

Economic Growth and Gender Inequalities in Labor Force Participation and Education in Kenya

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Abstract

The main development goal in Kenya's Vision 2030 is to raise economic growth and reduce gender disparities. However, majority of the Kenyans still remain in poverty and gender inequality is widening. To achieve its vision 2030, the government need deliberate win-win policies that aim at dropping gender gaps and raising growth in the Gross Domestic Product (GDP). To provide the relevant information necessary for designing these policies, this study sought to probe how gender disparities in education and labor force participation impact on GDP growth using time series data for the period between 1990 and 2012. The research utilizes Autoregressive Distributed Lag model (ARDL) to examine how gender inequality is affected by the education system and labor force involvement on the growth of the economy. The key findings show that gender disparities in education had a depressing consequence on GDP growth in both short and long run. On the other hand, gender disparities in labor force involvement had no consequence on GDP growth. The study recommends that the Kenyan government should focus on policies that ensure that the girl child has access to not only primary and secondary education but also institutions of higher learning in order to increase gender equality.

Keywords: Economic Growth, Gender Inequality, Labor Force Participation, Education and GDP Growth

Introduction

The main goal of this study is to examine the link between gender inequality in education and participation in the labor force and economic growth in Kenya so as to inform policy on the high impact area to target with gender parity policies. According to Kenya Vision 2030, the

country aims at growing at 10 percent per year in order to achieve the middle income status by 2030 (Government of Kenya, 2007). However 5.3 per cent GDP growth rate in 2014 is way below the targeted average growth rate of 10 percent (Government of Kenya, 2015). This poor performance could be explained by among other things, a large proportion of women been excluded from productive activities. Nonetheless, the government of Kenya is at the forefront in ensuring gender equity. The linkage between gender disparities and GDP growth remains largely unknown. Thus knowledge of the linkage between economic growth and gender inequality in education and participation in the labor market is not only urgent but also paramount in devising win-win policies that reduce gender disparities and increase GDP growth.

The existing literature shows that there exists a correlation between economic growth and gender inequalities in years of schooling and involvement in the labor market. Though there are a few studies that have found that the relationship between economic growth and gender inequalities is positive, other studies have revealed that gender gaps in education and labor force participation result in negate economic growth gains. The conclusion essentially is that the role of both women and men in fostering economic growth cannot be wished away and that resources should therefore be distributed without discrimination of either gender to eliminate existing inequalities. Most of the studies that have been done on economic growth and gender inequalities are have used cross sectional data and have found diverse results. There are limited country studies using time series data to establish the linkage between gender inequalities and growth of any given economy, for instance it is still unknown how gender inequalities in education and participation in the labor market influence economic growth in Kenya.

The concept of gender is now a never-present concept in every part of the world. It refers to the societal attributes that are acquired behaviors obtained during socialization as part of any given society. Since this attributes are learned behaviors, they change sooner or later. Gender concept is distinct from sex which is the genetic difference between men and women which are common to everyone and remain the same over time (Reeves and Baden, 2000). Gender parity is the similarity in handling of women and men based on the Declaration of Human Rights. Parity therefore means that both women and men are exposed to similar environment for achieving their maximum civil liberties and ability to have a say in socio- economic, political, and cultural advancement and both profit without partiality out of all results.

The gender concept is conceived as championing for parity and equity among boys, girls, men and women hence being fair to them. To ensure non partiality, actions ought to be established to pay off for past and present societal weaknesses that limit men and women from being at par. Therefore gender equity leads to gender parity and this permits women and men to benefit from the same condition without any discrimination. Gender parity is as a result the similar nature of appreciating by communities of mutually the resemblances and dissimilarities among women and men, as well as the differential responsibilities that they play. Gender parity does not mean then that men and women become the same; it means that one's privileges, liberties or prospects are not depended on their sexuality (Reeves and Baden, 2000).

Worldwide, women have been overwhelmingly disadvantaged than men in many ways including violence against women by their intimate partners; women's being less participation involved and represented in political spheres and decision-making structures; there are different economic prospects for both men and women whereby women are the majority among the poor; and when it comes to sex trade and human trafficking practices,

women and girls are the highest victims (United Nations, 2002). These forms of inequalities against women have resulted into their exclusion from mainstream development processes undertaken in various economies. The unequal treatment of women as compared to men results in gender inequalities. The inequalities can be as a result of cultural practices and attitudes which result in the lower status of women relative to men. This is evident in lower numbers of women in representative organs, retrogressive traditional practices, violence, and inequitable access to property, lower literacy, health complications, patriarchal marital practices and overwhelming workload (United Nations, 2002).

In the recent past, gender disparities have lived at the heart of the development policy discussions. The policy interest corresponds to a similar degree of scholarly attention that has created a lot of research aimed at showing that cutting back gender disparities contributes to development for women as individuals as well as for women on the whole. The evidence has been applied to back up strategies that reduce disparities among genders as a reasonable and successful instrument to encourage development both directly and indirectly (Bandiera and Natraj, 2013).

In a patriarchal society such as Kenya's, women have historically been disadvantaged and marginalized. There is a clear division of labor that is determined by sex and each society defines what a man or woman should do. This division of labor creates not only gender inequalities in terms of work done but also gaps in the right to use and management of resources and decision making power (Njiro, 2003).

In reacting to the underlying inequalities against women, there has been a wave of agitation for inclusion of women in all aspects of economic development undertaken in various economies. These calls for institution which can make difference at various stages which involves having different attitudes and relationships, different policy approach and institution and legal structures, and changes in political decision-making structures. These changes can be done holistically through gender mainstreaming strategy whose main aim is to reduce gender inequalities in all areas of economic development.

