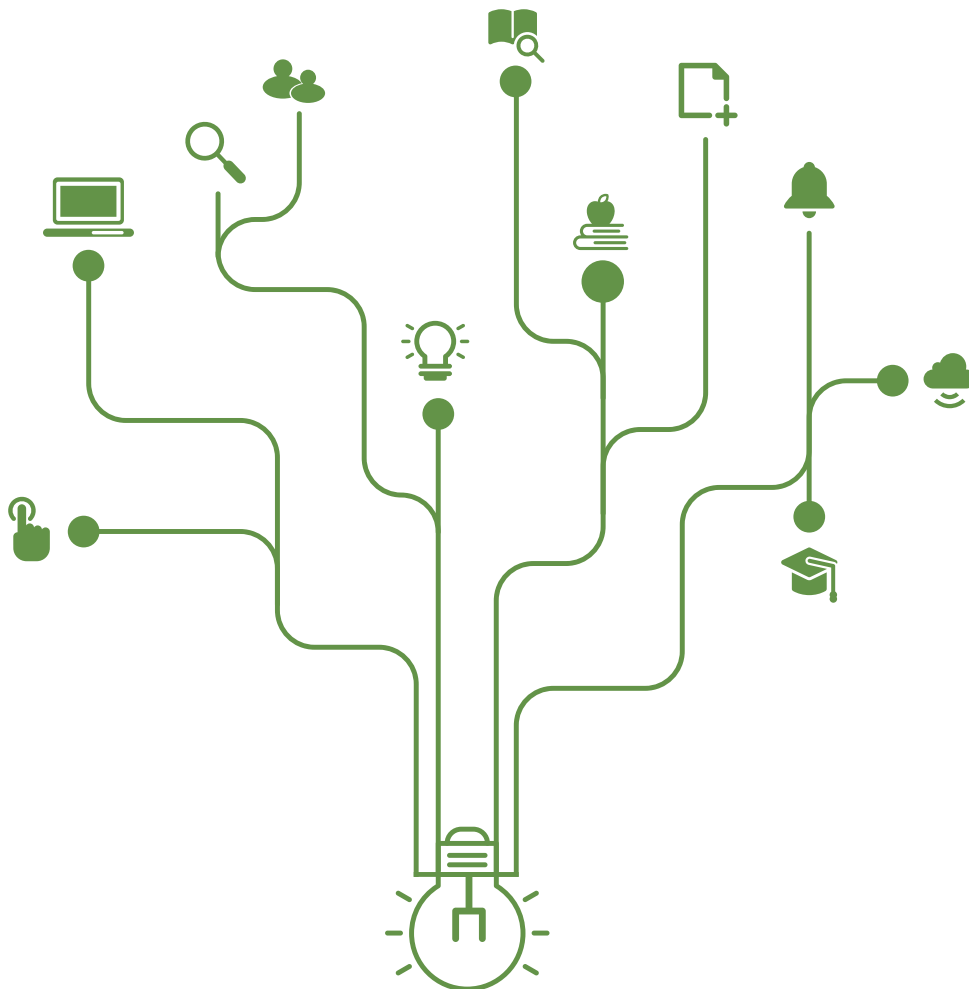


Foreign Aid and Income Inequality

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Abstract

This study contributes to the empirical understanding of aid effectiveness by examining the impact of foreign aid on income inequality in recipient countries. Impact of foreign aid on income inequality has been little studied despite the importance of the topic in terms of aid effectiveness, while among the existing literature, there is no consensus. This study utilizes both Pooled OLS and the Generalized Method of Moments (GMM) estimators for a panel of 156 countries covering the period 1997-2018. Data on inequality is extracted from the United Nation's World Income Inequality Database (WIID). The results indicate that foreign aid, controlling for other variables, is negatively correlated with income inequality at a statistically significant level, and the results are robust. Institutional variables, the level of democracy and control of corruption, are also incorporated to discern the relationship between foreign aid and governance. The results show that institutional variables have positive correlation with income inequality in an aid-receiving country. This implies that foreign aid may offset the equalizing effect of good governance, although overall, the equalizing effect of foreign aid on income inequality remains.

Keywords:

Foreign aid, Income inequality, Aid effectiveness, International Development, Governance, Panel data, Generalized Method of Moments (GMM), World Income Inequality Database (WIID)

I. Introduction

Foreign aid has a long history but whether it has left positive impacts remains unanswered. The effects of foreign aid on economic growth has been the main focus of previous literature on aid effectiveness (Boone, 1997; Burnside and Dollar, 2000; Banerjee and Rondinelli, 2003; Easterly, 2003; Rajan and Subramanian, 2008). On the other hand, there are not many literature that try to discern the effect of foreign aid on income inequality (Bourguignon et al., 2009; Calderon, Gradstein and Chong, 2009; Bjornskov, 2010;). Inequality, along with poverty, is an important issue to be tackled since high levels of inequality inhibit economic growth, and slows down poverty reduction, thereby hindering sustainable development. There is also a strong positive correlation between poverty and income inequality across countries. Especially in developing countries that receive foreign aid, where a big proportion of the population lives under the poverty line while few elites monopolize money and power, tackling inequality is key to alleviating poverty and promoting growth. Therefore, this paper aims to contribute to the empirical understanding of whether foreign aid helps reduce income inequality in recipient countries.

