Original Research Article

Effect of gendered foreign aid on income inequality in East Africa

Abstract

This study investigates whetherforeign aid alleviate income inequality in recipient countries, based on the aid focused on gender equality and women's empowerment. The impact of gender sensitive aid on income inequality has not been extensively investigated, while existing empirical literature conclusions are divergent. For this purpose we include gender sensitive aid, government expenditure, economic growth, inflation rate, trade openness and education as determinants of income inequality. Data on gender sensitive aid were extracted from OECD CRS database, while data on income inequality was obtained from Word Bank database. This study employs the generalized method of moments (GMM) technique for a panel set of three East African foreign aid recipient countries for the periodof 2009- 2022. The result indicated that gendered aid to the economy exhibit a negative and significant impact on income inequality at one percent significant level. Meaning that gender-sensitive aid is effective in reducing income inequality in aid recipient countries. Based on the results, governments in the three nations are advised to devise appropriate policies and targeted programs that can support and channel the proceeds from gender sensitive aid to productive ventures to reduce the incidence of income disparity in their respective countries.

Keywords: foreign aid, income inequality, gender inequality, gender financing

JEL Classification Numbers: F, 35, J16, O19,I32

1. Introduction

Many emerging countries, especially in East Africa, continue to experience income inequality. The distribution of wealth impacts general development, economic progress, and social cohesiveness (Khanum et al., 2024). This issue may be addressed, and the condition of people experiencing poverty may be improved while economic inequality is generally reduced via targeted foreign aid programs focusing on sectoral or gender parity(Thompson et al., 2021). East African development plans have significantly involved foreign aid, including infrastructure, health, education, and poverty reduction programs (Carroll & Kellow, 2021). More needs to be understood about how successfully gender-specific programs may reduce economic inequality, even in cases where these countries have received substantial foreign assistance. This paper looks at how gender-focused foreign aid may impact income inequality while controlling for other relevant factors such as unemployment, inflation, education, and economic growth to decrease this gap. This study reliably analyzes the dynamic interactions between these variables using the generalized technique of moments (GMM) estimation technique. Smith (2024) points out that wealth disparity persists in several economic sectors. Because income inequality affects economic stability, poverty reduction, and social cohesion, sustainable development depends on it.

Addressing these issues via focused foreign aid programs on gender equality may help create more equitable wealth distribution in a significant proportion. East African development initiatives have been made feasible mainly because of foreign donations. Donor countries and international organizations have helped in infrastructure, healthcare, and education, among other sectors (Javed et al., 2024). Still, more research needs to be done on how gender-focused foreign aid explicitly impacts economic inequality. This study focuses on the role of foreign aid programs meant to reduce income inequality by enhancing

economic opportunities for impoverished people, particularly women.Historical legacies, international economic trends, and socioeconomic policies complicatedly influence income inequality in East Africa. A legacy of unequal land distribution, educational opportunities, and economic opportunities left over from colonization still affects income distribution today (Dixit, 2021). Furthermore, socioeconomic policies in these countries sometimes have made wealth inequality worse by not being able to address the needs of the impoverished (Manda et al., 2023). Unemployment, inflation, education, and economic progress are among the factors that mainly influence income inequality outside of foreign aid. Education is crucial in income distribution as greater income levels and better economic prospects are often associated with higher educational attainment (Patrinos et al., 2020). In contrast, inflation may lower purchasing power and disproportionately affect low-income people, increasing economic inequality (Siami-Namini & Hudson, 2019). Finally, even in cases where economic growth is necessary to reduce poverty, unless it is inclusive and beneficial to all population segments, it does not necessarily lead to decreased income inequality (Lechheb et al., 2019).

Many countries in East Africa have put socioeconomic policies into place that are supposed to support economic expansion and development. Still, these steps have only sometimes been sufficient to meet the needs of women and other vulnerable groups (Manda et al., 2023). Thus, income inequality persists, and the benefits of economic growth are often distributed unfairly. Foreign aid may be very beneficial in tackling these problems when correctly selected. Women may be empowered, and gender inequities in economic opportunities can be closed with especially gender-focused foreign aid. Such support might be used to further initiatives to improve women's access to economic resources, healthcare, and education, thereby promoting more general measures to reduce income inequality (Manda et al., 2023). One way to continue primarily to fight income inequality is via education. More significant income and better economic prospects are strongly associated with higher educational levels (Indrawati&Kuncoro, 2021). Foreign aid may increase women's and girls' access to education, helping to share wealth more fairly. Moreover, educational programs for skill development and vocational training might give individuals the tools they need to participate more fully in the economy.

