ESSAYS ON THE IMPACT OF AID AND INSTITUTIONS ON INCOME INEQUALITY AND HUMAN WELFARE

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ESSAYS ON THE IMPACT OF AID AND INSTITUTIONS ON INCOME INEQUALITY AND HUMAN WELFARE

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To my mother, Kim Seng-Ath, 1956-2002

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SUMMARY

Billions of dollars in development aid are sent to developing countries every year. Weak institutions in recipient countries are the main impediments often discussed to prevent aid from reaching the intended targets. At the same time, they also hinder aid effectiveness in improving the lives of the people. This dissertation argues that the impact of aid on income distribution and human welfare in recipient countries differs by their institutional quality. Institutions encompass many different dimensions. This dissertation focuses on: corruption in government, quality of bureaucracy, and the rule of law. This study explores the impact in two essays.

The first essay investigates the role of institutions in aid distribution. In particular, we examine the interplay between aid and institutions on income shares of different population groups (measured by income quintiles), and on the gap between the rich and the poor (measured by the Gini coefficient). The study uses Principal Component Analysis to construct an institutional index from the three components: corruption, bureaucratic quality, and the rule of law. Employing Two-Stage Least Squares (2SLS) methodology on a panel data of 85 countries from 1960 to 2004, this study finds that an increase in aid as a percentage of Gross Domestic Product (GDP) decreases the income shares of the poor (quintile 1 and quintile 2), but increases that of the rich (quintile 5), thereby widening the gap between the rich and the poor (Gini coefficient). Contrary to our main hypothesis, though, recipient countries' institutions do not play any role in aid distribution.

Similarly, the second essay also focuses on the importance of recipient institutions, but it assesses aid effectiveness in improving human welfare. The study considers five human development indicators: the Human Development Index (HDI), the health index, the infant mortality rate, the education index, and the average years of schooling. The study empirically tests the hypothesis by utilizing the same methodology as in the first essay, but on a panel of 80 countries from 1980 to 2004. The findings suggest that human welfare in recipient countries improves as aid increases. The

improvement appears to be driven more by the health than the education sector. Furthermore, aid is more effective in countries with poorer institutional quality, which is contrary to the hypothesis. However, the results are not consistent when taking into account government's pro-poor public expenditure.

CHAPTER 1

INTRODUCTION

Official foreign aid to developing countries became an institution in 1947 when the Marshall Plan sought to reconstruct the European countries following the destruction caused by World War II. By the 1960s, aid had reached many developing countries and assistant programs had grown in significance (Brautigam & Knack, 2004). Over the past five decades, the amount of official aid provided has totaled to more than $2.3 trillion (Easterly & Pfutze, 2008). The level of development aid has experienced a steeper increase in the last decade by almost doubling in size from slightly less than $90 billion in 2001 to roughly $166 billion in 2010 (in 2010 dollars)[1]. The recent tight national budgets among the Organisation for Economic Co-operation and Development (OECD) countries, however, has put much pressure on the provision of aid to developing countries. In 2011, aid from major donors fell by almost three percent, ending the continuous upward trend in aid volume from 1997 (not taking into account debt relief)[2]. Even with declines, the size and scope of development assistance have indicated the importance of foreign aid to the world's poor.

However, development scholars remain divided on whether aid works. Two major camps in the aid debates are Jeffrey Sachs's and William Easterly's. Sachs (2005) defends the positive contributions and advocates for more aid to the world's poorest people, while Easterly (2006) argues that aid simply does not work. Sachs (2005) suggests that aid can bring about preconditions for the market to work. He argues that the market will bypass the world's poor if basic infrastructure and human capital are not

[1] Author's calculation based on OECD (2012b) database.
[2] Source: "Development: Aid to developing countries falls because of global recession" from http://www.oecd.org/dac/aidstatistics/developmentaidtodevelopingcountriesfallsbecauseofglobalrecession.htm

feasible. In Sachs's argument, the poor are too poor to solve their own problems, and their governments are too poor to efficiently provide for basic needs, such as healthcare, and education. When governments in developing countries fail to provide the necessities to meet the basic needs of the people, the outside world should intervene and provide them with assistance to help them get on their feet. Poor countries thus need help from rich nations to fill in the missing finances, which can then allow the market to take charge. In essence, Sachs sees aid not as a handout of welfare, but as an investment for sustainable growth. He also argues that aid brings about not only a welfare increase in recipient countries, but also that of the world (e.g., by stopping various diseases that can travel across continents). Moreover, aid also benefits the rich nations with respect to their national security. Although he persistently defends the positive contribution of development aid to the world's poor and advocates for more of it, the aid proponent remains concerned about how to ensure that the money benefits the intended communities and is the real investment to end poverty rather than to support a few individuals, making aid an endless support.

On the other hand, Easterly's (2006) camp argues that aid is the developed world's way of imposing its plan on the developing world. Particularly, aid simply goes through an already highly bureaucratic international donor system to another highly bureaucratic national system of the recipient countries with the aim to change policies. Such an attempt to change policies does not work, and it can do more harm than good when it comes to politics. This especially occurs when the aid continues, even though the leaders are corrupt. The plans do not work and billions of dollars are wasted because of poor implementation and little motivation for self help. He also points to recipient countries' poor institutions as an impediment to the implementation of those plans, preventing aid from reaching the poor and filling up the pockets of the powerful. In one way or another, Easterly sees aid as only an extension of the power of dictators, and not in helping recipient countries. His suggestion is to allow the free-market to find its own way to the solutions of lifting the world's poor, particularly through the agents for change, whom he refers to as *S*earchers, to bring about long-lasting homegrown development. Even though Easterly claims that development aid delivers close to no development, he

does not oppose the idea of lending hands to the poor through aid. The assistance though should be basic and start from the grassroots level.

Overall, the core argument of whether to aid or not or even how to provide the aid to ensure positive outcomes involves the problem of weak institutions in countries who are receiving the assistance. Poor institutions encompass various dimensions, such as poor quality of bureaucracy, weak adherence of law, rampant corruption, and mismanagement of public resources. Weak institutions not only prevent development aid from reaching its intended target, but also lessen the magnitude of the impact on other social aspects aimed at improving human welfare in recipient countries.