Ideally, foreign aid should reach the most impoverished individuals in developing countries. However, there are empirical and theoretical reasons to believe that the reality is somewhat different in many parts of the world. There have been numerous reported cases of the elites embezzling the money received from foreign aid and using it for their own benefits instead of for the public. Studies have given examples of political elites and leaders “stealing” the aid resources, such as Mobutu Sese Seko, the former president of Zaire, Indonesian political elite under Suharto, Philippine elite under Marcos, Zimbabwean dictator Robert Mugabe and another list of ten African dictators (Klitgaard, 1991; Svensson, 2005). Accordingly, foreign aid itself is not the problem but rather how it is used by whom seems to be the key in determining its effectiveness. If properly used, it should contribute to alleviating both poverty and inequality in these countries.

Democracy is supposed to provide checks and balances against such misuse of aid, as all citizens have the right to vote, and thus the power to change the government. In a properly-functioning democratic country, all votes count and leaders have to be accountable to their own citizens, including the poor. However,

critics of foreign aid argue that free money from outside is cutting off this accountability measure, thereby weakening democracy and facilitating corruption. Control of corruption is also a similar mechanism to democracy in terms of preventing monopolization of power and money, but whether foreign aid helps this mechanism is unclear. If corruption is properly controlled for, misuse of aid could be prevented. Hence, this study will try to see the effects of foreign aid on income inequality in relation to the level of democracy and control of corruption in recipient countries.

This paper is organized as follows. Section 2 provides literature review and Section 3 outlines the definitions, data sources of the variables and the research methodology. Section 4 shows and explains the findings of the empirical analysis. Section 5 summarizes the results and concludes the paper with implications. The Appendices contain a list of the countries included in the research and detailed definitions and sources of the employed data.

II. Literature Review

This section outlines previous studies on foreign aid and its impacts, largely in three categories: economic growth, governance or institution, and inequality. This paper contributes to the third section, impact of foreign aid on income inequality, by carrying out an empirical study using panel data. This will contribute to the existing literature in two ways. First, there has not been much empirical studies regarding aid's impact on income inequality and among the ones that exist, results are divided, which motivated this study. Therefore, this paper will add to the unfinished debate by providing robust results to supplement the weaknesses of the existing literature which do not seem to find strong evidence. Second, this paper will add to the literature of this field by discerning a relationship between governance and inequality in a foreign aid receiving country.

2.1. Foreign Aid and Growth

Foreign aid has been one of the main vehicles for the rich countries to help promote better living conditions in developing countries, by alleviating poverty and instigating growth and development. The effectiveness of foreign aid has been

frequently questioned but each with distinct findings and conclusions. First, on the most studied question of whether aid helps economic growth, Burnside and Dollar (2000), one of the most widely cited and noted papers in the field, examine the relationship between foreign aid, economic policies and growth. They find that aid only has positive impact on growth in countries with good fiscal, monetary, and trade policies, while in the absence of such policies, there is little effect.

However, this conclusion has been questioned by more recent literature. Easterly (2003), Easterly et al. (2004) and Rajan and Subramanian (2008) claim that there is no evidence of any effect of aid on growth, even when institutional quality is high. Burnside and Dollar (2004) replied to Easterly et al.'s comment by revisiting the econometric model and data, in which they again concluded that aid to countries with less corrupt governments and good policies will be more likely to produce good results. Dalgaard et al. (2004) also shares this positive view of aid on spurring growth, but they find that the magnitude of the effect depends on climate-related circumstances.

2.2. Foreign Aid and Governance

The dominant opinion on the relationship between aid and governance or institutions is that foreign aid harms the institutions of recipient countries, which hinders good governance. It is known that many developing countries have weak institutions and high levels of corruption, such as countries in Sub-Saharan Africa who have received most of the foreign aid over the past decades. Looking from a historical perspective, this may be stemming from the colonialist past where there was no room for strong institutions to be matured that could tackle the development demands of modern states. Moreover, these states have experienced economic crises, unsustainable debt, civil wars and political instability (Bräutigam and Knack, 2004), all of which impede the advancement of governance.

Theoretically, there are opposing views on the impact of foreign aid on institutions. On the positive side, aid can release governments from binding revenue constraints, enabling them to strengthen domestic institutions. On the other hand, aid can create dependency and liberate corrupt governments from being accountable to their citizens, therefore making it more difficult for good governance to progress. More literatures seem to be supporting the latter view (Bräutigam and Knack, 2004; Moss et al., 2006). Dambisa Moyo (2009),

acclaimed economist and author, also argues in her book “Dead Aid” that aid has been a disaster for Africa as foreign aid encourages dependency and facilitates corruption. This only exacerbates the situation in those countries since many of the reasons underlying the slow development of Africa is attributed to bad governance and mismanagement of resources (Hansen and Tarp, 2000).

However, there are previous studies that find no empirical evidence of aid having a systematically negative effect on political institutions. Proponents of foreign aid argue that aid can promote democracy and solidify institutions of the recipient countries. Research on the impact of foreign aid on democracy in a panel of 93 developing economies during the years 1971-2000 found that a percentage increase in foreign aid leads to an increase in the Polity Democratic Development Index (Altunbas and Thornton, 2014). More recent study also shows from data analysis that due to more stable inflows of “governance aid”, dynamic panel estimators show a small positive net effect of total aid on political institutions (Jones and Tarp, 2016).

Institutional quality and good governance seem important for sustainable growth and development. Nevertheless, corrupt governments still receive as much aid as less corrupt ones since corruption is not considered as a criteria in the application of debt relief (Alesina and Weder, 2002). Except for a few Scandinavian countries and Australia, who give more aid to less corrupt governments, most of aid, including ones coming from multilateral organizations, do not discriminate against corruption of the recipient countries (Alesina and Dollar, 2000).