Programs of foreign aid that prioritize inclusive growth might help East Africa create a fairer economic environment. This study makes a comprehensive analysis of these dynamic interactions possible via the GMM estimating method. Particularly suitable for this research is GMM since it manages any endogeneity issues and provides more precise estimates of the impact of gendered aid and other factors on income inequality (Arellano & Bond, 1991). By taking this tack, the study can provide insightful information on how effectively gender focused foreign aid may contribute to reducing income inequality in East Africa.

2. Literature review

According to Human capital theory (Becker, 1964), investing in people's health, education, and training raises their economic value and output. The theory is that while better health makes individuals more competent and effective participants in the economy, education, and training increase a person's earning potential and productivity. One of the methods these human capital investments support economic growth and development is the enhancement of the female labor force participation (Naftaly, 2024). Human capital theory is very helpful to this study as it highlights the importance of using foreign aid to finance gender-specific education and training programs. Women in East Africa may become more economically involved, which increases their income and productivity, with the help of foreign aid intended to enhance their health and education. These programs, which place a strong focus on gender equality, could help to

reduce income inequality by giving women more excellent economic opportunities and a more significant financial contribution.

Another useful concept is the dependency notion theory, developed by Hays (1964). It argues that economic disparity is maintained as developing countries depend on industrialized countries. The idea is that since industrialized countries control the economies and resources of developing countries, there is an unequal trade wherein poor countries buy expensive finished goods and provide raw materials at low prices. It further suggests that rising countries cannot achieve long-term economic development and reduce inequality because of structural constraints. Dependency theory is pertinent to our topic since it stresses the need to focus on foreign aid to empower impoverished people and reduce dependence. Foreign aid geared at women may invest in their health, education, and economic opportunities, breaking East Africa's dependency cycle. These support programs may encourage inclusive growth and self-sufficiency by enabling women and reducing economic inequality.

According to Arat (1988) Modernization theory, social and economic progress results from modernization processes, including industrialization, education, and technological improvement. The notion is that countries move through stages of development from traditional to contemporary cultures and that technology and education are necessary for this transition. Economic growth is thought to raise living conditions and accelerate social progress. The significance of modernization theory in this study is that it highlights technology and education's role in economic progress. With foreign aid to promote gender equality via education and skill development, East Africa may modernize more swiftly. These aid programs may increase the economy overall and reduce income disparity by enhancing women's potential.

The income inequality in developing nations is greatly affected by the aid these countries get. It needs to be clarified from empirical research what impact foreign aid has on income distribution. Concurrently, empirical studiesindicates a positive relationship between foreign aid and income inequality (Nosheen et al., 2022; Alao & Alola, 2022; Mouneer et al., 2022). Gender-specific foreign aid is necessary to address gender inequality in the receiving nations. Research indicates that irrespective of initial conditions, aid delivery to sectors like health and education may effectively reduce gender disparities in early literacy and maternal mortality (Pickbourn& Ndikumana, 2016). Donors consider differences in gender in health and education when distributing assistance; research shows that higher aid flows are associated with more female political representation (Gehring et al., 2013). Research shows that support for gender equality would increase when aid programs that include gender norms, like those from the World Bank, enhance local views, especially in gender-sensitive sectors (Gehring et al., 2013). Even when aimed at improving gender outcomes, foreign aid alone might not address structural gender inequities; more attempts to challenge institutional structures and norms might be required (Bali Swain et al., 2020). Moreover, a significant disparity between self-reported funding for gender equality and the actual execution of high-quality gender equality projects casts doubt on the effectiveness of donor funding for gender equality, highlighting the need for improved project design and evaluation processes to address gender inequality effectively.

