Effect of Macroeconomic, Demographic, and Governance Factors on Income Inequality of Selected sub-Saharan Africa Countries

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Abstract. *This research tried to look effect of macroeconomic, demographic, and governance factors on income inequality in 34 sub-Saharan Africa countries by using unbalanced panel data spanning from 2010 to 2017. Two-step System GMM estimation is used for the econometrics analysis of the Dynamic Panel Data model. The finding revealed income inequality has a dynamic nature. Also, Kuznets' hypothesis is worked in these countries: where economic growth is found to have a significant increasing effect on income inequality in short-run while in the long run, its' effect is significant and decreasing. Population growth is the other variable that is found to have an increasing impact on income inequality. Differently, FDI and low perception of corruption decrease income inequality. Therefore, much focus will have to be given to achieve sustainable development objectives, promoting FDI, and controlling corruption. Also, managing the population growth is important.*

Keywords: *Effect, Income Inequality, Two-step system GMM, Sub-Saharan Africa.*

1. Introduction

Economic growths which promote equity become one important macroeconomic objective that countries try to achieve (Heshmati and Kim, 2014). Over the past two decades, Africa has been in high economic growth where the average gross real domestic product (GDP) had been reached 5% in 2001- 2014, rising from just above 2% during the 1980-90s. Even if this growth had been moderate in 2015 and 2016, where the growth was 2.2 %, it recovered in 2017 and became 3.6%. Specifically, East Africa leads the growth miracle, followed by West Africa and Central Africa, and is lowest in Southern Africa and North Africa (AfDB, 2018).

Africa's socio-economic variables have not, however, matched this impressive economic performance; poverty and higher levels of inequality remains a feature of many African economies (Bhorat et al., 2016). Widespread poverty and income inequalities that continue to prevail across the continent are still problems Africans are facing (AfDB, 2012). Africa, while the growth is in progress and in addition to be the poorest regions in the world, takes the rank of the second most inequitable region next to Latin America. Specifically, 10 out of the 19 most unequal countries globally are located Sub-Sharan Africa (Odusola et al. 2017).

Compared to the rest of the developing world, a higher level of mean and median inequality measured by Gini is recorded in the region 0.43 and 0.41 respectively while it is 0.39 and 0.41 in the earlier case (Bhorat et al., 2016). The richest population which accounts less than five percent of the total population holds 18.8% of the total income in Africa, while the poor who account for 60.8% of Africa's population holds 36.5% of total income in Africa. The rest is middle-income population (Mubila et al., 2012). Specifically, the problem is serious in sub-Sharan Africa countries. For example, in this sub-region, the share of total national income accounted for by just that nation's top 10% earners is around 55 % (World inequality report, 2016).

According to Tridico (2017) and Thomas et al (2019), inequality results an unstable political system and leads easily to economic instability. Income inequality undermines the economy and restricts the trickle-down effect of economic growth (Nolan and Valenzuela, 2019). It influences the growth transformation to poverty reduction (Fosu, 2017). It has not also diminished over time. Many reasons have been raised, both theoretical and empirical, for this high inequality. The influential inverted---U hypothesis presented By Kuznets (1955) is one among the others and essentially predicts that inequality is related to the economic development in a country. In the early stages of development, countries are relatively equal, but during the process of industrialization, income inequality will rise. Subsequently, income inequality will decrease when a country reaches a certain level of development, and a trickle-down effect has benefitted the lower layers of society. Other scholars, for example, van der Walle, (2009); Bigsten and Shimeles, (2004), suggest the high level of initial inequality in SSA is related with the way colonial institutions are shaped in the region by the natural endowments. These institutional arrangements paved the way to transferred wealth to only a small group of African elites after independence. They created the conditions for the high levels of inequality found today. Beyond this, the initial distribution of resources is determined by sub-national tensions (ethnicity, religion, and, or race). For Bigsten (2018) the major determining factor behind level and evolution of income inequality in the region is nature of asset ownership. On the other side, Odusola et al., (2017), classified the basic structural drivers of inequality in the region into the highly dualistic economic structure, the high concentration of physical capital, human capital and land in specific groups or areas and the limited distributive capacity of the state.