As to whether aid conditionality on corruption should be put to practice invites another debate. A study on governance, economy and foreign aid concludes that donors can best foster good governance by helping to provide conditions for better accountability (Brautigam, 1992). On the other hand, a research paper for the World Bank argues that aid conditionality is not the most appropriate method to strengthen good governance in developing countries. Instead, the paper argues for a more radical approach in which donors cede control to the recipient country, within the framework of agreed-upon objectives (Santiso, 2001).

2.3. Foreign Aid and Inequality

The effects of foreign aid on inequality, which is less studied, have not

reached consensus but several papers conclude that aid has an inequality increasing effect, which should be noted by the international aid society. Inequality is not only undesirable by itself, but even more so when it comes to its negative impact on economic growth as it is argued that high income inequality may hinder growth (Barro, 2000; Mo, 2000). Empirical analyses conclude that the impact of inequality on growth is negative (Deininger and Squire, 1998; Banerjee and Duflo, 2003).

Inequality is hence associated with undesirable consequences. Then, how might foreign aid affect inequality theoretically? Aid increases the amount of resources the recipient government has in their pockets instead of benefitting the poor (Boone, 1997; Collier and Dollar, 2004). In fact, these aid funds are sometimes embezzled by the local elite, together with the officials in government (Drazen, 1999). This deteriorates governance since a government that is less constrained of resources has reduced interest in being accountable to the local population (Rajan and Subramanian, 2008). This would help governments stay in power for a longer period, regardless of whether the government's performance is good or bad, increasing the risks of an oppressive and selfish regime where the foreign aid would be directed to the rich instead of the poor. Thus, aid funds can, not only deteriorate democracy, but also exacerbate inequality, thereby failing to meet the intended purpose of mitigating poverty and inequality.

Regarding foreign aid's impact on inequality, only a few empirical studies have been performed. Foreign aid is found to be conducive to the improvement of the distribution of income when the quality of institutions is taken into account, but the result is not robust (Calderon, Chong and Gradstein, 2009). Also, although there are many theoretical perspectives that foreign aid aggravates income inequality, empirical evidence was found to be contrary, with aid causing small reductions in inequality (Shafiullah, 2011). In Latin America, only in the lower-middle income countries, it is found that aid had a negative effect on Gini coefficient, meaning that aid helped reduce income inequality (Gonzalez and Larru, 2012).

However, there are also empirical evidence shown by other studies that claim opposite results. Herzer and Nunnenkamp (2012) show from panel co-integration that aid exerts an inequality increasing effect on income distribution. In Sub-Saharan Africa, evidence shows that foreign aid has an inequality increasing effect, although the effect can be reversed when corruption is controlled for

(Pham, 2015). Accordingly, views are quite divided on the impact of foreign aid on recipients countries' income inequality. In light of this unfinished debate and ongoing claims, this paper would contribute to the field of international development by suggesting implications of foreign aid on income inequality in the recipient countries. This study is differentiated from previous studies by combining the best practices and measures from literature review to produce optimal results; it extracts Gini data from the Worldwide Income Inequality Database (WIID), utilizes both pooled OLS and GMM estimations, and checks the robustness of the results using a different measure of income inequality. Moreover, the scope of the study is not limited to any certain region but incorporates all developing countries that have received aid during the investigated period.

III. Empirical Framework

3.1. The Model

The dependent variable in the model is income inequality, proxied by the Gini coefficient, which measures the level of income inequality in the country. The independent variable of interest is foreign aid, which is represented by net official development assistance (ODA) and official aid received. The independent control variables are GDP per capita, population, trade openness, government expenditure, private sector credit, agriculture and industry value-added and an institutional variable. For the institutional variable, level of democracy and control of corruption are used. The democracy variable indicates the level between democracy and autocracy in the country. Control of corruption captures perceptions of the extent to which public power is exercised for private gain. The basic model is shown as below:

$$GINI_{it} = \beta_0 + \beta_1 AID_{it-1} + \beta_2 GDPPC_{it} + \beta_3 POP_{it} + \beta_4 TRADE_{it} + \beta_5 GOV_EXP_{it} + \beta_6 PRIV_SECT_{it} + \beta_7 AGRI + \beta_8 INDU_{it} + \beta_9 INSTITUTION_{it} + \varepsilon_{it}$$

$$t = 1997, \dots, 2018$$

$$i = Afghanistan, \dots, Zimbabwe$$

On the right hand side, foreign aid, GDP per capita and population are calculated in natural logarithm for better comparability against the Gini coefficient. Trade openness, government expenditure, private sector credit, agriculture and industry sector value-added are all considered in ratio relative to GDP in order to see each of the variable's share in the national economy. This is to ensure better comparison of the control variables between countries as the absolute amount of GDP vary vastly across countries.

3.2. Dependent Variables

Income inequality is measured by the Gini coefficient since there is no better proxy available than the Gini data to make broad, cross-country comparisons of inequality. Gini coefficient of 100 means perfect income inequality, while a Gini of 0 means perfect equality (Reuveny and Li, 2003). A higher level of Gini thus represents a higher level of inequality in the distribution of income.