3. Methodology

3.1 Data and Model Specification

The causal research design was used to investigate the extent and nature ofcause-and- effect relationship between gendered aid and income inequalities in East Africa using secondary data spanning from 2009

and 2022. The three countries chosen are Uganda, Kenya and Tanzania, the choice is informed by the availability of data. The selected countries are classified as lower-middle income and furthermore the countries are categorized as developing countries characterized by high poverty incidence and income inequality dynamicsand interactions (Ojeyinka& Ibukun, 2024). The econometric strategy involved checking for properties of time series data including stationarity test. This study adopted the Levin-Lin-Chu (LLC) technique to check for stationarity, the alternative to the ADF test. LLC allows for individual-specific intercepts and time trends (Levin et al., 2002). The LLC unit root test is specified as shown in equation 1.

$$\Delta X_t = \alpha_i + \beta_i X_{t-1} + \sum_{j=1}^{k} \gamma_{i,j} \Delta X_{t-j} + \varepsilon_t \quad (1)$$

Where Δ is the first difference operator, X_t is the dependent variable, $\varepsilon_t$is the stochastic term.

In line with the empirical works of Saidon et al. (2013), Ndungi (2017), and Ojeyinkaand Ibukun (2024), the study modified Calderon et al. (2009) and Kim and Kim (2022) model in estimating the impact of gendered sensitive aid on income inequality. The baseline model specification of this study can be presented by the following equation.

$$IE_{i,t} = \alpha + \beta AID_{i,t} + \gamma X_t + \varepsilon_{i,t} \quad (2)$$

Where:

ε is the error in the model and subscript t is the time and i is the country dimension.

The dependent variable is income inequality (IE), measured by Gini index or coefficient, the index lies between 0 and 1, with 1 representing perfect inequality and 0 perfect equality, as postulated bySaidon et al. (2013) and Berisha and Meszaros (2020).This can sometimes be shown as a percentage from 0 to 100%, called the Gini index. The data on Gini index was sourced from the World Bank and World income inequality database. The independent variables included gendered aid (AID) measured by total foreign aid allocated to support gender programmes in East Africa.Disaggregated foreign aid is used in order to disentangle the individual effect of different categories of foreign aid on income inequality. Aid projects targeting gender equality and women's empowerment (CRS) and is expected to reduce income inequality. This gender marker allowsorganizations to indicate to what degree their development projects target gender equality. In addition to the government's own resource allocation for gender equality, a significant source of gender financing in East Africa comes from international donors in the form of development assistance. The gender aid data was collected from OECD in Development Assistance Committee (DAC)and Credit Reporting System (CRS).Besides the key variables, some control variables (X) have been identified in the literature as major drivers of income inequality. Following Ndungi(2017), Berisha and Meszaros (2020) and Ojeyinka and Ibukun (2024), this study identified inflation rate (INF), economic growth (GDP), education (EDU), trade openness (TOP) and government expenditure (EXP) as control variables.Data for the set of control variables was sourced from World Bank online data base.All this variables are expected to be negatively related to income inequality except inflation rate. Table 1 shows the sources of data and measures of study variables.

Table 1: Variable Measurements

Variables	Measure	Source	Expected signs
Income inequality (IE)	Gini index (%)	World Bank	Not predicted (Berisha & Meszaros, 2020)

Gendered Aid (AID)	Gender total aid, US dollars	OECD	Negative (Saidon et al., 2013)
Education (EDU)	Primary school enrolment (% Gross)	World Bank	Negative (Ojeyinka& Ibukun, 2024)
Trade openness (TOP)	Total Trade (% GDP)	World Bank	Negative (Ndungi, 2017)
Government expenditure (EXP)	Government expenditure (% of GDP)	IMF	Negative (Kim & Kim, 2022)
Inflation (INF)	Inflation, consumer prices (%)	World Bank	Positive (Berisha & Meszaros, 2020)
Economic growth (GDP)	GDP per capita growth (%)	World Bank	Negative (Berisha &Meszaros, 2020)

Accordingly, the regression model of the impact of gendered aid on incomeequality has the following equation.

$$IE_{i,t} = \alpha + \delta_1 AID_{i,t} + \delta_2 GDP_{i,t} + \delta_3 EDU_{i,t} + \delta_4 TOP_{i,t} + \delta_5 EXP_{i,t} + \delta_6 INF_{i,t} + \varepsilon_{i,t} (3)$$

