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Effectiveness of Gender Budgeting on Gender Equality:

Evidence from Selected Sub-Saharan Countries.

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the Research Project contains no material previously published or written by another person except where due reference is made in the Research Project itself.

Alusa Grace Ongaya

10-02-2021

This Research Project has been submitted for examination with my approval as the Supervisor.

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ABSTRACT

This paper studied and analyzed the effect, if any, of gender budgeting on gender equality. Studies have been done on the importance of gender equality to governments through growth and development but there is still research needed on whether gender budgeting can lead to gender equality or at least lead to a reduction of gender inequality. Gender budgeting is a strategy to use public spending and collection to reduce the inequality between genders. Government budgets and fiscal measures such as gender budgeting can be key measures to enhance women's development and gender equality. The paper used GDI and GII scores as proxies for gender equality and use an Ordinary Least Squares fixed effect econometric model to model the effect of gender budgeting on variables such GDP, labor force participation, education and health. These scores were tested to find their effect on gender budgeting. The study found that gender budgeting reduces the GII index but has an increasing effect on GDI. The study also concluded then gender budgeting has no effect on GDP which shows that gender budgeting is more significant in increasing the gender equality indexes compared to economic growth. Furthermore, public spending on education and health will lead to an increase in GDI and GII.

CHAPTER 1: INTRODUCTION

1.1. Background to the study

The topic of the relationship between fiscal policy and gender equality is one that has been gaining traction in the world, including in the research world in the previous decades. Papers such as (Akitoby et al., 2019; Butt et al., 2018; L. S. Chakraborty et al., n.d.; Hadia & Siegmann, March 23-24, 2017; Seenivasan, 2018; Siegmann & Majid, n.d.; *Time for equality: Closing gaps, opening trails*, 2010) among others have been published and give disruptive insights into what gender equality is and how fiscal policies have an effect on them. This study aims to find out how effective gender budgeting is in achieving gender equality. The study will also introduce the aspect of gender budgeting, what it means, what it impacts and how it is connected with gender equality. The study begins by explaining what gender equality is and its importance.

Theories by structuralist and Kaleckian macroeconomics mainly focused on finding the link between income inequalities and macroeconomic outcomes. However, it is important to note that they only concentrate mainly on inequalities caused by class. This has brought the need to research and find out how other inequalities such as gender, which affect and are in all economic activities will have an effect on macroeconomic factors.

Neoclassical economics works on an assumption that the market is perfect and that all individuals are rational and use their utility and preferences to make decisions. However, this is entirely true. At times, individuals will also use social determinants and norms when making decisions.

Another critique is that neoclassical economics works on an assumption that households are one unit where all the members' needs are collectively maximized. In real life, social norms, privilege and inequality rule how resources and labor are allocated in the household. Women rarely control the resources though can be put in charge of ensuring resources are spent on family needs and managing the family budget.

Social determinants are things such as poverty reduction, environmental conservation and labor standards. These are all things that are now coming up in conversations and reforms on macroeconomics, debt relief and policies on trade. This begs the question; how will you know that your macroeconomic policies are well constructed? According to (Elson & Cagatay, 2000),this can be done by ensuring that the policies lead the community towards social justice which are equity, social inclusion, distributive justice, provision of needs for everyone without discrimination, which includes gender, and end to poverty.

Gender equality is defined as a situation where access to rights or opportunities is unaffected by gender. Social norms work towards promoting gender inequality. The son preference has led to many sex-selective abortions in many countries such as Korea and Taiwan.

As much as the world has made major milestones in reducing gender gaps, mostly through increase in female education, it estimates by the World Economic Forum that with the progress rate, it will take approximately more than 200 years to finally close the global gender gap in economic participation and opportunity.

Female empowerment is a current phenomenon in the world. Women empowerment and economic development are closely related: in one direction, development alone can play a major role in driving down inequality between men and women; in the other direction, empowering women may benefit development (Duflo, 2012). In this case development is in terms of health, pay, employment, rights, education and political participation.

However, it is also important to note that there are critics to whether gender equality leads to an increase or lag in growth. From (Cuberes & Teignier, 2014), we find that the causal relationship between the two of them is two-way, in that, gender equality can lead to both an increase and a lag in growth. For example, (Berik et al., 2009; Seguino, 2010) find that GDP in some countries has improved positively due to the fact that women's daily and seasonal wage labor in their agricultural sector has made the costs of food production low. In Indonesia and other countries that are semi-industrialized. women's low wages in industries such the textile industry which is low skilled has led to the countries getting more exports and foreign direct investments.

