Does foreign aid reduce income inequality in developing countries?

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ABSTRACT

Income inequality has become an increasingly pressing concern within developing economies. Foreign aid, a crucial source of financial assistance, plays a significant role in bridging the wealth gap in these nations. This paper delves into the research question of whether foreign aid effectively mitigates income inequality in developing countries. It does so by examining a dataset spanning from 2002 to 2022, encompassing 29 developing economies, and employs the difference GMM Arellano-Bond estimators. The results of this analysis demonstrate that foreign aid has a tangible and positive impact on reducing income inequality within these nations. In addition, economic growth plays a vital role in diminishing income inequality. On the flip side, trade openness and institutional quality exacerbate income inequality. These findings yield valuable policy insights for governments in developing countries, emphasizing the importance of utilizing foreign aid effectively as a means to combat income inequality.

1. Introduction

The effect of foreign aid on income inequality is still a controversial topic in the literature since some studies note that foreign aid reduces income inequality while others suggest that foreign aid widens income inequality. By contrast, Osode et al. (2022) provide evidence that foreign aid does not significantly affect income inequality.

Income inequality is an issue that transcends borders, affecting societies in both developed and developing countries, especially in the face of growing trends like globalization and digitalization (Nguyen, 2022). This multifaceted problem has deep-seated implications for economies, social structures, and overall societal well-being. While governments in developed countries often possess the financial means and infrastructure to address this issue more effectively, their counterparts in developing countries face unique challenges in their pursuit of improving the quality of life, reducing poverty, and bridging the wealth gap to meet the United Nations Sustainable Development Goals (United Nations, 2016).

In developed countries, robust social safety nets, progressive tax policies, and extensive public services are generally more readily available, providing a cushion for those on the lower end of the income spectrum. These nations often have stronger regulations to ensure fair labor practices and employee rights, contributing to a more equitable distribution of income. Moreover, educational opportunities and access to healthcare are usually more widespread, allowing individuals to enhance their skills and well-being, which can help them secure better-

paying jobs and improve their socioeconomic status (Nguyen, 2022). In contrast, developing countries often grapple with resource constraints, political instability, and infrastructure challenges. These nations face the daunting task of not only promoting economic growth but also ensuring that the benefits of that growth are widely distributed to alleviate poverty and reduce income inequality. Their governments frequently have to balance between attracting foreign investment and ensuring that their citizens are not left behind in the pursuit of economic progress. Addressing income inequality in developing countries demands innovative approaches tailored to their specific circumstances. These approaches may include implementing targeted social programs, improving infrastructure, strengthening education systems, and promoting inclusive economic growth. International cooperation and support from developed nations and organizations are also crucial in helping developing countries tackle this challenge (European Commission, 2023).

"Official Development Assistance (ODA) is defined as government aid that promotes and specifically targets the economic development and welfare of developing countries" (OECD, 2023, p. 01). According to Development Aid (2017), Official Development Assistance (ODA) exhibits several favorable dimensions of the economic development process within a nation, which are delineated as follows:

1. Contribution to Sustainable Development Goal (SDG) attainment: A significant portion of the foreign aid disbursed to nations in the contemporary era is expressly directed towards the realization of SDGs.

2. Reciprocal trade facilitation: Development aid extended to countries serves the dual purpose of fostering economic growth while simultaneously addressing their developmental needs.

3. Augmentation of sovereignty: By actively contributing to the establishment of a robust foundation encompassing fundamental education, enhanced infrastructure, and an overall healthier populace in conjunction with a prospering economy and improved integration into global markets, development aid is posited to empower nations towards greater self-sufficiency.

4. Inherent humanitarian value: Beyond its immediate humanitarian merits, such as the preservation of lives and the prevention of enduring disabilities, the control and eradication of diseases also play a pivotal role in averting their transnational dissemination.

Most developing countries grapple with challenges such as limited economic development, low living standards, and high unemployment rates (Nguyen, 2023). Domestic capital resources for fostering growth remain restricted. In this context, Foreign Direct Investment (FDI) and remittances have played pivotal roles. However, it is Official Development Assistance (ODA) that has emerged as a critical lifeline, addressing the pressing demands of economic advancement in these developing economies. The ODA-supported projects, when executed in developing countries, offer some effective solutions to intricate issues. These initiatives aim to elevate living standards, enhance access to education and healthcare, and generate employment opportunities, all of which collectively contribute to mitigating income inequality within these countries.