Specifically looking, the limited distributive capacity of the state directly relates to governance and institutional issues in sub- Sharan Africa countries. Governance involves in government policies to allocate resources for poverty alleviation and reduce economic inequality (Chiung-Ju and Yuan-Hong, 2018). Theoretically, the Government has the central role of Promoting economic development and growth (Gil and Ira, 2017). Political institutions and democracy influence how income and wealth are distributed in society (Juzhong et al., 2010). So, Government has a potential to play a vital role in reducing inequality through different channels including effective management of public funds and investment, leave fiscal space for targeted social protection policies for the most vulnerable and regulating market structures. However, African countries in general and sub-Sharan Africa countries ,in particular, are performing poorly in

governance measures, including following democratic processes, capacity to design and implement effective policies, regulate efficiently, and the political will to eradicate negative elements such as corruption (UNDP, 2016).

The empirical world, the literature on governance and institutions has mostly focused on their relationship with economic growth. Specifically, Literature in sub-Sharan Africa, which tried to look at their link with income distribution and inequality are scanty. Therefor in this research, in addition to other macroeconomic and demographic variables, the emphasis has also been given to look at the effect of different governance indicators on income inequality in sub-Saharan Africa countries. Therefore, assessing the impact of governance on income inequality could provide insight on effectiveness of governance in addressing income inequality problem in sub-Sharan Africa countries. Specifically, it answers how political instability, regulatory quality, and perception of corruption affect income inequality in these countries. Besides, since income inequality and its determinants have dynamic nature, there is always a need for new research which investigates what type of relationship they have. Moreover, to capture the dynamic nature of income inequality, we employed a dynamic panel data model estimated by Generalized Method of Moments (GMM).

2. Literature review

Earlier, following the trickle-down theory, researchers gave much emphasis on what determines economic growth of a country and its relation to income inequality. However, a strong emphasis on growth as the only solution for poverty and extreme inequality without determined efforts for the diminution of inequities has failed to show its beneficial outcome in much of the developing world, leaving the societies less harmonious with sharp sectoral divisions (Mughal and Diawara, 2009).

Consequently, efforts have been made by scholars to explore the determinants of income inequality in Africa countries. An early work by O. Odedokun and Jeffery I. (2004), found economic development attained, regional factors, size of government budget and the amount of it devoted to subsidies and transfers, phase of economic cycle, share of agricultural sector in total labor force, as well as human and land resources endowment are factors which affected income inequality . But inflation and openness to trade are found insignificant. On the other study, Anyanwu (2011) found international migrant remittances, per capita GDP, and inflation rate have a significant and increasing effects on income inequality while education has found to have a significant and reducing impact on income inequality. Anderson et al. ,(2015) found, for low and middle-income countries, certain types of spending such as government social spending and government consumption spending have a moderate negative impact on income inequality while for the case of total government spending they found evidence of a moderate positive relationship with income inequality.

Anyanwu (2016) found income inequality has a dynamic nature in South Africa countries. He also found the existence of the Kuznets curve in the sub-region while access to secondary education and natural resources dependence have strongly and significantly equalized income. On the other hand, population growth and domestic investment rate appear to be income dis-equalizing. Public expenditure has no significant effect on income inequality. On the other study, Anyanwu et al. (2016) shows income inequality has a dynamic nature, and the Kuznets curve exist in West Africa countries. Their results also show that access to secondary education (skill premium) social globalization, age dependency (for net income inequality), and democracy strongly and significantly equalize income in West Africa. The authors found that population

density, natural resources dependence, domestic investment rate, government consumption expenditure, trade openness, inward foreign direct investment, international remittances, and civil conflicts appear to be income dis-equalizing in the sub-region.