1.2. Problem Statement

Gender inequality has detrimental effects to an economy. It leads to a reduction of productivity of the current and future generations, national income levels, economic growth levels and development in the country. In recent years, there has been a world concern focused on how inclusive growth is. According to (Lahiri et al., 2005) well-being leads to higher productivity currently and in the long run in an economy. To attain gender equality, gender budgeting has been proposed and worked in many countries.

Most studies are focused on evaluating how successful gender budgeting has been implemented in countries however there is a lack of empirical knowledge and analysis of how effective the gender budgeting process is in solving the problem of gender inequality. This is the main focus of this study.

The study will use GDI and GII scores of the countries chosen and work with them as a proxy for gender equality, then create a model that will seek to find how gender budgeting has impacted gender equality in the countries.

1.3. Research Objective

The key objective of the study is to investigate the effectiveness of gender budgeting on gender equality in sub-Saharan Africa: Kenya, Uganda,

Rwanda and Tanzania. The study will also show how gender budgeting is important to improve gender development indices.

1.4. Research Question

Was gender budgeting effective in eradicating or reducing gender inequalities in Kenya, Uganda, Tanzania and Rwanda?

1.5. Scope of the Study

After Australia, Sub-Saharan countries took steps to adopt gender budgeting. South Africa took the lead which led to Uganda and Tanzania following suit and adopting the process. Through fiscal changes and changes in budget making procedures, positive achievement of gender budgeting has been noticed in South Africa, Uganda and Rwanda. The study focuses on countries that have adopted gender budgeting in their budgeting circulars.

Gender budgeting is currently being applied in Kenya, especially with the devolved government. This was hailed by the creation of the National Gender and Equality Commission (NGEC). Gender budgeting has key performance indicators such as increase in access to education, childcare, and health services, increase in employment opportunities for women and end of violence against women.

Uganda adopted gender budgeting formally in 2004/05 and by including a gender budgeting in their budget call circular. The circular has undergone various reforms and changes in the past years with a recent one being in the 2015/16 financial year.

Rwanda adopted gender budgeting in 2002 by adopting gender budget statements and including them in their program budgets. The country has also been commended and noticed for their gender budget statements which are of high quality.

A Women's Budget Initiative, inspired by the government of Australia was started in South Africa in 1995. The country has undergone many improvements on their journey towards fully applying gender budgeting within the following years and have

a well-functioning budgeting process and legal processes for addressing women needs and closing the gender gap.

Tanzania adopted gender budgeting through a non-governmental organization in 1997 which was formed to promote gender equality in the social sectors through the budget. Currently, the country is working on fully incorporating gender budgeting in their government budget.

1.6. Justification of the Study

This study will result in significant benefits in the academia world, to governments and policy makers.

Gender budgeting is done for the purposes of gender equality which is linked with growth and development. In Africa, research on Gender inequality and how it affects the agricultural sector and its productivity shows that, if gender inequality was reduced, it could lead to significant increase in agricultural yields. In Kenya, giving both genders the same level of education and agricultural inputs, it could lead to a more than 20 percent increase in yield from female farmers. In Kenya, the agricultural sector contributes to a huge percentage in the GDP, thus, in the long run, gender equality would lead to an increase in GDP and economic growth.

This study will be helpful to more economies in Africa and the rest of the world which want to practice gender budgeting since it will show them through empirical analysis how gender budgeting has worked in other countries and whether or not they should include it into their budgetary process.

The results will also be beneficiary to policy makers, since with evidence on how gender budgeting would affect gender equality and public spending, policy makers will have precedence on how to make fiscal policies and knowledge on biases that fiscal policies have on gender equality.

CHAPTER 2: LITERATURE REVIEW

2.1. Fiscal Policies and Gender Inequality

A fiscal policy can help a government to attain a human economy if the policies are made in a way that they take care of gender inequalities and biases both in the economic model and in macroeconomic thinking(Butt et al., 2018). In more advanced economies, gender equality through increasing the female workforce is achieved by introducing fiscal policies such as paid maternal leave, individual taxes as opposed to household tax and subsidies such as childcare subsidies.

