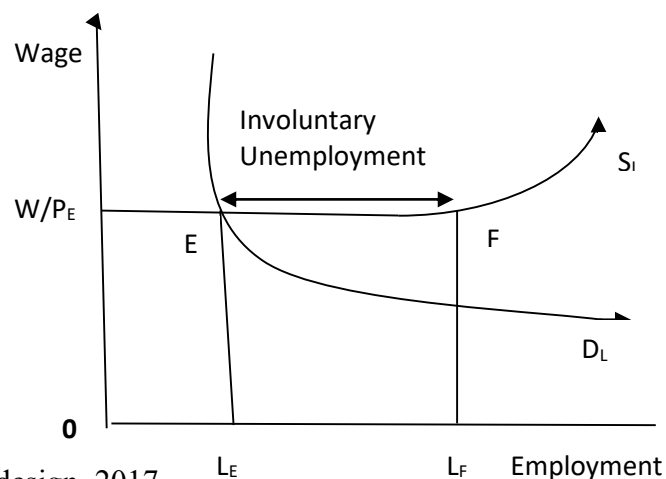
In an economic system labour is supplied by household and demanded by firms. In the above diagram, supply curve and the demand curve indicates the quantity supplied and demanded at a revealing wage rate. In the diagram, the point of equilibrium is indicated where demand curve intersect supply curve at the wage rate W_1 . At the equilibrium wage rate W_1 , the firms are willing to employ the entire labourer available in the labour market Q_2 . But as the wage rate moves up to w_2 , there is a decline in the quantity of the labourer from Q_2 to Q_1 and supply of labours increases from Q_2 to Q_3 . Therefore, the quantity supply of labourer increases more than the quantity demanded by the firms and this results in unemployment. At the point W_2 , the real wage is higher than the market equilibrium wage rate (W_1).

The classicalist believe that unemployment will occur when rigidities are present in the wage structure and interferences occur to hinder the free working of the market system, may be as a result of the trade union activities or minimum wage legislation (Egunjobi 2012). Jhigan (2004) argues that there are many more labourers seeking unemployment at the going wage than there are jobs available, as such the involuntary unemployment is prevalent. However, there are short coming on classical model especially in the developing countries where wages are not flexible downward because they are largely determined by institutional forces including trade union pressures (Egunjobi 2012).

Keynesian Theory of unemployment

Keynes emphasizes that the equilibrium is determined by aggregate demand and it is cyclical in nature. During recession or economic downturn, unemployment arises out of imperfections of the free market economy. Now demand falls short of the supply and there is fall in production and workers are laid off their jobs. The new Keynesian school of thought believes employment arises involuntarily and unemployment arises due to economic recession. During this period, the firm lay off their worker due to fall in aggregate demand. But classical view maintained that unemployment is voluntary, and could be cleared by natural market forces, while Keynes believed that government interference is beneficial to an economy. Keynes establishes the theory of involuntary unemployment by rejecting classical assumption of wage price flexibility. He assumed that money wage is rigid or inflexible in the downward direction. There are two reasons for wage inflexibility; money illusion and institutional reasons. He argued that labour supply function focused on money wage rather than real wage.

Figure 2.2; Keynesian Involuntary Unemployment



Source: Arthur's design, 2017

The Keynesian labour supply assumed to be a function of money wage rate because of the rigid wage rate, the labour supply is perfectly elastic. Let us assume that there is a fixed wage, W , the supply curve is horizontal in the area above the wage rate (W), and wages are free to rise. The labour supply must be positive sloping, however, equilibrium in the labour market is established when labour demand curve intersects the labour supply curve. Point E represent underemployment equilibrium and a corresponding required real wage (W/P_E), at this wage rate L_f are waiting to work while L_E people are employed.

Economic Effect of unemployment

There are so many factors that can cause unemployment in an economic system, and this is linked to the types and forms of unemployment. And being out of job is a situation that poses an economic problem not only upon the individual but also to the society and country at large.

Unemployment poses financial cost on the national budgets; that is in advanced countries where unemployment benefits are being paid by the government. The nation suffers because the greater the number of the unemployed the greater the national budget will be and this add to the national cost.

It leads to the reduction in the spending power of the unemployed, as well as decrease in the spending power of the employed, due to increased taxes and insecurity about their work.

It can lead to recession; unemployment can be harmful to health, mental state, standard of living. It causes crime, insecurity and violence. And a prolonged unemployment status can lead to an erosion of skills, skepticism and pessimism about the value of education and training among others.

Gender Inequality: Concepts and Theories

Gender inequality is referred to unequal treatment or perception of individuals based on their gender; it is more than a guess for equal pay, for equal work. Following the report of Gender Inequality Index (GII) (2015), Gender Inequality remains a major restriction to Human Development all over the world. Many theoretical and empirical literatures have covered many areas on gender issues, indicating how sensitive the issues of gender differences are in relationship with labour market.

Theories of Gender Inequality

There are many answer to the question why gender inequality exists, example, gender inequality is viewed from many perspectives, the functionalists view, the conflict perspective and the feminists theory of gender inequality.

Functionalist theory was developed by Talcott Parsons in the 1940s and 1950s. The theory argued that gender inequality is an efficient way to create division of labour to maximize resources and achieve efficiency. The theory suggests that gender inequality exists in different part of the economy and is a social system in which a particular segment of the population is clearly responsible for certain act of labour and another is clearly responsible for other acts. The theory applied division of labour to view predefined gender roles as complementary. Women are responsible for cares of home while men provide for the family.

On the other hand, the conflict theory perspective by Frederick Engels, compared the family structure to the relationship between the bourgeoisie and the proletariat. The theory sees society

as a platform where social groups struggle for dominance. He argues that gender is best understood as men attempt to maintain power and privileges to the detriment of women. The men are seen as the bourgeoisie while women are seen as the subordinate group. Therefore, social problems exist when dominant group exploit or oppress the subordinate.

Then the Feminist theory perceive gender inequality from many perspectives; namely liberal feminism, socialist feminism, radical, and multi-radical feminism. The feminist theory is an ideology that opposed gender disparity and male dominance by opposing the functionalist and the conflicts view of gender inequality. The belief that simultaneous actions bring justice, fairness, and equity to all people regardless of gender and helps in the development of a society in which women and men are equal in all areas of life. Feminists attempts to understand the nature of women in society in order to bring about social changes that will liberate women from being oppressed and bring parity between women and men.

Thus, Gender inequality is defined by the Feminist theory as disparity that exist among individuals based exclusively on their gender rather than objective differences in skills, abilities, or other characteristics. By African culture and economic disposition, women have been referred to as “minor sex” and this continue to generate conflicts at home and work place. This maxim that have been accorded to female child, have been debated over decades. And based on this cultural heritage: the inequality between male and female exist in political sector, work life and economic affairs, sex and discrimination in employment, occupational gender segregation by gender, wage pay gap/ income disparity, social life and education. Understanding the causes and effect of gender inequality is a subject of intense study. Many empirical literatures have affirmed that, the education of the female child is and still remain the only sure way to bridge the disparity that exists in the work place and homes. Mat Sui (2013) affirmed that investment in female education can yield growth premiums in GDP trends and that narrowing gender gap in employment through education can boost per capita income. While IMF (2016) posits that better opportunities provided through higher levels of school enrollment for girls can contribute to broader economic development (IMF 2016).