This dissertation joins the discussion on aid by also focusing on the role of recipient countries' institutions. The study empirically explores the effect of institutions on the impact of aid on income distribution and human welfare in two essays. Essay 1 studies the role of institutions in aid distribution. Specifically, it examines the effect of aid on income shares of different population groups, as measured by income quintiles, *conditional* on institutional quality in recipient countries. Furthermore, the research also joins the growing concerns of increasing inequality in developing countries by analyzing whether aid can bridge the gap between the rich and the poor, as measured by the Gini coefficient. Additionally, since tied aid (sectoral aid) and untied aid (non-sectoral aid) may carry different incentives that can affect the way aid is distributed, the study also investigates the impact of the two aid types on income distribution. The institutions considered in the analysis comprise of three components: corruption in government, bureaucratic quality, and the rule of law. We employ the Principal Component Analysis to construct an index of institutions and use the instrumental variable method to take into account the potential causality between aid and income inequality.

Essay 2 examines the impact of aid on improving recipient countries' overall living standards. Essay 2 employs the same methodology and focuses on the role of institutions as in Essay 1, but assesses aid effectiveness on non-monetary welfare. The study also takes into account the recipient government's pro-poor public expenditure, which is a potential channel of the mechanisms through which aid affects welfare.

The two essays are connected through two common objectives: (a) to study the impact of aid on different outcomes, and (b) to highlight the importance of institutions in the provision of aid.

CHAPTER 2

THE ROLE OF INSTITUTIONS IN AID DISTRIBUTION

2.1 Introduction

The international community is committed to ending the world's extreme poverty. Their commitment to focus on poverty is reflected through the Millennium Development Goals (MDGs), one of which is to cut extreme poverty by half by 2015. To accomplish this goal, the donor community pledged to increase aid by focusing on areas having the largest impact on poverty. In particular, social and economic sectors, which are often perceived as crucial for poverty reduction, have continued to receive the largest share of aid. From 1990 to 2011, the combined share of these two sectors account for up to 50% of total aid disbursement. Particularly, the social sector has received the largest funding of approximately 34% of total aid, of which education, and government and civil society have received the largest share of equal amounts (see Figure 2.1). If we examine the trend of aid given to the social sector, government and civil society saw an increasing of support starting in 2000, this surpassed education and other sectors funding in 2002 (see Figure 2.2). The support to this sector comes in the wake of increasing recognition of the valuable contribution that civil society and community empowerment can make to policy-making process. On the other hand, the education and health sectors also continue to receive large shares among other important contributions, such as water and sanitation, population policy and reproductive health.

Donor countries disburse a substantial proportion of aid funding to the world's poor through recipient governments, which distribute the funds to the general public. Even in cases when governments do not distribute the funds directly, recipient governments are among the major implementing partners of aid projects/programs, e.g. they work in collaboration with other NGOs or aid agencies. During the allocation, a

recipient country's population in different income quintile groups may benefit from development aid differently even though the aid mostly targets poverty reduction. However, critics of foreign aid often argue that much of the transferred resources do not reach the intended recipients, and in some cases, only a small fraction of the money gets to the target. The main impediment that plagues many of the aid efforts is weak institutions in recipient countries. Corruption of the recipient institution is the most prevalent issue. Corruption can hamper not only economic development, as many studies suggest, but it can also change the distribution of public resources by diverting the resources towards specific groups. Specifically, corruption redirects aid money away from its intended target to a small segment of the population, increasing income inequality.

Poor quality of bureaucracy is another widespread issue in developing countries. The poor who depend heavily on government-provided goods and services usually have limited access to the services, and they often describe their experiences with government bureaucrats as unpleasant (Narayan, Patel, Schafft, Rademacher, & Koch-Schulte, 2000). Generally, only those with connections and those who are able to pay bribes are the first in line to receive services. Lack of competency and motivation, shirking, and absenteeism among government officials also undermine the quality of public goods and services provisions. When a large amount of development aid is transferred through government bureaucratic system, which is often described as corrupt and inefficient, the poor may not benefit much from the transferred resources. Furthermore, the rule of law, which includes judges, court personnel, and police, is supposedly in place to enforce public accountability in the bureaucracy and ensure public sector integrity. When the rule of law cannot perform its functions, as is often the case in many developing countries, corruption is rampant and government accountability is plummeting, affecting any resource distribution coming through the system.

Motivated by the observed relevance of institutions in allocating public resources and the implementation of aid projects/programs, this research takes into consideration the role that institutions play in aid distribution. Specifically, the study examines the impact of aid on different income quintiles as well as on income inequality and asks

whether the impact differs by recipient countries' institutional quality. We argue that aid distributed to countries with poor institutional quality has less impact on promoting better conditions of the poor, but it can bring about much change if given to countries with good institutions. The three institutional dimensions considered in the study are corruption, quality of bureaucracy, and the rule of law, which commonly work together to shape how the resources are shared and used.

On another note, some aid is tied to specific social expenditures to make it more traceable while others are untied, such as general budget support or action relating to debt. Recently, donor countries have increasingly provided more tied aid with respect to specific investment in infrastructure such as transportation, water services, or energy (Chatterjee & Turnovsky, 2007). Aid tied to different sectors is a better targeted aid than the untied aid. Thus, by inducing different incentives, tied and untied aid may also have different effects on income distribution, thereby income inequality. For that reason, we also include tied and untied aid in our analysis.

Research Questions

This study tries to answer the following questions:

1. Which income quintiles in recipient countries benefit the most from foreign aid?
2. Does the quality of institutions affect aid distribution in recipient countries?
3. Does aid reduce the income gap between the rich and the poor?
4. Does aid reduce income inequality more in countries with better institutional quality?