Macroeconomic policies that aim to achieve income equity and exacerbation of poverty should be gender neutral. However, they face several biases such as the 'male breadwinner bias'. This is a bias that assumes that wages are paid to a male breadwinner who then takes care and provides mainly for his dependents, thus gets state social benefits such access to social services. This has made women mainly dependent on men and they have been excluded from the social benefits.

Another bias is the deflationary bias. Governments are at times forced to turn to contractionary monetary policies to deal with a recession. Nevertheless, they do not take into account the negative and highly disproportionately and discriminative effect this has on women.

2.2. Gender Budgeting and Gender Equality

Governments' are mandated to ensure that they fulfill their international obligation to ensure that their states are gender equal and follow human rights. This mandate can be achieved by gender budgeting.

It means a gender-based assessment of budgets, incorporating a gender perspective at all levels of the budgetary process and restructuring revenues and expenditures in order to promote gender equality. This means that for public expenditures, they will be according to the quota of the expenditure that will affect women. This will in the end solve gender inequality in the society and promote a type of development which is fair and inclusive.

One way of deciding how to plan and formulate a government's budget would be to introduce the aspect of a social process and take into account the poor, women, the disabled among others who would not be included in traditional macroeconomic policy making. Governments at the national, state, and local levels can use budgets and fiscal measures and institutions to promote women's development and gender equality (Kolovich & Leyva, 2019). This does not mean that a budget is created for each gender, however it means that the different impacts a budget has on each gender is put into consideration and policies and allocations are made with this in mind.

For effective gender budgeting, reforms should be made in the administrative systems of a country and the policy making processes. Administrative systems include the monitoring of expenditures and program results while policy making processes are the budgeting and program design processes.

A Gender Responsive Budget (GRB) aims to put into consideration gender as a factor during the budgetary process therefore planning revenue and expenditures in a way that will promote gender equality. This can be done through merging the normal budgeting practice with policy frameworks that cover gender equality and equity. In addition to this, the GRB will aim to allow for consideration of externalities that result from gender gaps.

The main aims of gender budgeting are that it will reduce gender equality which will lead to higher growth, productivity and efficiency in an economy. The following studies and research show how the above aims are linked with gender equality.

2.3. Gender Equality and Growth

One aim of gender budgeting it to increase growth. In order to increase growth, you need to work on three aspects; increase workforce, human capital, investment and total factor productivity. Gender gaps and inequality leads to a low GDP per capita in the labor market. It also leads to low economic growth and acts as a stumbling block stopping the country from competing internationally. According to the World Bank, countries with higher female representation in terms of access to employment, female

goods and good access to markets in terms of gender differences have better economic growth and capacity to compete in the international market.

Increasing the female labor workforce to a point where it is at the same level as that of males, this can increase the Gross Domestic Product of a country(Seenivasan, 2018). In particular, in the USA and in Egypt it will lead to an increase in GDP by five and thirty four percent respectively. It will also lead to a positive impact on productivity through a higher domestic demand which women have. The gender gaps in the labor market according to (Teignier & Cuberes, n.d.) lead to almost twenty seven percent of GDP per capita losses in some places. Having more women in the labor force also fosters diversity which grows to an increase of idea production.

An example is a study (Marzia & Luisa, 2008) which showed that in Africa and South Asia, women's poverty has a positive correlation with time taken with fetching and firewood. It goes further to show that in Tanzania in particular, if this time had been diverted towards paid work it would lead to as many as 5 million jobs for women and reduce the high-income inequality caused by gender.

Increasing human capital is attained by allowing women to have better access to education which will make them use their talents. Another argument for this is that failure to give women equal access to education can be interpreted as a distortion of the market and thus will affect human capital productivity. There is also a connection between women investing more on their children's' human capital thus in the long run having a positive impact on growth. (Klasen & Lamanna, 2009) states that largely due to the impact of female education on fertility and the creation of human capital of the next generation, a lower gender gap will spur economic development.

Aside from this it was found that there is a positive correlation between education of women and high gross national product. In countries where the female-to-male school-enrollment ratio is lower than 0.75, gross national product is approximately 25 percent lower than in countries with greater gender parity in education(King & Anne Hill, 1997)

There is also a correlation between a high access to water, good sanitation, improved electricity and a girl's illiteracy and secondary education. This can also improve a child's cognitive development and health due to the fact they now have free time away from care work(Koolwal & van de Walle, 2010; Njoh et al., 2018). Providing better public forms of education, health, water among others can lead to an increased level of happiness and quality of lives, reduced fights in the household and increase of the time allocated to leisure as seen in Morocco(Devoto et al., 2012).