Women and Labour Market Segmentation

Labour market is segmented if it consists of various sub-groups with little or no crossover capability. There are two sectors of labour market segmentation; primary and secondary sector. The primary sector consists of higher- grade, higher status, better paid jobs with the best terms and conditions. Which means it requires or need long-on the job training in firm-specific skills, and it guarantee job security and promotional prospects and high reward. While the secondary market is mostly low skilled workers that require relatively little training, there is no barrier to job mobility because the wages are low and the terms of conditions of the job are poor. There is no job security and no promotional prospect. Both primary and secondary labour market possesses different wages with different employment characteristic. Unfortunately, the secondary sector is dominated by female workers, due to limitations for them to access the primary sector.

In recent time, it is often difficult to think of women as oppressed minority. They are seen in all the social stratification (primary and secondary sector), women are no longer regulated to positions of wives, mothers, secretary but good number have gone through education and are doctors, engineers, lawyers, nuclear physicists as well as truck drivers. Despite this development, women are still underrepresented when compared to their majority status in the population. They receive unequal treatment when compared to men. A report published by

Center for American Women in Politics (2013) shows that out of 535 members of 113th congress only 98 are women. In 2012, median income for year – round male workers was \$50,955 as against \$39,977 for female workers (Us Census Bureau 2012).

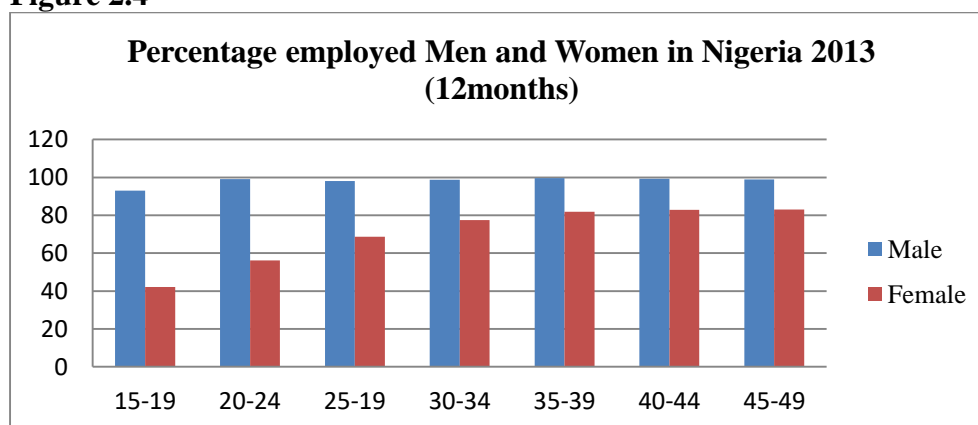
In Nigeria one of the major Millennium Development goal is to promote gender equality and empower women and reduce the pay wage gap that exist in the labour market. This can be done if only women are empowered through education. Ntuli (2007) affirms an expansion in the labour force participation of women in South Africa from 38 percent in 1995 to 46 percent in 2004. Beside the analyses of women's participation rates in labour force by race show that the rates for Africans are still lower than those of Whites. For instance, in 1995 African women had a participation rate of 34 percent and it rose to 43 percent in 2004 while the corresponding rates for White women were 52 percent and 59 percent respectively (Center for American Women in Politics, 2013).

Anugwom (2009) examined the implication of the growing educational opportunities for women in Nigeria. He argues that the number of women who have acquired tertiary education is inconsistent to the number involved in the labour market. This causes low capacity utilization and a negative return to investment in human resources. Lee and James (2007) show that shareholder responses to the appointment of female CEOs were more negative than for their male counterparts. Additionally, while investors demand greater diversity, they simultaneously punish it by reducing holdings in firms appointing female directors. Parrotta et al (2011) using a matched employer-employee data-set analyzed how work force diversity in cultural background, education and demographic characteristics affects productivity of firms in Denmark. They found that labour diversity in education significantly enhances productivity and adds value while diversity in ethnicity and demographics induces negative effects on firm productivity.

Women in Nigeria are predominantly engaged in subsistence agriculture and less likely than men to be engaged in professional, technical and managerial fields and even in governance. Women lag behind men in employment status, educational attainment, literacy and exposure. All these factors mitigate women involvement in socio-political development of Nigeria.

Figure 2.4 below is a reinforcement of the existence of gender inequality in Nigeria. It shows the disparity in percentage in the employment rate of men and women from age 15 – 49 in 2013

Figure 2.4



Source: Women's Empowerment and Demographic and Health Outcomes (2013)

The employment rate of male from age 15-19 was 87.6% against 31.4% for female, while age 20-24, 25-29, 45-49; the percentage employed men figure rose from 97.6%, to 99.0% and declined 98.6% against 32.5%, 41.0%, and 45.3% for women respectively.

Education and Gender Inequality: The Nigerian scenario

Human capital is a stock of knowledge and characteristic acquired by an individual that contributes to his/her productivity. Labour economics views human capital as a set of skills/characteristic that increases workers productivity. While Bowles-Ginitis sees human capital as the capacity to work in organization, obey orders, adapt to life in a hierarchical/capitalist society. This view maintains that the role of schooling is to instill in individual the correct ideology and approach towards life. Investments in human capital are inputs in education, health care, professional qualification and other activities which allow people to be more economically efficient.

Psacharopoulos and Woodhall (1977), states that human capital theory rest on the assumption that formal education is highly instrumental and necessary to improve the production capacity of a population. In the same hand, Becker (1993) confirms that education and training is the important components of investing in human capital and income of better educated and trained persons are usually higher than average wage rate. Lucas (1988), Romer (1990), Barro and Lee (1993) using endogenous growth model has shown a positive correlation between human capital development and economic growth through improving physical capital. They conclude that human capital development through education and training contributes to economic development by impacting on general attitudes, specific skills, reducing fertility and improving living standard.

Education is the basic Human Right according to Universal Declaration on Human Rights in 1948. Education bestows on women a disposition for a lifelong acquisition of knowledge, value, attitudes and competence and skills (Aliu, 2001). The socioeconomic development of any nation depends on the education of the women and there is strong correlation that exists between enrollment of girls in primary school and productivity. To ensure equal access to education at all level, the Nigerian National policy on education states that access to basic education is the right of all Nigeria children regardless of gender, religion, and disposition and disability.