Overview of Gender Inequalities in Kenya

The Government of Kenya has made its pledge to deal with gender disparities by putting in place a National Gender and Equality Commission and putting in place Gender Desks in all ministries. Despite the fact that there is lack of updated sex-disaggregated data in the country, the data available indicate women though keenly participate in economic activities, have gender-related limitations. Eliminating such constraints may well as well offer a major improvement to the country's economic growth. Nonetheless, Kenya still experiences gender inequalities in education and employment.

In Kenya, gender disparities take various forms; for instance, huge differences in the national share of income, employment, security, levels of investment, health care and public services are apparent across counties, especially parts of the population, ethnic communities and gender. In regard to income distribution, gender disparities are persistent with men owning more productive resources relative to their female counterparts (Njiro, 2003). On the other hand, gender disparities in education worsen social inequality (Mulongo, 2013).

Gender Inequalities in Education

Inequalities in education manifest through the enrolment in institutions of learning, education completion rates, distribution of gender in different carriers among other indicators. In Kenya, enrolment in institutions of learning is generally higher for males than

females despite the fact that female population in Kenya is slightly higher than that of males (Government of Kenya, 2012). Moreover, primary completion rates in Kenya indicate that generally more boys complete primary school as compared to girls (Figure 1).

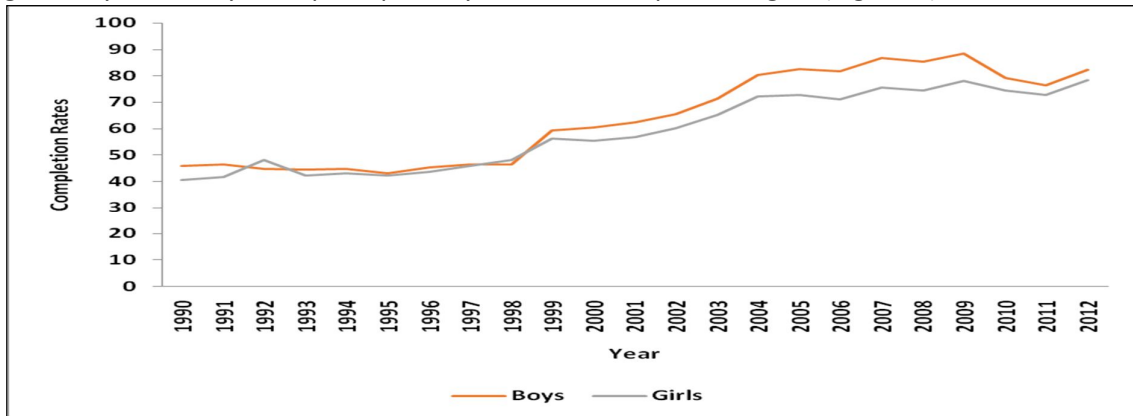


Figure 1: Primary School Completion Rates 1990-2012

Source: Ministry of Education Science and Technology (2013)

Gender Inequalities in Employment

In Kenya, estimates of the count of men and women in self-employment depict a rising course, particularly in the 1990s. For example, between 1991 and 1999 percentage of self-employment male had increased by 30 per cent. However, the count of women that is self-employed increased by a higher rate of 70 per cent (Central Bureau of Statistics, 1998, 1999). Now women account for almost half of the people who are self-employed in Kenya.

Gender inequalities in employment in Kenya can be analyzed based on various indicators such as, labor force participation of different genders, wage disparities between different genders, women participation in unpaid household and agricultural work among others. For instance, female labor force as a ratio of the whole labor force has been lower than male labor force participation since 1990 (Figure 2). This suggests a higher female unemployment given that the population of females is slightly higher than that of males.

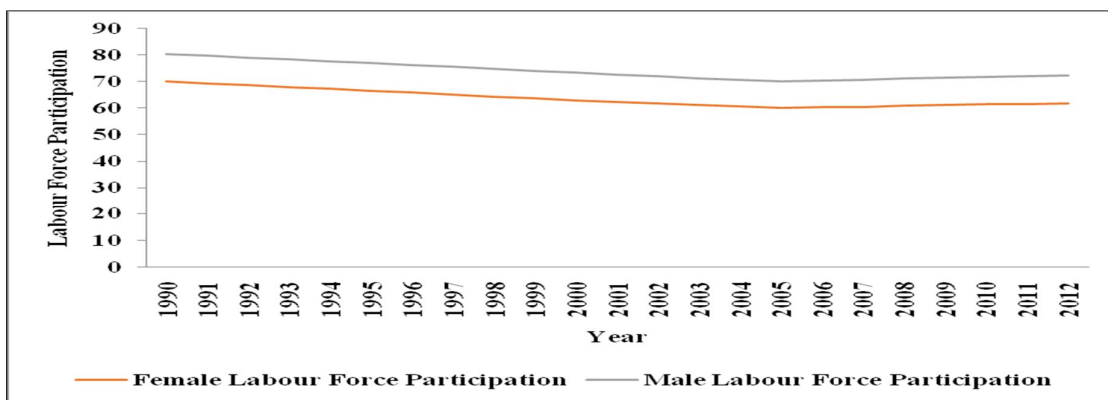


Figure 2: Labor Force Participation Rate 1990-2012

Source: World Bank (2012)

However, to unmask the gender difference in terms of labor force participation, the study estimates the difference between female and male rates of participation in the labor force.

As shown in Figure 3, in the early 1990 the gender gap rose sharply but had a moderate decline until year 2005 thereafter the gap has been rising with some fluctuations.