From a literature perspective, there is a notable absence of studies that employ the one-step and two-step difference GMM Arellano-Bond estimators with the more stringent requirements proposed by Roodman (2009). Furthermore, no prior research has undertaken such an investigation, specifically focusing on a group of exclusively developing countries, as this paper does. These research gaps constitute the primary focus of this paper's little contribution.

Derived from the vital significance of Official Development Assistance (ODA) in addressing income inequality and economic conditions within developing countries, this paper utilizes both the two-step and one-step difference GMM Arellano-Bond estimators to investigate the influence of ODA on income inequality using a well-balanced panel dataset comprising 29 developing countries over the period from 2002 to 2022.

The paper is organized into five key sections. The introduction, covered in Section 1, sets the stage for the study. Section 2 delves into the theoretical framework and offers a comprehensive literature review. Methodology and research data are outlined in Section 3, while Section 4 is dedicated to presenting the results and engaging in a thorough discussion. Finally, Section 5 provides a conclusive summary along with valuable policy insights.

2. Theoretical background

2.1. Theoretical framework

According to Maqbool and Ali (2022), foreign aid can exert direct or indirect influences on economic indicators, depending on its intended goals and how it is utilized. When foreign aid is primarily aimed at mitigating income inequality and is effectively deployed for this purpose, it is likely to contribute to resource redistribution and the reduction of income disparities. Alesina and Dollar (2000) have identified three primary categories that encapsulate the motives behind foreign aid flows:

1. "Humanitarian" encompasses compensation for historical injustices, addressing global disparities in natural resource distribution, and fulfilling moral obligations to uplift impoverished populations and improve their living standards.

2. "Economic self-interest" seeks to create markets for the donor country's products by securing access to affordable raw materials, disposing of surplus goods, and generating profits.

3. "Political or strategic self-interest" aims to foster amicable relations with recipient countries, diminish the risk of conflicts, and establish peaceful diplomatic associations on the international stage.

Among these categories, it can be anticipated that humanitarian aid is more likely to have a direct impact on reducing income inequality, while the relationship between the other two motives and income inequality remains less straightforward.

In scenarios where foreign aid primarily aims to bolster the productive sectors of an economy, its impact on income inequality may be indirect, driven by the effects of economic growth and rising per capita income. However, the hypothesis by Kuznets (1955) posits the existence of an inverted U-shaped relationship between GDP per capita and income inequality. It suggests that, in the early stages of development, as per capita income rises, income inequality tends to increase, and vice versa. Consequently, the effect of production-focused foreign aid on income inequality in developing nations remains uncertain, as it could either elevate or alleviate income disparities.

2.2. Literature review

Increasing evidence suggests a persistent rise in income inequality over time, with potential repercussions for societal harmony and peace. Extreme income disparities frequently give rise to civil violence and instability (Nguyen, 2022). In this context, alongside Foreign Direct Investment (FDI) and remittance inflows, official development aid from foreign nations emerges

as a pivotal avenue to narrow income inequality. In light of its significance, certain studies suggest that foreign aid exacerbates income inequality, while others find that it alleviates it.

In the context of the negative effects of foreign aid on income inequality, notable studies include those by Chong et al. (2009), Castells-Quintana and Larrú (2015), Deyshappriya (2017), Maqbool and Ali (2022). Chong et al. (2009) apply the OLS regression and the two-step difference GMM Arellano-Bond estimator for 101 developing countries from 1971 through 2002. Meanwhile, Castells-Quintana and Larrú (2015) use the pooled OLS regression and the two-step system GMM estimator for 18 Latin American economies between 1990 and 2008. In the same vein, Deyshappriya (2017) employs the one-step difference GMM Arellano-Bond estimator for a panel dataset of 33 Asian economies during the period 1990 - 2013. More recently, Maqbool and Ali (2022) used the two-step difference GMM Arellano-Bond estimator for a group of use 78 recipient economies from 2007 to 2020. Significantly, Castells-Quintana and Larrú (2015) emphasize that there is a need to reconsider the reduction in Official Development Assistance (ODA) and the departure of certain donors from the continent if the explicit goal of aid in Latin America is to enhance income distribution. Lately, Wang et al. (2023) utilize a quasi-experimental methodology, demonstrating that foreign aid may reduce income inequality by potentially increasing the income shares of the lower 80%, albeit at the cost of diminishing the income share held by the top 20%.