These are worthwhile questions to explore because it is critical to examine who in recipient countries gains the most benefits from the huge transfers of aid funding often perceived to help the poor in the receiving countries. Likewise, we want to have a better understanding whether aid brings about social justice by closing the gap between the rich and the poor. More importantly, since recipient countries' institutions are widely perceived as key to success for aid efforts, we want to explore if this is truly the case.

Possible Contributions

The potential contributions of this essay are as follows:

First, despite exhaustive aid research, most previous studies have focused on the effect of aid on growth. By examining the effect of aid on income shares of different income groups, as well as on the gap between the rich and the poor, this study diverges from the path of traditional aid literature into exploring another growing branch of the literature. That is to say, this study contributes to filling the gap in aid literature by investigating the effect of aid from a different standpoint: the impact of aid on income distribution and inequality.

Second, if aid scholars are interested in the impact of aid on income distribution, the majority focuses on aid impact on Gini coefficient, and they do not address the issue with respect to which income groups are the largest beneficiary. While using Gini coefficient may answer the question of whether aid has any role in reducing or expanding income inequality, using the shape of income distribution allows this study to elucidate how aid is distributed among different populations. This study addresses both aspects of inequality as measured by Gini coefficient and the shape of income distribution.

Third, in addition to its contribution to a few studies on the role of institutions in aid effectiveness[3], the study contributes to the empirical aid literature by focusing on the area that has not been addressed much: the role of institutions in aid resource distribution. By building on previous literature which explores only small and defined types of institutions—democracy and corruption—this study places emphasis on the institutional setting that covers wider institutional components (corruption, bureaucratic quality, and the rule of law) to determine how they affect aid distribution in recipient countries.

Fourth, some studies of aid distribution have attempted to uncover the effect of aid by type. However, two specific types of aid that are overlooked in the literature are tied and untied aid. These two aid types may induce specific sets of incentives, leading to

[3] Even though a number of studies find that institutions contribute to economic growth, it is surprising that only a few studies examine institutions as the conditioning mediator of aid effectiveness on growth. The studies include: Collier and Dollar (2002), Burnside and Dollar (2004), and Baliamoune-Lutz and Mavrotas (2009).

different outcomes in bridging the gap between the rich and the poor. By incorporating the impact of aid by type, the study continues to add more to the existing literature about aid distributions.

Structure of the Essay

The rest of this essay is structured as follows: Section 2.2 provides an overview of the definitions of institutions used by previous literature, the mechanism through which institutions affect aid distribution, and other aid and institution related literature. Section 2.3, Data and Methodology, provides a simple general model of the interplay between aid and institutions, the method, and the data used for the analysis. Section 2.4 provides empirical results and discussions, while the last section, Section 2.5, provides the results of the analysis.

2.2 Literature Review

This section of the study summarizes the theories and evidence underpinning the impact of aid on income inequality and the role played by institutions in reducing/increasing the income gap. The study relates to literature in two major areas: the distributional effect of aid, which also includes the impact of tied and untied aid, and the influence of institutions on income inequality. To fully comprehend the role of institutions in aid distribution, we start by understanding what institutions are, i.e. defining institutions, which is followed by the arguments as to why institutions are important in aid distribution. We then provide the conceptual relationship underlying the distributional path by reviewing related literature.

2.2.1 Defining Institutions

Prior literature presents a variety of definitions of institutions and does not reach a consensus on the definition. Acemoglu (2009), for instance, asserts that it is somewhat

difficult to define institutions and sometimes literature is not clear about its definition. Furthermore, the literature often uses institutions and governance interchangeably.

Of the many definitions, the one offered by Dollar and Levine (2006) state that institutions are "the rules, norms, and behaviors" that determine the economic environment (p. 2036). The definition encompasses both formal and informal institutions. Formal institutions include constitutions, political regime, the rule of law, and other rules and regulations enforced by different societies using its coercive power and organization. Informal institutions, on the other hand, reflect cultural values, social conduct, traditions, norms, and other social mechanisms that are enforced through interpersonal ties and relations (Fabro & Aixalá, 2009; Zhuang, Dios, & Lagman-Martin, 2010). For the purpose of this dissertation, we are going to use the definition of institutions by Dollar and Levine (2006), due mainly to its simplicity. The best measures to fit this definition of institutions are: corruption, bureaucratic quality, and the rule of law. Quality of bureaucracy and the rule of law are formal institutions because they are regulations enforced by a society. On the other hand, corruption is a form of informal institutions because it is enforced through interpersonal tie and relationship.

The literature on the causes and consequences of corruption is also full of vague and diverse definitions of corruption. Corruption can occur in various forms, and different countries and cultures may consider different activities as corrupt. For instance, what is considered as a courtesy of gift giving in some cultures and countries could be considered as corrupt practices in others (Ear, 2006). Thus, it is difficult to find a common explanation of what constitutes corruption. Several studies use the definition of corruption as the abuse of public power for private gain (Maxwell et al., 2008; Rothstein, 2011; Shleifer & Vishny, 1993; Treisman, 2000). On the basis of this definition, various activities can be considered as corrupt, which includes, but is not limited to, the selling of public assets for personal gain, dishonest bidding on government contracts, nepotism, and the issuance of permits or licenses in return for bribes (Olken, 2007; Rock & Bonnett, 2004; Shleifer & Vishny, 1993). Many studies provide other alternative definitions of corruption; however, for simplicity, as well as consistency, we will use the definition of the abuse of public power for private gain.

Similarly, bureaucratic quality covers different dimensions of government effectiveness ranging from the ease of doing business to the recruitment and training of public officials. Even though a large amount of the literature employs the concept of bureaucracy, it nevertheless remains uncertain as to what bureaucracy means. Various definitions are available. Beetham (1996) synthesizes a list of explanations that includes "rule by officials, a system of professional administration, organizational inefficiency, public administration, non-market institutions, undemocratic organization" (p. 1). As bureaucracy does not have a definitive definition, we prefer to use a more general meaning of bureaucracy as the layers of state organizations engaging in policy formulation and implementation, and in regulating, and delivering services (Hyden, Court, & Mease, 2003). With respect to the workforce in the system, the term "bureaucrat" is sometime perceived as a derogatory term and often replaced by "official" (Downs, 1964). In our study, we use *bureaucrat* and *official* interchangeably.