Finally, increasing investment can be achieved by ensuring women have equal rights when it comes to property thus using it to be able to receive loans and credit to start businesses. Having women have better property rights can also increase the overall household production in terms of agriculture, due to efficient usage and sharing of resources between both genders.

Another pathway is through the care economy which (Butt et al., 2018) defined as paid and unpaid care work. Mostly women are affected by unpaid care work. As shown previously, when women lose their jobs, they resort to work that has poor working conditions and wages such as unpaid care work. This has implications on their societal and economic life, time and even health. Mothers are drained by the double work of taking care of their families both through care and financial which can prove to be detrimental to their health.

2.4. Gender Equality and Equitable Development and Human Rights.

Governments such as India, South Korea, Afghan and Asia advocating for gender budgeting mention eradication of gender inequality and empowering women as their key motivation(L. Chakraborty, 2016; Kolovich et al., 2016). Women and girls suffer greater when it comes to social and economic facets and achieving equality through gender budgeting will be a step in itself towards equitable development. During a recession, women in the formal sector lose their employment much quicker than their male counterparts (Elson & Cagatay, 2000; United Nations. Division for the Advancement of Women, 1999).

Women also face a higher chance of getting their wages reduced yet they are more represented in the public sector employment and are already more vulnerable due to discriminatory social norms and occupational bias due to their gender(Berik et al., 2009). On losing their jobs, they resort to the private sector where they get poor working conditions and low wages. This has been found in studies in Egypt, Uganda, Ethiopia and Cote d'Ivoire (Appleton et al., 1999; Wolf & Kabeer, 1995).

With the introduction of the Sustainable Development Goals (SDGs) by the United Nations, in particular SDG 5 which states that providing women and girls with equal access to education, health care, decent work, and representation in political and economic decision-making processes will fuel sustainable economies and benefit societies and humanity at large.(Nations & United Nations, 2019).

Another argument for the need for gender equality for women and girls is that it leads to development for children and society. In Pakistan, it was found that children had higher grades and spent an hour more reading if their mothers went to school. In Nepal, the children had a better level of health while in India, the more women were given political representation, the better public goods were provided to the society.

There is also a positive impact on public expenditure on human rights on gender development indicators such as the UNDP's Human Development Index (HDI) and the Gender Development Index (GDI). A study by (L. S. Chakraborty et al., n.d.; Lahiri et al., 2005) found that in the period 1993-2005, there was a 0.33 percent increase in the UNDP's HDI and a 0.06 percent increase in GDI with a 1 percent increase in spending on education and health.

CHAPTER 3: RESEARCH METHODOLOGY

This section employs an econometric estimation of gender equality determinants such as GDI and GII acting as proxies for gender equality. The model is similar as the one used by (L. S. Chakraborty et al., n.d.) in a similar discussion.

3.1. Data and Sampling

The data used in this paper will be mainly collected from the World Development Indicators (WDI) database on gender statistics, and world development indicators and the International Monetary Fund (IMF) database on gender indicators for the years 2004-2019.

3.1.1. Gender Development Index (GDI)

There are three social elements of choice and well-being according to the United Nations Development Program. These are the ability to; get education and knowledge, get resources for decent living and to lead a healthy life. In order to achieve this, the Human Development Index was created since it gets the levels of the three elements using a geometric mean that is gender neutral. The GDI is a derivative of the HDI since it uses the same variables of achievement but measures them as per gender. These equally distributed indexes of achievements will now be termed as (X_{edi}).

According to (Lahiri et al., 2005), the equally distributed index X_{edi} for any variable X using a function with a constant elasticity marginal valuation of 2 will be calculated by:

$$X_{edi} = [p_{sf}(\frac{1}{X_f} + p_{sm}\left(\frac{1}{X_m}\right)]^{-1} \quad (1)$$

Where X_f and X_m are the values of the variables for males and females, p_{sf} and p_{sm} are the population shares for males and females.

Denoting adult literacy percent as A, life expectancy at birth in years as L, gross primary, secondary and tertiary enrolment ratio percent as E and GDP per capita as Y this is in PPP United States in purchasing power parity.