3. Data and Methodology of the Study

This study used secondary data, the unbalanced panel in nature spanning 2012-2017 for 34 sub-Sharan Africa countries, obtained from various institutions. Different international sources were used to get the required data. Data for the dependent variable (Gini coefficient) were collected from the Standardized World Income Inequality Database (SWIID) 2018. This data set has advantage over the other sources of income inequality data by addressing the issue of comparability (Kaulihowa and Charles, 2017). Data for economic growth, inflation, foreign direct investment, and population growth rate are from World Development Indicator, which released in 2018. Data for institutional quality, which include political instability and regulatory quality, were from word governance indicator of World Bank 2019. Corruption data is from transparency international corruption perception index from 2010-2017, and the higher value indicates less corruption prevalence. Data for financial sector development and general government expenditures were from IMF world economic outlook 2018.

Theoretical and empirical evidence shows there are important macroeconomic variables that significantly affect income inequality. Besides, most macro variables and economic relations are dynamic in nature. Income inequality has a dynamic nature in which the current level has likely been affected by the previous period(s); since it changes very slowly (Anyanwu, 2016). To capture this characteristic, it is better to use Lagged Dependent Variables (LDV) models, often known as a dynamic panel data model. It can be created by introducing the lagged dependent variables to either fixed or random-effects models.

According to Judson and Owen (1996), forming a dynamic panel model on the fixed effects model is more appropriate than a random-effects model for many macro datasets because of two reasons. One, if the individual effect represents omitted variables, it is highly likely that these country-specific characteristics correlate with the other regressors. Two, it is also reasonably expected that a typical macro panel will contain most of the countries of interest (which is also the case of this research) and, thus, will be less likely to be a random sample from a much larger universe of countries. Because of these reasons the econometric working (dynamic fixed-effect models) models to estimate the determinants of income inequality was specified as follows;

$$Gini_{it} = \beta_i + \beta_1 Gini_{it-1} + \beta_2 lnGDP_{it} + \beta_3 lnGDP2_{it} + \beta_4 INF_{it} + \beta_5 FDI_{it} + \beta_6 FSD_{it} + \beta_7 FSD_{it} + \beta_8 PGR_{it} + \beta_9 PI_{it} + \beta_9 RQ_{it} + \beta_9 COUR_{it} + \varepsilon_{it}$$

Where, $Gini_{it}$; Gini index which measures income inequality; $Gini_{it-1}$: previous year income inequality; $lnGDP_{it}$: Economic growth of countries; $lnGDP2_{it}$ economic growth of countries in the long run measured by GDP per capita (constant 2010 US$) ; INF_{it}: Inflation rate measured by GDP deflator; FDI_{it}: Foreign direct investment per unit of GDP; FSD_{it}: Financial sector development measured by credit extended to the private sector per GDP; PGR_{it}: Population Growth rate; PI_{it}: Political Stability and Absence of Violence/Terrorism which measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. Since this value is between -2.5 and 2.5, from the worst to the stable, in this research it is a dummy variable which takes 1 for score greater than or equal to 0 and 0 for the value less than 0;RQ_{it}:

Regulatory quality which Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Similarly, this value is between -2.5 and 2.5, from the weak to the strong, in this research it is a dummy variable which takes 1 for score higher than or equal to 0 and 0 for the value less than 0; $COUR_{it}$: level of corruption with a value from 0 to100 that is from highly Corrupt to very clean and: ε_{it}: stochastic error term.

The common fixed estimator is inconsistent to estimate this dynamic panel model having small Time and large number of observations (Kazuhiko and Meng, 2019). So, we used the system GMM estimator which is fully developed by Blundell and Bond (1998) that estimates both the levels equation and the difference equation.

The system GMM estimator, that solve endogeneity problem, combines the standard set of equations in first differences with suitably lagged levels as instruments, with an additional set of equations in levels with suitably lagged first differences as instruments. So, our model is estimated by using system GMM in which lagged first differences and lagged levels are used as instruments. In the du process, the validity of the additional instruments is tested by using Sargan/Hansen tests of over-identifying restrictions. Relatively Short time periods and highly persistent time series are common characteristics of country-level panel data used in empirical growth analysis (Kamara, 2013). Having such features also in this research, System GMM gives an efficient estimator with low bias and highest efficiency (Bond et al., 2001).