Lastly, the very concept of the rule of law also remains ambiguous. The rule of law covers various dimensions from security of person (civil conflict and crime, control of violence, state failure etc.), to property and contracting rights (in economic perspective), to government checks and balances (Haggard & Tiede, 2011). The most suitable description of the rule of law in our study is the government checks and balances, which we use throughout the study.

2.2.2 Institutions and Aid Distribution: The Mechanism

Before addressing the argument of why one would expect recipient's institutions to play a role in aid distribution, this section starts by briefly reviewing some aid efforts in receiving countries. The discussion draws mainly on the work of Non-Governmental Organizations (NGOs) which are among the largest project/program implementers. NGOs often work closely with the poor at the grassroots level and understand the struggles of the poor the most. Aid funding to NGOs supports different activities in the community, especially in rural areas where the poor can most often be found. Their

services include but are not limited to children and adult education, health, agriculture, employment, skills training, and other advocacy services.

Much aid funding has been allocated to the education sector, a goal of the MDGs. In many developing countries, where many people barely have adequate necessities to support their lives, school attendance is low as poor families find it hard to send their children to school. Unlike richer families with fewer children, poor parents not only bear significant cost from school fees, uniforms, and textbooks when sending their children to school, but they may also incur a loss of income that the families would otherwise earn. Aid efforts through NGOs thus are there to provide all school necessities and even cash grant to families who send their children to school as an incentive to encourage more attendance (Banerjee & Duflo, 2011; Kremer, 2003). The outcomes of NGOs' work on improving education sector in many parts of the world are by and large more than satisfactory. An NGO in India focusing on education, for example, can reach out to 200,000 children in fourteen states in India. The evaluation of the program has also shown that their work improved education outcomes (Banerjee, Cole, Duflo, & Linden, 2007).

A health sector is another major concern for developing countries. Maternal mortality rates are high. Nearly 1,000 expectant mothers die every day; 98 percent of those are in developing countries (CARE, 2011). Many NGOs' missions are to educate women about pregnancy and the dangers associated with it and to make maternal health services more accessible. For instance, CARE is among the many NGOs working on this issue in Bangladesh, where 52% of the rich use maternal health services as opposed to only 17% of the poor. They also work in the most difficult environments, such as in some parts of the Democratic Republic of the Congo, where maternal mortality is twice as high as its national rate and child mortality is among the highest (CARE, 2011). In regards to child mortality, children are dying every year from diseases that are simple to prevent, such as malaria, diarrhea, and tuberculosis, not to mention the millions of children who go hungry and die of malnutrition around the world. The diseases are especially common in areas with poor sanitation and without clean drinking water. Aid projects are also focusing on improving the living conditions of the poor. In Zambia, Population Services

International (PSI) is providing chlorine bleach to purify water at subsidized rate, while other organizations work on providing bed nets and vaccinations, among other preventive measures (Banerjee & Duflo, 2011). These organizations believe that better health can lead to improved educational outcomes and a better future income.

Many international organizations are also working on micro-finance to provide small loans to the poor when most commercial banks would not consider them worthy loan applicants. Widely known as a poverty reduction tool, micro-finance allows the poor access to financial capital. The capital enables the poor to add to their income by employing new means of income (e.g. street food vending or trading small commodity), securing their personal safety nets and sustainable livelihoods. Microcredit and micro-finance are largely motivated by the wave of success pioneered in Bangladesh during the 1970s. In Bangladesh, where nearly one third of the population is living below the poverty line[4], NGOs normally provide three major services, among which microfinance stands on the top of the list followed by health and sanitation. A typical NGO in Bangladesh services about 4,300 beneficiary households (Gauri & Galef, 2005). Micro-finance is also popular in other part of the world and is reaching out to an estimate of 150 to 200 million borrowers (Banerjee & Duflo, 2011).

Furthermore, agriculture and livestock are at the core of food security. The majority of the poor depend largely on agriculture to sustain a *functional* livelihood. Unfortunately, they constantly face risk from natural disasters such as drought and flood annually. Crops from subsistence farming can barely feed poor farmers throughout the year, let alone leave them with minimal income for saving or for improving their agricultural techniques. Some farmers cannot even set aside a small amount of money to buy fertilizer for the next planting season. Thus, many NGOs are working to tackle the issue by initiating microsavings as well as providing fertilizer vouchers for farmers to buy soon after their harvesting season (Banerjee & Duflo, 2011). Other NGOs, such as Oxfam and World Vision, are also focusing on small-scale farming by improving

[4] Source: The World Bank: Bangladesh Overview from http://www.worldbank.org/en/country/bangladesh/overview

agricultural practices and access to markets and providing tools, seeds, fertilizers, as well as building pipes and canals to ensure sufficient water for the fields (Oxfam, 2012; World Vision, 2013).

Nonetheless, poor institutions at the implementation stage disrupt/undermine much aid efforts to reduce poverty. Various anecdotes suggest how corruption drains away a bulk of aid money from aid projects/programs, hampering the very efforts of development assistance to the world's poor. For instance, ranked among the bottom by Transparency International for its corruption index (at the top are those with low corruption), Cambodia saw a major corruption scandal in World Bank financed projects in 2004. The World Bank sought $2.8 million dollars in repayment, and terminated $2.5 million in project funding after the finding. The government of Cambodia later agreed to repay the missing funds to the World Bank and had committed to reform its various functions (Ear, 2006; World Bank, 2007). The missing funds may not appear to be much compared to other high-profile aid captures, but in absolute terms, the money could bring about improvement to the standard of living where more than one third of the population then lived below the national poverty line.

Through what trajectory do corruption, bureaucratic quality, and the rule of law affect the distribution of aid to the poor?