From this, the GDI will now be calculated as:

$$\text{GDI} = \frac{(\ Ledi + \frac{2}{3}Aedi\ + \frac{1}{3}Eedi\ ) + Yedi}{3} \qquad (2)$$

3.1.2. Gender Inequality Index (GII)

The GII uses geometric mean to measure the inequality between genders across three main facets: reproductive health which uses the maternal mortality ratio (MMR) and the adolescent fertility rate (AFR) as proxies, women empowerment which uses parliamentary political representation by each gender (PR) and secondary education rate per gender (SE) as proxies, and economic activity which uses the labor force participation rate (LFPR) as a proxy. It is used to show where gender gaps are and could be closed.

The GII replaced the GDI in 2010 and it shows how much less development a country is facing due to gender inequality. To understand it, we use a score of 0 to mean full equality while a score of 0 means full inequality. The higher the GII the higher the gender inequality and loss in human development is. It is important to note that, since you cannot find a mean for a value that is 0, for all the outlier values, a minimum of 0.1 is set for calculation purposes. For the MMR, we set a maximum and a minimum rate, this means, 1000 deaths per 100000 births is the maximum and 10 deaths per 100000 births is the minimum.

To calculate the reproductive health geometric mean, there are two different formulas for each gender, male and female.

For females:

$$RH_f = \sqrt[3]{\left(\sqrt{\left(\frac{10}{MMR} \cdot \frac{1}{AFR}\right)} \cdot \sqrt{\left(PR_f \cdot SE_f\right) \cdot LFRP_f}\right)} \tag{3}$$

For males:

$$RH_m = \sqrt[3]{\left(1 \cdot \sqrt{\left(PR_m \cdot SE_m\right)} \cdot LFRP_m\right)} \tag{4}$$

From this, we then get the harmonic mean index (HARM) which shows us the inequality between the genders by finding the average per gender.

$$HARM\left(RH_f, RH_m\right) = \left(\frac{\left(\left(RH_f\right)^{-1} + \left(RH_m\right)^{-1}\right)}{2}\right)^{-1} \tag{5}$$

To ascertain that both genders have equal weighting per the three facets, we use the geometric means of the arithmetic means to get a composite index.

$$CI(\overline{f},\overline{m}) = \sqrt[3]{(\overline{Health} \cdot \overline{Empowerment} \cdot \overline{LFPR})} \tag{6}$$

Where

$$\overline{Health} = \left(\frac{\sqrt{\left(\frac{10}{MMR} \cdot \frac{1}{AFR} \right) + 1}}{2} \right) \tag{7}$$

$$\overline{Empowerment} = \left(\sqrt{\left(PR_f \cdot SE_f \right)} + \sqrt{\left(PR_m \cdot SE_m \right)} \right) \tag{8}$$

$$\overline{LFPR} = \frac{\left(LFPR_f \cdot LFPR_m \right)}{2} \tag{9}$$

In the end, we will calculate GII using:

$$GII = 1 - \frac{HARM\left(RH_f, RH_m \right)}{CI(\overline{f},\overline{m})} \tag{10}$$

As much as the GII is helpful, there are many criticisms of it. The main criticism is that it tries to merge both genders together yet some of the variables it uses such as AFR and MMR only represent the female gender. These two variables do not have figures for the male gender thus we assign a value of 1, however, this leads to overestimation of the gap when it comes to reproductive health. Another problem is that, in poor countries, the reproductive health gap may be due to poverty or a poor health sector as opposed to a gender gap but this cannot be distinguished from the reproductive health calculation.

When it comes to the measure of women empowerment, the formula only focuses on the national parliamentary seat's women hold, yet, in many countries there are other positions of political power such as in the local municipalities and other government branches.

Previously in the paper, we mentioned the care economy, this economy is ignored in the calculator for the LFPR which only dwells on the market economy. The care economy, especially the unpaid care work should be put into consideration since it boosts the GDP for a country.

3.1.3 Econometric model

The research question we aim to answer is whether the gender budgeting (GB)process has any impact, negative or positive, on gender equality (GE) in the Sub-Saharan Region, with concentration of Kenya, Rwanda, Tanzania and Uganda. Using the calculated GDI and GII scores, we will be able to measure the countries gender equality and inequality levels.

