FOREIGN ASSISTANCE AND CONSUMPTION INEQUALITY:

DOES THE STRUCTURE OF AID MATTER?

by

Cheryba Nestor

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Thesis Supervisor: Professor Sergii Kiiashko

Approved by _____
Head of the KSE Defense Committee, Professor

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Abstract

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The issue of the effect of foreign aid on economic outcomes is relatively old – dating back to 1960s literature. This thesis looks into whether the decomposed aid has any effect on consumption inequality. The variable of assistance was split into grants and loans with the central hypothesis of the differing non-linear impact of each with the impact of loans being convex and grants concave. Another hypothesis that the thesis tests is the influence of episodes of violent regime change on inequality. The thesis used a dataset on 75 countries covering 1960-2010. The thesis confirms the central assumption regarding the direction and the type of impact that foreign assistance has on inequality. The hypothesis regarding the effect of Coup d'états hasn't been confirmed by the models in the thesis.

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GLOSSARY

OECD – Organization of Economic Cooperation and Development

UN – United Nations

IMF – International Monetary Fund

WIID – World Income Inequality Database

SWIID – Standardized World Income Inequality Database

EHII – Estimated Household Income Inequality

Chapter 1

INTRODUCTION

It is well-established that income inequality is harmful to development and prosperity. Income inequality has detrimental effects on the credit markets (Aghion and Bolton 1997), may cause economic crises (Piketty and Saez 2003), and slows down the recovery after the crisis (Stiglitz 2012).

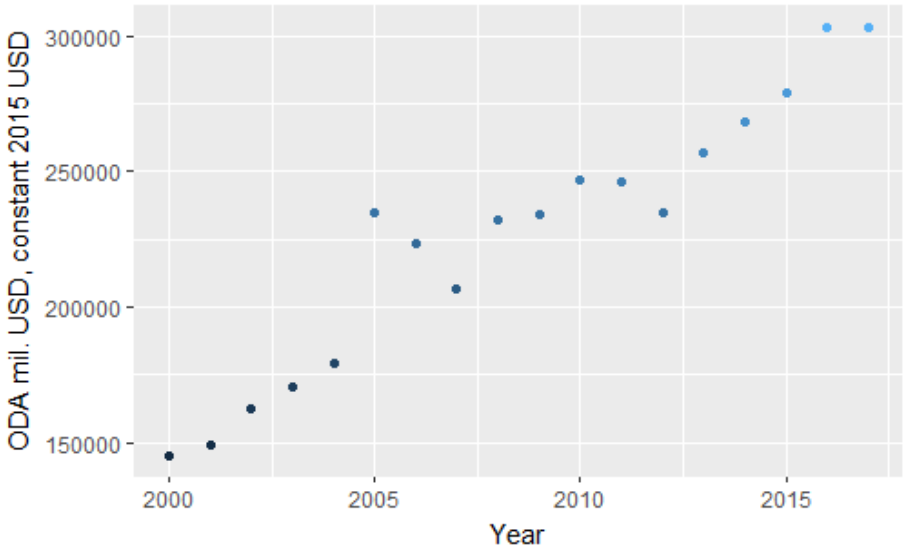


Figure1. Total yearly ODA sent to developing countries in 2015 USD
Source: OECD https://data.oecd.org/oda/net-oda.htm#indicator-chart

The attempts to reduce poverty and income inequality increased in 2000 with the establishment of the Millennium Development Goals (UN 2005) with one of the main instruments of the international community being foreign aid.

The importance of foreign assistance in combatting poverty cannot be overestimated. Organization of Economic Cooperation and Development (OECD) suggests that foreign aid is the primary way in which developed countries can help to alleviate poverty in the developing world (OECD 2006)

and the official rhetoric of donor organizations states that economic growth is a direct consequence of poverty reduction (Keeley 2012). Due to these assumptions, for the last two decades, the international community has poured its resources into foreign aid in hopes of alleviating poverty, during those years the amount of external development assistance (ODA) distributed to the developing countries has increased by more than twofold (Figure 1). Despite the best efforts of the international community, income inequality has persisted in the developing world (Ravallion 2014).

However, empirical studies are inconclusive as to the direct connection between economic growth and poverty reduction. According to Basu and Stiglitz (2016), the claim that development causes a decrease in inequality is doubtful. This "straightforward" view was challenged in 2006 when the World Development Report on "Equity and Development" was published. The report concludes that reducing inequality isn't necessarily a consequence of economic growth and that inequality matters when it comes to improving economic efficiency (World Bank 2006). The abovementioned arguments suggest that the impact on income distribution remains a relatively new avenue of studies which should be explored in depth.

The other avenue which has not been explored in the literature is the differing effect of loans and grants on income inequality. Fiala (2018) finds that when comparing the influence of microfinancing via loans and grants in Uganda, only loans increase sales of a firm. These findings imply that when faced with the condition of repayment, entrepreneurs allocate their investments more efficiently. Morrissey et al. (2006) reach a different conclusion when studying the effects of grants and loans. They conclude that grants are preferred to loans as they don't impose an obligation to repay them in the future as loans do. Bulow and Rogoff (2005) also find that borrowing from development banks encourages more lending by the developing countries, which retards development. Though the current literature mostly looks into the effect on

economic growth, their methodology may be used for studying the effect on income inequality.

This thesis studies the efficiency of foreign aid in alleviating income inequality of emerging economies depending on the foreign aid type. The hypothesis is that the impact of foreign assistance is ambiguous and depends on the type of aid being sent to the recipient country. If the aid is given with the constraint of returning the credit at a later date, it will have an inequality-reducing effect as the money will be allocated more efficiently. On the other hand, if there is no constraint of returning the money, it will only temporarily boost the household's consumption, but will not have a significant effect on income distribution. Some previous research by Sanford (2002) shows that the influence of grants and loans is indeed different, and the question as to which form of aid is more efficient is still open.

The main contribution of the thesis is the decomposition of foreign aid's influence on income inequality by studying the simultaneous effects of foreign loans and grants, the addition of the variable for the cases of violent regime changes and the use of a new dataset on income inequality.

The use of the regime change variable is interesting as existing studies (e.g., Masaki 2016, Haggard and Kaufman 2012, etc.) show the existence of the relationship between the episodes of violent regime changes and foreign aid and income inequality. Hence, the addition of this variable into the regression may help eliminate the omitted variable bias of the dependent variables.

Concerning the data, this work uses the Global Consumption and Income Project inequality database, which hasn't been used in the literature yet. This dataset allows evaluating the models based on the data from 75 countries over 1961-2010 years (See Appendix A for the full list of countries). The main advantage of this dataset of the other ones used in the literature is the availability of more country-years and shrinking the number of gaps in the data. These data are also available for both consumption and income based Gini; this feature allows for additional robustness check.

The main issue with the full dataset is gaps in the periods that are aligned with the episodes of violent regime changes. In many cases, some observations were not collected due to the overthrow of the government in the country of interest. These gaps may prove to be an issue for the model itself and the role of the variable of violent regime change in particular. Another issue is the fact that the model doesn't consider the effects of grants and loans given on condition of the reform(i.e., loans are broken up into different parts and given only when the country implements the set of reforms required to receive the next payment). Unfortunately, such data are unavailable for the current dataset, and the thesis leaves this aspect of foreign aid's influence to future research on the topic.

The methodology is based on the works of Bandyopadhyay and Younas (2013) and Hansen et al. (2009), in advancing the idea of the decomposition of foreign aid from the former article, the control variables specification, and estimation procedure from the latter one. As for the model itself, the main specification follows the Hansen et al. (2009) in removing the fixed effects from each country to account for the country-specific characteristics.

The thesis shows that both forms of aid are characterized by a significant nonlinear relationship with inequality. At low inflow to GDP ratios grants are inequality-reducing but become inequality-enhancing after a point, the relationship is reversed for grants. One may argue that these relationships may partially cancel each other out, so as a way of checking the economic significance of the thesis' findings, a model of total aid's influence on the inequality is also presented. The model shows that foreign aid has a significant, albeit small, negative impact on consumption inequality. As for the variable of episodes of violent regime change, it is shown to be insignificant in all of the models independent of the specification. One may conclude that this is most likely due to the missing country-year data during the years when the overthrow was occurring.