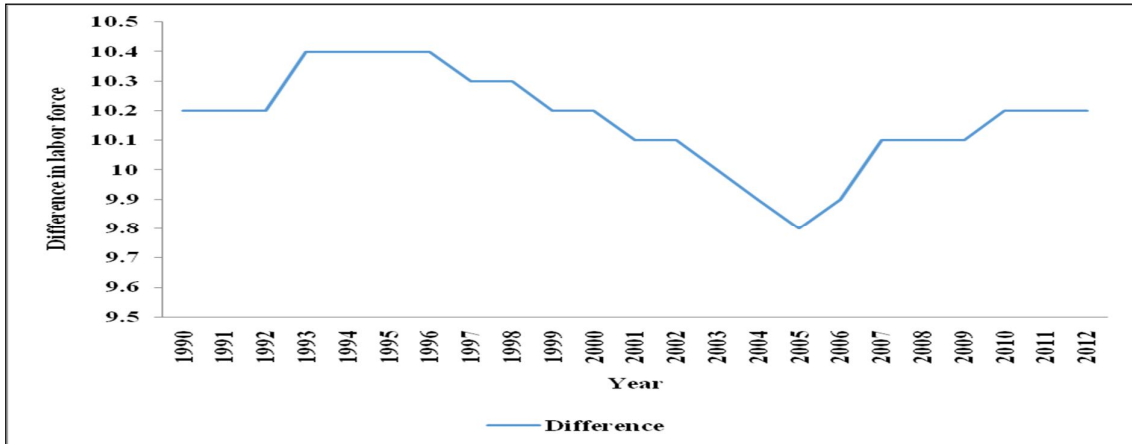


Figure 3: Difference in Labor Force Participation Rate 1990-2012

Source: Authors Construction

The rise in gender disparities in education and participation in the labor force could have devastating effects on the economy if appropriate measures are not put in place. World Bank (2007) recognized the need to look at the implications of gender-based disparities on the economy since reducing gender disparities in education and labor force participation is critical in: achieving Kenya’s real GDP growth target, increasing the level of employment, making sure the level of poverty has tremendously reduced, promoting all agricultural based activities and exports, boosting financial sectors, eradicating the HIV/AIDs pandemics for women and eventually achieving Millennium Development Goals (MDGs).

As argued by (Andersson, 2010; Klasen, 1999; World Bank, 2001; Jacobsen, 2011; Lagerlof, 2003; Greenwood et al., 2005; Galor and Weil, 1996) there exists a correlation between GDP growth and gender disparities in education and participation in the labor force. In the Kenyan case, differences in primary school completion rates seem to move together with Gross Domestic Product (GDP) growth rate. However, difference in participation in the labor force seemed constant over the period between 1990 and 2012 (Figure 4). This suggests that investigating the trend between differences in education and labor force participation, and economic growth may provide relevant information that could be used in policy formulation.

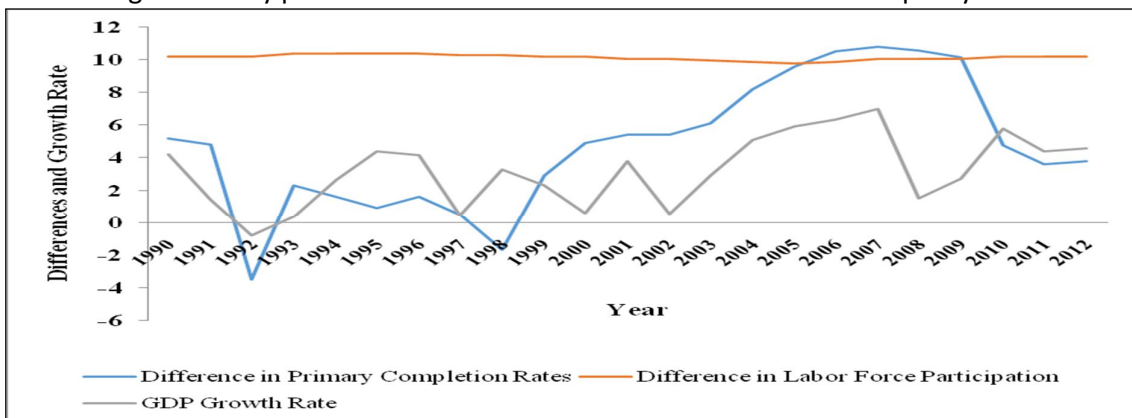


Figure 4: Differences in Employment, Education and Growth Rate

Source: World Bank (2012)

Methodology

This section presents model specification, model estimation as well as data types and sources.

Theoretical Framework

To investigate the link between gender inequality and economic growth, the study follows Mankiw, Romer and Weil (1992) neoclassical growth model and its modification by Knowles (2002). This model assumes that real output (Y) is determined by physical capital (K), female education stock (SEF), male education stock (SEM), health capital stock (X), technological level (A) and labor (L). This relationship is presented in equation 1.

$$Y_i = K_i^\alpha SEF_i^{\beta_f} + SEM_i^{\beta_m} X_i^\varphi (A_i L_i) (A_i L_i)^{1-\alpha-\beta_f-\beta_m-\varphi} \dots\dots\dots 1$$