The model we propose to use will be:

$$GE_u = \propto + \beta_1 GB_{it} + \beta_2 X_{it} + \mu_{it} \tag{11}$$

where X represents the control variable (log of public spending on education, log of public spending on health, female LFPR and GDP per capita) and gender equality is proxied by GDI and GII.

The first model used will compare the effect of GII on gender budgeting and the control variables while the second model will be testing the effect of GDI on the gender budgeting and the control variables. The study will also include an estimation where the gender budgeting variable is lagged twice. This is to cover for a case where the effects of gender budgeting are not applied to the variables immediately and are rather applied in the long run.

The gender budgeting variable will be measure by the use of a dummy variable which will take a value of 1 of the country has gender budgeting in their annual budget and 0 if it does not. On the year the country started adopting a gender budgeting process, the value changes to 1.

The effect of gender budgeting on gender equality using a panel data approach. An ordinary least square (OLS) and fixed effects specification will be applied in the econometric model.

CHAPTER 4: RESULTS AND ANALYSIS

4.1 Preliminary tests

4.1.1. Summary statistics

Before any regression is done, it is important to do summary statistics in order to find out information such as measures of central tendency, measures of dispersion and measures of normality.

The results from the normality test were as follows:

Descriptive Statistics

Variables	Obs	Mean	Std.Dev.	Min	Max	Skew.	Kurt.
gb	64	.875	.333	0	1	-2.268	6.143
gii	64	.536	.065	.412	.662	-.396	2.508
gdi	64	.91	.032	.854	.954	-.602	1.902
gdp	64	2108.492	712.774	845.007	4521.479	1.313	5.611
pedue	64	4.068	1.359	1.742	7.336	0.254	2.659
phltex	64	6.775	1.981	3.629	11.793	0.666	3.087
flfpr	64	75.085	8.839	60.282	87.16	-.078	1.301

Table 1: Descriptive statistics of variables.

From these results, we can see that the leptokurtic variables are gb and gdp since they have a kurtosis value of more than 3. It can also be observed that flfpr, pedue. gdi and gii have a kurtosis of less than 3 thus are platykurtic. Only phltex is mesokurtic and this is because it has a kurtosis of 3.

On explaining the skewness values of the variables, gii, pedue and flfpr have a normal skewness. Their values lie between a threshold of -0.5 and 0.5. The highly skewed

variables are gb and gdp, this is because their values are more than -1 or 1. The negatively skewed variable is gdi while the positively skewed variable is phltex.

4.1.2. Test for cross-sectional dependence

It is key to check if there is cross-sectional dependence of errors in the data. This is important because it determines the unit root test that will be applied in the analysis. The Pesaran's (2004) Cross-sectional Dependence is the test that was used for our variables, it yielded the following results for the models:

Ho:no cross-sectional dependence

Ha: cross-sectional dependence

Test	Pesaran's Test	Model 1(GII)	Model 2(GDI)
P - Value		0.0480	0.0376

Table 2: Test for cross-sectional dependence

The two models both had a p-value that was lesser than 0.05 thus the decision made was to reject the null hypothesis. This means we have no cross-sectional dependence and a first-generation unit root test should be applied.

4.1.3. Test for unit root

It is important to confirm stationarity before analysis. This can help avoid a spurious regression and to confirm that standard tests result on variables are valid. The data used in this project was highly balanced. The fisher-type unit root test was used will a null and alternative hypothesis of:

Ho: Unit root

Ha: No unit root

Variable	Statistic	P - Value
gdi	-3.1740	0.0008
gii	-3.1746	0.0008
dlgdp	-1.2892	0.0424
dlphltx	-4.8721	0.0000
flfpr	-3.0515	0.0011
lpedue	-3.0540	0.0011

Table 3:Test for unit root

Lgdp and lphltx were not stationary on the first test but after one difference, they became stationary.

4.1.4. Test for Autocorrelation

The Wooldridge test for autocorrelation in panel data was used to check for first order serial correlation in the models. The following results were found,

Ho: no first-order autocorrelation

Ha: first-order autocorrelation

Test	Wooldridge test for autocorrelation in panel data	Model 1(GII)	Model 2(GDI)
P - Value		0.0029	0.0108

Table 4:Test for Autocorrelation

This means that we reject the null hypothesis of no first-order autocorrelation as the p-value is less than 5%. Hence it is seen that our data is not autocorrelated.