Nevertheless, there has been disparity in primary and secondary education in Nigeria since the pre-colonial era. Girls enrollment in basic education has been very low, before 1920- primary and secondary education was within the scope of Christian organization, out of 25 secondary schools only three 3 were girls. In 1949, the colonial government gave subventions to voluntary associations involved in education out of 57secondary School; only 8 were exclusively for girls.

The first national plan for basic education was announced in may 1961 in collaboration with the United Nation's Universal Declaration of Human Rights and UNESCO's educational plans for Nigeria in Addis Ababa Ethiopia. The main objective was to achieve 100% universal primary education in Nigeria in the year 1980. Nigeria has had basic plans and policies geared towards eradication of illiteracy in Nigeria, in 1970, the United Nation implemented free and compulsory Universal Primary Education (UPE). There have been many conferences and researches internationally and nationally on empowering girl child through education.

Taking lead from the cultural disposition, there has been more boys than girls participation in education in Nigeria until 1970. According to Aromolaran and Adebayo (2004) from 1970 to 1994, the enrollment of girls in primary education has steadily increased from 30% to 80%. But still there exists obvious difference between enrollment of males and females in all levels of education in Nigeria. The Bureau of Statistics (2014), National literacy survey posit that the literacy rate of male and female in Nigeria is 70.1% and 50.4% respectively, again showing the gender inequality exists. Issues of gender disparity in education and employment have been a theme of debate for so long. In Nigeria, there are obviously gender disparity between the education of boys and girls. And this because of cultural values and traditions, cost of education and colonial policies among others. To correct this, many policies have emerged and the most recent is the 2015 Millennium Development Goals which have a target on gender parity.

Bakare (2015) affirmed that despite on-going policies and encouragement from the government, improvements to female education across African continent have been slow. Literacy rate is the most crucial factor of human development because specialized training for literate persons is less costly. The Neoclassical theory of economic growth emphasized on the technical progress as an important factor of growth; which is exogenously determined. But human development (education and training) are endogenously determined. Therefore, without education we cannot achieve technical progress because education is wealth. Educated women have equal opportunity in employment, high standard of living, high life expectancy, and better chances in most spheres of life.

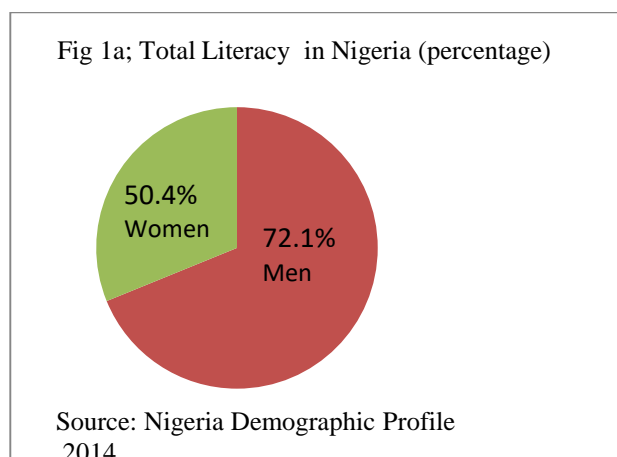
Table2.1: Nigeria's GDI Value (2015)

Description	Female	Male
Life expectancy at birth	53.1	52.4
Expected year of schooling	8.2	9.8
Mean year of schooling	4.9	7.1
GNI per capita	4,052	6,585
Human Development Index Value	0.466	0.556
Labour Force Participation Rate (% age 15 ...)	48.2	63.7
Domestic Work (% of total employment)	0.6	0.4

Data Source: Nigerian HDI (2015)

The above table 2.1 shows inequality in various human developments indicator for female and male in Nigeria for 2015.

Figure 2.5: Shows the percentage difference in literacy rate of men (72.1%) and women (50.4%).



EMPIRICAL LITERATURE

There are different strands of empirical literature reviewed to achieve our objectives in this study;

Empirical Literature on the Relationship between Unemployment and Economic Growth

Obviously there has been a relationship between economic growth and unemployment rate, Economist Arthur Okun unveils this in 1960s which later become Okun's law. Okun's law investigates the statistical relationship between a country's unemployment rate and the growth rate of the economy. He tried to study how much of the country's gross domestic product (GDP) may be lost when the unemployment rate is above its natural rate.

Since output depends on the amount of labour used in the production process, so there is a positive relationship between output and employment and invariably there exist a negative and inverse relationship between unemployment and output growth (and it is conditional on labour force). According to Okun, to achieve 1% decline in unemployment rate annually, real GDP must grow approximately at 2% faster than the rate of growth of potential GDP over that period. That is if the potential rate of GDP growth is 2%, Okun's law says that GDP must grow at 4% rate for one year to achieve 1% reduction in the rate of unemployment.

Moosa (1996) carried out a study to validate Okun's law for Canada, Italy, UK, US, France, Germany, Japan, using Harvey's structural time series model and found that Okun's coefficient is high in North America and lower in Japan. Ahmed and Abdelaziz (2014) investigate the validity of Okun's law in Sudan using cointegration analysis and discovered long-run relationship between real GDP Growth and unemployment rate. And the findings detected a negative and statically significant relationship between the two variables. Also, using a different method to calculate Okun's coefficient Marinkov and Geldenhuys (2007) found support for negative relationship between unemployment and economic growth in South Africa. Al-Habees and Ruinman (2012) apply Okun's law to study the relationship between unemployment and economic growth in Jordan and some Arab countries to evaluate the reasons for high unemployment rates.

In Asian countries, Iran et al (2010) employ Engel Granger Cointegration method and Error Correction model for short –run analysis and found no support for no relationship between output and employment.

Campbell and Chol-Won Li (2001) using efficiency wage model identified five channels through which the productivity slowdown can affect workers' effort incentives and he found that the link between growth and unemployment depends on labour market institutions. While Parello (2009) introduces an efficiency wage and unemployment in a model of growth with endogenous technical changes under two objectives, the study provides an analytical model of growth which can be viewed as an alternative to the standard models of growth and search employment. On the other hand, they analyzed the steady state effect of labour market policies on equilibrium unemployment and long-run economic growth, the result indicates a positive relationship between growth and employment, the effectiveness of any labour market policy aimed at improving the performance of the labour market crucially depends on how individual discount future income. While Brecher et al (2002) using a dynamic efficiency wage model with labour augmenting technical progress, study the long-run relationship between unemployment and growth. The study assumed that the rate of productivity is either exogenous or endogenously determined, and concludes that there is an exogenous increase in the growth rate which may raise the rate of efficiency wage unemployment while a permanent increase in the labour force may reduce the unemployment rate in the endogenous-growth case. Meckel (2004) extends his previous model by introducing skilled and unskilled labour to analyze whether the emergency of growth – employment trade off is skill linked to intersectional wage differentials. He finds that the importance of wage differentials for the growth – unemployment trade off remains when differential between skilled and unskilled labour and that higher minimum wages for unskilled labour increases growth and unemployment of the unskilled while reducing the unemployment of skilled labour.