The authors assumed a Cobb-Douglas production function exhibiting constant returns to scale and with each factor having diminishing marginal products. Equation 1 can be transformed into effective unit of labor hence accumulation of physical capital, stock of female and male education and health can be derived as:

$$\dot{k}_i = A_{ki} Y_{ki} - (n_i + g + \delta) k_i \dots\dots\dots 2$$

$$\dot{sef}_i = s_{sefi} y_{ki} - (n_i + g + \delta) sef_i \dots\dots\dots 3$$

$$\dot{sem}_i = s_{semi} y_{ki} - (n_i + g + \delta) sem_i \dots\dots\dots 4$$

$$\dot{x}_i = s_{xi} y_{ki} - (n_i + g + \delta) x_i \dots\dots\dots 5$$

Where n, g and δ denote labor growth rate, growth rate of technology and depreciation rate respectively, $s_{ki}, s_{sefi}, s_{semi}$ and s_{xi} are fractions of output spent on physical capital, female education, male education and health respectively. These accumulation equations can be used to derive steady state which when rearranged results into a theoretical model as shown in equation 6.

$$\ln(Y_i/L_i)^* = a + \ln A_{i0} + \alpha/(1-\alpha)\{\ln(s_{ki}) - \ln(n_i + g + \delta)\} + \beta_f/(1-\alpha) \ln(sef_i^*) + \beta_m/(1-\alpha) \ln(sem_i^*) + \varphi/(1-\alpha) \ln(x_i^*) + \varepsilon_i \dots\dots\dots 6$$

This equation could be tackled through Ordinary least Squares (OLS) approach if there is an assumption that inequality in labor participation and gender inequality in education do not have a causal effect with economic growth.

Model Specification

Based on theoretical framework, the study modifies equation 6 so as to include gender disparity in education and in participation in the labor force. However, the study recognizes that gender disparities in education and inequality in labor force involvement may influence GDP growth and at the same time GDP growth may influence gender disparities in education and in labor force participation. This indicates that there could be causality effect. Moreover, the study would like to distinguish the long run and short run effect of disparities in education and participation in the labor force and economic growth. To account for causality effects simultaneous equation models could be used (Greene, 2012). Nevertheless, the study would like to account for causality and at the same time estimate the long run and short run effects.

According to Johansen (1991) Johansen multivariate cointegration approach could be utilized to establish the short run and long run relationships. Thus model 6 could be transformed into estimation model as shown in equation 7.

$$Y_t = A_1 Y_{t-1} + \dots + A_i Y_{t-i} + \dots + A_p Y_{t-p} + \beta X_t + \varepsilon_t \dots \dots \dots 7$$

Where: Y_t is the vector of endogenous variables which include; GDP growth rate, inflation, openness, investments, gender inequality in education and inequality in labor force participation in time t . X_t denotes a vector of deterministic variables such as constants, trends and seasonal terms while A_i and β are matrices of coefficients to be estimated. ε_t Denotes a vector of innovations, i denotes the lag length and p denotes the maximum lag length.

To distinguish whether model 7 should be estimated as a Vector Error Correction model (VECM) or Vector Autoregressive model (VAR) Engle-Granger (1987) suggested that for a VECM to be used, the endogenous variables need to be integrated of order one while for a VAR the endogenous variables should be covariance stationary. Moreover, if variables are integrated of order one and order zero Autoregressive Distributed Lag (ARDL) model would be appropriate. Thus the choice of whether to use a VAR, VECM or ARDL was based on the unit root results.

Estimation Issues

The study conducted various diagnostic tests before running the model. This is to ensure that time series assumptions are not violated. There are both pre and post estimation test that will be conducted. The pre estimation tests include:

Lag Length Determinations

The study used likelihood ratio (LR) test to test selects the lag length to be used in the VAR, VECM or ARDL. The selection of appropriate lag length ensures that the residuals do not have significant autocorrelation since autocorrelation leads to inconsistent least square estimates (Enders, 1995). The study complimented the LR test with Schwarz Information Criterion (SIC) as well as Akaike Information Criterion (AIC) statistics. These lag selection criteria enables one to select the smallest lag order with no much loss in the degrees of freedom.

Test for Stationarity

The study tested for unit root presence in the series. According to Gujarati (2008) a stationary series is a series that has constant variance and mean over a period of time and the value of covariance between the two time periods only depended on the difference between the two time periods and not the real time when the covariance is calculated, otherwise the series is nonstationary. Estimating an Ordinary Least Square (OLS) model with non stationary series would result to spurious results (Gujarati, 2008). The commonly used techniques for testing for unit root are Augmented Dickey-Fuller (ADF) and Phillips-Peron. ADF test has a null hypothesis of a presence of unit root, that is, the series integrated of order one. Though Phillips-Peron has a different specification as that of ADF, the research utilizes Augmented Dickey Fuller to test for presence of unit root for the variables used in the analysis.

Cointegration Test

To establish the long run correlation between variables, the series must be integrated of order one. Given that variables are integrated of order, it is then possible to test for the number of long-run equilibrium relation(s) among the variables (Johansen, 1991). This is done by use of trace or maximum eigen values. The null hypothesis of the trace statistic is that there are r

cointegrating relations vis-a-vis the alternative that states that there are k cointegrating relations. The null hypothesis for the maximum eigen values is that there are r cointegrating relations against the alternative hypothesis of $r+1$ cointegrating relations. However, if the series are integrated of order one and order zero then ARDL approach will be used to estimate the long and short run relationships.

Autocorrelation Test

Running a model in the presence of autocorrelation the estimates are unbiased, consistent and asymptotically normally distributed but they are not efficient. Thus it is important to test for serial autocorrelation in order to ensure that the estimates are efficient. Among other tests of autocorrelation such as Runs test, Durbin-Watson tests and the Breusch- Godfrey test, this study used Breusch- Godfrey test since it overcomes the constraints of the tests such as Durbin-Watson test (Gujarati 2008).