In the context of the positive impacts of foreign aid on income inequality, Herzer and Nunnenkamp (2012), Sharma and Abekah (2017), Younsi et al. (2019) are prominent studies. Herzer and Nunnenkamp (2012) apply panel cointegration techniques such as the FMOLS estimator and the DOLS estimator for a panel dataset of 21 countries between 1970 and 1995. Meanwhile, Sharma and Abekah (2017) use the OLS regression for a sample of 71 South American and African economies from 1970 to 2014. Similarly, Younsi et al. (2019) employ the random effects model with robust OLS regression and the two-step system GMM estimator for a group of 16 African economies during the period 1990 - 2011. In the policy recommendation, Younsi et al. (2019) propose that enhancing financial sector development, improving institutional quality, and implementing sound policies can serve as an effective strategy for foreign aid to narrow income inequalities and promote economic growth.

Unlike the above studies, Osode et al. (2022), Tsaurai (2023) do not discover the significant impact of foreign aid on income inequality. Osode et al. (2022) use the 2SLS and quantile regression for a group of 18 Sub-Saharan African economies from 1996 through 2015. Meanwhile, Tsaurai (2023) employs pooled OLS, fixed effects, and fully modified OLS (FMOLS) for a group of 07 selected emerging markets from 2004 to 2019. He does not find the significant impact of foreign aid on income inequality.

Notably, Saidon and Zainal (2019) examine the role of institutional quality in the sectoral allocations of foreign aid - income inequality relationship for 50 selected foreign aid recipient countries from 1995 to 2017 using the system GMM estimator. The findings show that the interaction terms between sectoral allocations of foreign aid and institutional quality reduce income inequality.

In short, no existing studies examine the impact of foreign aid on income inequality for a group of developing countries. Furthermore, the one-step and two-step difference GMM difference GMM Arellano-Bond estimators are not employed by these studies. This paper will focus on these issues as a new contribution to the literature.

3. Methodology

3.1. Empirical model

Following Maqbool and Ali (2022), the paper suggests the empirical model as follows:

$$GIN_{ij} = \delta_0 + \delta_1 GIN_{ij-1} + \delta_2 ODA_{ij} + Z_{ij}\delta' + \mu_i + \xi_{it} \quad (1)$$

In our analysis, we use subscripts i and j to denote the country and time indices, respectively. GIN_{ij} represents the Gini coefficient, a proxy for income inequality, obtained from the Standardized World Income Inequality Database developed by Solt (2020). GIN_{ij-1} represents the initial value of income inequality. The control variable, Z_{ij}, encompasses various factors, including economic growth, unemployment, education, trade openness, and institutional quality. Additionally, μ_i refers to a country-specific effect that remains constant over time and is not directly observable, while ξ_{ij} accounts for observation-specific error. The estimated coefficients are denoted as γ_0, γ_1, γ_2, and γ'.

To determine the appropriate control variables for our empirical model, we conducted a comprehensive review of relevant studies. Specifically, we drew insights from Chong et al. (2009), Castells-Quintana and Larrú (2015), Maqbool and Ali (2022), Osode et al. (2022) for economic growth; Deyshappriya (2017) for unemployment; Castells-Quintana and Larrú (2015), Deyshappriya (2017), Osode et al. (2022) for education; Deyshappriya (2017), Sharma and Abekah (2017), Younsi et al. (2019), Maqbool and Ali (2022), Osode et al. (2022) for trade openness; Younsi et al. (2019), Maqbool and Ali (2022), Osode et al. (2022) for institutional quality.

Estimating Equation (1) poses several noteworthy challenges. Firstly, endogenous regressors like economic growth, education, and unemployment may exhibit correlations with μ_i. Secondly, unobservable characteristics within μ_i (fixed effects) might be intertwined with the independent variables. Thirdly, the presence of GIN_{ij-1} may lead to a pronounced serial correlation. Lastly, the dataset comprises a large number of countries (29) with a limited observation period (21), rendering the utilization of random effects models, fixed effects models, OLS regressions, and IV-2SLS estimators unsuitable, as they could introduce biased and inconsistent coefficient estimates. In line with Judson and Owen (1999), this study employs the difference GMM Arellano-Bond estimators as a more suitable alternative.