Likewise, Benigno et al (2015) proposes a theory of low-frequency movements in unemployment based on asymmetric real wage rigidities. The study predicts that long-run unemployment increases with a fall in long-run productivity and a rise in the variance of productivity growth. Chen, Rezai and Semmler (2007) study the nexus between productivity growth and unemployment using disaggregated data on productivity growth into short and long-run component, they employed a maximum likelihood estimation (MLE), structural vector autoregression (SVAR) and non-parametric time varying estimation. They find productivity growth effect on unemployment positive in the short run, while in the long run productivity growth reduces unemployment and Tirelli (2001) finds a negative correlation between growth and unemployment.

Empirical Study on Gender Inequality Relationship with employment and economic growth

Khera (2016) using a dynamic stochastic general equilibrium model for India evaluates the impact of gender targeted policies on female labour force participation, female formal employment, gender wage gap, as well as aggregate economic outcomes. He discovers that policies that increases female labour participation and output and lack of sufficient formal job creation due to labour market rigidities leads to an increase in unemployment, informality and further widens gaps in formal employment and wages. Lorgelly and Owen (2002) build gender inequality into Solow framework but treating male and female education as separate factors of production. Their model was tested by regressing education gender differentials on steady state levels of output per worker; they found that continued higher rates of gender inequality are

associated with lower levels of steady state output per worker. While Azid et al. (2001) analyzed economic behavior of the female workers involved in the business of embroidery Pakistan and they indicate that the factors influencing female participation in cottage industry are number of children, age, education, poverty status and all have a positive and significant impact on female labor force participation. In the same way, Naqvi and Shahnaz (2002) argued that the number of children in a household and the presence of a female household head are negatively linked to women's economic participation. Although women's age and education level have a positive correlation on female labour force participation, and marital status has negative impact on women participation. Older women, better educated women, women who are household heads, and women from smaller, financially stronger urban families are more likely to choose to participate, while younger women, poorly educated women, and women from larger families are more likely to be compelled to participate in the labor market.

Ruwanpura (2004) took another dimension theoretical to review the quality of women's employment in the South Asian and African regions and affirms that geographical areas is a strong factor in Women labour Participation. Again, in a study on Ghana, Sackey (2005) finds that both primary and post-primary schooling have a positive impact on female labour force participation and a negative impact on fertility. In addition, the gender gaps in education have narrowed over the years and it is important for government policies to ensure that the gains of female education are sustained. Education is thus an important determinant of female human capital and productive employment. In addition, Olusoji (2006) considered the determinants of female labour participation in Nigeria, to include differences in hours put in by both women in formal and informal sectors, family size, relationship with household head, and sector of participation, education and location. Ntuli (2007) utilises a decomposition technique devised by Even and Macpherson (1995) on a survey data to examine the determinants of the low-level participation of an African woman in labour force. The result indicates that education is the prime factor, among other factors like non-labour income, marriage, fertility and geographical variations in economic development persistently stifled participation. It is argued that the perceived change in participation is due to emigration and changes in human capital and financial endowments. Secondly 9 percent of the observed shifts in the participation rates from 1995-2004 is due to disparities in characteristics while differences in coefficients account for 109 percent of the shifts.

In Pakistan, Faridi et al (2009) employ logistic regression technique in a cross-sectional date, argues that the analysis of labour market participation is useful for formulating employment and human resource development policies. Females form almost more than half of the total population in Pakistan. The study endeavors to estimate the various factors which affect the women work participation, the result shows educational attainment levels to be significant determinant. Female's labour force participation rises with increasing level of education. Presence of children in early age groups reduces the female labour force participation. In the same way, the results of the study conclude that female education is necessary for better employment opportunities. Fadayomi and Ogunrinola (2013) examined empirically, the influence of household structure on labor market participation in Nigeria. The study establishes the relative importance of the household structure in influencing labor force participation of household members while the other traditional economic and socio-demographic variables conform to a priori expectations. While in a separate study, Faridi and Ayesha (2014) evaluates the factors that affect educated women's decision to participate in the labor force, and found a positive effect of age, levels of education, husband's education level, marital status, family structure, and family expenditure. The presence of an educated father, being an educated

married woman, location, distance from the district headquarters, the husband's employment status and income, and ownership of assets significantly reduces women's labor force participation. The results of the earnings equation show that variables such as women who live in an urban area and their level of education and experience are associated with a substantial increase in earnings with each additional year. The number of children has a negative and significant impact on women's earnings. The hours-of-work model shows that age and the number of completed years of education have a positive effect on working hours, while the number of dependents and the number of hours spent on household activities have a negative effect on working hours. Also, Iweagu et al (2015) uses the logistic regression on a house hold survey data of employment to explore the determinants of labour force participation separately for urban and rural sectors of Nigeria. The study discovered that the determinants of female labour participation were not the same in urban and rural areas. The results imply that marital status, religion, poverty rate and per capita income were significant determinants in the rural sector, while age and literacy rate were the significant determinants in the urban sector. Likewise, Gaywan and Adeboyo (2015), using a logistic model with geo-additive predictors examined the determinants and geographical variations of employment of women, diffuse priors were assumed for modeling fixed effects, Bayesian p-spine for the nonlinear smooth functions and intrinsic conditional autoregressive prior for the spatial effects. Results showed that while a north-south divide existed in the likelihood of women engaging in all-year employment against not working, an east-west divide was found in seasonal/occasional jobs.

Model Specification

Many literatures have modeled the relationship between unemployment and economic growth. But this study follows the work of Al-Habees and Rumman (2012), the study examines relationship between unemployment and real GDP in Jordan and some Arab countries using the law of Arthur Okun. Okun (1962) affirms that unemployment is a negative proportion (decline) against the nature of actual economic growth rate.

$$U = A + B (Y - Y^*) \quad \dots\dots\dots (1)$$

According to Al – Habees and Rummen (2012), the above equation supposes to determine the natural percentage of unemployment determined by Okun with 3% on determining the potential growth rate (Y^*) and changes over time, using dynamic analysis we have;

$$Y + \Delta U = \alpha + b\Delta\varepsilon \quad \dots\dots\dots (2)$$

Where

ΔU = change in the rate of unemployment

Y = economic growth changes

b = flexibility between growth and unemployment

ε = the error rate

Variables α , b are the parameters that specify the percentage of natural growth or actual one which reflects rate of unemployment when declined.

$$Y^* = \alpha/b$$

α/b is the rate needed to maintain the unemployment rate unchanged, which ensures stability of the employment rate. The influence between the growth and unemployment begin when there is a higher growth rate than the real potential rate.

$$b = \Delta U / \Delta Y$$

b refers to the relationship between the unemployment and growth and it determines the rate of unemployment change with every change in the unitary economy growth (Al-Habees and Rumman, 2012).