Normality Test

Running a model with residuals that are not normally distributed will result to invalid inference of t and F statistics. To ensure that the residuals used are normally distributed, the study uses Jarque-Bera test to test for normality of the residuals. The null hypothesis of Jarque-Bera is that there is no skewness in the series and the kurtosis is mesokurtic. This implies that for normally distributed residuals the Jarque-Bera statistic is equal to zero (Gujarati 2008). Other tests that the study conducted include ARCH effects, Ramsey RESET test and test for stability of parameters.

Types and Sources of Data

The main source of data utilized for the study was sourced out of the World Development Indicators (World Bank, 2012). This dataset comprises time series data for various macroeconomic indicators of Kenya. Specifically, data from the period between 1990 and 2012 on economic growth, inflation, exports and imports, investments and male and female labor participation rates and education was sourced from World Development Indicators. Data on male and female primary school completion rates was sourced from Kenya Ministry of Education, Science and Technology.

Empirical Results and Discussion

This section presents the diagnostic, regression results and their interpretation.

Descriptive Statistics

The study found that the mean GDP growth rate over the period between 1990 and 2012 was 3.2015 with a standard deviation of 2.1466 (Table 1). On the other hand, the mean for gender inequality in labor force participation was 0.085 with maximum and minimum values of 0.0680 and 0.1147 respectively. Gender inequality in education had -0.0138 mean and a 0.0062 standard deviation while the mean for inflation, openness and investments was 13.51, 56.21 and 18.41 respectively.

Table 1

Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
GDP growth rate	3.2015	2.1466	-0.79949	6.9933
Gender inequality in labor force participation	0.0850	0.0149	0.0680	0.1147
Gender inequality in education	-0.0138	0.0062	-0.0290	-0.0072
Inflation	13.5094	10.3440	1.5543	45.9789
Openness	56.2125	10.0720	38.6503	76.3512
Investments	18.4087	2.3609	15.0038	24.1641

Diagnostic Tests

The study tested for various diagnostic tests and the results are discussed as follows:

Lag Length Determinations

The study sought to find out the lag length of each variable used in the analysis. Selection of lag length is critical in analysis of time series data since it enables the research to use residuals that do not have significant autocorrelation. Gujarati (2008) argues that failure to effectively account for autocorrelation leads to inconsistent least square estimates. This study uses both the Schwarz Information Criterion (SIC) and Akaike Information Criterion (AIC) statistics to test for the lag length of each variable. The outcomes in Table 2 illustrates that GDP growth rate, gender disparity in education and in labor force involvement, inflation, openness and investments all have a maximum lag of 1.

Table 2

Lag Length Determination

Variable	Maximum Lag
GDP growth Rate	1
Gender inequality in labor force participation	1
Gender inequality in education	1
Inflation	1
Openness	1
Investments	1

Test for Stationarity

The study used ADF to test for unit root in each series. This is because running non-stationary series would lead to spurious results (Gujarati, 2008). Table 3 present results for unit root at levels and at the first difference both with intercept as well as trend. The results show that GDP growth rate and investment are integrated of order zero. Gender disparity in labor force involvement and gender gaps in education are integrated of order one suggesting stationarity at the first difference. Additionally, inflation and openness are integrated of order one suggesting that stationarity of these variables after the first difference. This finding refutes the use of Johansen cointegration to test for the long run relationships between variables. For the Johansen cointegration test to be employed, variables must be integrated of order one (Johansen, 1991). Given that some variables are not integrated of order one then VAR

and VECM will also not work. The study therefore adopts Autoregressive Distributed Lag Model (ARDL) bounds testing approach (Pesaran et al., 2001) to estimate the linkage between gender disparity in participation in the labor force and education on growth rate of the economy. H_0 There is unit root; the values in the brackets are the P values

Table 3
Test for Unit Root

Variables	Level		First difference		Decision
	Intercept	Trend	Intercept	Trend	
GDP growth rate	-2.9474 (0.0560)	-4.0025 (0.0243)	-5.6871 (0.0001)	-5.5202 (0.0012)	I(0)
Gender inequality in labor force participation	-2.1953 (0.2081)	-0.8471 (0.9600)	-0.2120 (0.0923)	-1.7958 (0.0670)	I(1)
Gender inequality in education	-2.2410 (0.1988)	-2.2202 (0.4552)	-4.7504 (0.0013)	-4.6046 (0.0081)	I(1)
Inflation	-2.6233 (0.1035)	-2.8367 (0.2000)	-5.1160 (0.0000)	-4.9867 (0.0001)	I(1)
Openness	-0.2251 (0.9215)	-2.0771 (0.5294)	-4.5161 (0.0020)	-4.3988 (0.0115)	I(1)
Investments	-3.5375 (0.0167)	-3.6227 (0.0510)	-5.1320 (0.0005)	-5.5292 (0.0000)	I(0)

Multicollinearity

The study tested for multicollinearity using the correlation matrix as shown in Table 4. Gujarati (2008) noted that severe multicollinearity may inflate the standard errors of the estimates and therefore it should be accounted for. The test for severe multicollinearity is that the correlation coefficient should be less than 0.8 (Gujarati, 2008). As shown in Table 4.4, gender disparities in education, inflation, openness, investments and gender inequality in labor force participation had correlation coefficient greater or equal to 0.8 implying that the variables used do not suffer from severe multicollinearity.