There are several sources for the Gini coefficient data, such as the dataset provided by Deininger and Squire (1996), the Luxembourg Income Study (LIS), World Income Inequality Database (WIID) and the Standardized World Income Inequality Database (SWIID). For this paper, WIID, released by the United Nations University and updated in May 2020, was used due to its comprehensiveness and reliability. SWIID data (Solt 2019) has a wider coverage than WIID, but the imputation method of filling in the values contain econometric problems (Wittenberg, 2015).

A comparison between the two world income inequality databases, the WIID and SWIID, was assessed and concluded that WIID is recommended over SWIID for academic researches (Jenkins, 2015). WIID combines information coming from many sources, including historical compilations with updated information from the most salient data repositories (including LIS, ECLAC, SEDLAC, Eurostat, World Bank, and OECD), as well as from national statistical offices, and independent research papers. Different criteria from various sources are homogenized in the WIID dataset in order to avoid problems of definition. To examine the robustness of my Gini-based results, I also employ the share of income held by the top 20% of the national population as an alternative measure of income inequality.

3.3. Independent Variables

The main independent variable of interest is foreign aid. Foreign aid, or development resource flows, can include other official flows (OOF) and private flows, on top of the ODA. For this study, however, OOF and private flows will not be considered, as it is usually not regarded as foreign aid per se, although they are certainly important elements for economic growth of the developing countries. Hence, in this paper, foreign aid would refer to only ODA and official aid, both of which are reported as ODA since 2005.

With respect to the foreign aid data used in this paper, “official development assistance and official aid received” was extracted from World Development Indicators. Official aid refers to aid that was given to the countries in DAC List Part II, which was abolished in 2005 as mentioned above. It is now counted as ordinary ODA. The standard definition of ODA, stated by the OECD DAC, includes grants and concessional loans, provided by public donor countries and organizations, and received by developing countries. ODA data from the World Development Indicators uses the OECD data as their base but it offers a wider coverage. To avoid the potentially disproportionate influence of countries receiving large amounts of foreign aid, I use the natural logarithm value of aid. By doing so, all negative values of aid received was eliminated which better suits the analysis and interpretation. Note that concessional loans given by China is not included in the OECD estimates because little information is available on their objectives or financial terms which makes it difficult to ascertain whether they fit into the official aid definition set by OECD.

Democracy variable is included which is a measurement of the level between democracy and autocracy from the Polity5 dataset developed by Ted Gurr and last updated in 2018. This widely-used dataset provides two indices of political regime characteristics. Democracy index is an additive eleven-point scale (0-10) which measures the democratic characteristics of the regime. Autocracy index is also constructed additively, ranging from 0 to 10. Some scholars have observed that many governments may have both democratic and autocratic characteristics (Mansfield and Snyder, 1995; Londregan and Poole, 1996). Hence, they measure the level of democracy as the difference between the democracy index and the autocracy index, whose practice I adopted in this paper as well. This measure is

already provided in the Polity5 dataset as “polity2” variable which ranges between -10 (most autocratic) and 10 (most democratic).

The other institutional variable used in this study is control of corruption indicator from the Worldwide Governance Indicators (WGI) provided by the World Bank. The World Bank uses 30 existing data sources to develop the WGI. The sources are selected to include the views of citizens, business owners, academics and experts drawn from the public, private, and NGO sectors from across the globe, and the standard methodology is used (World Bank, 2011). The control of corruption indicator is developed using an ‘Unobserved Components Model (UCM)’ which enables the development of the control of corruption indicator that ranges from -2.5 (most corrupt / least effective) to 2.5 (least corrupt / most effective).

The model includes control variables frequently used in previous studies. GDP per capita is expressed in constant 2010 U.S. dollars as dollar figures for GDP are converted from domestic currencies using 2010 official exchange rates. The natural logarithm values of GDP per capita and population are used for the analysis. Trade openness is also included in the model as a control variable to see whether economic openness of a country affects income inequality. It is the sum of total import and export values as a share of the country’s GDP which shows the magnitude of trade relative to the size of the domestic economy. Government expenditure, private sector credit, and the agriculture and industry value-added, which can also affect income inequality, are included as control variables in the model. These variables are highly correlated with GDP, and thus are all expressed in percentages, to show each of the variable’s share in the country’s GDP. These variables are extracted from the World Development Indicators, last updated in 2020.

Data on the variables mentioned above are taken from 156 developing countries across Africa, Latin America, the Caribbean, Eastern Europe, and Asia over a period of 22 years that spans from 1997 to 2018. The list of countries included in this study is provided in Appendix 1. Definitions and sources of all the variables employed are shown in Appendix 2. Table 1 below shows descriptive summary statistics of the variables.

Table 1. Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Gini coefficient	1,685	37.70	9.62	20.00	73.40
Foreign aid (log)	3,261	19.11	1.66	9.90	23.94
GDP per capita (log)	4,676	8.57	1.52	5.23	12.19
Population (log)	4,688	15.33	2.26	9.14	21.06
Trade openness (%)	4,261	89.59	56.43	0.03	860.80
Government expenditure (%)	3,912	16.71	9.02	0.91	147.73
Private sector credit (%)	4,004	45.08	39.49	0.19	308.98
Agriculture, value added (%)	4,301	12.34	11.97	0.03	79.04
Industry, value added (%)	4,291	26.56	12.50	3.15	87.80
Democracy (polity2)	3,202	4.23	6.13	-10.00	10.00
Control of corruption	3,814	-0.00	0.98	-1.83	2.47
Income shares by top 20 (%)	1,395	45.32	7.41	34.00	71.00

3.4. Empirical Methodology ¹⁾

First, a simple cross-section regression approach is taken by using Pooled OLS estimator. Interaction term between foreign aid and the institutional variable is introduced in the Pooled OLS model.