The structure of the thesis is the following: chapter 2 is the review of the current and historical literature on the subject of the foreign aid's effect, section 3 describes the methodology and the econometric model that is going to be run, chapter 4 provides a description of the data, and sources used to acquire it, chapter 5 discusses the results of the model, section 6 presents conclusions and policy implications.

Chapter 2

LITERATURE REVIEW

Overall the literature on the economic effect of foreign aid can be divided into four methodological generations. The first generation concentrated on simple Keynesian Harrod-Domar-like models, which linked foreign aid to economic growth via aid's link to savings and consumption. The second generation started in the 1970s and concentrated on the direct effect of foreign aid on the investment. The third generation of studies began in 1996 with Peter Boone's paper "Politics and the effectiveness of foreign aid", which was the first one of the papers to develop aid models with the variables of institutional and policy environments. The fourth generation of research moved away from the growth theory and concentrated on the effects of foreign aid on social factors such as health, education, etc.

The first models describing the influence of foreign aid on the economy were developed in the 1960s and concentrated mostly on the added productivity of international assistance. These models assumed that every dollar of foreign inflows in the form of assistance should be followed by a 1 dollar increase in investment and imports (Rosenstein-Rodan 1961). Further models get more complicated - the assumption of the fixed capital-output ratio was forgone while importing capacity of the countries and domestic savings were included (Chenery and Carter 1973). All of these models assumed that the aid inflows were added to the local investment and imports dollar for dollar.

The third wave of the aid research began in 1996 with the abovementioned paper by Peter Boone. This paper is revolutionary in the sense that it was the first one to address the range of factors that may affect the effectiveness of foreign aid (e.g., political regime) (Boone 1996).

The latter course of foreign aid literature strayed from looking into the direct effect of foreign aid on growth. Instead, these papers investigated the

consequences of the inflow of foreign assistance on social indicators. Some of the most prominent examples of the literature from this period include Burnside and Dollar (1998) who link foreign aid to infant mortality and conclude that when the country has fixed property rights, open trade regimes, and macroeconomic stability, the assistance has a reductive effect on infant mortality. Collier and Dollar (2001) develop a poverty reduction model showing that aid can only be effective in reducing poverty in an appropriate policy environment. Fielding et al. (2006) show that foreign aid has a positive effect on development outcomes, including health, education, and fertility.

The first studies that link foreign aid to income inequality appear in this period. One of the most prominent papers written in this period was Chong et al. (2009). In this paper, the authors argue that using simple cross-sectional estimation when estimating the effect of foreign aid leads to biasedness of the estimators due to the problems of simultaneity and reverse causality. The solution proposed is the use of dynamic panel data modeling. The particularity of the effect of foreign aid on income inequality is the presence of autoregressive errors that implies the need to use an estimator with uncorrelated disturbances. Taking this issue into account, the authors used the GMM-IV model. Their model showed that when the quality of the country's institutions was taken into account, foreign aid might as well have a small positive effect on income inequality, but they concluded that the result was not robust. A similar model is used in Pham (2015), though it's a simple GMM. This paper found that foreign aid exhibited an inequality increasing effect, though a small one.

Bourguignon et al. (2009) reach a similar conclusion when looking into the impact of trade and foreign aid on income inequality. While in their model, aid is statistically significant; it isn't economically. However, while the effect is small, it is still helpful for the most deprived decile of the population.

Following this stream of results, Shafiullah (2011) finds that the variable of foreign aid causes a small reduction in inequality when fixed and random effects models are used to analyze the data.

The other stream criticizes foreign aid, concluding that it may have an inequality increasing effect. Layton and Nielson (2008) show that, depending on the model specification, foreign assistance has either inequality enhancing the impact or an insignificant one. For the estimation, they use the instrumental variable approach to tackle the issue of endogeneity of the relationship between aid and inequality.

Bjørnskov (2010) shows that the interaction term between democracy and foreign aid has a positive effect on the share of income held by the upper quintile of the population. This result holds for democratic societies only as in authoritarian ones the effect is negligible. These results were later disproven in Hansen et al. (2009) who address the issue of regression models with non-constant partial effects and conclude that foreign assistance has no significant impact on income inequality.

Another approach to the problem can be seen in Herzer, and Nunnenkamp (2012) who argue that foreign aid and income inequality are cointegrated of the same order hence, a panel cointegration model can be built. This model shows that foreign aid exhibits an adverse effect on the distribution of income.

Another type of debate that exists in the foreign aid literature concerns the ambiguity of its effect on the economy depending on the kind of aid. These debates originate in the report of the International Financial Institution Advisory Commission in 2000. This report argued that international grants were the preferred instrument for alleviating poverty in developing countries as opposed to loans. Somewhat repeating the argument of Mosley, et. al (1987) the report concludes that when the loans given by the IMF and the World Bank are in the hands of the politicians of developing countries the

funds are being spent on policies that can hardly be called growth-inducing (e.g., tax-reduction) (IFIAC 2000).

Grants were viewed as preferable to loans based on three main arguments: firstly, grants are more suited for social projects such as the development of the education or healthcare infrastructure, as they do not produce the returns needed to return the loan in the short run. Secondly, grants do not place more debt-burden on the developing countries as loans do. Lastly, as grants do not need to be repaid the donors can place more control on how the funds are spent to keep with the requirements of the UN's development goals and prevent the recipients' governments from squandering the assets, Sanford (2002)

Bulow and Rogoff (2005) reach a similar conclusion as they find that borrowing from development banks encourages more lending by the developing countries which retards development.

On the other hand, one can find persuasive arguments regarding why loans should be preferred to grants. The core of this argument lies in the aid's influence on the fiscal behavior of the recipient: unlike loans, grants do not need to be repaid and hence may induce inefficient spending of the funds. Gupta et al. (2004) build a panel model investigating the fiscal response to the decomposed aid inflows. The model shows that loans have a positive effect on tax revenues, while grants' impact is negative. This relationship may imply that grants cause inefficient policymaking. In the limited sample of highly corrupt countries, grants were fully offset by the decrease of tax revenues.

These results were later criticized by Morrissey et al. (2006), who show that when long-run effects are considered, this relationship disappears. Their findings suggest that there should be no consistent long-run relationship between decomposed foreign aid and tax revenues. Bandyopadhyay and Younas (2013), on the other hand, show that the relationship is not as straightforward. In their paper, they examine a non-linear relationship between economic growth and foreign aid. Using the quadratic links and

modeling simultaneous effects of both loans and grants, they find that grants are better for growth on the low levels of funding as the relationship between growth and financing via grants is hump-shaped. Furthermore, the relationship between growth and loans tends to be U-shaped, implying that high-level loans are highly effective in assisting with the country's growth.

As for the more recent literature, Fiala (2018) finds that when comparing the effect of microfinancing via loans and grants in Uganda, only loans increase sales of the firm. These findings imply that when faced with the condition of repayment, entrepreneurs allocate their investments more efficiently.

The current thesis contributes to the literature by exploring the effects of constrained and unconstrained by repayment aid. It also introduces the variable of violent regime changes to eliminate the potential bias on the variable of foreign aid. The paper takes inspiration from the models presented by Bandyopadhyay and Younas (2013) and Hansen et al. (2009) by joining some elements of their models (i.e., the aid decomposition and estimation methodology) and extending them.

Chapter 3

METHODOLOGY

The thesis estimates a model of simultaneous influence of each type of aid following the methodology of Bandyopadhyay and Younas (2013). The specification of the empirical model and the estimation method is similar to Hansen et al. (2009)

$$GINI_i^{t+1} = \beta_0 + \beta_1 * Loan_i^t + \beta_2 * (Loan^2)_i^t + \beta_3 * Grant_i^t + \beta_4 * (Grant^2)_i^t + \beta_5 Coup_i^t + \beta_6 Polity_i^t + \beta_j X_i^t + \mu_i + \varepsilon_i^t \quad (1)$$

In this specification, GINI is the consumption-based income inequality index, loans and grants are the variables of the international assistance provided with and without the constraint of returning the money respectively. Loans and grants are expressed in relative terms as the percentage of real GDP in 2016 USD. This is done to normalize the amounts of aid between the countries in the sample. As the countries in the sample differ in sizes of their economies, populations, and territories, the model estimated on absolute values would be flawed. The issue would be caused by neglecting relative importance of the assistance for the country's economy, which can be eliminated with the use of relative measures.