Table 4

Results for Multicollinearity

	GLFP(Labor Force Participation Inequality)	Gender inequality in education (GIE)	Inflation	Openness	Investment
GLFP(Labor Force Participation Inequality)	1.0000				
Gender inequality in education(GIE)	0.2530	1.0000			
Inflation	0.4870	0.2101	1.0000		
Openness	-0.0851	0.0976	-0.2055	1.0000	
Investments	0.4610	0.3411	0.1203	-0.1454	1.0000

ARDL Regression Results

On the basis of the analytic results the study uses ARDL to examine the impact of gender disparities on economic growth in Kenya. Pesaran et al. (2001) ARDL bounds test approach is commonly used in cases where series are integrated of order zero and order one. This study chooses this approach since the ARDL bounds testing approach is not restrictive on the order the variables are integrated and it solves the problem of serial correlation and endogeneity by specifying appropriate lags. Additionally, this approach can be used to estimate long run and short run parameters simultaneously (Pesaran et al., 2001). The study estimated both short and long run impacts of gender disparities on economic growth in Kenya and the findings are discussed as follows.

The study conducted post estimation tests that are presented in the appendices. The study tested for presence of heteroscedasticity using Breusch-Pagan test and found a test statistic of 3.850670 with a p value of 0.696876 (Appendix 1). The insignificant test statistic implies that the model does not suffer from heteroscedasticity, that is, the variance of the residual is constant. Appendix 2 presents the test for normality whereby the result shows that the residuals are normally distributed. Breusch-Godfrey test for autocorrelation (Appendix 3) had a test statistic of 1.068355 with P value of 0.466 implying that the residuals in one period are not related with the residuals from another period. The study also tested for ARCH effects(Appendix 4) and found a test statistic of 9.64368 with a P value of 0.209681 while the test statistic for RESET specification test(Appendix 5) was 0.048238 with p value of 0.83 respectively implying that the model does not suffer from ARCH effects and functional misspecification. Finally, the study tested for parameter stability and found Harvey-Collier value of 0.325209 with p-value 0.7502 that suggests that the model parameters are stable. These tests suggest that the results from ARDL are robust.

The short run ARDL results are presented in Table 5. The results show that the short run model has an R squared of 0.628057 implying that about 63 percent of the disparities in economic growth are elucidated by gender disparities in schooling and involvement in the labor force, inflation, openness and investments in Kenya. This finding is supported by the F statistic of 3.940030 with a significant p value of 0.016191 suggesting that jointly all the independent variables; gender disparities in education and participation in the labor force, inflation,

openness and investments significantly influence Kenya's economic growth. The study reported various criteria used to choose the maximum lag of variables and the following are the information criteria results. The Akaike criterion, Schwarz criterion and Hannan-Quinn had a value of 89.82720, 97.13885 and 91.41401 respectively.

The results further show that gender inequality in participation in the labor market, openness and investment have no significant effect on GDP growth. However, education inequality in gender has a coefficient of -3.74730 that is significant at 10 percent level. This finding implies that a unit rise in gender inequality in education reduces economic growth by 3.75 percent. This finding could be explained by the fact that an increase in gender inequality in education implies that lesser women/ girls are educated as compared to their male counterparts. This implies that a huge number of women would not participate in economic activities that require high education consequently excluding them from mainstream development processes necessary for economic development. This result supports Bandiera and Natraj (2013) finding that reducing gender inequality enables women to contribute fully to economic development of a country. Additionally, the findings is in support of Dollar and Gati (1999) who found that a 10 percent rise in the stock of adult women with secondary schooling increases growth per capita by 0.3 percent.

This study established that inflation has significant negative effect on short run economic growth. The coefficient for inflation is -0.0993843 with a p value of 0.0980 that is significant at 10 percent level. This finding implies that a rise in inflation by one unit leads to 0.0994 reduction in economic growth in Kenya. This finding suggests that an increase in inflation leads to rise in cost of living and erodes resources that can be used for generating more wealth for an individual or for a country as a whole. Erosion of returns to investments would discourage investors from investment in the country thereby reducing economic growth.

The study found that the coefficient for error correction model was 0.777536 with a p value of 0.0394 implying that the ECM is statistically significant at 10 percent level. This finding suggests that variables could be related in the long run.

Table 5

ARDL Short Run Results

	Coefficient	Std. Error	t-ratio	p-value
Constant	-0.362882	0.622053	-0.5834	0.5689
ΔGLFP	-110.493	203.448	-0.5431	0.5956
ΔGIE	-3.74730	2.1333	-1.7566	0.0681*
ΔInflation	-0.0993843	0.0560593	-1.773	0.0980 *
ΔOpenness	0.146376	0.182240	0.8032	0.4353
ΔInvestments	0.302132	0.259562	1.164	0.2639
ECM	0.777536	0.342217	2.272	0.0394 **
Mean dependent variable	0.008756		S.D. dependent variable	2.472855
Sum squared residual	45.48872		S.E. of regression	1.802552
R-squared	0.628057		Adjusted R-squared	0.468653
F(5, 16)	3.940030		P-value(F)	0.016191
Log-likelihood	-37.91360		Akaike criterion	89.82720
Schwarz criterion	97.13885		Hannan-Quinn	91.41401
rho	-0.035178		Durbin's h	2.051118

ARDL (1, 1, 1, 1, 1) OLS Results, Dependent variable: Δ GDP growth rate, *, ** and *** denotes 10%, 5% and 1% level of significance, GLFP denotes gender inequality in labor force participation and GIE denotes gender inequality in education.

As indicated before, the study approximated the long run link between variables and found that some variables had long run relationship. The results for long run relationship are shown in Table 6 where the R squared is 0.495119 suggesting that half of the variations in economic growth are explained by the independent variables; gender disparities in education and participation in the labor force, inflation, openness and investments. Additionally, the F test had a value of 3.138123 that had a p value of 0.036644 indicating that jointly all the independent variables influence economic growth. Thus jointly gender gaps in education, gender inequality in labor force involvement, inflation, openness and investments determine long run economic growth. As for the case of short run relationship, the study reported values of three information criteria that were used namely; Schwarz criterion, Akaike criterion and Hannan-Quinn. Akaike criterion, Schwarz criterion and Hannan-Quinn had values of 92.56256, 99.10882 and 94.10466 respectively.