Before proceeding further into this analysis, it is worth emphasizing that a large proportion of development assistance flows into recipient countries through government systems. These systems design, implement, and deliver the goods and services coming in and channel them to the different groups. Even in cases where aid flows through different channels, recipient governments are mostly counterparts to a larger distribution chain in those aid projects/programs. Because recipient governments are the main aid distributor or at least take part in the distribution, any flaws or obstructions stemming from recipients' institutions (i.e. corruption, quality of bureaucracy, the rule of law) affect the distribution of aid. Indeed, the three dimensions of institutions function together in this aspect. Corruption can affect aid distribution through two channels, direct and indirect

channels. Bureaucracy affects the distribution directly and/or via corruption. The rule of law, on the other hand, can either provide the opportunity for the corrupt activities to continue or it can prevent corruption from spreading.

Corruption changes the course of the transfers directly when the recipient countries' bureaucracy are layered with corrupt officials. They siphon off aid money before it reaches the intended poor; therefore, the direct channel of the impact of corruption constitutes how bureaucracy affects aid distribution via corruption. The indirect channel, on the other hand, is through the impact of corruption on bureaucratic quality and on other factors supporting the implementation of aid programs. Aside from working through corruption, bureaucracy affects the distribution when the capacity and motivation of bureaucrats implementing the projects are limited. The rest of this section discusses how institutions play a role in aid distribution using examples from studies or case studies at different project levels. The focus of the discussion is on several social sectors, including education, health, and infrastructure, which are perceived to be the most crucial for poverty reduction.

Corruption affects aid distribution *directly* by diverting the funding away from its intended targets, including direct theft, bribing in bidding procedure, reporting of nonexistent labor expense, and procurement scams in various forms such as submissions of the same invoices multiple times, purchases of unnecessary items, or receipts forgery by vendors (Easterly, 2006; Maxwell et al., 2008; Olken, 2007). Though the consequences of these scams are low, their high occurrences can have a detrimental impact to the very efforts of poverty reduction as they accumulate. The direct impact of corruption occurs in various public sectors, including health sector; the damage from which can be profound. For instance, Easterly (2006) reports that aid funding to health sectors through government often go missing in "patronage-swollen national health bureaucracies" and "health officials often sell aid-financed drugs on the black market" (p. 259). The author further asserts that in some countries such as Cameroon, Guinea, Tanzania, and Uganda, roughly 30 percent to 70 percent of medicines are *lost* before reaching the patients.

In addition to the health sector, the infrastructure sector is another attractive target for corruption. Basic infrastructure, such as roads and bridges connecting rural poor, are for local farmers and manufacturers to transport their products to the markets. Corruption takes away the money from the poor when community leaders or project implementers (contractors) trim materials from making those roads or bridges and add to their pockets. When the number of bridges and the length of roads are built as intended by the programs, using less materials than the recommended standards means that the infrastructures are of poor quality, which can become very vulnerable to damages (Banerjee & Duflo, 2011). In a study assessing the effectiveness of auditing in reducing corruption, Olken (2007) finds roughly 20 percent of materials for road construction are missing in a World Bank loan program funding through the Indonesian government. This type of corruption can also damage roads and bridges when law enforcement officers receive bribes from overload trucks and allow them to constantly operate on the poorly built roads (Banerjee & Duflo, 2011). The poor then are in the same situation as though no roads or bridges were built because the *updated* ones are weak and nearly useless.

Furthermore, as generally is the case, public fund misuse can occur at all levels of governments from the central to local district level, all of which can be consequential for the aid distribution. Another example of the direct effect of corruption is in the education sector in Uganda at the local level. Reinikka and Svensson (2003) track public funds allocated for education from the central Ugandan government to its local facilities. Initially, only twenty percent of the entitlements reached the local schools. Then, after the Ugandan government published the monthly transferred grant in local newspapers, the percentage of the funds reaching the local facilities grew to more than eighty percent. Reinikka and Svensson (2003) share many anecdotes suggesting that the missing money was used to increase counselors' and bureaucrats' allowances, and in some cases when the money did reach local offices, the elites at the local government decided where the money went—most likely to their own pockets. Notwithstanding the fact that the above unfortunate case is on a central government grant, we should note that part of the grant may have been aid resources because part of aid is actually used to finance recipient government expenditure.

The *indirect* channel through which corruption affects the distribution of aid is through its impact on bureaucracy and on other factors that work to support the poor. Corruption can be both a cause and a consequence of poor bureaucratic quality. When the mechanism for recruitment and selection of civil servants is not in place, people bribe to be placed in public offices with the prospect of abusing the power for higher returns. Corrupt officials then change the course of aid distribution via corruption as discussed above. Corruption also affects other factors that complement the distribution of aid towards the poor. In particular, it introduces policy distortions leading to misallocation of public resources (e.g., directing aid funds toward projects offering higher opportunities for corrupting), as well as changing composition of government expenditure. Studying the effect of corruption on the composition of government spending, Mauro (1998) finds a robust amount of evidence that corruption causes a decline in government expenditure on education, and he also finds some evidence of the similar effect on health spending. Since part of the expenditures is aid money, corruption changes the course of the distribution by shifting away aid funds from the sectors that the poor can potentially benefit the most.

Additionally, when corruption is a norm in many developing countries, specifically in the health and education sectors, the poor still cannot benefit from aid funded infrastructure aimed at providing them with accessibility to basic healthcare and education (e.g., health centers, specialty clinics, or school buildings). Generally, the poor still cannot afford education or health services when they have to pay bribes or additional illicit fees to get these services (Menon & Morgan, 2013). Some common corruption practices in health or education sectors include healthcare providers receiving private payments to see some patients first, or providing medicine only to those who pay extra money, or school teachers collecting bribes from students. When the standard of living for many is at the edge of subsistence, and some are even living in extreme poverty, the fear of losing additional income from sending their children to school is already a burden for poor families, let alone having to pay bribes or additional fees to get education (Banerjee & Duflo, 2011).