I use consumption inequality as a measure of inequality. The reason is that traditional income inequality measures do not reflect the asset availability of the population (e.g., housing). However, this is reflected in the consumption inequality measure. The other issue with income as the primary measure of inequality is that it ignores shadow economy – the income of the people on

the bottom of the income distribution is often underreported in developing countries for the sake of tax evasion, making the income inequality measure imperfect. It is worth noting that the income measure is used in the robustness check portion of the thesis.

Polity is the Polity IV index, defined on a range from -10 to 10, and determined by the country's overall level of democracy, press freedom, transparency of the governing bodies and the general process of electing of the government.

The Coup is an indicator of a violent political regime change. This variable is expected to have a significant effect on the model's structure as it was shown to influence the aid variables and the inequality variable. Its influence on the foreign aid is negative and proven by the literature (Masaki 2016, Haggard and Kaufman 2012), and, as for the impact on the regime changes, it's positive but not as straightforward. According to the literature, the relationship is backward – income inequality causes regime changes. As our variable of regime changes, the association of interest becomes that of the Coup de tat's influence on income inequality. If one supposes that after the regime change, the regime becomes more egalitarian, the income inequality should decline (Galbraith 2010). However, it is quite expected that a period of political instability would come after the overthrow hence causing a decrease in equality. Understandably this relationship is not as straightforward and should be explored in depth, but as it's not our variable of interest and is only added to the model to eliminate a part of the bias, it shouldn't matter all that much.

The problem with the coup variable, however, is that the episodes of violent regime change usually cause abrupt breaks in the data. This trend is especially evident in the 1970s-1980s, which were historically characterized by many Coup de tats, but unfortunately, the data for the response variable and independent ones is not available for these years. This issue is not supposed to cause much trouble as most of the time, the indicator is positive for

another year after the Coup ends, and hence, it matches up with the existing data. The dummy at the end of such structural breaks should be enough to soften the impact of the breaks.

The control variables are standard for the income inequality literature such as Burnside and Dollar (1998), Hansen and Tarp (2000) Arndt, Jones, and Tarp (2010). These include the index of human capital, trade openness, government expenditures as the share of GDP and the population share of people living in rural areas.

As suggested by Shafiullah (2011), all variables are taken with the lag of 1 year as it is expected that foreign assistance's effect will not be immediate. As a way of checking the robustness of the findings models with 3 and 5-year lags are also estimated. The lag also alleviates a potential endogeneity problem. While foreign aid affects income inequality, the reverse can also be true. Hence, by forwarding the response variable by 1-year, we may limit its effect as inequality in the future period is quite unlikely to have a significant influence on the amount of foreign aid in the present one.

Chapter 4

DATA DESCRIPTION

The inequality measure is taken from the Global Consumption and Income Project (GCIP), which presents a dataset containing measures of inequality based on income and consumption spanning 1960-2015 and covering more than 160 countries. This dataset was chosen over the other inequality datasets (WIID, SWIID, EHII, etc.) due to its country-year coverage. As it covers more country-years, it allows running models on more observations. While the merged datasets for the other income inequality measures allowed running the final regression on mere four-six hundred observations the GCIP allows for almost three thousand observations in the merged dataset (this is especially helpful considering that the independent variables are estimated with the lag which already reduces the number of observations by a large margin).

The data for the dependent variable of international loans and grants are taken from OECD's Geographical Distribution of Financial Flows to Developing Countries annual publication. The full dataset covers over 150 different countries over 1960-2018 years. It contains the data on all of the aid funds flowing into the developing countries from both country and supra-national level donors. The final model uses the measure of net loans instead of gross loans because net loans more accurately show how much aid money the country has at a given moment. This choice may also capture the effects of political violence more accurately (i.e., states are more likely to receive a loan after a government overthrow and less likely to return old loans (Haggard and Kaufman, 2012) as well as partially serve as an indicator for the quality of governance in the country.

To measure the level of democracy in the country, the model uses the Polity index from Polity IV Annual time series covering 167 countries from 1800-

2017. Polity IV is a combined index consisting of indices measuring democracy and autocracy. They are constructed using the measures of the governance selection process and its openness, regulation of the participation in political processes, etc. The Polity IV index ranges from -10 to 10 depending on the level of the democracy in the country, during the process of data preparation the index was normalized to the range of 0 to 20.

To account for the possible structural breaks in the inequality distribution, the data on the adverse political regime changes will be taken from the PITF State Failure Problem Set. It covers episodes of regime changes in 85 countries from 1955 to 2017.

Other control variables should also be added to the model to reduce the endogeneity. These variables include: the index of human capital composed on the basis of years of studying taken from Barro and Lee (2013) and assumed rate of return to education calculated using the Mincer equation Psacharopoulos (1994); trade openness measured as the ratio of exports and imports to GDP; government expenditures as the share of GDP. The data for human capital, trade openness and government expenditures are taken from Penn World Tables (Feenstra et al. 2015), the data on the rural share of the population can be found in World Development Indicators. Some additional dummy controls are added: the continent of the origin country, and whether the state is a post-soviet one.

As one can see from Table 1, grants are far more preferable to loans when it comes to foreign aid. Judging by the averages, the total quantity of loans is more than 3 times smaller than the grants given by the international community. These data are presented for net loans, but even if we consider gross loans, the grants are still 2 times larger than the loans (see Figure 2).

Table 1. Summary statistics of the data

Variable	Observations	Mean	Standard deviation	Min	Max
Grants	2,994	.017	.024	.000	.181
Net loans	2,994	.005	.010	-.048	.171
GINI	2,994	.425	.077	.247	.875
Human capital	2,994	1.732	.538	1.007	3.301
Govt. spending	2,994	.178	.089	.016	.687
Polity	2,994	.538	6.874	-10	10
Trade openness	2,994	63.352	39.337	5.222	251.112
Rural pop.	2,994	.598	.218	0	.97807
Regime change	2,994	.026	.159	0	1

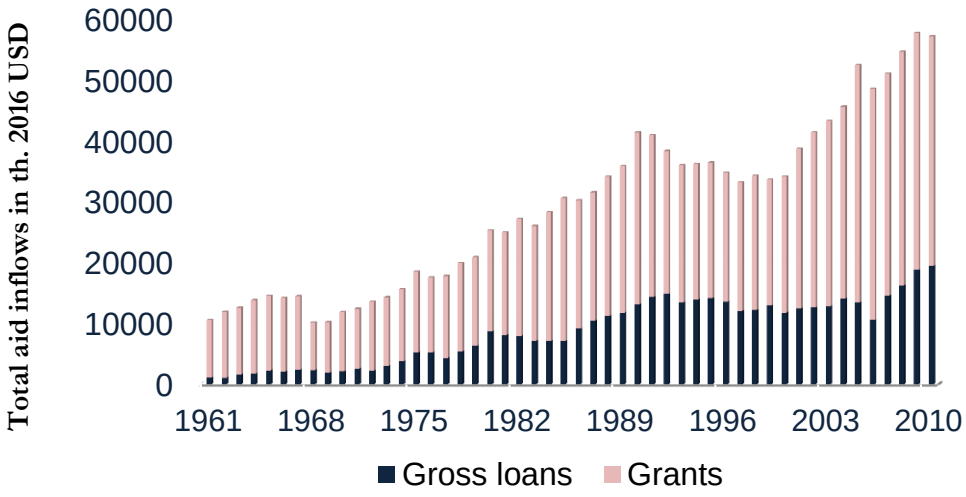


Figure 2. Total yearly aid inflows in 2016 USD

With this in mind, we can construct a simple classificator for the countries in the sample to see whether we have a strict divide in the funding source specialization. Considering the relative weight of grants versus loans, one can view the country as loan oriented if the relative importance of loans is higher than grants. The country is deemed to be grant-oriented if grants account for more than twice the percentage of loans in the economy. We end up having 6 states that are purely loan oriented and 57 countries that are grant oriented with the rest falling somewhere in-between (the full lists can be found in Appendix B). The traditional role of loans in the loan oriented countries of the sample cannot be overestimated, and it may have led to positive inequality outcomes. Some of those countries were allowed to take large amounts of loans due to the American-supported governments during the '70s and '80s (e.g., Chile, Indonesia) others are countries who have historically been productive in the poverty-alleviation process (e.g., India, Turkey). Historical development of these countries and the growth associated with poverty reduction may become a focus of further research.