The study found a relationship between gender disparities in education and Kenya's economic growth in the long run. The coefficient for gender inequality in education was - 11.6712 with a p value of 0.0159 that is significant at 5 percent level. This finding suggests that widening gender inequality in education lowers economic growth of a country. A unit rise in education gender inequality lowers economic growth by 12 percent. As compared to short run, the effect of gender inequality in education in the long run is larger by about 8 percentage points. This suggests the importance of reducing gender education disparities by gender in contributing to GDP growth. This finding supports Bandiera and Natraj (2013) and Dollar and Gati (1999) who argued that reducing gender disparities in education positively impacts on a country's economic growth.

The study sought to investigate the long run effect of investment on Kenya's economic growth. The study found that the coefficient for investment was 0.368390 with a p value of 0.0888 that is significant statistically at 10 percent level. This suggests that an increase in investment results in an increase in economic growth. For instance, a one unit increase in investment results to about 0.4 increase in economic growth. Increased investments play a critical role in creating jobs and expanding economic opportunities in a country thereby increasing the rate of wealth creation, that is, increases economic growth of a country. Further the study found that gender inequality in labor force involvement; inflation and openness do not have long run relationship with economic growth in Kenya.

Table 6

ARDL Long Run Results

	Coefficient	Std. Error	t-ratio	p-value
Constant	-4.01224	11.1365	-0.3603	0.7234
GLFP	-28.1788	76.0347	-0.3706	0.7158
GIE	- 11.6712	6.0529	-1.9282	0.0159**
Inflation	-0.0633497	0.0451806	-1.402	0.1800
Openness	0.0634511	0.110182	0.5759	0.5727
Investments	0.368390	0.203285	1.812	0.0888 *
Mean dependent variable	3.138058	S.D. dependent variable	2.174948	
Sum squared residual	50.15409	S.E. of regression	1.770489	
R-squared	0.495119	Adjusted R-squared	0.337343	
F(5, 16)	3.138123	P-value(F)	0.036644	
Log-likelihood	-40.28128	Akaike criterion	92.56256	
Schwarz criterion	99.10882	Hannan-Quinn	94.10466	
rho	0.148388	Durbin's h	1.669256	

ARDL (1, 1, 1, 1, 1) OLS Results, Dependent variable: GDP growth rate, *, ** and *** denotes 10%, 5% and 1% level of significance, GLFP denotes gender inequality in labor force participation and GIE denotes gender inequality in education
 This study found that gender education gaps have a significant effect on growth of GDP both in short and long runs while inflation had short run effect on economic growth and investment had long run impact on economic growth. Gender inequalities in labor force participation and openness have no impact on output growth in both short and long run period.

Summary, Conclusion and Recommendations

This chapter presents summary of the findings based on the objectives of this study. Based on the results, we draw a conclusion and make recommendations on the way forward.

Summary

The study sought to examine how economic growth in Kenya is impacted by gender inequality both in education and in labor force participation using time series data for the duration between 1990 and 2012. The study reviewed various theoretical and empirical literatures on gender disparities and economic growth and found a dearth of literature centering on gender inequality and GDP growth. To achieve its objectives, the study used ARDL model to examine the relationship both in the short and long run between inequality and growth.

The study found that gender disparities in education and inflation negatively influenced economic growth in the short run. An increase in gender inequality in education effected economic growth negatively in Kenya. In the long run, gender disparities in education were also found to have a negating effect on Kenya’s growth path while investment had positive effect. Gender gaps in labor force involvement and openness were found to have no major impact on GDP growth in both short and long run periods.

Conclusion

The study used ARDL to examine the effect of gender inequality in education and labor force participation on economic growth in Kenya. The study established that in the short run, gender inequality in labor force participation, openness and investment did not statistically influence economic growth. Gender inequality in education was found to have a negative

effect on economic growth. The coefficient for gender inequality in education was -3.74730 implying that a unit rise in gender inequality in education would reduce economic growth by 3.75 percent. However, in the long run, gender inequality in education would reduce economic growth by 12 percent. This finding complements the results by Bandiera and Natraj (2013) and Dollar and Gati (1999) who found that increase in gender inequality in education reduces economic development of a country. On the other hand, a unit increase in inflation was found to reduce economic growth by 0.0994 percent in the short run. This finding suggests that a rise in cost of living erodes resources that can be used for wealth generation of a country. Finally the study found that an increase in investment would increase economic growth by 0.4 percent in the long run. Thus investments play a critical role in creating jobs and expanding economic opportunities of a country.

Policy Recommendations

The study found that education equality for both boys and girls plays a critical role in influencing economic growth and development path of a country. Inflation and investments were also found to significantly influence economic growth in Kenya. On the basis of the results of the study, the following recommendations are proposed.

The Kenyan government ought to deliberately formulate policies aimed at reducing gender inequality in education. Such policies should focus on ensuring that the girl child has access to not only primary and secondary education but also university and institutions of higher learning in order to increase gender equality.

Moreover, the Kenyan government should aim at increasing and attracting investment in various sectors of the economy since investments increases economic growth. Some of the investments that government can focus on are investing in infrastructure such as schools, roads and electricity among others.

Finally, the government through central bank should focus on ensuring stable and low inflation rates since high inflation hurts the public through higher prices of goods and services. Stabilization policies will also reduce uncertainties that emanate from fluctuations in inflation rate that discourages investments.