Cross-section findings may have limitations due to common problems of simultaneity and reverse causation that may arise because while income inequality may be affected by foreign aid, so may aid allocation be affected by the level of inequality of the recipient countries. Econometrically, a panel data approach can help to resolve the causal aid effect on inequality. Another problem is of endogeneity, which may occur since past levels of inequality may be important predictors of current levels of inequality, which is likely to make the cross-section findings biased.

Hence, following practice from previous literature that takes into account the particular characteristics of the series under examination, Generalized Method of Moments (GMM) (Arellano and Bond, 1991; Blundell and Bond, 1998) is considered to be the most suitable estimator. This estimation model takes into account both fixed effects and endogenous independent variables. The lagged term of foreign aid, the main independent variable of interest, is employed as the

1) Statistical software package Stata® version 15.1 is used for running regressions

instrumental variable for additional control in the IV-GMM estimator. Further fixed effects or random effects are not needed by applying this method. The standard errors used in both Pooled OLS and IV-GMM estimators are suitable because when taking into consideration the within entity correlation, the results are same when clustered into countries.

IV. Empirical Results

4.1. Pooled OLS Estimations

First, I estimate the effect of foreign aid on Gini coefficient in column (1) in Table 2. The negative coefficient on foreign aid suggests that developing countries that receive more foreign aid are more likely to have lower levels of inequality. The coefficients on control variables have expected signs; natural logarithm of GDP per capita, trade openness and government expenditure are all negatively related to Gini coefficient at a statistically significant level, while private sector credit is positively related with the dependent variable. Agriculture value added in the domestic economy is also negatively correlated with Gini while industry value added is found to have no statistical significance.

In column (2), I introduce democracy as the institutional variable to see how it affects the relationship between foreign aid and income inequality. The coefficient on foreign aid changes from -1.786 to -1.622, implying that higher level of democracy in the aid receiving country may reduce the extent to which foreign aid helps to lessen income inequality. The democracy variable is positively correlated to the Gini coefficient at a statistically significant level. This can be interpreted that democracy can exert a negative influence when the amount of foreign aid in natural logarithm flowing in is around its average at 19. The estimates support the notion that foreign aid may worsen income inequality in democratic developing countries, which is in line with some of the literature (Brautigam and Knack, 2004; Djankov et al. 2008; Bjørnskov, 2010).

In column (3), the interaction term between foreign aid and democracy is introduced. Although both the democracy variable and the interaction terms are not statistically significant, it can be calculated that given the same amount of foreign aid received, one level increase in the democracy index amplifies the negative

(equalizing) impact of foreign aid on income inequality, thereby further reducing inequality.

Table 2. Pooled OLS estimations

Dependent variable:	(1)	(2)	(3)	(4)	(5)
Gini coefficient	OLS	OLS	OLS	OLS	OLS
First lag of foreign aid (log)	-1.786*** (-5.12)	-1.622*** (-4.41)	-1.572*** (-4.02)	-1.491*** (-4.24)	-1.589*** (-4.56)
GDP per capita (log)	-3.186*** (-4.43)	-3.840*** (-5.22)	-3.891*** (-5.19)	-4.037*** (-4.77)	-4.064*** (-4.84)
Population (log)	0.793* (2.34)	0.939* (2.56)	1.018** (2.77)	0.977** (2.76)	1.156** (3.22)
Trade openness (%)	-0.069*** (-5.19)	-0.060*** (-4.26)	-0.062*** (-4.18)	-0.072*** (-4.58)	-0.068*** (-4.20)
Government expenditure (%)	-0.247*** (-3.70)	-0.273** (-2.83)	-0.224* (-2.26)	-0.230** (-3.40)	-0.232** (-3.44)
Private sector credit (%)	0.064*** (4.30)	0.072*** (4.99)	0.072*** (4.38)	0.045** (2.71)	0.597* (2.80)
Agriculture, value added (%)	-0.304*** (-3.91)	-0.257** (-3.30)	-0.245** (-3.09)	-0.332*** (-3.68)	-0.309*** (-3.50)
Industry, value added (%)	-0.072 (-1.49)	0.054 (0.99)	0.068 (1.21)	-0.034 (-0.66)	-0.043 (-0.81)
Democracy		0.502*** (6.95)	1.903 (1.96)		
Aid (log) * Democracy			-0.070 (-1.42)		
Corruption				2.307** (3.35)	-12.385 (-1.55)
Aid (log) * Corruption					0.795 (1.86)
Observations	833	774	751	721	699
R-squared	0.146	0.195	0.209	0.162	0.170

Note: Robust t-statistics in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Control of corruption is employed as the institutional variable in columns (4) and (5). Control of corruption variable ranges from -2.5 (most corrupt) to 2.5 (least corrupt). In column (4), the coefficient on foreign aid is -1.491, which signifies that, when controlling for corruption on top of the other control variables in column (1), the extent to which foreign aid helps to reduce inequality in the

recipient country diminishes. 1% increase in foreign aid would lead to -1.786 points decrease in Gini in column (1) while in column (4), it would lead to -1.491 points decrease in Gini. Although control of corruption itself intuitively and empirically helps reduce inequality, it can be seen from the coefficient on corruption that in the context of foreign aid, control of corruption is positively associated with income inequality at a significant level, hinting at the possible adverse effect of foreign aid on corruption.