Some other interesting facts that can be derived from Table 1 include the importance of the government sector in the developing economies. The role of government expenditures in the budget averages out to approximately 18%. A few African countries are most likely the cause of the high maximum value of the variable (mostly Nigeria and Madagascar).

Most of the countries in the sample are open economies and are considered to be pretty democratic according to the polity index and a large rural population. The high rural population isn't driven by the outliers but is caused by the inclusion of the data for developing countries during the 1960s and 1970s. The other side of the distribution is exclusively produced by the data on Singapore.

As for the variable of the violent political regime changes, it is only present in less than 3% of the sample. This is mostly due to Coups being a rare political event and the unavailability of the data for the years where the overthrow has

occurred. This may cause further problems in the estimation stage of the thesis.

After merging the data, we end up with the dataset containing 2994 observations 1961-2010 years and 75 countries with all of the countries with less than four country-year cells deleted. One of the peculiarities of the merged data is the presence of Singapore and Israel in the final sample. To avoid any inconsistencies with the data that may have arisen due to the presence of these countries in the sample, both countries were excluded from the final models.

Figure 3 presents the distribution of income inequality (consumption estimate) with "stars" being the outliers of the distribution. As one can observe the inequality has remained stable over the entire available period, though this might be explained by the composition of the sample (i.e., only developing countries selected and China is out of the sample).

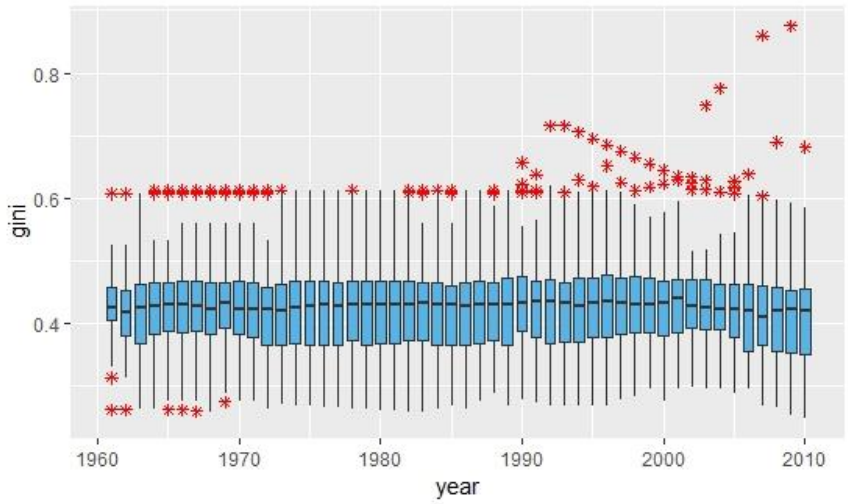
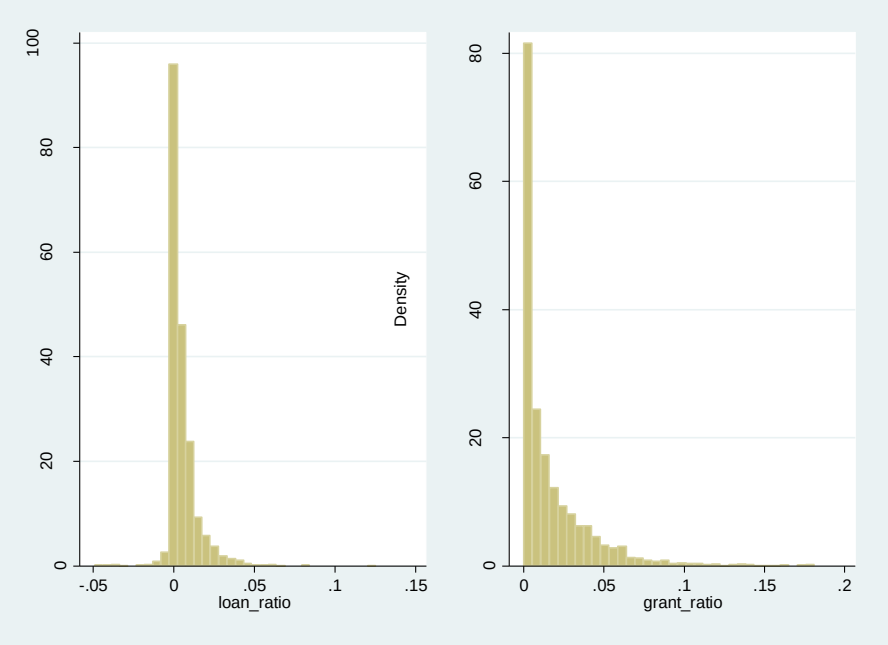


Figure 3. The boxplot of consumption inequality

Initially, variables of loans and grants were characterized by outliers that caused the skewness of both distributions. To normalize the distributions, the

outliers have been dropped; the histograms with the "clean" data can be found in Figure 4. As a result, the sample has been reduced to 2887 observations.



(a) (b)

Figure 4. The distribution of ratios of loans (a) and grants (b)

Chapter 5

RESULTS

The following section is structured in the following way: the first subsection presents an overview of the estimation results of the primary model, the second subsection is dedicated to the robustness check of the models, and the last subsection is dedicated to the post-estimation tests.

5.1. The main results

As expected, both loans and grants have significant effects on income inequality in the final FE (fixed effects) model. However, the direction of their impact seems to be the opposite. For loans, the breakpoint at which loans help to reduce inequality is 2.6 % of GDP, this percentage of loans was at some point present in 33.3% of the countries in the sample. As for the grants, the breakpoint after which they start to enhance the inequality is 9.9%. It is quite interesting to note that the amount of grants at which they are helpful for the economy is quite significant in relative terms. This percentage was at one point present in 20% of the countries of the sample.

As for the violent episodes of political change, they don't seem to affect income inequality despite it being one of the main reasons behind government overthrows. This insignificance may be due to the structural breaks in the data which distort the results. Some ways of dealing with this issue are presented in the final chapter.

The coefficients on all the other control variables are consistent with the literature. Human capital, trade openness, the percentage of the rural population and the government expenditures all have an inequality enhancing effect while the polity index reduces inequality as was shown in Hansen et al. (2009).

Figure 3 presents the version of the specification without continental dummies. The full model can be found in Appendix C.

Table 2. Main model estimation results

	(1)	(2)	(3)	(4)
	Gini panel	Gini panel	Gini panel	Gini FE
Loans	0.283**	0.321**	0.334**	0.336**
	(0.006)	(0.002)	(0.002)	(0.001)
Loans squared	-5.625**	-6.177**	-6.256**	-6.304**
	(0.004)	(0.002)	(0.001)	(0.001)
Grants	-0.400***	-0.299**	-0.320**	-0.320**
	(0.000)	(0.003)	(0.002)	(0.002)
Grants squared	2.229**	1.618*	1.753*	1.751*
	(0.002)	(0.025)	(0.015)	(0.015)
Openness		0.00713**	0.00672**	0.00680**
		(0.001)	(0.002)	(0.002)
Govt. Exp.		0.0614***	0.0634***	0.0633***
		(0.000)	(0.000)	(0.000)
Human cap.		0.0166***	0.0217***	0.0215***
		(0.000)	(0.000)	(0.000)
Polity		-0.000407**	-0.000404**	-0.000416**
		(0.006)	(0.006)	(0.005)
Rural pop.		0.0247	0.0377**	0.0375*
		(0.089)	(0.010)	(0.012)
Coup d'État		-0.00116	-0.00104	-0.00116
		(0.768)	(0.790)	(0.767)
_cons	0.419***	0.342***	0.365***	0.336***
	(0.000)	(0.000)	(0.000)	(0.000)
N	2887	2887	2887	2887

p-values in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.2. Robustness check

Table 3 presents the first robustness check of the model. The main claim behind the 1-year lags in our main model is that the changes in inequality are not visible as soon as the aid is given. We take the minimal lag following the suggestion presented in Shafiullah (2011), but one may argue that one-year lag is too short. Sometimes the governments in developing countries take years to invest funds, so to test for this we take the lags of three and five years to check the model's robustness (see Appendix D for the full table).