Thus, our empirical model is specified below;

$$UNEM_t = \beta_0 + \beta_1 RGDP_t + \beta_2 GENIQ_t + \beta_3 GFCF + \mu_t \dots\dots\dots (3)$$

The above model was developed to achieve our first objective, and our variables are UNEM (unemployment rate), RGDP (Real GDP), GENIQ (gender inequality), GFCF (gross fixed capital formation), μ_t (the error term), t is the time period and $\beta(s)$ are the parameter estimate.

Methodology and Time Series Property of Data Used

Regression Analysis/ Spurious Regression Problem

Completely unrelated time series may appear to be related using conventional testing procedures.

$$\text{Suppose } y_t = py_{t-1} + v_t \text{ where } v_t \text{ iid } N(0, \sigma^2, v) \dots\dots\dots (5)$$

$$x_t = px_{t-1} + \varepsilon_t \text{ where } \varepsilon_t \text{ iid } N(0, \sigma^2, \varepsilon) \dots\dots\dots (6)$$

with v_t and ε_t independent, ie. $E(v_t \varepsilon_s) = 0$ for all t and s

when $p=1$, y_t and x_t are random walks:

$$y_t = y_{t-1} + v_t \text{ and } x_{t-1} + \varepsilon_t \dots\dots\dots (7)$$

$$\text{If we run a regression between } y_t \text{ and } x_t : y_t = \alpha + \beta x_t + u_t \dots\dots\dots (8)$$

Despite lack of causal relationship, we are likely to find a significant t-ratio for the null $H_0: \beta=0$. A simulation study would show that (reject H_0 using 5% level test) >75% (Granger 1983, Engel and Granger 1987)

The problem is that the t-test of $\beta=0$ is not $N(0,1)$ even asymptotically. The standard asymptotic distribution theory does not apply when variables have unit root.

Cointegrating Regression and Granger Theorem

Unit Root Test of the Error Term (U) Using Augmented Dickey Fuller Test

Using Engel-Granger Critical Values for the Unit Root testing at 5% which is equal to (-3.34).

Here we are concerned with testing for cointegration of the error term in a system. If resid is found 1(1) and have a long run relationship, and there must be some force which pulls the equilibrium error term back to zero. (Granger 1983, Engel and Granger 1987)

Therefore we estimate the long run equation: $y_t = d_0 + d_1 x_t + u_t$ (9)

The OLS residuals from the above equation are a measure of the disequilibrium:

$$\hat{u}_t = y_t - d_0 - d_1 x_t \quad \dots\dots\dots (10)$$

A test of cointegration is a test of whether \hat{u}_t is stationary. This is determined by ADF tests on the residuals. If cointegration holds, the OLS estimator is said to be super consistent. Implies that there is no need to include 1(0) variables in the cointegrating equation (Granger 1983, Engel and Granger 1987)

Error Correction Model

If the variables are cointegrated, we can run error correction model (ECM) as below;

$$D(Y_t) = \beta_1 + \beta_2 D(X_t) + \beta_3 u_{t-1} + v \quad \dots\dots\dots (11)$$

where u_{t-1} is the one period lag residual of the model, v is the white noise error term and β_1 is the intercept while β_2 and β_3 are the coefficients.

Variance Decomposition for Objective 2

The variance decomposition indicates the amount of information each variable contributes to the other variables in the autoregression model. It determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables.

$$Y_t = v + A_1 Y_{t-1} + \dots + u_t \quad \dots\dots\dots (12)$$

In econometrics variance decomposition is used to support or aid in the interpretation of a vector autoregression (VAR) model once it is fitted (Levine 2004 in Ogbuagu and Ewubare 2014).

Econometric Procedural (Test)

- Breusch-Godfrey Serial Correlation LM test; test for autocorrelation.
- Arch LM Test for Heteroscedasticity
- And Jarque – Bera to check whether the residuals are normally distributed

Presentation of Result and Interpretation

Table 3.1 Correlation Matrix

	C	D(RGDP)	D(GENIQ)	D(GFCF)	U(-1)
C	0.101570	7.78E-05	-0.736991	0.002132	0.004291
D(RGDP)	7.78E-05	0.001978	-0.096209	-0.001009	0.000832
D(GENIQ)	-0.736991	-0.096209	148.2247	-0.041569	-0.639457
D(GFCF)	0.002132	-0.001009	-0.041569	0.008471	-0.001106
U(-1)	0.004291	0.000832	-0.639457	-0.001106	0.025905

The result of the correlation matrix indicates a very poor linear relationship existing between

the dependent (unemployment) and the independent variable (economic growth, gender inequality and gross fixed capital formation.) as shown in the table above.

OLS Regression at Level to check the spurious Nature of our model 1 and the result is presented below;

**Table 3.2 Dependent Variable: UNEM
Method: Least Squares**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-67.19194	12.80349	-5.247939	0.0000
RGDP	-0.042341	0.126371	-0.335049	0.7400
GENIQ	91.92889	14.99406	6.131019	0.0000
GFCF	0.214863	0.116506	1.844226	0.0754
U(-1)	0.063706	0.340172	0.187276	0.8527
R-squared	0.595311	Mean dependent var	11.12882	
Adjusted R-squared	0.539491	S.D. dependent var	5.927397	
S.E. of regression	4.022379	Akaike info criterion	5.756677	
Sum squared resid	469.2064	Schwarz criterion	5.981142	
Log likelihood	-92.86351	Hannan-Quinn criter.	5.833226	
F-statistic	10.66497	Durbin-Watson stat	0.944563	
Prob(F-statistic)	0.000019			

The result in the above table indicates that there is no spurious regression since the R^2 coefficient (0.595311) is less than the Durbin-Watson stat (0.681549). And the result showed that gender inequality significantly and positively affects the rate of unemployment at levels. While economic growth has a negative insignificant impact on the rate of unemployment, gross investment has positive significant impact on the rate of unemployment.

Unit Root Result of the Error Term (U) Using Augmented Dickey Fuller Test

Using Engel-Granger Critical Values for the Unit Root testing at 5% which is equal to (-3.34).

Table 3.3

$t_{statistics}$	Constant	Constant & linear trend	None
Level	-2.423563	-2.761927	-2.463960
1 st differenced	-6.544694	-6.569530	-6.64376

Author's Computation 2017

The results in table 3.3 as presented above confirms that the error term is not stationary at level since $t_{statistics}$ is less than the Engel-Granger Critical value at 5%, also at first differenced as the $t_{statistics}$ values are all greater than the Engel-Granger Critical value at 5%, therefore our variables in model are stationary at first differenced. Our variables are co integrated, which means that they have long-run relationship.