In column (5), the interaction term between foreign aid and the corruption variable is added, but the result turns statistically insignificant. The coefficient on foreign aid changes to -1.589 in column (5), but still negatively associated with income inequality and statistically significant.

4.2. Dynamic Panel Data Approach

OLS estimator may lead to biased results due to problems of endogeneity, reverse causation and omitted variables bias. Fixed effects model cannot solve all of these problems. Therefore, following previous literature on this topic (Chong et al., 2009; Nikoloski, 2009; Tezanos et al., 2012; Chong and Gradstein, 2007) and taking into consideration the particular characteristics of the series under examination, the dynamic panel data IV-GMM technique is adopted in this study.

The Generalized Method of Moments (GMM) technique (Arellano and Bover, 1995; Blundell and Bond, 1997) controls for endogeneity of the variables in a dynamic panel data model. By using this method, the regression equation is estimated in differences and in levels simultaneously, so there is no need for further fixed effects. In the GMM model for this study, first lagged value of the independent variable, foreign aid, is instrumented for additional control to solve the problem of endogeneity. The instruments used are second lagged value of foreign aid and lagged value of trade and government expenditure (% of GDP), as they may affect the amount of aid given to a country in the previous period.

Hansen test of over-identifying restrictions for the IV-GMM is used to test the overall validity of the instruments by analyzing the sample analog of the moment conditions used in the estimation process. The null hypothesis is that the set of instruments in the model are valid and the model is correctly specified. Thus if the p-value is greater than 0.05, the null hypothesis is not rejected and the results

give support to the model. Table 3 shows results of the estimations using IV-GMM estimator. In all five estimations, the Hansen test hypothesis is not rejected, and thus the model is correctly specified.

Table 3. Dynamic panel data approach

Dependent variable:	(1)	(2)	(3)	(4)	(5)
Gini coefficient	GMM	GMM	GMM	GMM	GMM
First lag of foreign aid (log)	-2.259*** (-6.01)	-2.191*** (-5.47)	-1.781*** (-3.69)	-1.997*** (-5.24)	-1.849*** (-4.50)
GDP per capita (log)	-3.762*** (-4.78)	-4.548*** (-5.62)	-4.384*** (-5.28)	-4.505*** (-5.28)	-4.370*** (-5.18)
Population (log)	0.999** (2.77)	1.159** (2.96)	1.047** (2.65)	1.208** (3.27)	1.263** (3.320)
Trade openness (%)	-0.079*** (-5.45)	-0.073*** (-4.86)	-0.076*** (-4.83)	-0.075*** (-4.70)	-0.073*** (-4.39)
Government expenditure (%)	-0.224*** (-3.49)	-0.235* (-2.34)	-0.198 (-1.91)	-0.213** (-3.36)	-0.228** (-3.44)
Private sector credit (%)	0.067*** (4.38)	0.079*** (5.20)	0.078*** (4.54)	0.049** (2.89)	0.052* (2.95)
Agriculture, value added (%)	-0.341*** (-3.96)	-0.296** (-3.37)	-0.279** (-3.15)	-0.354* (-3.93)	-0.328*** (-3.73)
Industry, value added (%)	-0.086 (-1.69)	0.044 (0.78)	0.061 (1.06)	-0.043 (-0.80)	-0.052 (-0.96)
Democracy		0.517*** (6.91)	1.920* (1.92)		
Aid (log) * Democracy			-0.070 (-1.38)		
Corruption				2.306** (3.37)	-11.554 (-1.47)
Aid (log) * Corruption					0.752 (1.79)
Observations	785	728	706	711	690
Adj. R-squared	0.152	0.202	0.219	0.159	0.167
Hansen J-test (p-value)	0.485	0.338	0.453	0.416	0.278

Note: Robust t-statistics in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Independent variable of interest, foreign aid, still shows the expected negative signs and remain statistically significant in all 5 estimations. Column (1) reports the basic model with Gini as the dependent variable, foreign aid as the

independent variable of interest with control variables in place. The coefficient on foreign aid is still negative, with a value of -2.259 and statistically significant at 1%, which implies the equalizing effect of foreign aid on income in the recipient countries. 1% increase in foreign aid would lead to 2.259 points decrease in the Gini. The coefficients on the control variables are also as expected, as in the OLS estimator.

Column (2) reports the estimation with democracy institutional variable included. Coefficient on foreign aid changes from -2.259 to -2.191 , meaning that with democracy controlled for, the equalizing effect of foreign aid on income is slightly reduced. This can be interpreted that democracy can exert a negative influence when foreign aid is being given to that country, in line with literature that foreign aid may be detrimental to the development of democracy. The coefficient on democracy is positive at the value of 1.920 and statistically significant at 1% level. This means that in a country where foreign aid is given, one level increase in the democracy index will lead to 1.920 points higher in the Gini, thus exacerbating income inequality.

Column (3) includes the interaction term between foreign aid and democracy. Although not statistically significant, the coefficient is negative. When calculated for the average developing country in the sample, whose democracy level is around 4, the coefficient on foreign aid is -1.997 , indicating that 1% increase in the inflow of foreign aid would lead to 1.997 points decrease in the Gini.

Column (4) and (5) reports the estimations with the other institutional variable, control of corruption. Foreign aid, controlling for corruption, is still negatively associated with income inequality at a statistically significant level. The coefficient on control of corruption is positive at the value of 2.306 , implying that in a developing country where foreign aid is given, control of corruption may not function properly to mitigate inequality as it should. The interaction term between foreign aid and control of corruption in the final column yields a positive coefficient at 0.752 , implying a similar situation as column (4).