4. Results and Discussion

To look proper specification of the model and the issue of the autocorrelation, the results of the Sargan test and autocorrelation test of order one and order two are used. The Hansen over-identification test shows the instruments used in the model are not over-identified since its p-value is 0.346, which is higher than 0.05. In the regression, the null of no autocorrelation is also tested using the AR (1) and AR (2). The first-order autocorrelation test for the models rejects the null. But, according to Roodman (2007), giving a conclusion depending on this test is not advisable since it depicts the presence of autocorrelation, and hence, there is a need to undertake a second-order autocorrelation test which is dependable. So, second- order Autocorrelation is important. Therefore, the results of second-order autocorrelation show the model has no serial correlation problem since it has a high p-value (0. 667).

Looking at the significance of the regressors, the first lag of the dependent variable is statistically significant at 1% level of significance with a positive sign. The result implies that the past level of income inequality has an increasing effect on current income inequality. Thus, in sub-Sahara countries, income inequality is characterized by a situation in which the previous level hinders a rapid and dramatic change in the current level of income inequality. In short, income inequality has an inertia effect. Empirically, this finding is in line with that of Calderon and Chong (2001), Dincer and Gunalp (2012), Mahmood and Noor (2014), and Anyanwu (2016) findings that show current inequality is affected by previous level inequality.

The result also revealed that Economic growth has a positive and significant effect on income inequality in the short-run while its long-run effect is negative since GDP and GDP2 are significant at a 5 percent significance level with negative and positive signs, respectively. In short-run, holding other determinants of income inequality constant: an increase in economic growth by 1% result 1.251 percent increase in income

inequality in these Sub Sharan countries. But in the long run, 1 % economic growth results 0.077 decreases in income inequality in these countries.

Table 1: two-step system GMM result

GINI	Coef.	St.Err.	t-value	p-value	Sig.
L.GINI	0.999	0.017	57.88	0.000	***
lnGDP	1.251	0.616	2.03	0.042	**
lnGDP2	-0.077	0.037	-2.10	0.036	**
INF	0.000	0.002	0.01	0.995	
FSD	0.005	0.005	1.00	0.316	
FDI	-0.002	0.001	-2.83	0.005	***
PG	0.147	0.060	2.46	0.014	**
PI	0.031	0.112	0.28	0.778	
RQ	0.256	0.180	1.42	0.156	
COUR	-0.021	0.012	-1.72	0.085	*
Year dummies	Yes	.	.	.	

Arellano-Bond AR(1)= Pr > z = 0.003	Hansen test	Prob > chi2 = 0.346
Arellano-Bond AR(2)= Pr > z = 0.667	Wald chi2	Prob > chi2 = 0.000
Number of instruments= 37	Number of obs = 263	

*** p<0.01, ** p<0.05, * p<0.1

Source: 'Stata 13' results

Accordingly, the finding supports Kuznets's hypothesis in sub-Saharan Africa countries, where income inequality is expected to increase in the initial stage of economic development and will decrease in the long run. This result can be looked as robust where there are countries in this region that have been recording economic growth recently, but still job creation of these economies is very slow (AfDB, 2018). Unemployment is a common problem in sub-Sharan Africa and has reached 7.31% in 2017 from 6.83 % in 2011, while many of these region countries have been achieved impressive economic growth (WB, 2018). This unemployment has retarded poverty reduction of economic growth and increases income inequality. Empirically, results that support the Kuznets's hypothesis were also observed O. Odedokun and I.Round (2001), Ospina (2010) and,

Anyanwu (2016). Their result revealed economic growth has increasing effect on income inequality in short run and it decreases income inequality in long run.