4.1.5. Test for Normality

Apart from the results from the descriptive statistics, a Shapiro-Wilk test was done. This test helps find how likely a variable is to follow a normal distribution. From the results of the test, it is clear that only dlphltx and lpedue are likely to follow a normal distribution. The graphs for the variables also show the same results.

The test has the following hypotheses:

Ho: There variable normally distributed

Ha: The variable is not normally distributed

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
gdi	64	0.878	7.004	4.211	0.000
gii	64	0.944	3.198	2.515	0.006
gb	64	0.830	9.749	4.927	0.000
flfpr	64	0.846	8.796	4.704	0.000
dlgdp	56	0.896	5.327	3.591	0.000
dlphltx	56	0.966	1.767	1.222	0.111
lpedue	60	0.969	1.672	1.108	0.014

Table 5:Test for Normality

4.1.6. The Hausman Test.

In order to choose between a random as opposed to a fixed effect model a Hausman test had to be done. The hypotheses for the Hausman test were:

Ho: Random Effects model is preferred.

Ha: Random Effects model is not preferred

Model 1 (GII) Hausman (1978) specification test	
	Coef.
Chi-square test value	4.459
P-value	.415

Model 2 (GDI) Hausman (1978) specification test	
	Coef.
Chi-square test value	127.45
P-value	0

Table 6: The Hausman Test.

The results show us that both models would work better with a fixed effect models as opposed to a random effects model.

4.1.7. Test for Heteroscedasticity.

Heteroskedasticity occurs when there is a systematic change in the values of the residuals over a range of values. The Modified Wald test for groupwise heteroskedasticity in fixed effect regression model was done using the hollowing hypotheses:

Ho: Error variances are equal

Ha: Error variances are a multiplicative function of one or more variables

	Model 1(GII)	Model 2 (GDI)
P-value	**0.0215**	**0.0000**

Table 7: Test for Heteroscedasticity.

From the results above, it can be seen that there is a heteroskedasticity problem in the regressions run. To correct for this, the model used will have to have robust standard errors.

4.2. Econometric model estimation

4.2.1. OLS Regression

On regressing the first model (Table1 and Table 2), both the regression with a gender budgeting and a lagged gender budgeting had a significant f-statistic which means the model can statistically explain and predict GII.

In table 1, the independent variables can explain 57.2% of the variance in GII. The significant variables are gdi, gb, dlgdp, lpedue and the constant. Gender budgeting causes a negative 0.016 decrease in GII; however, GDP has a zero effect while GDI has a negative 0.016 effect on GII in the model. The log of public spending on education causes a 0.01 increases in GII, log of public spending on health causes a 0.008 increase in.

In table 2, with a lagged gender budgeting variable, the independent variables explain 59.3% of the dependent variable GII. All the variable apart from flfpr and dlgdp are significant. A lagged gender budgeting variable causes a decrease of 0.03 on GII but again with a zero effect from GDP. The log of public spending on education causes a 0.01 increases in GII, log of public spending on health causes a 0.008 increase in GII.

In table 3 and 4, it is clear that the f-statistic is significant and can explain the table. The independent variables explain 45.3% of the dependent variable GDI. The gender budgeting variable in table 3 causes an increase in GDI by 0.025. All the variable apart from dlphltx, lpedue, and dlgdp are significant. A unit change in dlgdp causes a zero change in GDI. The log of public spending on education causes a 0.01 increases in GDI, log of public spending on health causes a 0.002 increase in GDI.

In table 4, the independent variables explain 38.6% of the dependent variable GDI. The lagged gender budgeting variable causes an increase in GDI by 0.02. All the variable apart from dlphltx, lpedue, and dlgdp are significant. A unit change in dlgdp causes a zero change in GDI. The log of public spending on education causes a 0.01 increases in GDI, log of public spending on health causes a zero change GDI.

From the OLS regression, it is clear that GDP has a zero effect on the gender equality indexes. However, the log of public spending and log of public spending on health mainly cause an increase in the gender equality indexes. Gender budgeting, which is the important variable in the study cause an increase in GDI but a decrease in GII.