Table 3. Robustness check – 3 and 5-year lags

	(1)	(2)	(3)	(4)
	Gini FE	Gini Panel	Gini Panel	Gini FE
	3 year lag	3 year lag	5 year lag	5 year lag
Grants	-0.166	-0.162	-0.0119	-0.00583
	(0.112)	(0.122)	(0.911)	(0.957)
Grants squared	0.610	0.579	-0.0140	-0.0610
	(0.418)	(0.444)	(0.985)	(0.936)
Loans	0.263*	0.267*	0.129	0.133
	(0.018)	(0.017)	(0.277)	(0.262)
Loans squared	-4.640*	-4.719*	-3.251	-3.346
	(0.021)	(0.019)	(0.121)	(0.111)
Coup d'État	-0.00118	-0.00134	-0.00398	-0.00414
	(0.765)	(0.736)	(0.315)	(0.297)
_cons	0.344***	0.317***	0.330***	0.305***
	(0.000)	(0.000)	(0.000)	(0.000)
N	2738	2738	2590	2590

p-values in parentheses* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

It appears that grants have no effect on the income inequality in neither 3rd nor 5th lag models. Loans, on the other hand, have a significant adverse effect on the third lag with the consistent non-linear relationship. It suggests that loans have a lasting impact on the country's economy and are essential to decreasing inequality long after they came into the country. However, the effect of loans becomes insignificant with the fifth lag model, which suggests that the positive influence of this form of aid diffuses after some time. As for the Coup d'État, it remained insignificant in all of the models above.

The second robustness check of the model (see Table 4) concerns the variable of net loans. As the argument of the thesis goes – net loans are a preferable measure to gross loans as they show the actual amount of aid that a country has at a given year. But the argument may also go vice versa – one should look into how much money is given to the country per year to see the results.

Table 4. Robustness check - gross loans

	(1)	(2)	(3)	(4)
	Gini Panel	Gini Panel	Gini Panel	Gini FE
Gross loans	-0.00878	-0.132	-0.290	-0.258
	(0.956)	(0.717)	(0.435)	(0.489)
Gross loans squared		9.270	18.34	17.49
		(0.508)	(0.189)	(0.212)
Grants	-0.131**	-0.398***	-0.315**	-0.320**
	(0.003)	(0.000)	(0.003)	(0.003)
Grants squared		2.070**	1.515*	1.534*
		(0.005)	(0.041)	(0.039)
_cons	0.421***	0.424***	0.368***	0.339***
	(0.000)	(0.000)	(0.000)	(0.000)
N	2887	2887	2887	2887

p-values in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The term of gross loans is insignificant in this specification. This means that the total amount of aid that's pumped into the economy per year doesn't matter for income inequality. Only the real amount available is the value that determines the change in inequality. The full table can be found in Appendix E.

Table 5 deals with the economic significance of the model. As the effects of both loans and grants are simultaneous one may certainly argue that they cancel each other out and the cumulative effect of foreign aid is either insignificant or too small to matter. Table 5 presents the full aid model with the removal of the hump shape hypothesis. As the effects of the decomposed aid are inverse to each other, the "U" shaped relationship is unlikely to hold. Moreover, the linear relationship is a standard specification for the current literature (Herzer and Nunnenkamp 2012, Layton and Nielson 2008, etc.) (see Appendix F for the full table)

Table 5. Robustness check – the total effect of aid

	(1)	(2)	(3)	(4)
	Gini	Gini	Gini	Gini FE
Total aid	-0.113**	-0.0900*	-0.0932*	-0.0930*
	(0.002)	(0.014)	(0.011)	(0.011)
Openness		0.00710**	0.00681**	0.00679**
		(0.001)	(0.002)	(0.002)
Human cap.		0.0143**	0.0187***	0.0190***
		(0.001)	(0.000)	(0.000)
Coup d'État		-0.00112	-0.000990	-0.00112
		(0.773)	(0.798)	(0.772)
_cons	0.421***	0.349***	0.374***	0.344***
	(0.000)	(0.000)	(0.000)	(0.000)
N	2914	2914	2914	2914

p-values in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The variable of the aid ratio is significant econometrically, as for the economic side, it's not the case. The change presented would mean that a 1% increase in the total aid would result in approximately 0.2% wealth transfer from the population above the median income to the population below it.

Table 6 deals with the separation of the influence of foreign aid types. The results of models of simultaneous influence may have been caused by the multicollinearity in the loans and grants variables. The following table presents separate models for both grants and loans. The full table can be found in Appendix G

Table 6. Robustness check – splitting the effects of aid

	(1)	(2)	(3)	(4)
	Gini panel	Gini panel	Gini FE	Gini FE
Grants	-0.309**		-0.311**	
	(0.002)		(0.002)	
Grants squared	1.561*		1.566*	
	(0.027)		(0.028)	
Loans		0.297**		0.300**
		(0.004)		(0.004)
Loans squared		-6.903***		-6.972***
		(0.000)		(0.000)
Polity	-0.000407**	-0.000479***	-0.000414**	-0.000486***
	(0.005)	(0.001)	(0.005)	(0.001)
Coup d'État	-0.00117	-0.000410	-0.00130	-0.000545
	(0.762)	(0.916)	(0.736)	(0.888)
_cons	0.375***	0.364***	0.344***	0.335***
	(0.000)	(0.000)	(0.000)	(0.000)
N	2914	2914	2914	2914

p-values in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The results from this robustness check show that both variables are significant, and their magnitudes and directions of the effect remain virtually unchanged from the main model.

Table 7 is the last of the robustness check section of this chapter. It tests the consistency of the model under a different measurement of inequality. Instead of a consumption-based measure, the models use the income-based one.

Table 7. Robustness check – income measure of inequality

	(1)	(2)	(3)	(4)
	Gini panel	Gini panel	Gini panel	Gini FE
Loans	0.216	0.285	0.300*	0.304*
	(0.128)	(0.050)	(0.038)	(0.035)
Loans squared	-4.143	-4.852	-4.857	-4.869
	(0.124)	(0.072)	(0.070)	(0.069)
Grants	-0.298*	-0.237	-0.302*	-0.340*
	(0.028)	(0.084)	(0.027)	(0.013)
Grants squared	1.417	1.043	1.448	1.665
	(0.146)	(0.288)	(0.137)	(0.090)
Openness		0.0155***	0.0137***	0.0136***
		(0.000)	(0.000)	(0.000)
Govt. Exp.		-0.000238	0.00329	0.00338
		(0.986)	(0.800)	(0.796)
Coup d'État		0.00377	0.00423	0.00404
		(0.480)	(0.425)	(0.447)
_cons	0.527***	0.435***	0.508***	0.430***
	(0.000)	(0.000)	(0.000)	(0.000)
N	2949	2949	2949	2949

p-values in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The income-based models show results similar to those of the primary model but less significant. This may be due to the noisiness of the income inequality measure as compared to the consumption inequality one. Both loans and grants still exhibit a significant negative and positive effect on income inequality, respectively.

5.3. Post-estimation test

To see whether the main model has any statistical issues, I've conducted three post-estimation tests for the following issues: multicollinearity, autocorrelation, and heteroskedasticity.

To test for multicollinearity, I've conducted a variance inflation factor test (VIF) with centered values of test's coefficients. The mean variance inflation factor is 2.91, meaning that the model doesn't face the problem of multicollinearity.

Inoue and Solo LM test was used to test the model for autocorrelation. This test inspects the model for autocorrelation of any order with the null hypothesis of there being none. The test produced a p-value of 0.936, so one fails to reject the null hypothesis of the test.

Lastly, to test for heteroskedasticity, I've used a Modified Wald test for group-wise heteroskedasticity. With the null hypothesis of homoscedasticity, this test has shown a p-value of 0, meaning that one can reject the assumption on homoscedasticity.

To solve this issue, a linear regression absorbing multiple levels of fixed effects with robust standard errors was run. The panel variable was chosen for the factor the effects of which were specified to be absorbed by the model. This model is an extension of linear regression with a large dummy-variable set and is usually used for datasets with multiple levels of fixed effects. This model is preferable to the simple addition of the robust standard errors to the fixed effects panel model when it comes to heteroskedasticity.