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Appendices

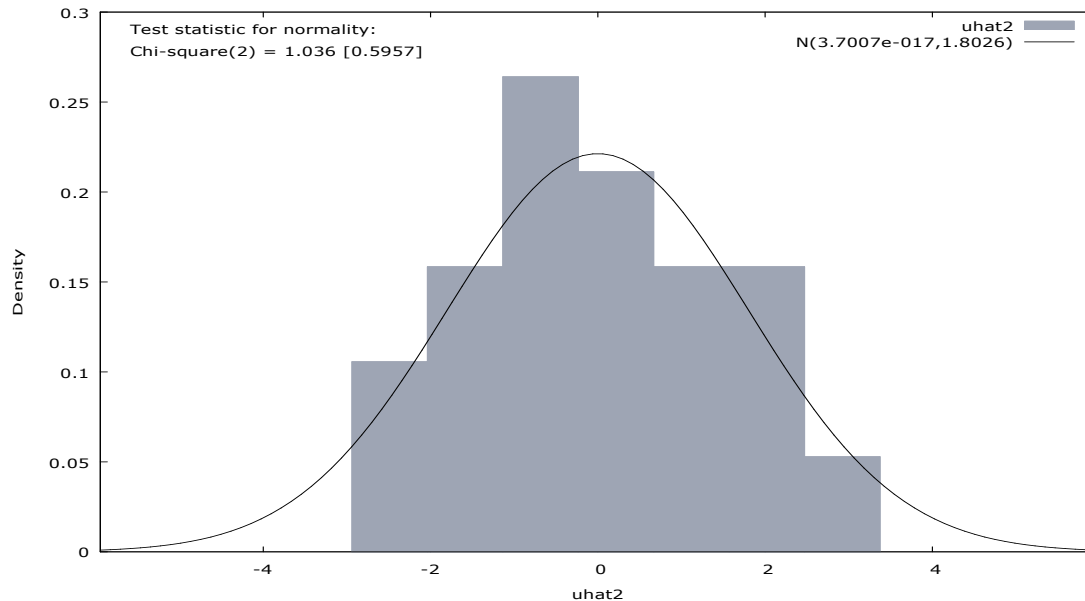
Appendix 1: Test for Heteroscedasticity

Breusch-Pagan test for heteroscedasticity

Test statistic: LM = 3.850670

P-value = $P(\text{Chi-square}(6) > 3.850670) = 0.696876$

Appendix 2: Test for Normality



Appendix 3: Test for Autocorrelation

Breusch-Godfrey test for autocorrelation

Test statistic: LMF = 1.068355,

P-value = $P(F(7, 7) > 1.06836) = 0.466$

Alternative statistic: $TR^2 = 10.847005$,

P-value = $P(\text{Chi-square}(7) > 10.847) = 0.145$

Ljung-Box $Q' = 5.88615$,

P-value = $P(\text{Chi-square}(7) > 5.88615) = 0.553$

Durbin-Watson statistic = 2.05112,

P-value = 0.39654

Appendix 4: Test for Autoregressive Conditional Heteroscedasticity (ARCH)

Null hypothesis: no ARCH effect is present

Test statistic: LM = 9.64368,

P-value = $P(\text{Chi-square}(7) > 9.64368) = 0.209681$

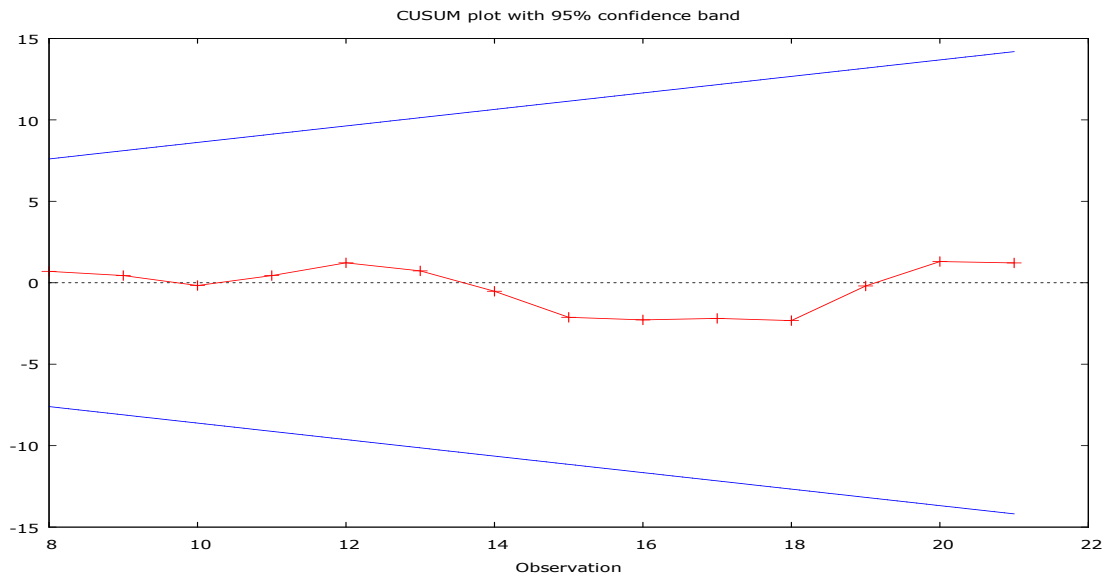
Appendix 5: Test for Model Misspecification

RESET specification test

Test statistic: F = 0.048238,

P-value = $P(F(1, 13) > 0.0482375) = 0.83$

Appendix 6: Test for stability of parameters



CUSUM test for stability of parameters

Mean of scaled residuals = 0.161927

Sigma hat = 1.86303

Harvey-Collier t (13) = 0.325209 with p-value 0.7502