Aside from its *indirect* effect, bureaucratic quality affects aid distribution *directly* when capacity and motivation of counterparts or implementers are limited. In many

developing countries, entry into civil servant positions is usually not through open examination, but strong connection, nepotism, or bribery. Equally important training and monitoring of civil servants are only marginally available in most countries. As a result, bureaucrats who supposedly are experts in their fields lack both expertise and knowhow. Additionally, low motivation and shirking among government employees, arguably resulting from low salary, are also widespread issues. Since recipient governments are generally the aid projects/programs implementers, or the counterparts who work in collaboration with other NGOs or aid agencies, the potential outcomes of those efforts are also constrained by such limitations. Indeed, as World Bank (1998) notes, donors and government technocrats used to assume that the benefits of aid projects/programs would start flowing once the infrastructure (e.g., health clinics, roads) are completed, but actually they would start flowing only when "there are adequate incentives for (mainly civil service) providers" (p. 88). Easterly (2006) further exemplifies how poor bureaucratic quality can be an issue hampering the delivery of health aid. In the treatment of AIDS that requires fairly complicated care and handling of drugs, health professionals at the local level are often poorly trained and cannot meet the high requirements of the treatment. As a consequence, the end result of the intervention can be rapid resistance to the drugs, in addition to ineffective treatments.

The poor mostly rely on services provided by their governments, which are often funded by foreign aid; hence, access to and consumption of those services are critical to the question of whether the poor benefit from the assistance. As widely known, the poor usually have low access to public services and only the rich and the well-connected are able to pay bribes to get privilege access to those government provided goods and services (Gupta, Davoodi, & Alonso-Terme, 2002; Hyden et al., 2003). Adding to that, it is reported that the poor's experiences with bureaucrats is dreadful. In fact, Narayan et al. (2000) highlight that the poor often describe their experiences with bureaucrats as unpleasant and unfair and that the bureaucrats are corrupt. When a large amount of development assistance is channeled through such inefficient and frequently corrupt bureaucratic system, the poor are not gaining the benefits from the assistance, but the already better-off are. Thus, the quality of bureaucracy in recipient countries indeed is important in the distribution.

Finally, the rule of law affects the distribution of aid funding through two lenses: (1) through control of private capture and corruption, and (2) through institutional checks on government. The rule of law is a tool in combating corruption when it prevents a corrupt behavior by prosecuting corrupt offenses. Many aid receiving countries are characterized by weak rule of law (e.g., dependent judicial system, not everyone is under the same law) signifying low probability of formal prosecution and punishment of corrupt officials when caught. As a result, corruption is rampant in such environments, the consequences of which are damaging to the course of aid distribution as discussed above. Furthermore, as Haggard and Tiede (2011) argue, the government has both the power and incentive to back out of its commitments, because the government does not follow through with its commitments, proper checks are needed. Nonetheless, lack of institutional checks on the government is not uncommon in many developing countries. With no suitable checks and balances, recipient government who manages the aid resources have all the incentives, for whatever reasons, to somehow manipulate and relocate the funds away from its intended use. This concept is known as fungibility (we discuss later).

The discussion above undoubtedly shows that in a country where institutions are of poor quality (i.e., rampant corruption, poor quality of bureaucracy, weak rule of law), aid efforts are either poorly managed and implemented or aid funding is leaked along the distribution chain. In both cases, foreign aid is diverted away from reaching the intended targets.

2.2.3 The Redistribution of Foreign Aid: A Conceptual Perspective

The redistribution of development assistance from donor to recipient countries is generally explained by the contract theory within the principal-agent framework. Normally, a donor country presents as the principal, and the recipient government takes the role of an agent[5]. When aid is disbursed to recipient countries, several groups (e.g., politicians, bureaucrats, special interest groups) can divert aid resources into either

[5] Some studies assume taxpayers in donor countries as the principals (see, for example, Azam & Laffont, 2003).

development or into rent which is captured by the elites[6] (Paul, 2006). If the elites use aid for development purposes, the poor can benefit from the assistance as intended, but if they convert aid into rent, only their groups are benefiting. The result of which is higher income inequality in aid receiving countries. However, the latter is more likely to occur, especially as donors and recipient governments rarely have common objectives and interests, particularly with respect to the goal of poverty alleviation (Azam & Laffont, 2003; Killick, 1997; Svensson, 2006).

While donors may want to assist recipient countries in poverty reduction, recipient governments may also have other agendas in addition to poverty alleviation, e.g., answering to their constituency, which in most cases are not the poor (Svensson, 2006). When the interests of donors and recipient governments do not align and the governments usually have more information than donors, there is a chance that the governments take advantage of the information asymmetry to shirk or divert the transfers away from donors' preferences into theirs. Consequently, the so called "agent problem" (especially, moral hazard problem) redirects aid away from its intended recipients, leading to unintended outcomes (e.g., higher income inequality) in development projects/programs. Moral hazard occurs when information asymmetry prevents donors from fully observing or verifying the action of recipient governments; for example, when the governments are corrupt, thus have the incentive to embezzle aid, or when bureaucrats shirk from work (Ouattara, Amegashie, & Strobl, 2009; Paul, 2006; Reinikka & Svensson, 2003). Therefore, any aid efforts delivering to countries with better institutional quality, where moral hazard is low, can better reach the intended targets.

Donors may not be able to respond to recipient countries' shirking behavior, but they may responds to rent-seeking and corrupt aspects of moral hazard by tying their

[6] According to Angeles and Neanidis (2009), elites are the small proportion of the population who dominate a disproportional share of power, be it politically or economically.

assistance to specific projects (Ouattara et al., 2009; Ouattara, Amegashie, & Strobl, 2013)[7]. They can either tie aid to an investment project, a policy reforming requirement, or to commodities and services among others (Chatterjee & Turnovsky, 2007; Kanbur, Sandler, & Morrison, 1999). With tied aid, donors have higher chances of tracking the assistance to a particular recipient group (Kanbur et al., 1999), while recipient governments are bound to oblige to the implementation of the conditions to be rewarded with more aid. For that reason, aid tied to different sectors can perform better than untied aid with respect to its positive impact on the poor. Indeed, a model by Azam and Laffont (2003) predicts that untied aid does not have any impact on the poor due mainly to moral hazard of the government in its redistribution practices.