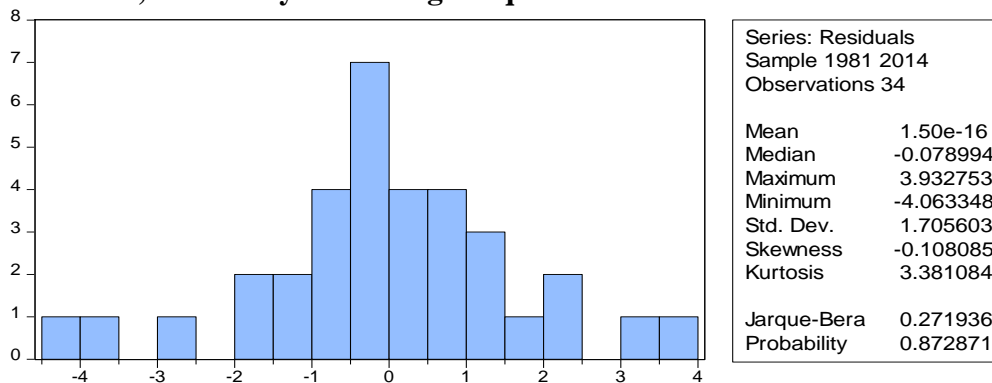
Table 3.4 ERROR CORRECTION Result for MODEL

Dependent Variable: D(UNEM) Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.424362	0.318700	1.331541	0.1934
D(RGDP)	-0.028813	0.044474	-0.647875	0.5222
D(GENIQ)	2.390926	12.17476	-0.196384	0.0457
D(GFCF)	0.030174	0.092037	0.327844	0.7454
U(-1)	-0.483150	0.160950	-3.001863	0.0055
R-squared	0.271567	Mean dependent var		0.433529
Adjusted R-squared	0.171093	S.D. dependent var		1.998404
S.E. of regression	1.819433	Akaike info criterion		4.169980
Sum squared resid	95.99975	Schwarz criterion		4.394445
Log likelihood	-65.88966	Hannan-Quinn criter.		4.246529
F-statistic	2.702870	Durbin-Watson stat		1.638103
Prob(F-statistic)	0.049909			

Author's Computation 2017

From the above result, gender inequality has a positive and significant impact on the rate of unemployment with the coefficient of (2.3909), while economic growth has a negative but insignificant impact on the rate of unemployment. The signs of our variables conform to the appropriate expectation, from our economic theory we are expecting that the rate of an economy's growth will be able to reduce unemployment rate because growth causes increase in productivity and once an economy is productivity, more labour will be employed, thereby reducing the rate of unemployed. Though, in this case the negative impact of economic growth in Nigeria have no significant value on the unemployment rate. Gender inequality is found positive and significant showing that it is a strong factor of unemployment. The long-run coefficient U(-1) is negative and significant, indicating that there is long-run relationship between the variables under review and the speed of adjustment towards the equilibrium is 52%. Finally only 27% of the variation in unemployment is explained by economic growth, gender inequality and gross fixed capital formation.

Econometric Procedural (Test)**Table 3.5; Normality Test using Jarque-Bera**

Source; Author's computation, 2017

The normality test shows that the model is normally distributed.

Table 3.6; Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.128081	Prob. F(2,27)	0.3384
Obs*R-squared	2.621995	Prob. Chi-Square(2)	0.2696

The Beusch-Godfrey Serial Correlation results shows that there is no serial correlation.

Table 3.7; Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.337049	Prob. F(4,29)	0.8507
Obs*R-squared	1.510423	Prob. Chi-Square(4)	0.8248
Scaled explained SS	1.308222	Prob. Chi-Square(4)	0.8600

While the Breusch-Pagan-Godfry test indicates no autocorrelation in the model

Table 3.8; Summary of the Variance Decomposition Result

Period	UNEM/UNEM	RGDP/UNEM	GENIQ/UNEM	GFCF/UNEM
1	100.0000	0.994808	6.118690	0.001967
2	97.59091	1.891946	7.708178	0.056744
3	91.66172	1.994093	20.10422	0.067796
4	89.44239	2.117571	30.05920	1.035790
5	88.53806	2.117938	38.17371	2.704816
6	87.74994	2.251654	43.55360	5.042145
7	87.22607	2.417546	46.92644	7.666724
8	86.85423	2.574814	49.11599	10.07492
9	86.50149	2.708014	50.84284	12.11415
10	86.15046	2.791016	52.40312	13.89546

Source; Arthur's Computation 2017

From the above table 3.8, it is noted that Unemployment rate transmitted an average of 90.1711% impulse on itself for the 10 periods under review on average rate. On average economic growth emitted 2.1859% impulse on unemployment rate for the 10 periods, while gender inequality discharges 34.50% impulses on unemployment. And gross fixed capital formation emitted 0.3869%, emitted impulse on unemployment.

CONCLUSION/POLICY IMPLICATION

The objectives of this paper is of two folds; to examine the short-run impact of gender inequality, economic growth and gross fixed capital formation on unemployment, secondly to check the variance decomposition of unemployment to external shocks from gender inequality, economic growth and gross fixed capital formation.

From our model gender inequality has a positive and significant impact on the rate of unemployment with the coefficient of (2.3909), meaning that the inequality that exist between male and female enrollment in primary and secondary education is a problem because it constitute 239 per cent increase in the rate of unemployment for the period under review, while economic growth has a negative but insignificant impact on the rate of unemployment. The sign of our variables conforms to the approri expectation, from our economic theory we are expecting that the rate of an economy's growth will be able to reduce unemployment rate because growth causes increase in productivity and once an economy is productivity, more labour will be employed, thereby reducing the rate of unemployed. Though in this case, the negative impact of economic growth in Nigeria have no significant impact because the trends of economic growth in Nigeria have not been inclusive. And this result agrees with the previous work of (Iran et al 2010, Ahmed and Abdelaziz 2014, Tirelli 2001).

Gender inequality is found positive and significant showing that it is a strong factor of unemployment especially in less developed countries like Nigeria where female gender are marginalized in labour force market and mostly in education.

Critical look on the results in table 3.2 and table 3.4, the impact signs of economic growth, gender inequality and gross fixed capital formation are consistent and robust.

The long-run coefficient $U(-1)$ is negative and significant, indicating that there is long-run relationship between the variables under review and the speed of adjustment towards the equilibrium is 52%. Finally only 48% of the variation in unemployment is explained by economic growth, gender inequality and gross fixed capital formation.

Again, from variance decomposition model, it is only gender inequality that transmitted high external shocks on the rate of unemployment at about 34.50% on the average of 10 periods under review. This shows that the issue of inequality still perverse in spite of millennial policies developed towards tackling gender imbalance in the system. . In Nigeria, there are obviously gender disparity between the education of boys and girls. And this is as a result of cultural values and traditions, cost of education and colonial policies among others. To correct this, many policies have emerged and the most recent is the 2015 Millennium Development Goals which have a target on gender parity. And again, problem of unemployment and its determinant are diverse. Especially in the case of Nigeria, it is very important to look at institutional framework disposition; the issues of corruption, religious/political instability, and terrorism (Boko Haram) are all strong factors of unemployment to be examined.