4.3. Robustness Checks of the Results

Concerning the reliability of data for measuring income inequality, robustness of the results shown above is tested here with a different measure of income inequality. The measure used above is Gini coefficient extracted from the World

Income Inequality Database (WIID). Although WIID is argued to be the optimal measure, it is not the absolute measure. Therefore, income share by top 20% from World Development Indicators (WDI) is adopted as an alternative measure of income inequality for robustness checks.

Table 4. Robustness to different measure of inequality

Dependent variable:	(1)	(2)	(3)	(4)	(5)
Income share by top 20%	GMM	GMM	GMM	GMM	GMM
Lagged aid (log)	-2.257*** (-8.10)	-2.147*** (-6.90)	-1.895*** (-4.77)	-2.092*** (-7.25)	-1.723*** (-5.42)
GDP per capita (log)	-2.743*** (-4.39)	-3.822*** (-6.00)	-3.548*** (-5.55)	-3.193*** (-5.08)	-3.236*** (-5.09)
Population (log)	0.590* (2.10)	0.978** (3.22)	0.990** (3.20)	0.791** (2.78)	0.882** (3.07)
Trade openness (%)	-0.071*** (-5.61)	-0.062*** (-4.99)	-0.061*** (-4.76)	-0.061*** (-4.69)	-0.060*** (-4.54)
Government expenditure (%)	-0.104** (-2.61)	-0.014 (-0.17)	0.041 (0.46)	-0.117** (-2.86)	-0.123** (-2.95)
Private sector credit (%)	0.045*** (3.63)	0.051*** (4.22)	0.050*** (3.57)	0.030* (2.18)	0.032* (2.24)
Agriculture, value added (%)	-0.286*** (-4.49)	-0.264*** (-4.01)	-0.240*** (-3.66)	-0.282*** (-4.52)	-0.252*** (-4.11)
Industry, value added (%)	-0.081* (-2.08)	-0.012 (-0.29)	0.005 (0.13)	-0.053 (-1.32)	0.038 (-0.93)
Democracy		0.468*** (8.68)	1.568 (1.91)		
Aid (log) * Democracy			-0.056 (-1.33)		
Corruption				1.871** (3.46)	-27.053*** (-4.37)
Aid (log) * Corruption					1.558*** (4.65)
Observations	747	654	634	693	673
Adj. R-squared	0.160	0.238	0.255	0.161	0.202
Hansen J-test (p-value)	0.147	0.188	0.149	0.115	0.176

Note: Robust t-statistics in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table 4 reports the results from the dynamic panel data approach using income share by top 20% as the dependent variable instead of the Gini coefficient. First of all, it should be noted that in all 5 estimations, the coefficient on foreign aid remains negative and statistically significant, which proves the

robustness of the main results. The more foreign aid a developing country receives, the less income share by the top 20%. The coefficients on control variables also remain mostly similar, although the statistical significance differ in a few cases. Moreover, the coefficients for the institutional independent variables are similar to the main results, with democracy and control of corruption statistically significant at 1% level. Also, the null hypothesis of the Hansen test for overidentifying restrictions is not rejected in all five columns, which proves the soundness of the instrument sets. Last but not least, note that in column (5), the interaction term between foreign aid and corruption turns significant at 1% level.

In column (5), the coefficient on foreign aid is -1.723, statistically significant at 1% level, while the coefficient for control of corruption and the interaction term is -27.053 and 1.558 respectively, both significant at 1% level. Foreign aid and control of corruption themselves are both negatively correlated with income inequality, which is logical. The more foreign aid, the less income inequality and the higher the control of corruption, the less income inequality. Given the interaction term being significant, it can be calculated that in an average developing country where the control of corruption is around 0, 1% increase in foreign aid leads to 1.723% share decrease of income by top 20%. Given the same amount of foreign aid, when the control of corruption rises to the highest, around 2.5, 1% increase in foreign aid leads to 2.172% share increase of income by top 20%. This means that for a developing country where foreign aid is given, control of corruption is not correlated with reduced inequality, but instead with exacerbated income distribution.

Turning the estimates the other way, the results can also be interpreted that in an average developing country where the amount of foreign aid received in logarithm is around 19, one level increase in the control of corruption would lead to 2.549% share increase of income by top 20%. This means that if this country receives more foreign aid, the extent to which the control of corruption exacerbates income inequality becomes even greater. All in all, by employing a different measure of income inequality, the robustness of the results using the Gini data from WIID is proven.

V. Conclusion

Recently, there has been worldwide recognition of the problems of inequality; international organizations such as World Bank, United Nations and OECD have set twin goals of tackling both poverty and inequality simultaneously. Although reducing inequality constitutes one of the primary objectives of international development, empirical research on the effect of foreign aid on inequality is scarce and divided, which motivated this study.

In this paper, I focused on both the direct effect of foreign aid on inequality and how this effect is possibly mediated by the recipient countries' governance, i.e. the level of democracy and control of corruption. In line with some previous research that claims aid's positive impact on reducing inequality (Shafiullah, 2011; Gonzalez and Larru, 2012) and against ones that identify aid's failure to do so (Bjornskov, 2010; Herzer and Nunnenkamp, 2012), I find that foreign aid has a negative correlation with inequality, through cross-section and dynamic panel data approach. On the other hand, institutional variables, the level of democracy and control of corruption, report to have positive correlation with inequality in the recipient countries. All results are robust, and the coefficients for foreign aid and the institutional variables are statistically significant.