Holtz-Eakin et al. (1988) initially advocated for the GMM Arellano and Bond (1991) estimator, known for employing all variables in the form of the first difference in Equation (1) to eliminate fixed effects (μ_i). This estimator is commonly referred to as the difference GMM estimator (DGMM). However, when it comes to the application of one-step DGMM (1DGMM) and two-step DGMM (2DGMM) in small sample settings, a challenge emerges. It is because the proliferation of instrumental variables increases quadratically as the time dimension grows, potentially surpassing the number of panel units, as highlighted by Roodman (2009). To address this issue, Roodman (2009) proposes a practical guideline: the number of panel units (countries) should exceed the number of instruments.

To ascertain the integrity of instrumental variables, the Hansen and Sargan tests are employed to identify potential endogeneity issues, while the Arellano-Bond AR (2) tests are utilized to assess the presence of serial correlation in the first-difference errors. The 1DGMM approach involves the use of Sargan and AR (2) tests, whereas the 2DGMM approach extends its evaluation with the inclusion of Hansen, Sargan, and AR (2) tests.

3.2. Research data

The dataset contains the Gini index, ODA (% GNI), real GDP per capita, unemployment rate, enrollment school (primary), trade openness, and six governance indicators. These variables are extracted from World Development Indicators of the World Bank. The sample consists of 29 developing countries[1] during the period from 2002 through 2022.

The research report provides the definition and descriptive statistics for the data, along with correlation coefficient matrices for various variables, all of which are available in the appendix, specifically in Tables A, B, C, D, and E. Table D highlights that income inequality is inversely related to foreign aid, unemployment, and trade openness, while it is positively associated with economic growth and education. It's worth noting that the correlation coefficients in Table D are relatively modest, indicating the absence of significant collinearity in the empirical model. Meanwhile, in Table E, the correlation coefficients among governance indicators are notably strong, which is why the paper utilizes them individually.

4. Results

4.1. 2DGMM estimates

The paper illustrates the 2DGMM estimates in Table 1. Every column in the tables is an empirical model for a governance dimension. The paper finds that in each estimation procedure, economic growth is endogenous while the remaining variables are not. Therefore, it uses economic growth as an instrumented in the GMM style and income inequality, foreign aid, unemployment, education, trade openness, and institutional quality as instruments in the IV style.

The results in Table 1 show that foreign aid narrows income inequality. In addition, trade openness and institutional quality widen income inequality, while economic growth reduces it.

Development aid capital provided by international organizations such as the World Bank, the International Monetary Fund (IMF), and developed countries is primarily channeled towards advancing the United Nations' Millennium Goals in developing nations. These capital flows are instrumental in funding and implementing projects geared toward strengthening infrastructure, bolstering healthcare systems, and expanding educational opportunities, all with the overarching objective of generating more employment opportunities and elevating the living standards of impoverished communities. Of paramount significance, these economic initiatives foster a more conducive environment for individuals to secure gainful employment and increase their income levels, thereby contributing to the alleviation of poverty and the narrowing of the income gap between the affluent and the less privileged segments of society. As a result, foreign aid serves as a potent tool for reducing income inequality within these countries. This finding resonates with the research of Chong et al. (2009), Castells-Quintana and Larrú (2015), Deyshappriya (2017), Maqbool and Ali (2022), all of which underline the role of foreign aid in addressing these critical socio-economic issues. In short, these insights underscore the indispensable role that foreign aid plays in diminishing poverty and income inequality within developing economies. Consequently, it becomes evident that seeking foreign aid is not only advisable but, indeed, a strategic imperative for governments in developing countries. By fostering these collaborations and securing foreign assistance, these nations can take significant steps toward realizing their development goals and creating more equitable and prosperous societies for their citizens.