Policy Recommendation

Unemployment and gender inequality are not new phenomenon, there have been policies and programs geared towards tackling these issues because theories and researches have affirmed that the effect slows rate of growth through decline in productivity. Thus, from our findings, this paper recommends;

- 1) Public sector reforms should play an important role in promoting gender equality via labour market regulations, social protection programs and public investment in infrastructure that will help reduce women's care burden
- 2) There should be labour force laws to ensure a reduced wage gap, and gender stratification in the labour market

- 3) Policies that will help women's full representation in labour market and parliaments should be encouraged to help reposition women for national development
- 4) Infrastructural imbalance and political/religious problem are all strong factor of unemployment in Nigeria, therefore there is need for the government to develop policies and laws to ensure stable environment.
- 5) Exchange rate policy should be reexamined if Nigeria will record increase in foreign investment which is very important for economic growth.

Further Research

This paper has tried to evaluate extensively the impact of gender inequality on unemployment rate with time series secondary data (gross primary and secondary school enrollment rate) from 1980 – 2015, using Engel Granger Error Correction Model and the Dynamic Stochastic Variance Decomposition Model.

But the issues of gender inequality as it relates to unemployment is a complex one, therefore we suggest that further studies should consider using primary data (questionnaire) to allow an inclusive detail aspect of gender issues as it relates to employment especially in the rural areas.

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APPENDICES

Level Regression

Dependent Variable: UNEM

Method: Least Squares

Date: 03/15/17 Time: 21:13

Sample (adjusted): 1981 2014

Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-67.19194	12.80349	-5.247939	0.0000
RGDP	-0.042341	0.126371	-0.335049	0.7400
GENIQ	91.92889	14.99406	6.131019	0.0000
GFCF	0.214863	0.116506	1.844226	0.0754
U(-1)	0.063706	0.340172	0.187276	0.8527
R-squared	0.595311	Mean dependent var	11.12882	
Adjusted R-squared	0.539491	S.D. dependent var	5.927397	
S.E. of regression	4.022379	Akaike info criterion	5.756677	
Sum squared resid	469.2064	Schwarz criterion	5.981142	
Log likelihood	-92.86351	Hannan-Quinn criter.	5.833226	
F-statistic	10.66497	Durbin-Watson stat	0.944563	
Prob(F-statistic)	0.000019			

Error Correction Model

Dependent Variable: D(UNEM)

Method: Least Squares

Date: 03/15/17 Time: 21:19

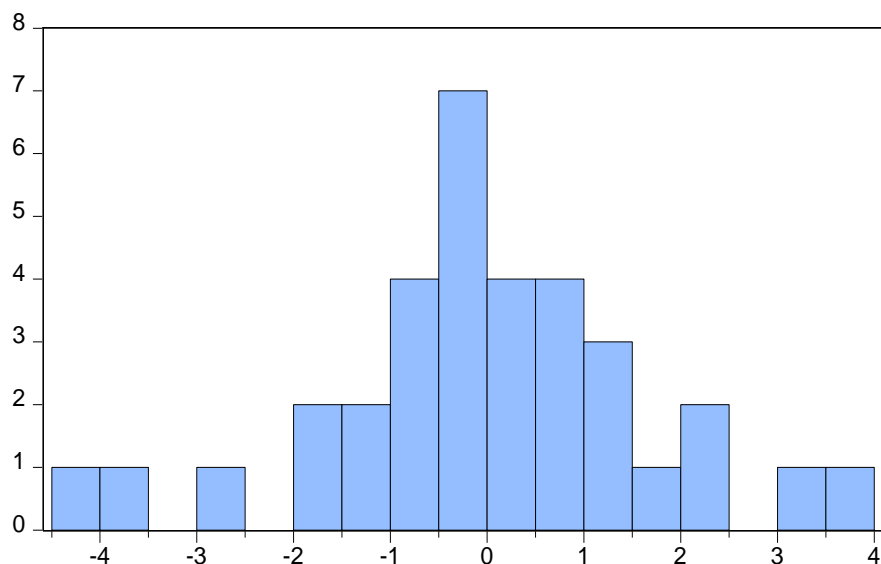
Sample (adjusted): 1981 2014

Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.424362	0.318700	1.331541	0.1934
D(RGDP)	-0.028813	0.044474	-0.647875	0.5222
D(GENIQ)	2.390926	12.17476	-0.196384	0.0457
D(GFCF)	0.030174	0.092037	0.327844	0.7454
U(-1)	-0.483150	0.160950	-3.001863	0.0055
R-squared	0.271567	Mean dependent var	0.433529	
Adjusted R-squared	0.171093	S.D. dependent var	1.998404	
S.E. of regression	1.819433	Akaike info criterion	4.169980	
Sum squared resid	95.99975	Schwarz criterion	4.394445	

Log likelihood	-65.88966	Hannan-Quinn criter.	4.246529
F-statistic	2.702870	Durbin-Watson stat	1.638103
Prob(F-statistic)	0.049909		

Normality Test



Series: Residuals

Sample 1981 2014

Observations 34

Mean	1.50e-16
Median	-0.078994
Maximum	3.932753
Minimum	-4.063348
Std. Dev.	1.705603
Skewness	-0.108085
Kurtosis	3.381084
Jarque-Bera Probability	0.271936

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.128081	Prob. F(2,27)	0.3384
Obs*R-squared	2.621995	Prob. Chi-Square(2)	0.2696

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 03/15/17 Time: 21:21

Sample: 1981 2014

Included observations: 34

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.004933	0.318170	-0.015503	0.9877
D(RGDP)	-0.003937	0.045503	-0.086513	0.9317
D(GENIQ)	1.862268	12.84920	0.144933	0.8858
D(GFCF)	0.001184	0.092146	0.012844	0.9898
U(-1)	-0.220428	0.218712	-1.007845	0.3225
RESID(-1)	0.313121	0.244321	1.281598	0.2109
RESID(-2)	0.174625	0.211588	0.825308	0.4164

R-squared	0.077117	Mean dependent var	1.50E-16
Adjusted R-squared	-0.127968	S.D. dependent var	1.705603
S.E. of regression	1.811450	Akaike info criterion	4.207373
Sum squared resid	88.59649	Schwarz criterion	4.521624
Log likelihood	-64.52535	Hannan-Quinn criter.	4.314542
F-statistic	0.376027	Durbin-Watson stat	1.918958
Prob(F-statistic)	0.887772		

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.337049	Prob. F(4,29)	0.8507
Obs*R-squared	1.510423	Prob. Chi-Square(4)	0.8248
Scaled explained SS	1.308222	Prob. Chi-Square(4)	0.8600