This is due to the fact that it absorbs multiple levels of country-level effects. The results of the model are presented in Table 8.

Table 8. The main model corrected for heteroskedasticity

	(1)	(2)	(3)
	Gini panel	Gini panel	Gini panel
Loans	0.0501	0.283*	0.333**
	(0.643)	(0.014)	(0.003)
Loans squared		-5.610*	-6.281**
		(0.014)	(0.002)
Grants	-0.143**	-0.421***	-0.320**
	(0.005)	(0.001)	(0.008)
Grants squared		2.337***	1.746**
		(0.001)	(0.009)
Openness			0.00668**
			(0.007)
Govt. Exp.			0.0634***
			(0.000)
Human cap.			0.0209***
			(0.000)
Polity			-0.000407**
			(0.010)
Rural pop.			0.0359**
			(0.008)
Coup d'État			-0.00104
			(0.822)
_cons	0.428***	0.431***	0.338***
	(0.000)	(0.000)	(0.000)
N	2914	2914	2914

p-values in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

As one can see, the issue of heteroskedasticity of the data isn't as critical as might seem at first glance. The model with the absorption of country-level fixed effects remains consistent with the thesis' previous findings in terms of variables' significance.

Chapter 6

CONCLUSIONS

Some important policy implications can be derived from the results above. The first one is that grants and loans are different in their effects on income inequality. These relationships may be caused by the difference in the repayment condition of both. As grants don't need to be repaid, given a large enough sum, the money is going to be used inefficiently because there's no direct incentive to use them properly, the relationship reverses for loans

Overall foreign aid has a positive, albeit small, effect on income inequality. With the correct balance of loans and grants, a net inequality reductive effect can be reached. Loans are well suited for a reduction in small quantities. A net point of 2% is needed for the loans to have an inequality-reducing effect on inequality. As for the grants they are only harmful when they constitute more than 9% of the economy, which may seem like a lot, but such values are indeed present in the sample, and they aren't as uncommon as it may appear on the first glance.

We can hypothesize about the reasons behind such a relationship. As for the loans, the reasoning is quite straightforward: at low levels, loans aren't likely to help deal with inequality as there aren't just enough of them to effectively use. If there are a bit more of them, the governments, who understand the importance of the repayment constraint use loans in an effective way. The grants may be effective at low levels as when used on the types of low-profit social projects aimed at increasing human capital (building schools, hospitals, etc.). They may be more effective because, as mentioned above, such projects don't actually produce any profits in the short run and as such grants are preferable to loans in the case of such projects. And at higher levels, grants are easier to be misused by the corrupt government officials in the developing countries, and as such, they become ineffective in reducing inequality.

The thesis has shown that the question of the effect of foreign aid on income inequality is an important topic that deserves more attention in the literature than it currently gets. Not only is income inequality a more appropriate measure of effectiveness when it comes to the alleviation of poverty, but it also helps to see what is the effect of international efforts to combat global poverty.

The decomposition of the aid sheds light into the mechanism behind the aid's influence on the economy. In this regard, the thesis has shown that the effect is twofold – one form of assistance serves as inequality redactor while another kind is inequality expander. This relationship is shown to be non-linear with its breakpoints and the appropriate strategies for each type of aid. The thesis has demonstrated that it is vital to use a large enough amount of loans to reduce inequality while at the same time keeping a small amount of grants in order not to expand it. The model has passed most forms of the robustness check, though it is worth noting that loans were more consistent than grants. This result may have been due to how the loans were measured. In the models above a measure of net loans was used; as such, it may have captured some degree of political competence of the government bodies, and caused the coefficient to be more stable over time.

Still, the research is just one small step on the way to fully understand the nature of aid's influence on income inequality. Another avenue that may be studied in the future is further decomposition of the loan variable into loans that are given on the condition of legislative reforms and loans that are given on the simple term of repayment. This may show an even more interesting result as reform-demanding loans are likely to have a larger magnitude of the effect on the inequality.

As for the variable of political violence, it was insignificant in all of our models. In further research, it may be prudent to concentrate on a different way of measuring the political instability in the county. One of such measures may be the percentage of the population fleeing the country as refugees or the

rate of Internally Displaced Persons (IDP) in the society. These ratios are likely to be correlated with both income inequality and the amount of foreign aid given to the country. Moreover, because the variable of coups was only binary, it had a significant flaw in ignoring the magnitude of the political violence in the country. The number of refugees is a lot more sensitive and their emergence more common than the episodes of political overthrows, hence making it a better potential indicator.

There are some other ways in which the work can be continued such as the choice of the estimation procedure (e.g., the use of the dynamic panel modeling) finding sources with better data, other ways of cleaning the new data, etc. But those choices will be left to the future researchers interested in the disentangling the aid's effect on income inequality.

WORKS CITED

Aghion, Philippe, Patrick Bolton. 1997. «A Theory of Trickle-Down Growth and Development.» *The Review of Economic Studies* 64 (2): 151–172.

Alesina, Alberto, Dani Rodrik. 1994. «Distributive Politics and Economic Growth.» *The Quarterly Journal of Economics* 109 (2): 465-490.

Arndt, Channing, Sam Jones, Finn Tarp. 2010. «Aid, Growth, and Development Have We Come Full Circle?» *WIDER Working Paper Series* 96.

Bandyopadhyay, Subhayu, Sajal Lahiri & Javed Younas. 2013. «Financing growth: foreign aid vs. foreign loans.» *Working Papers* (Federal Reserve Bank of St. Louis).

Barro, Robert J., Jong Wha Lee. 2013. «A new data set of educational attainment in the world, 1950-2010.» *Journal of Development Economics* 104: 184-198.

Basu, Kaushik, Joseph E. Stiglitz. 2016. *Inequality and Growth: Patterns and Policy, Volume 1. Concepts and Analysis.* New York: World Bank Publications.

Bjørnskov, Christian. 2009. «Do elites benefit from democracy and foreign aid in developing countries?» *Journal of Development Economics* 92 (2): 115-124.

Boone, Peter. 1996. «Politics and the effectiveness of foreign aid.» *European Economic Review* 40 (2): 289-329.

Bourguignon, François, Victoria Levin, David Rosenblatt. 2009. «International Redistribution of Income.» *World Development* 37 (1): 1-10.

Bulow, Jeremy, Kenneth Rogoff. 2005. «Grants versus loans for development banks.» *American Economic Review* 95 (2): 393-397.

Burnside, A. Craig, David Dollar. 1998. «Aid, the Incentive Regime, and Poverty Reduction.» *World Bank Policy Research Working Paper No. 1937.*

Chani, Muhammad, Sajjad Jan, Zahid Pervaiz, Amatul Chaudhary. 2014. «Human capital inequality and income inequality: testing for causality.» *Quality & Quantity: International Journal of Methodology* 48 (1): 149-156.

Chenery, Hollis B., Nicholas G. Carter. 1973. «Foreign Assistance and Development Performance, 1960-1970.» *The American Economic Review* 63 (2): pp. 459-468.

Chong, Alberto, Mark Gradstein, Cecilia Calderon. 2009. «Can foreign aid reduce income inequality and poverty?» *Public Choice* 140 (1): 59–84.

Collier, Paul, David Dollar. 2001. «Can the World Cut Poverty in Half? How Policy Reform and Effective Aid Can Meet International Development Goals.» *World Development* 29 (11): 1787-1802.

Feenstra, Robert, Robert Inklaar, Marcel P. Timmer. 2015. «The Next Generation of the Penn World Table.» *American Economic Review* 105 (10): 3150-3182.

Fiala, Nathan. 2018. «Returns to microcredit, cash grants and training for male and female microentrepreneurs in Uganda.» *World Development* 105 (C): 189-200.

Fielding, David, Mark McGillivray, Sebastian Torres. 2006. «"A Wider Approach to Aid Effectiveness: Correlated Impacts on Health, Wealth, Fertility and Education.» *WIDER Working Paper Series 023*.

Galbraith, James K. 2010. «Inequality and economic and political change: a comparative perspective.» *Cambridge Journal of Regions* 4 (1): 13-27.