[1]Argentina, Armenia, Belarus, Bolivia, Brazil, Chile, China, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Georgia, Honduras, Indonesia, Kazakhstan, Kyrgyz Republic, Malaysia, Mexico, Moldova, Pakistan, Panama, Paraguay, Peru, Thailand, Turkey, Ukraine, Vietnam, and West Bank and Gaza

The adverse effect of trade openness on income inequality arises from the dynamics of economic integration and openness within developing countries, a phenomenon that tends to favor the rich disproportionately. Individuals with advantages in knowledge, skills, and wealth (the rich) are better positioned to exploit opportunities that yield higher income, further exacerbating inequality. This trend is corroborated by findings in studies conducted by Deyshappriya (2017), Sharma and Abekah (2017), Younsi et al. (2019). Similarly, the ongoing efforts to reform and enhance institutional quality in the majority of developing economies are directed toward fostering economic growth, job creation, and the overall improvement of living standards for the populace. In this process, both the rich and the poor benefit. Nonetheless, as previously noted, the rich can accrue a more substantial share of these benefits due to their inherent advantages in knowledge, skills, and financial resources. Consequently, the enhancement of institutional quality ultimately contributes to an increase in income inequality, a conclusion supported by research conducted by Younsi et al. (2019), Maqbool and Ali (2022), Osode et al. (2022). These findings underscore the imperative for governments in developing economies to be mindful of the potential negative consequences associated with openness policies and institutional quality reforms, particularly concerning the reduction of income inequality. To mitigate these disparities, governments can leverage fiscal instruments, such as taxation and public spending, with a focus on providing targeted assistance to the disadvantaged segments of society (the poor), thereby fostering a more equitable distribution of income and improved living standards.

In contrast to the impact of trade openness and institutional quality, economic growth serves as a potent force in diminishing income inequality. The process of economic expansion contributes to enhanced income levels and the generation of additional employment opportunities, ultimately benefiting both the rich and the poor. Economic growth plays a pivotal role in elevating the income of underprivileged groups and, concomitantly, narrowing the income disparity between the rich and the poor as economies develop. These observations align with the findings from earlier research, as demonstrated by studies conducted by Chong et al. (2009), Castells-Quintana and Larrú (2015), Maqbool and Ali (2022).

The insignificant effect of education on income inequality may stem from the fact that in developing economies, educational opportunities extend equally to students from both rich and poor families. It suggests that the enjoyment of education remains consistent regardless of family circumstances. Likewise, the influence of unemployment on income inequality appears insignificant, as it is plausible that the unemployment rate does not significantly vary between wealthy and poor individuals, resulting in a negligible impact on income inequality.

Table 1

Foreign Aid - Income Inequality, 2DGMM: 2002 - 2022

Dependent variable: Income inequality (Gini index)

Variables	GO1	GO2	GO3	GO4	GO5	GO6
Income inequality (-1)	-0.172*** (0.047)	-0.153*** (0.039)	-0.181*** (0.042)	-0.167*** (0.040)	-0.160*** (0.043)	-0.174*** (0.045)
Foreign aid	-0.880*** (0.187)	-0.598*** (0.115)	-0.990*** (0.186)	-0.603*** (0.119)	-0.848*** (0.193)	-0.826*** (0.204)
Economic growth	-0.111*** (0.013)	-0.112*** (0.012)	-0.134*** (0.014)	-0.119*** (0.011)	-0.114*** (0.013)	-0.112*** (0.012)

Variables	GO1	GO2	GO3	GO4	GO5	GO6
Unemployment	0.031 (0.027)	0.041 (0.023)	0.001 (0.054)	0.036 (0.028)	0.034 (0.030)	0.034 (0.032)
Education	0.024 (0.017)	0.026 (0.017)	0.016 (0.078)	0.020 (0.016)	0.032 (0.017)	0.023 (0.018)
Trade openness	0.039*** (0.009)	0.047*** (0.007)	0.043*** (0.004)	0.048*** (0.007)	0.049*** (0.006)	0.043*** (0.008)
Governance	1.029*** (0.004)	0.489*** (0.004)	0.292** (0.147)	0.453** (0.189)	0.655** (0.318)	1.135*** (0.335)
Instrument	25	27	28	27	25	25
Country/Observation	29/551	29/551	29/522	29/551	29/551	29/551
AR(2) test	0.430	0.348	0.336	0.302	0.297	0.413
Sargan test	0.256	0.178	0.178	0.190	0.105	0.221
Hansen test	0.596	0.535	0.442	0.473	0.491	0.587

Note. *** denotes a 1% significance level, ** 5% significance level, and * 10% significance level. The data are from Authors

4.2. Robustness check: 1DGMM estimates

The study utilizes a 1DGMM approach to assess the robustness of the estimates derived from a 2DGMM model. The findings are presented in Table 2. Consistent with the 2DGMM results, the study also identifies economic growth as an endogenous factor in the estimation process. To address this issue, the study employs economic growth as an instrument in the GMM style, while the remaining variables are treated as instruments in the iv style.