3.2 Econometrics analysis

The study adopted the generalized method of moments (GMM) or dynamic panel data approach proposed by Blundell and Bond (1998) and Arellano and Bond (1991) to estimate the effect of gendered aid on incomeinequality through equation 3. The consistency of the GMM estimator depends on whether lagged values of the independent variables are valid instruments in the model. Most empirical studies such as Saidon et al. (2013), Kim and Kim (2022),Mose (2024)and Ojeyinka and Ibukun (2024) have all employed GMM to estimate the link between aid and income inequality.This technique allows us to control for endogeneity problem and reverse causality of independent variables, controls for heteroscedasticity and eliminate time invariant country-specific effects (Saidon et al., 2013; Ergün & Göksu, 2013;Ojeyinka& Ibukun, 2024). Time-invariant variables are eliminated from (1) since under our estimator the data is first differenced while we assume all variables are potentially endogenous.Levini-Lin-Chu test was carried out to confirm the stationarity of study variables (Levin et al., 2002). To control for such possibility, the study adopts the generalized method of moments (GMM) to ensure the reliability and the consistency of the estimates. The dynamic model is chosen to account for self –reinforcing attribute of income inequality among lower-middle income countries.The GMM model was subjected to the residual diagnostic tests, namely the Hansen-J-test and normality test, to avoid misleading inferences. To test the validity of instruments, the study conducted Hansen-J- tests aimed at checking for the validity of the exclusion restrictions. The null hypothesis states that instruments are correctly excluded from the GMM model (Hansen & West, 2002; Roodman, 2009). Jarque-Bera test will be applied to make sure whether the data fits the normal distribution or not. This study performed Dumitrescu-Hurlin causality test to check for association between independent and dependent variables. Dumitrescu and Hurlin (2012) offer an extension of Granger (1988) causality test designed to sense causality in panel data.

4. Empirical Results

Levin-Lin-Chu (LLC) panel unit root test was performed to investigate the time series properties of the study variables. Table 2 below demonstrate the unit root test result using LLC approach.

Table 2: Stationarity result

Variables	Level		First difference		Order
	Adjusted t	Prob.	Adjusted t	Prob.	
IE	0.08680	0.5346	-25.9946***	0.0000	I(1)
AID	-0.11357	0.4548	-16.5496***	0.0000	I(1)
EXP	-0.23282	0.4080	-57.3115***	0.0000	I(1)
GDP	-0.62312	0.2666	-136.876***	0.0000	I(1)
EDU	-0.36307	0.3583	-45.4772***	0.0000	I(1)
INF	-0.79316	0.2138	-8.47495***	0.0000	I(1)
TOP	-1.24388	0.1068	-11.6992***	0.0000	I(1)
Note *** Signifies significance at a 1% level of significance Null Hypothesis: The variable has a unit root					

LLC unit root test has demonstrated that income inequality, gendered aid, government expenditure, trade openness, inflation, economic growth and education have a unit root. The seven variables are converted into stationary by differentiation. The study proceeded to conduct estimation analysis using GMM based unit root inferences.The study performeda GMM regression analysis to define the relationship between income inequality and independent variables. Table 3 presents the estimated results of the impact of gendered aid on income inequality in recipient countries.

Table 3: Estimation results

Variable	**Coefficient**	**Standard error**	**t-Statistics**	**p-Value**
AID	-0.012545	0.003762	-3.334364***	0.0021
EXP	-0.304507	0.157559	-1.932658*	0.0619
GDP	0.003949	0.001818	2.172673**	0.0371
EDU	-0.373746	0.041778	-8.945930***	0.0000
TOP	-0.173664	0.141425	-1.227956	0.2282
INF	0.039922	0.082392	0.484531	0.6312
	Durbin Watson test = 2.225936		Adjusted R2 = 0.746326	
	Hansen-J-statistic = 0.004212		Prob= 0.948252	
	Jarque Bera test = 4.129167		p-value= 0.126871	
Note: * p < 0.1, ** p < 0.05, *** p < 0.01 are significance levels, in which the null hypothesis is rejected. Dependent variable: IE				

The result indicate that gendered aid to the East African economies exhibit a negative and significant impact on income inequality at one percent significant level. This imply that gender sensitive aid has been effective in reducing income inequality. The research findings provide critical new angles on the link between wealth disparity in East Africa and gender-based foreign assistance. Among the important conclusions is gendered foreign assistance's notable and detrimental influence on wealth disparity. With a coefficient of -0.012545 and a very significant p-value of 0.0021, the findings show that foreign assistance programs, especially those aiming at gender equality, may efficiently lower income inequality (Nosheen et al., 2022; Alao & Alola, 2022; Mouneer et al., 2022). This emphasizes the need to focus foreign assistance on projects with a gender concentration. Empowering women, increasing their

economic involvement, and removing gender-specific obstacles will help provide fair economic opportunities and rewards. Aid support might be used to further initiatives to improve women's access to economic resources, healthcare, and education, thereby promoting more general measures to reduce income inequality (Manda et al., 2023).The result agree with the empirical findings of Saidon et al. (2013) and Kim and Kim (2022). Saidon et al. (2013) conducted a study in 75 countries and concluded that aid is effective tool for mitigating income inequality in aid recipient countries.