The results suggest that foreign aid helps the recipient countries in terms of reducing income inequality, thereby providing some background as to why foreign aid may be necessary and should be continued in the future. However, the positive correlation between the institutional variables and the Gini in aid-receiving-countries implies that foreign aid may deter the advancement of democracy and weaken control of corruption, or offset the positive effects of democracy and good governance. Therefore, the international aid community should pay more attention to how foreign aid could affect other aspects unrelated to the supported area, and how such backfires could be prevented. Also, the international aid community needs to provide better measures to ensure that foreign aid does not harm good governance.

Although this study points out the possible harms to the advancement of democracy and control of corruption, overall, foreign aid has an income equalizing effect, through which developing countries could achieve more inclusive and balanced growth. Despite its possible backfires, foreign aid is still awaited and needed in many parts of the world, and if measures are provided to prevent side-effects, it could certainly contribute to making a more egalitarian world.

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Appendices

Appendix 1. List of countries

Country				
Afghanistan	Comoros	Indonesia	Morocco	South Africa
Albania	Congo, Dem. Rep.	Iran, Islamic Rep.	Mozambique	South Sudan
Algeria	Congo, Rep.	Iraq	Myanmar	Sri Lanka
Angola	Costa Rica	Israel	Namibia	St. Lucia
Argentina	Cote d'Ivoire	Jamaica	Nepal	Vincent and the Grenadines
Armenia	Croatia	Jordan	Nicaragua	Sudan
Aruba	Cyprus	Kazakhstan	Niger	Suriname
Azerbaijan	Czech Republic	Kenya	Nigeria	Tajikistan
Bahamas, The	Dominica	Kiribati	North Macedonia	Tanzania
Bahrain	Dominican Republic	Kosovo	Oman	Thailand
Bangladesh	Ecuador	Kuwait	Pakistan	Timor-Leste
Barbados	Egypt, Arab Rep.	Kyrgyz Republic	Panama	Togo
Belarus	El Salvador	Lao PDR	Papua New Guinea	Tonga
Belize	Equatorial Guinea	Latvia	Paraguay	Trinidad and Tobago
Benin	Eritrea	Lebanon	Peru	Tunisia
Bhutan	Estonia	Lesotho	Philippines	Turkey
Bolivia	Eswatini	Liberia	Poland	Turkmenistan
Bosnia and Herzegovina	Ethiopia	Libya	Qatar	Uganda
Botswana	Fiji	Lithuania	Romania	Ukraine
Brazil	Gabon	Macao SAR, China	Russian Federation	United Arab Emirates
Brunei Darussalam	Gambia, The	Madagascar	Rwanda	Uruguay
Bulgaria	Georgia	Malawi	Samoa	Uzbekistan
Burkina Faso	Ghana	Malaysia	Sao Tome and Principe	Vanuatu
Burundi	Guatemala	Maldives	Saudi Arabia	Venezuela, RB
Cabo Verde	Guinea	Mali	Senegal	Vietnam
Cambodia	Guinea-Bissau	Mauritania	Serbia	Yemen, Rep.
Cameroon	Guyana	Mauritius	Seychelles	Zambia
Central African Republic	Haiti	Mexico	Sierra Leone	Zimbabwe
Chad	Honduras	Micronesia, Fed. Sts.	Singapore	
Chile	Hong Kong SAR, China	Moldova	Slovak Republic	
China	Hungary	Mongolia	Slovenia	
Colombia	India	Montenegro	Solomon Islands	

Appendix 2. Definitions and sources

Variable	Definition	Source
Gini coefficient	The Gini coefficient is a measure of statistical dispersion intended to represent the income inequality or wealth inequality within a nation or any other group of people.	World Income Inequality Database
Net aid	Net official development assistance and official aid received (constant 2016 US\$). Net official development assistance is disbursement flows (net of repayment of principal) that meet the DAC definition of ODA and are made to countries on the DAC list of aid recipients. Net official aid refers to aid flows (net of repayments) from official donors to countries and territories in part II of the DAC list of recipients. Part II of the DAC List was abolished in 2005.	World Development Indicators (WDI)
GDP per capita	GDP per capita is gross domestic product divided by midyear population. Data are in constant 2010 U.S. dollars.	WDI
Trade openness	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.	WDI
Government expenditure	General government final consumption expenditure includes all government current expenditures for purchases of goods and services (including compensation of employees).	WDI
Private sector credit	Monetary Sector credit to private sector (% GDP). Domestic credit to private sector refers to financial resources provided to the private sector, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises.	WDI
Industry, value added	Industry corresponds to ISIC divisions 10-45. It comprises value added in mining, manufacturing (also reported as a separate subgroup), construction, electricity, water, and gas. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs.	WDI
Agriculture, value added	Agriculture corresponds to ISIC divisions 1-5 and includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs.	WDI
Democracy	Measured by the Democracy index (0-10) minus the Autocracy index (0-10) which shows the level of democracy in a country on a 21 scale, from -10 being the most autocratic, while 10 being the most democratic. Given as "polity2" in the data.	Polity Project V
Corruption	Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 (most corrupt) to 2.5 (least corrupt).	Worldwide Governance Indicators
Income share by top 20%	Percentage share of income or consumption is the share that accrues to subgroups of population indicated by deciles or quintiles. Percentage shares by quintile may not sum to 100 because of rounding.	WDI