On the other hands, foreign direct investment has been found to have a decreasing effect on income inequality at a 1 % percent significance level. Therefore, when other determining factors of income inequality are constant, on average 1 % increase in foreign direct investment as a percent of GDP results 0.005 percent decrease in sub-Saharan Africa countries. This finding is in line with the neoclassical theory that argues FDI stimulates higher economic growth and, hence, lower inequality (Mundell, 1957). Recently, in developing countries including sub -Sharan Africa countries, since domestic capital accumulation remains too small to stimulate sufficient growth, most countries are dependent on inward FDI to stimulate economic growth, and FDI becomes source of employment, foreign exchange, and skills (Thomas and Deborah, 2014). FDI into these countries has mainly directed to labor-intensive products, and there is a very small difference in ratio between low-skilled and high-skilled workers. So, the result can be looked as robust since FDI contributes to reducing income inequality by raising the relative demand for unskilled cheap labor in these countries. Also, this result is similar to that of Milanovic (2005) and Vivian (2018) that found FDI effect on income inequality is negative.

Population growth is the other variable which is found to have a positive and significant effect on income inequality is. At a five percent significance level in sub-Saharan Africa countries, a 1% increase in population growth can result 0.147 percent increase in income inequality, having the other variables constant. Theoretically, there is a relation between the size of the population and income inequality. For example, according to Deltas (2003), small Gini coefficient is common for countries that have a small population size than a larger population. Ospina (2010) and Anyanwu (2016) also found population growth increases income inequality in South Africa and Latin America respectively.

In addition, the effect of Corruption on income inequality is marginally significant and negative. According to the result, at a 10 percent significance level when the level of corruption decreases by one unit, income inequality decreases by 0.021 on average when the other factors are not changing. This result is expected because Corruption continues to be a severe problem in many Sub-Saharan African countries (Julian et al., 2018). In addition to this theoretical support to this finding, Pervious work by Batabyal & Chowdhury, 2015; Dincer & Gunalp, 2008; Mo, 2009 found the same result that show high level of corruption result income inequality.

Lastly, variable Inflation, financial sector development, political instability, and regulatory quality are found to be insignificant.

5. Conclusions

In Africa, despite the growth in the economy, income inequality also has been growing trend in recent decades. Some people out of a nation's population are enjoying the benefit of this economic growth while the majority is still suffering in lousy living condition. This research tried to look at Determinants of income inequality empirically for 34 purposively selected, based on the availability of data, sub-Sharan African countries. Differently, with many of existed research, an effort had also been exerted to look how institutional and governance factors like political instability and violence determine income inequality. For

the estimation of unbalanced panel data spanning from 2010-2017, dynamic panel data two-step system GMM technique was used.

Regarding the econometric output, Income inequality in these countries is found to be affected significantly and positively by its previous year level at a 1% significance level. From this, we can conclude that countries struggle to escape from a high level of income inequality is hindered by the level of income inequality they recorded in the past. The result which supports the Kuznets hypothesis was also found between economic growth and income inequality. Accordingly, in the short-run, economic growth is found to have a positive and significant impact on the level of income inequality. While in the long-run, its effect is negative and significant. Recently, having countries which have been in high economic growth in these regions, this may be a robust result. Population growth is the other variable that has been found to have significant positive effect on income inequality. FDI is found to have a significant decreasing impact on the level of income inequality in the region. This may be resulted because there is minimal difference in ratio between low-skilled and high-skilled workers in the region and FDI result increase for unskilled labor. Corruption perception is the other marginally significant determinant of income inequality in the area where the low perception rate of corruption decreases income inequality.

As per these findings, much focus will have to be given to achieve sustainable development objectives, since there is a stage where economic growth will contribute to reducing income inequality. Regarding objective of income inequality, fighting today's income inequality means transferring a country where equal distribution of income exists t to the next generation. Besides, promoting FDI and controlling corruption is necessary. Lastly, stable population growth is the other important aspect the government of these countries will have to address to solve the highly increasing income inequality in this region.

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