The result has shown that government expenditure has a negative impact on income inequality. This imply as government budget allocation and spending increase income inequality decline.Income disparity is also much influenced by government budgeting and allocation to gender programs. This result emphasizes fiscal measures' critical role in assisting lower-income groups and income redistribution. Using necessary services and assistance to underprivileged groups, as well as effective government expenditure, especially in social services, education, health, and welfare programs, can help to reduce economic inequalities (Mose, 2024). The resultare similar with Kim and Kim (2022) findings that show expenditure can alleviate income inequality.

The result show that GDP per capital growth as a measure of economic growth aid worsens income inequality. As GDP increases income inequalityincreases in this three countries. Finally, even in cases where economic growth is necessary to reduce poverty, unless it is inclusive and beneficial to all population segments, it does not necessarily lead to decreased income inequality (Lechheb et al., 2019).This result implies that although general development depends on economic expansion, its advantages are not equally shared across many income levels (Dorofeev, 2022). If the benefits of fast economic development are limited to the more affluent sections of society, then more notable income inequalities might result. Finally, even in cases where economic growth is necessary to reduce poverty, unless it is inclusive and beneficial to all population segments, it does not necessarily lead to decreased income inequality (Lechheb et al., 2019).The finding support similar result by Berisha and Meszaros (2020) and Kim and Kim (2022), argue that as income increase the wealth inequality will increase. However the finding contrast the result by Saidon et al. (2013), who noted economic growth mitigate income inequality.

The result indicate that education measured by school enrollment rate has a negative relationship with income inequality. As year of schooling increases prospect of getting employment increase and thus reduce the income inequality (Ojeyinka& Ibukun, 2024). This solid negative link emphasizes that education is essential to advancing economic equality (Lu, 2022). Education is crucial in income distribution as greater income levels and better economic prospects are often associated with higher educational attainment (Patrinos et al., 2020). Higher education gives people greater economic possibilities, earning potential, and social mobility, lowering general income inequalities. Fostering long-term fair economic growth depends on investments in knowledge. Funding for education should be given top priority by policymakers, especially in underprivileged and underdeveloped areas, to guarantee that everyone can get high-quality education. By raising educational results, nations may strengthen human capital, boost production, and support more equitable economic development.

The inflation rate has insignificant effect on income inequality.Most studies argue that inflation may lower purchasing power and disproportionately affect low-income people, increasing economic inequality (Siami-Namini & Hudson, 2019). The result contradict other studies that reported significant result including Berisha and Meszaros (2020) and Saidon et al. (2013). Furthermore, Berisha and Meszaros (2020) argue that as inflation increases the wealth inequality will increase while Saidon et al. (2013) indicate that as inflation increases inequality declines. In contrast Ndungi (2017) stated the relationship is negative to income inequality in East Africa.

The result has indicated that trade openness was not significant in affecting income inequality at 5 % significant level.Trade openness made no difference. These findings imply that changes in trade policies had no appreciable impact on income inequality within East Africa over the research period. The finding agree with Saidon et al. (2013) and Ndungi (2017) result who also indicated that trade openness is not able explain income inequality dynamics in East Africa. Kim and Kim (2022) show the relationship is negative in most developing countries.

Our findings show that the coefficient of determination,adjusted R-squared is 0.74, this indicate that 74 per cent of the variation in the dependent variable has been explained by explanatory variables, thus showing that data fits the model well. Furthermore, Jarque Bera test confirm that all variables are normally distributed and thus can be used for analysis and forecasting. Durbin Watson value of 2.22 has confirmed that the error term is free of auto correlation. Implying serial correlation is not an issue.Hansen-J- testis conducted to check the validity of the instruments. Based on the result, the Hansen-J-test p value is greater than 0.05 at 5 percent level of significance, which is 0.948. This means the regression model is not over identified since we fail to reject the null hypothesis of no over-identification restriction. The test has confirmed that the instruments used have no over identifying restrictions and residuals are interdependent and GMM approach can be used in regression analysis. The study continued to check causality relationship between dependent and explanatory variables using Dumtrescu-Hurlin panel causality test. Table 4 defines the association between dependent and independent variables.