Gupta, S., B. Clements, A. Pivovarsky, E. Tiongson. 2004. «Foreign Aid and Revenue Response: Does the Composition of Aid Matter?» y *Helping Countries Develop: The Role of Fiscal Policy*, author: S.Gupta, B. Clements G. Inchauste, 385-406. Washington DC: International Monetary Fund.

Haggard, Stephan, Robert R. Kaufman. 2012. «Inequality and Regime Change: Democratic Transitions and the Stability of Democratic Rule.» *American Political Science Review* 106 (3): 495-516.

Hansen, H, F Tarp. 2000. «Aid Effectiveness Disputed.» y *Foreign Aid and Development: Lessons Learnt and Directions for the Future*, author: (ed.) Tarp F., 103-128. London: Routledge.

Hansen, Henrik, Louise Lund Rants, Julie Buhl-Wiggers. 2009. «Do elites benefit from democracy and foreign aid in developing countries?: Comment.» *University of Nottingham Discussion Papers , CREDIT*. 9 (6).

Herzer, Dierk, Peter Nunnenkamp. 2012. «The Effect of Foreign Aid on Income Inequality: Evidence from Panel Cointegration.» *Kiel Working Papers 1762, Kiel Institute for the World Economy (IfW)*.

Houle, Christian. 2016. «Why class inequality breeds coups but not civil wars.» *Journal of Peace Research* 53 (5): 680-695.

IFIAC. 2000. «International financial institutions reform: report of the International Financial Institution Advisory Commission.» Washington DC.

Keeley, Brian. 2012. *From Aid to Development: The Global Fight against Poverty*. Paris: OECD Publishing.

Layton, Timothy, Daniel Nielson. 2008. «Aiding Inequality: The Effect of Foreign Aid on Income Inequality.» *Brigham Young University (mimeo)*.

Lee, Jong-Wha, Hanol Lee. 2018. «Human Capital and Income Inequality.» *ADBI Working Papers* (Asian Development Bank Institute) (810).

Masaki, Takaaki. 2016. «Coups d'État and Foreign Aid.» *World Development* (79) C: 51-68.

Morrissey, Oliver, Olaf Islei, Daniel M'Amanja. 2006. «Aid Loans versus Aid Grants: Are the Effects Different?» *Discussion Papers 06/07* (University of Nottingham, CREDIT).

Mosley, Paul, John Hudson, Sara Horrell. 1987. «Aid, the Public Sector and the Market in Less Developed Countries.» *The Economic Journal* 97 (387): 616-641.

OECD. 2006. *Promoting Pro-poor Growth. Key Policy Messages.* Paris: Organisation for Economic Co-operation and Development.

Pham, Thi Hong Hanh. 2015. «Income Inequality and Foreign Aid.» *Working Papers hal-01158240.*

Piketty, Thomas, Emmanuel Saez. 2003. «Income Inequality in the United States, 1913-1998.» *The Quarterly Journal of Economics* 118 (1): 1–41.

Psacharopoulos, George. 1994. «Returns to investment in education: A global update.» *World Development* 22 (9): 1325-1343.

Ravallion, Martin. 2014. «Income inequality in the developing world.» *Science* (344) 6186: 851-855.

Rosenstein-Rodan, P. N. 1961. «International aid for underdeveloped countries.» *Review of economics and statistics* 43 (2).

Sanford, Jonathan E. 2002. «World Bank: IDA Loans or IDA Grants?» *World Development* 30 (5): 741-762.

Shafiullah, Muhammad. 2011. «Foreign Aid and its Impact on Income Inequality.» *International Review of Business Research Papers* 7 (2): 91-105.

Stiglitz, Joseph E. 2012. *The Price of Inequality: How Today's Divided Society Endangers Our Future.* New York: W. W. Norton & Company.

UN. 2005. *The Millennium Development Goals.* Progress report, New York: United Nations.

World Bank. 2006. *World development report: Equity and Development.* New York : The World Bank and Oxford University Press.

APPENDIX A

Table A: The list of countries used in the models

Albania	Kazakhstan	Togo
Algeria	Kenya	Trinidad and Tobago
Angola	Lesotho	Tunisia
Argentina	Liberia	Turkey
Armenia	Madagascar	Uganda
Bangladesh	Malawi	Ukraine
Benin	Malaysia	Uruguay
Botswana	Mali	Zambia
Brazil	Mauritania	
Burkina Faso	Mauritius	
Burundi	Mexico	
Cambodia	Mongolia	
Cameroon	Morocco	
Central African Republic	Mozambique	
Chile	Namibia	
Colombia	Nepal	
Costa Rica	Nicaragua	
Croatia	Niger	
Cyprus	Nigeria	
Dominican Republic	Pakistan	
Ecuador	Panama	
El Salvador	Paraguay	
Ethiopia	Peru	
Fiji	Philippines	
Gabon	Rwanda	
Ghana	Senegal	
Guatemala	Serbia	
Haiti	Sierra Leone	
Honduras	Slovenia	
India	South Africa	
Indonesia	Sri Lanka	
Jamaica	Tajikistan	
Jordan	Thailand	

APPENDIX B

Table B: The aid specialization classification

Loan Oriented	Grant Oriented	
Brazil	Albania	Mali
Chile	Algeria	Mauritania
India	Angola	Mauritius
Indonesia	Argentina	Mongolia
Pakistan	Bangladesh	Mozambique
Turkey	Benin	Namibia
	Botswana	Nepal
	Burkina Faso	Nicaragua
	Burundi	Niger
	Cambodia	Nigeria
	Cameroon	Panama
	Central African Republic	Paraguay
	Costa Rica	Peru
	Croatia	Philippines
	Cyprus	Rwanda
	Ecuador	Senegal
	El Salvador	Serbia
	Ethiopia	Sierra Leone
	Fiji	South Africa
	Gabon	Tajikistan
	Guatemala	Thailand
	Haiti	Togo
	Honduras	Trinidad and Tobago
	Jordan	Uganda
	Kazakhstan	Ukraine
	Kenya	Uruguay
	Lesotho	Zambia
	Liberia	
	Madagascar	

APPENDIX C

Table C: Main model results – full table

	(1) Gini panel	(2) Gini panel	(3) Gini panel	(4) Gini FE
Loans	0.283**	0.321**	0.334**	0.336**
	(0.006)	(0.002)	(0.002)	(0.001)
Loans squared	-5.625**	-6.177**	-6.256**	-6.304**
	(0.004)	(0.002)	(0.001)	(0.001)
Grants	-0.400***	-0.299**	-0.320**	-0.320**
	(0.000)	(0.003)	(0.002)	(0.002)
Grants squared		1.618*	1.753*	1.751*
		(0.025)	(0.015)	(0.015)
Openness		0.00713**	0.00672**	0.00680**
		(0.001)	(0.002)	(0.002)
Govt. Exp.		0.0614***	0.0634***	0.0633***
		(0.000)	(0.000)	(0.000)
Human cap.		0.0166***	0.0217***	0.0215***
		(0.000)	(0.000)	(0.000)
Polity		-0.000407**	-0.000404**	-0.000416**
		(0.006)	(0.006)	(0.005)
Rural pop.		0.0247	0.0377**	0.0375*
		(0.089)	(0.010)	(0.012)
Coup d'État		-0.00116	-0.00104	-0.00116
		(0.768)	(0.790)	(0.767)
Americas			0.00239	
			(0.896)	
Asia			-0.109***	
			(0.000)	
Europe			-0.181***	
			(0.000)	
Middle East			-0.0490	
			(0.283)	
Oceania			-0.110	
			(0.083)	
Post-soviet			-0.175***	
			(0.000)	
_cons	0.419***	0.342***	0.365***	0.336***
	(0.000)	(0.000)	(0.000)	(0.000)
N	2887	2887	2887	2887