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 03/15/17 Time: 21:22

Sample: 1981 2014

Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.881494	0.807789	3.567139	0.0013
D(RGDP)	-0.006360	0.112724	-0.056423	0.9554
D(GENIQ)	-14.54468	30.85857	-0.471334	0.6409
D(GFCF)	0.046108	0.233280	0.197650	0.8447
U(-1)	-0.344583	0.407950	-0.844669	0.4052

R-squared	0.044424	Mean dependent var	2.823522
Adjusted R-squared	-0.087379	S.D. dependent var	4.422431
S.E. of regression	4.611599	Akaike info criterion	6.030079
Sum squared resid	616.7386	Schwarz criterion	6.254544
Log likelihood	-97.51135	Hannan-Quinn criter.	6.106628
F-statistic	0.337049	Durbin-Watson stat	2.363245
Prob(F-statistic)	0.850719		

Vector Autoregression Estimates

Date: 03/15/17 Time: 21:40

Sample (adjusted): 1982 2014

Included observations: 33 after adjustments

Standard errors in () & t-statistics in []

	UNEM	RGDP	GENIQ	GFCF
UNEM(-1)	0.813411 (0.18420) [4.41589]	0.265168 (0.42139) [0.62927]	0.001025 (0.00202) [0.50757]	-0.125635 (0.19284) [-0.65151]
UNEM(-2)	0.019299 (0.18620) [0.10365]	-0.288854 (0.42597) [-0.67811]	0.003884 (0.00204) [1.90199]	0.167459 (0.19493) [0.85906]
RGDP(-1)	-0.005103 (0.07227) [-0.07061]	0.276381 (0.16532) [1.67176]	-0.000347 (0.00079) [-0.43789]	0.064169 (0.07566) [0.84817]
RGDP(-2)	0.146922 (0.06294) [2.33430]	-0.138634 (0.14399) [-0.96283]	-0.001213 (0.00069) [-1.75667]	-0.062366 (0.06589) [-0.94650]
GENIQ(-1)	19.83015 (15.2623) [1.29929]	-29.34840 (34.9148) [-0.84057]	0.280527 (0.16738) [1.67596]	26.31922 (15.9778) [1.64724]
GENIQ(-2)	0.181118 (13.9142) [0.01302]	63.32737 (31.8309) [1.98949]	0.068717 (0.15260) [0.45031]	-17.42676 (14.5665) [-1.19636]
GFCF(-1)	-0.018239 (0.12064) [-0.15119]	-0.461252 (0.27597) [-1.67138]	0.000891 (0.00132) [0.67350]	0.926478 (0.12629) [7.33607]
GFCF(-2)	0.060979 (0.13768) [0.44291]	0.160459 (0.31496) [0.50946]	-0.003657 (0.00151) [-2.42170]	-0.189019 (0.14413) [-1.31142]
C	-15.47617 (11.5830) [-1.33612]	-19.57748 (26.4978) [-0.73883]	0.533067 (0.12703) [4.19632]	-4.968536 (12.1260) [-0.40974]
R-squared	0.921793	0.483211	0.879319	0.887599
Adj. R-squared	0.895724	0.310948	0.839093	0.850132
Sum sq. resids	89.43150	468.0272	0.010757	98.01325
S.E. equation	1.930366	4.416009	0.021171	2.020863
F-statistic	35.35964	2.805080	21.85901	23.69015
Log likelihood	-63.27490	-90.58328	85.64919	-64.78679
Akaike AIC	4.380297	6.035350	-4.645406	4.471927
Schwarz SC	4.788435	6.443489	-4.237267	4.880065
Mean dependent	11.24788	4.864242	0.826667	12.18333
S.D. dependent	5.977876	5.319907	0.052777	5.220142

Determinant resid covariance (dof adj.)	0.118764
Determinant resid covariance	0.033226
Log likelihood	-131.1267
Akaike information criterion	10.12889
Schwarz criterion	11.76145

Variance Decomposition of UNEM RGDP GENIQ GFCF

Variance Decomposition of UNEM						
Period	SE.	UNEM	RGDP	GENIQ	GFCF	
1	1.930366	100.0000	0.000000	0.000000	0.000000	
2	2.584875	97.59091	0.020687	2.368406	0.019993	
3	3.107938	91.66172	4.504635	3.718897	0.114745	
4	3.538572	89.44239	6.446449	3.994286	0.116872	
5	3.905760	88.53806	6.376126	4.694809	0.391006	
6	4.225537	87.74994	6.210520	5.353543	0.685994	
7	4.518305	87.22607	6.061148	5.669378	1.043403	
8	4.793615	86.85423	5.863818	5.792499	1.489456	
9	5.052014	86.50149	5.714511	5.846460	1.937536	
10	5.293288	86.15046	5.644307	5.866531	2.338702	

Variance Decomposition of RGDP

Period	SE	UNEM	RGDP	GENIQ	GFCF
1	4.416009	0.994808	99.00519	0.000000	0.000000
2	4.713663	1.891946	92.04066	2.222182	3.845211
3	4.856809	1.994093	87.05082	4.253208	6.701881
4	4.891131	2.117571	85.85901	5.343154	6.680269
5	4.898491	2.117938	85.62362	5.388045	6.870398
6	4.926217	2.251654	85.06654	5.328225	7.353580
7	4.941601	2.417546	84.62616	5.295265	7.661032
8	4.950430	2.574814	84.33468	5.286293	7.804214
9	4.957645	2.708014	84.13138	5.275074	7.885535
10	4.962083	2.791016	84.02075	5.266754	7.921481

Variance Decomposition of GENIQ

Period	SE	UNEM	RGDP	GENIQ
GFCF				
1	0.021171	6.118690	2.162238	91.71907
2	0.022301	7.708178	2.008789	89.64197
3	0.025676	20.10422	6.285107	69.50130
4	0.028599	30.05920	6.643162	56.32265
5	0.031066	38.17371	5.827682	47.78451
6	0.033341	43.55360	6.245650	41.53181

7	0.035238	46.92644	6.899823	37.44067	8.733064
8	0.036754	49.11599	7.370531	34.92434	8.589133
9	0.038020	50.84284	7.492652	33.22214	8.442370
10	0.039147	52.40312	7.370529	31.86495	8.361394

Variance Decomposition GFCF

Period	SE	UNEM	RGDP	GENIQ	GFCF
1	2.020863	0.001967	0.334709	1.333098	98.33023
2	2.884548	0.056744	2.844148	7.410987	89.68812
3	3.201195	0.067796	2.491487	7.263441	90.17728
4	3.317295	1.035790	2.946272	7.471286	88.54665
5	3.384008	2.704816	3.213035	7.489052	86.59310
6	3.434982	5.042145	3.118500	7.340563	84.49879
7	3.487587	7.666724	3.131635	7.156503	82.04514
8	3.540609	10.07492	3.285178	7.028325	79.61158
9	3.590939	12.11415	3.503782	6.986207	77.39586
10	3.637587	13.89546	3.664732	7.006568	75.43324

Cholesky Ordering: UNEM RGDP, GENIQ GFCF