Table 4: Pairwise Dumitrescu Hurlin panel causality test

Null hypothesis	W-Statisics	Zbar-statistics	Probability
Gendered aid does not homogeneously cause income inequality	2.51036	-0.11729	0.9066
Income inequality does not homogeneously cause gendered aid	7.72796	1.99564**	0.0460
Note: * p < 0.1, ** p < 0.05, *** p < 0.01 are significance levels, in which the null hypothesis is rejected. Null hypothesis: no causality			

Table 4 result present the causality analysis estimates. The study has established one way causality running from income inequality to gendered aid, while there is no causality running from gender aid to income inequality. The result indicate that increase in income inequality will lead to increase in gendered aid inflow. This also implies policies affecting income inequality will not have causal effect on gendered aid and vice versa.

Conclusion

This paper analyzes the impact of gendered foreign aid on economic inequalities in East Africa from 2009 to 2022, emphasizing Kenya, Uganda, and Tanzania. It draws upon human capital theory, dependency theory, and modernization theory and GMM estimation approach. According to the empirical data, the results indicated that gendered aid exhibit a negative and significant impact on income inequality. Meaning that gendered aid is effective in reducing income inequality in aid recipient countries. In addition, government expenditure and education attainment show a negative impact on income inequality. While, economic growth indicated a positive and significant impact on income inequality. The study has established that gendered aid, government expenditure and education are enabler of economic equality in East Africa. In contrast, inflation rate and trade openness do not appear to exert any statically significant effect on income inequality. These results assist one in understanding how concentrated efforts may

produce more equitable economic outcomes and provide a complicated picture of the financial processes in East Africa.

One of the key policy recommendations is more terrific gendered foreign aid. Following dependence theory, which emphasizes the need for foreign support to eliminate structural disparities and enhance development, the study shows that gendered foreign aid significantly reduces income inequality. Local governments and international sponsors should prioritize gender-oriented development projects and additional funding. These programs should empower women, increase their economic participation, and eliminate gender-specific barriers, fostering more inclusive economic growth.

Still, another vital recommendation is to increase government social service expenditure. Modernizing theory holds that state-led initiatives reduce inequities and promote development. Higher government spending typically helps to reduce income inequality. East African nations should pay more attention to social services, education, health, and welfare projects. Public investment should be guaranteed to reach and assist the most deprived populations most effectively using clear and effective processes.

The paper also underlines the need to promote inclusive economic growth. According to modernity theory, inclusive development policies guarantee fair economic outcomes. Still, the facts reveal that growing income inequality is connected to economic growth. Policymakers should use inclusive development policies that guarantee equitable sharing of the benefits of economic growth. Policies, including inclusive economic policy, social security programs, and progressive taxation, are critical to ensure that development benefits all spheres of life, particularly the economically deprived. Funding education is also another fundamental policy idea. Human capital theory stresses how education might assist in reducing inequality and increasing economic opportunities. Studies show that increased education levels significantly reduce wealth differences. Governments should prioritize educational expenses, especially in undeveloped and impoverished regions. Policies should focus on increasing access to high-quality education, improving academic performance, and eliminating poverty, gender inequality, and geographical distances, all of which stand in the way of educational success. By raising human capital, output will increase, and more fair economic development will be advanced.

Finally, the paper recommends adjusting trade and inflation measures under observation. Although dependence theory and modernization theory suggest that economic policies should be context-specific to fit local needs and dynamics, the actual data of this study indicates that trade openness and inflation were statistically irrelevant in impacting income disparities. Still, one needs ongoing observation and context-specific adjustments. Policymakers should consider the more significant economic structure and local factors when designing trade and inflation strategies to ensure they assist in producing fair outcomes.In terms of limitation of the study, future studies might expand the scope by including all countries in sub-Saharan Africa. Future studies can also consider analysis of the possibility of asymmetrical and symmetrical relationship between two main variables.

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