Table 8: GII Regression results

Table 8: GII Regression results

gii	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig
gdi	-.849	.32	-2.65	.011	-1.494	-.204	**
gb	-.016	.018	-0.93	.045	-.052	.019	*
flfpr	.003	.002	-1.64	.107	-.006	.001	
dlgdp	0	0	-0.12	.904	0	0	
dlphltx	.008	.004	1.79	.08	-.001	.017	*
lpedue	.01	.005	2.05	.046	0	.02	**
Constant	1.494	.355	4.21	0	.779	2.208	***

Mean dependent var	0.531	SD dependent var	0.064
R-squared	0.572	Number of obs	56.000
F-test	10.231	Prob > F	0.000
Akaike crit. (AIC)	-288.349	Bayesian crit. (BIC)	-274.172

*** $p<.01$, ** $p<.05$, * $p<.1$

Table 9: GII Regression results with lagged gb

Table 9: GII Regression results with lagged gb

gii	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig
gdi	-.749	.297	-2.53	.015	-1.346	-.152	**
lngb	-.03	.016	-1.81	.076	-.063	.003	*
flfpr	.002	.002	-1.42	.162	-.005	.001	
dlgdp	0	0	0.49	.624	0	0	
dlphltx	.008	.004	1.86	.07	-.001	.017	*
lpedue	.01	.005	2.23	.031	.001	.02	**
Constant	1.366	.325	4.21	0	.713	2.019	***

Mean dependent var	0.531	SD dependent var	0.064
R-squared	0.593	Number of obs	56.000
F-test	11.156	Prob > F	0.000
Akaike crit. (AIC)	-291.171	Bayesian crit. (BIC)	-276.993

*** $p<.01$, ** $p<.05$, * $p<.1$

Table 10: GDI Regression results

Table 10: GDI Regression results

gdi	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
gii	-.156	.059	-2.65	.011	-.274	-.037	**
gb	.025	.007	3.70	.001	.011	.038	***
flfpr	.002	.001	-3.16	.003	-.004	-.001	***
dlgdp	0	0	-0.34	.733	0	0	
dlphltx	.002	.002	1.00	.322	-.002	.006	
lpedue	0	.002	0.19	.848	-.004	.005	
Constant	1.135	.063	17.90	0	1.007	1.263	***

Mean dependent var	0.912	SD dependent var	0.033
R-squared	0.453	Number of obs	56.000
F-test	6.359	Prob > F	0.000
Akaike crit. (AIC)	-383.251	Bayesian crit. (BIC)	-369.074

*** $p<.01$, ** $p<.05$, * $p<.1$

Table 11: GDI Regression results with lagged gb

Table 11: GDI Regression results with lagged gb

gdi	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig
gii	-.163	.064	-2.53	.015	-.292	-.033	**
lngb	.02	.007	2.67	.01	.005	.034	**
flfpr	.002	.001	-2.51	.016	-.003	0	**
dlgdp	0	0	-0.62	.538	0	0	
dlphltx	.001	.002	0.68	.498	-.003	.006	
lpedue	0	.002	-0.19	.847	-.005	.004	
Constant	1.118	.067	16.67	0	.983	1.253	***

Mean dependent var	0.912	SD dependent var	0.033
R-squared	0.386	Number of obs	56.000
F-test	4.816	Prob > F	0.000
Akaike crit. (AIC)	-376.723	Bayesian crit. (BIC)	-362.546

*** $p<.01$, ** $p<.05$, * $p<.1$

CHAPTER 5: CONCLUSION

The study assesses the influence of gender budgeting in East Africa and captures the relationships between gender budgeting which was denoted as a dummy variable, gender equality indexes (GII and GDI) which were the dependent variables, and control variable such as log of public spending on education, log of public spending on health, female LFPR and GDP per capita. The study tries to bring a quantitative side to the many studies that have been done on the effectiveness of gender budgeting in East Africa which are mostly qualitative.

From the results of the regression, the study finds that gender budgeting and a lagged gender budgeting variable causes a negative effect on the index GII, however it causes an increase in the GDI index. In all the cases, it is important to note than GDP has a zero effect on gender equality and its indexes. This shows that gender budgeting is more significant in increasing the gender equality indexes compared to economic growth.

Despite that, it is clear that public spending on education and health will lead to an increase in GDI and GII. Therefore, if gender budgeting is improving gender equality through education and health, it is through higher public spending on the two.

The quantitative effect of laws associated to gender budgeting on the gender equality is beyond the scope of the study and can be investigated in future studies.

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