p-values in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX D

Table D: Robustness check – 3 and 5-year lags

	(1) Gini FE 3 year lag	(2) Gini Panel 3 year lag	(3) Gini Panel 5 year lag	(4) Gini FE 5 year lag
Grants	-0.166	-0.162	-0.0119	-0.00583
	(0.112)	(0.122)	(0.911)	(0.957)
Grants squared	0.610	0.579	-0.0140	-0.0610
	(0.418)	(0.444)	(0.985)	(0.936)
Loans	0.263*	0.267*	0.129	0.133
	(0.018)	(0.017)	(0.277)	(0.262)
Loans squared	-4.640*	-4.719*	-3.251	-3.346
	(0.021)	(0.019)	(0.121)	(0.111)
Openness	0.00858***	0.00875***	0.00995***	0.0102***
	(0.000)	(0.000)	(0.000)	(0.000)
Govt. Exp.	0.0748***	0.0748***	0.0861***	0.0862***
	(0.000)	(0.000)	(0.000)	(0.000)
Human cap.	0.0234***	0.0233***	0.0241***	0.0240***
	(0.000)	(0.000)	(0.000)	(0.000)
Polity	-0.000495***	-0.000510***	-0.000596***	-0.000613***
	(0.001)	(0.001)	(0.000)	(0.000)
Rural pop.	0.0472**	0.0478**	0.0527***	0.0539***
	(0.002)	(0.002)	(0.001)	(0.001)
Coup d'État	-0.00118	-0.00134	-0.00398	-0.00414
	(0.765)	(0.736)	(0.315)	(0.297)
Americas	0.00806		0.0132	
	(0.658)		(0.484)	
Asia	-0.106***		-0.102***	
	(0.000)		(0.000)	
Europe	-0.178***		-0.173***	
	(0.000)		(0.000)	
Middle East	-0.0453		-0.0442	
	(0.317)		(0.344)	
Oceania	-0.108		-0.105	
	(0.087)		(0.107)	
Post-soviet	-0.183***		-0.187***	
	(0.000)		(0.000)	
_cons	0.344***	0.317***	0.330***	0.305***
	(0.000)	(0.000)	(0.000)	(0.000)
N	2738	2738	2590	2590

p-values in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX E

Table E: Robustness check – Gross loans

	(1) Gini Panel	(2) Gini Panel	(3) Gini Panel	(4) Gini FE
Gross loans	-0.00878	-0.132	-0.290	-0.258
	(0.956)	(0.717)	(0.435)	(0.489)
Gross loans squared		9.270	18.34	17.49
		(0.508)	(0.189)	(0.212)
Grants	-0.131**	-0.398***	-0.315**	-0.320**
	(0.003)	(0.000)	(0.003)	(0.003)
Grants squared		2.070**	1.515*	1.534*
		(0.005)	(0.041)	(0.039)
Openness			0.00681**	0.00690**
			(0.002)	(0.002)
Govt. Exp.			0.0661***	0.0661***
			(0.000)	(0.000)
Human cap.			0.0203***	0.0200***
			(0.000)	(0.000)
Polity			-0.000402**	-0.00041**
			(0.006)	(0.005)
Rural pop.			0.0371*	0.0370*
			(0.013)	(0.016)
Coup d'État			-0.00138	-0.00149
			(0.725)	(0.703)
Americas			0.00201	
			(0.913)	
Asia			-0.109***	
			(0.000)	
Europe			-0.180***	
			(0.000)	
Middle East			-0.0488	
			(0.286)	
Oceania			-0.111	
			(0.081)	
Post-soviet			-0.174***	
			(0.000)	
_cons	0.421***	0.424***	0.368***	0.339***
	(0.000)	(0.000)	(0.000)	(0.000)
N	2887	2887	2887	2887

p-values in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX F

Table F: Robustness check – the total effect of aid

	(1) Gini	(2) Gini	(3) Gini	(4) Gini FE
Total aid	-0.113**	-0.0900*	-0.0932*	-0.0930*
	(0.002)	(0.014)	(0.011)	(0.011)
Openness		0.00710**	0.00681**	0.00679**
		(0.001)	(0.002)	(0.002)
Govt. Exp.		0.0633***	0.0653***	0.0654***
		(0.000)	(0.000)	(0.000)
Human cap.		0.0143**	0.0187***	0.0190***
		(0.001)	(0.000)	(0.000)
Polity		-0.000435**	-0.000439**	-0.000447**
		(0.003)	(0.003)	(0.002)
Rural pop.		0.0180	0.0280	0.0301*
		(0.208)	(0.050)	(0.043)
Coup d'État		-0.00112	-0.000990	-0.00112
		(0.773)	(0.798)	(0.772)
Americas			0.00291	
			(0.874)	
Asia			-0.100***	
			(0.000)	
Europe			-0.177***	
			(0.000)	
Middle East			-0.0497	
			(0.276)	
Oceania			-0.110	
			(0.082)	
Post-soviet			-0.171***	
			(0.000)	
_cons	0.421***	0.349***	0.374***	0.344***
	(0.000)	(0.000)	(0.000)	(0.000)
N	2914	2914	2914	2914

p-values in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX G

Table G: Robustness check – Splitting the effects

	(1) Gini panel	(2) Gini panel	(3) Gini FE	(4) Gini FE
Grants	-0.309**		-0.311**	
	(0.002)		(0.002)	
Grants squared	1.561*		1.566*	
	(0.027)		(0.028)	
Loans		0.297**		0.300**
		(0.004)		(0.004)
Loans squared		-6.903***		-6.972***
		(0.000)		(0.000)
Openness	0.00663**	0.00702**	0.00660**	0.00703**
	(0.002)	(0.001)	(0.002)	(0.001)
Govt. Exp.	0.0649***	0.0634***	0.0651***	0.0636***
	(0.000)	(0.000)	(0.000)	(0.000)
Human cap.	0.0188***	0.0209***	0.0192***	0.0213***
	(0.000)	(0.000)	(0.000)	(0.000)
Polity	-0.000407**	-0.000479***	-0.000414**	-0.000486***
	(0.005)	(0.001)	(0.005)	(0.001)
Rural pop.	0.0313*	0.0307*	0.0335*	0.0335*
	(0.028)	(0.031)	(0.025)	(0.025)
Coup d'État	-0.00117	-0.000410	-0.00130	-0.000545
	(0.762)	(0.916)	(0.736)	(0.888)
Americas	0.00131	0.00577		
	(0.943)	(0.753)		
Asia	-0.102***	-0.0981***		
	(0.000)	(0.000)		
Europe	-0.179***	-0.177***		
	(0.000)	(0.000)		
Middle East	-0.0502	-0.0493		
	(0.274)	(0.280)		
Oceania	-0.110	-0.109		
	(0.084)	(0.086)		
Post-soviet	-0.173***	-0.171***		
	(0.000)	(0.000)		
_cons	0.375***	0.364***	0.344***	0.335***
	(0.000)	(0.000)	(0.000)	(0.000)
N	2914	2914	2914	2914

p-values in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX H

Table H: Robustness check – Income measure of inequality

	(1) Gini panel	(2) Gini panel	(3) Gini panel	(4) Gini FE
Loans	0.216	0.285	0.300*	0.304*
	(0.128)	(0.050)	(0.038)	(0.035)
Loans squared	-4.143	-4.852	-4.857	-4.869
	(0.124)	(0.072)	(0.070)	(0.069)
Grants	-0.298*	-0.237	-0.302*	-0.340*
	(0.028)	(0.084)	(0.027)	(0.013)
Grants squared	1.417	1.043	1.448	1.665
	(0.146)	(0.288)	(0.137)	(0.090)
Openness		0.0155***	0.0137***	0.0136***
		(0.000)	(0.000)	(0.000)
Govt. Exp.		-0.000238	0.00329	0.00338
		(0.986)	(0.800)	(0.796)
Human cap.		0.00622	0.0121*	0.0145*
		(0.303)	(0.045)	(0.023)
Polity		-0.000211	-0.000194	-0.000174
		(0.296)	(0.332)	(0.388)
Rural pop.		0.0335	0.0383*	0.0465*
		(0.082)	(0.043)	(0.024)
Coup d'État		0.00377	0.00423	0.00404
		(0.480)	(0.425)	(0.447)
Americas			-0.0899***	
			(0.000)	
Asia			-0.161***	
			(0.000)	
Europe			-0.256***	
			(0.000)	
Middle East			-0.163***	
			(0.000)	
Oceania			-0.144*	
			(0.020)	
Post-soviet			-0.165***	
			(0.000)	
_cons	0.527***	0.435***	0.508***	0.430***
	(0.000)	(0.000)	(0.000)	(0.000)
N	2949	2949	2949	2949

p-values in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$