In line with the 2DGMM estimates, the results in Table 2 reveal that foreign aid plays a role in reducing income inequality in developing countries. Additionally, the study shows that trade openness and institutional quality are associated with an increase in income inequality, whereas economic growth acts as a mitigating factor, contributing to its narrowing.

Table 2

Foreign Aid - Income Inequality, 1DGMM: 2002 - 2022

Dependent variable: Income inequality (Gini index)

Variables	GO1	GO2	GO3	GO4	GO5	GO6
Income inequality (-1)	-0.216*** (0.057)	0.143 (0.057)	-0.210*** (0.056)	0.179 (0.151)	0.194 (0.148)	0.078 (0141)
Foreign aid	-0.789** (0.400)	-0.635** (0.309)	-0.844** (0.416)	-0.774** (0.349)	-0.646* (0.348)	-0.661** (0.314)
Economic growth	-0.145*** (0.014)	-0.104*** (0.019)	-0.142*** (0.014)	-0.101*** (0.020)	-0.096*** (0.019)	-0.109*** (0.019)
Unemployment	0.057 (0.069)	0.108 (0.070)	0.047 (0.068)	0.120 (0.073)	0.122 (0.071)	0.091 (0.069)

Variables	GO1	GO2	GO3	GO4	GO5	GO6
Education	0.017 (0.027)	0.020 (0.026)	0.023 (0.027)	0.017 (0.027)	0.025 (0.026)	0.026 (0.025)
Trade openness	0.051*** (0.014)	0.038*** (0.014)	0.046*** (0.014)	0.035*** (0.015)	0.040*** (0.014)	0.036*** (0.014)
Governance	4.636*** (0.004)	1.632 (1.110)	0.235 (1.717)	0.503 (0.587)	1.462* (0.827)	1.466** (0.775)
Instrument	27	29	27	26	26	29
Country/Observation	29/522	29/522	29/522	29/522	29/522	29/522
AR(2) test	0.224	0.848	0.148	0.904	0.876	0.915
Sargan test	0.438	0.392	0.231	0.623	0.534	0.369

Note. ***denotes a 1% significance level, **5% significance level, and *10% significance level. The data are from Authors

5. Conclusion

Income inequality poses a pervasive global challenge, with particularly severe implications for developing economies, which often grapple with limited resources to address this issue. In this context, foreign aid emerges as a significant pillar of support alongside Foreign Direct Investment (FDI) and remittance inflows. Foreign aid plays a pivotal role in empowering developing nations to enhance their economic prospects, stimulate growth, and foster job creation. Given these facts, the paper examines the impact of foreign aid on income inequality for a balanced panel dataset of 29 developing economies during the period from 2002 through 2022. To this end, it applies the two-step and one-step difference GMM Arellano-Bond estimators for estimation and robustness check. The results provide evidence that foreign aid narrows income inequality in developing countries. Furthermore, trade openness and institutional quality increase income inequality, while economic growth reduces it.

The findings in this paper propose some policy lessons for governments in developing countries. These governments should use foreign aid as one of the effective ways to narrow income inequality in society. These countries should promulgate and rigorously enforce regulations and policies that streamline the absorption of foreign aid from international organizations and advanced countries. Notably, they should ensure the appropriate allocation of development aid resources, channeling them efficiently into sectors like infrastructure, education, and healthcare. This targeted investment enhances the human capital of marginalized populations, stimulating job creation and fostering a more prosperous, equitable society. Consequently, this approach can uplift the lives of the underprivileged, augment income levels, and progressively reduce the income disparity between the wealthy and the disadvantaged.

In common with several studies, this research also exhibits inherent limitations, primarily stemming from the relatively small sample size of 29 developing economies. This constraint arises due to the scarcity of comprehensive Gini index data for each country. As a result, future studies should expand the scope of developing countries included in the research sample, while concurrently examining the influence of institutional quality on the nexus between foreign aid and income inequality.

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