Even so, several aid fungibility studies[8] indicate that tied aid can be very fungible. Fungibility occurs when recipient government reduces its own resources from sectors that receive aid funding and redirects the resources to other purposes not funded by the assistance. Eventually, donors are funding some other sectors/expenditures they did not intend for (Brown, 2012; Feyzioglu, Swaroop, & Zhu, 1998). With fungibility, tied aid is still not an ideal method to target aid. In contradiction to the fungibility literature, however, a related theory within public finance literature suggests otherwise. Specifically, the flypaper effect theory suggests that money would stick in the sector where it initially hits; therefore, there should be higher public spending in the sector receiving aid funding (McGillivray & Morrissey, 2001; Pettersson, 2007b; van de Walle & Mu, 2007). For instance, Pettersson (2007b) and van de Walle and Mu (2007) find the existence of a flypaper effect in foreign aid to Indonesia and Vietnam, respectively. As far as untied aid

[7] Tied aid can take several forms; a common form is the tying of aid to purchases of goods and services from donor countries' suppliers or contractors or from a limited number of countries (Lahiri & Raimondos-Moller, 1995). Chatterjee and Turnovsky (2007) point out that recent studies by the World Bank have noticed an increasingly higher proportion of aid is untied with respect to its requirement for procurement from donor countries, while more aid are tied to specific investment in infrastructure (such as transportation, water services, or energy). The move toward untying aid from procurement requirement may come after consensus findings of studies on the impact of such tied aid on recipient countries' welfare. Mainly, the literature concludes that aid tied to procurement from specific countries or to other conditions in pursue of donors' commercial interest reduces the value of development assistance and lowers welfare of recipient countries (see, for example, Kemp & Kojima, 1985; Michael & van Marrewijk, 1998; Quartey, 2005). In this study, however, tied aid refers to aid tied to specific sectors. We use "tied aid", "sectoral aid", and "restricted aid" interchangeably. Similarly, "untied aid", "non-sectoral aid", and "unrestricted aid" are used interchangeably.

[8] Fungibility literature studies the extent to which recipients use aid for the expenditure intended by donors (Feeny & Rogers, 2008).

is concerned, there is no restriction as to which sectors recipient governments can use the money for, thus making untied aid fully fungible (Brown, 2012). Taking these different characteristics into consideration, tied aid is better targeted aid than untied aid. We discuss the impact of tied and untied aid on income distribution in more detail in Section 2.2.4 below.

Apart from the principal-agent problem discussed above, the Samaritan's dilemma is another aspect as it relates closely to the distribution of aid. The Samaritan's dilemma occurs when donors are poverty averse and are "unable to commit not to help the poor" (Torsvik, 2005, p. 505). Recipient governments can then anticipate this kind behavior and take advantage of such softness. In particular, recipient governments have the incentive to present the country as poor to get more assistance, e.g., by not adopting policies that help lift the poor out of poverty. This will take place if they know that donors allocate their assistance based on the country's poverty level (Paul, 2006; Pedersen, 2001; Svensson, 2000b; Torsvik, 2005). Thus, donors' altruism may ultimately have an adverse effect on the poor.

Despite donors' altruism and concerns for recipient countries, the aid selectivity literature suggests that donors are not always purely altruistic. In particular, recipient's need is one factor among many other political and strategic interests that donors consider when allocating aid. Recipient countries' measures of need include indicators such as GDP per capita, the Human Development Index, poverty headcount, and primary school enrollment among others. Donors' political and strategic interests include factors such as recipient's geographical location, voting in the United Nations General Assembly (UNGA), and whether recipient countries are donors' trade partners, former colonies, or members of their national security alliance (Alesina & Dollar, 2000; Collier & Dollar, 2002; Dreher, Nunnenkamp, & Thiele, 2011; Harrigan & Wang, 2011). If donors are motivated by political and strategic interests rather than recipient's need, aid is only partially designed for the poor in the first place. Thus, the distribution of aid can be biased towards the elites who support donors' political interests.

The next section provides a discussion of the findings from previous literature concerning the impact of aid and institutions on income inequality.

2.2.4 Existing Literature on the Study of Aid and Institutions on Income Inequality

2.2.4.1 The Impact of Aid on Income Inequality

So far, research on the impact of aid on income inequality is still limited, and different types of evidence—anecdotal, theoretical, and empirical—do not appear to support the claim that the poor are the primary beneficiaries of aid. The anecdotal evidence reports that those who benefit the most from foreign aid to developing countries are the elites and officials whose social class is in the upper income group. Numerous anecdotes are available from various high-profile cases, but the famous incidents often mentioned in aid literature include billions of dollars of public resource embezzlement in former Zaire under Mobutu Sese Seko, in Indonesia under Suharto, and in the Philippines under Marcos (Bjornskov, 2010; Herzer & Nunnenkamp, 2012; Shafiullah, 2011; Svensson, 2005).

Theoretical considerations have also laid some ground-work on the role of the aid receiving country, particularly in relation with moral hazard, in determining how foreign aid is distributed (Boone (1996), Svensson (2000a), Hodler (2007), and Economides, Kalyvitis, and Philippopoulos (2008)). From the theoretical standpoint, an increase in a resource pool as a result of aid inflow induces corruption and other types of rent-seeking activities rather than productive activities (Economides et al., 2008; Hodler, 2007; Svensson, 2000a). The beneficiaries of those *aid-induced rent-seeking* activities, as termed by Herzer and Nunnenkamp (2012), are those who engage in the activities, specifically those with immediate access to the resources who often belong to high income group.

Empirical work on the issue is scarcely addressed in the literature. One of the first to study the impact of foreign aid on inequality, Chase-Dunn (1975) finds that aid is associated with increasing inequality. A later study by Bornschier, Chase-Dunn, and Rubinson (1978) shares the same finding. These earlier studies are based primarily on dependency theory, which according to Bjornskov (2010) is no longer active on research agenda. Few studies also examine the impact between aid and inequality, the results from which are mixed but leaning more toward the inequality increasing effect of aid. Of the

few studies, only Shafiullah (2011) finds that aid reduces (minimally) income inequality. Other work finds either aid is associated with higher inequality or no evidence of the impact (see, for example, Chong, Gradstein, & Calderon, 2009; Herzer & Nunnenkamp, 2012; Layton & Nielson, 2009).

The literature mainly stresses how those with the upper hand in aid resources misuse and mismanage the resources through rent-seeking or corruption. Government officials in particular play an important role in resource distribution as they are entitled with special privilege and authority in designing and implementing policies, and delivering goods and services (Gupta, Davoodi, et al., 2002; Hyden et al., 2003). They can either convert the resources into development as intended or use them for personal gain. The latter use is more prevailing since the redistribution of resources is the preferences of the group with more power whose goal is to maximize personal rent (Cervellati, Fortunato, & Sunde, 2008; Congdon Fors & Olsson, 2007). Private capture of aid resources then can be either through "direct appropriation (e.g., seizure of power) or manipulations of bureaucrats and politicians to implement favorable transfers, regulations or other redistributive policies" (Svensson, 2000a, p. 438). Lack of punishments of corrupt officials and insufficient rules and regulations to oversee political decision-makings allow politicians and bureaucrats to continue draining aid into their pockets.

Similarly, local elites are also at the central stage of the allocation since their firms are in charge of converting aid money into products and services, such as into health centers, school buildings, roads, and power supplies (Angeles & Neanidis, 2009). The elite and the well-connected can use their wealth to bribe government officials in aid related procurement contracts or in designing biasing policies, diminishing the impact of aid-funded programs on the genuine poor. In a corrupt system, corrupt officials would award a winning bid to the contractor who gives the highest bribe, not the highest quality goods or services. Local elites and officials work closely together in this respect to manage how aid is distributed. Indeed, the presence of political and wealth elites can be very harmful to the effort of development assistance. For instance, studying the role of elites in aid effectiveness, Angeles and Neanidis (2009) find that aid contributes less to growth in countries with higher percentage of powerful elite groups, measured in their

study by the percentage of European settlers to local population in colonial times. The finding suggests that the elites, together with government officials, redirect aid from its intended targets and use it only for the benefits of their groups, the consequence of which is higher income inequality.

Specific studies on the impact of aid on income inequality also find similar results. Using survey data on assets, education, and health of each population quintile from 45 developing countries, McGillivray, Fielding, Torres, and Knowles (2011) find that aid brings about improvement in well-being, but the bottom two income quintiles benefit much less from foreign aid than do the richer quintiles. Likewise, employing a panel cointegration technique to study the impact of aid on income inequality in 21 countries from 1970 through 1995, Herzer and Nunnenkamp (2012) find that aid increases income inequality. The results are robust under different estimation methods, datasets, and outliers. Interestingly, Herzer and Nunnenkamp (2012) argue that because their estimation technique captures overall effects of aid and inequality, hence free of any transmission channels (e.g., rent-seeking or private capture of the elites), aid by itself carries inequality increasing effect. In other words, they contend that aid increases inequality not due to elites' moral hazard behavior, but because donors do not necessarily allocate their aid in accordance with the pro-poor growth rhetoric by targeting the poor and needy. Their argument somewhat discounts that of ours, as well as those from previous studies which attribute the relationship between aid and inequality to moral hazards on recipient side.

Using infant mortality, life expectancy, and primary schooling as indicators of the improvement of economic conditions of the poor, Boone (1996) finds no significant impact of aid programs on improving welfare and that aid always ends up benefiting relatively wealthy population. He concludes that politicians favor the rich over the rest of the population. A later study by Layton and Nielson (2009) also agrees, but further extends the argument to focus on political aspect of the benefits. In particular, because politicians need support from their affluent constituencies to win subsequent elections, they manipulate their control over aid resources to pursue favorable transfers for the interests of their groups. Despite the argument, Layton and Nielson (2009) find zero to

little positive impact of aid on the income inequality in a group of 85 developing and transitional countries. This result is similar to what Chong et al. (2009) found (no significant results).

Furthermore, adding to the already low bureaucratic quality in most developing countries, aid worsens recipient countries' accountability to their people. As development aid increases resources in the receiving country's national budget, the government faces fewer constraints in its revenue collection efforts, making it unappealing to reforms and less accountable to its people (Brautigam & Knack, 2004; Knack, 2001). The result would be unchanging conditions for the poor. Shafiullah (2011) argues that in many aid recipient countries, low-income population with low skills and less education usually work in informal economy. As more resources make the recipient government less likely to carry out reforms, the poor continue to make ends meet in the informal sector. Through such a trajectory, foreign aid poses a larger impact on income inequality. In contradiction to the study's argument, nonetheless, Shafiullah (2011) finds that aid actually reduces income inequality, though it has a very minimal impact.

From the theoretical discussion above, we are able extract our first hypothesis as below:

Hypothesis 1: An increase in aid decreases the income shares of the poor (Q1-Q2) but increases the income shares of those in the upper quintiles (Q4-Q5), thereby increasing income inequality (Gini coefficient).

The Impact of Tied and Untied Aid on Income Inequality

In our analysis, we focus our attention on the effects of aid that is tied to specific sectors as opposed to those that are not tied to any sectors, i.e. "tied aid" (sectoral aid) vs. "untied aid" (non-sectoral aid). The impact of these types on the shape of income distribution in recipient countries may vary given different incentives they offer. We did not find any studies on the effect of tied and untied aid on income distribution. Yet,

previous studies on growth and welfare effect of the transfers may shed some light on the overall effects.

The literature looking at the impact of aid tied to specific purposes is relatively scarce compared to that of aid tied to procurement in donor countries. Furthermore, the few studies on the topic present mixed results. A recent study by Brown (2012) finds that untied aid has a greater impact on pro-poor public expenditure, the spending of which often argued to be the most supportive to the poor. Other studies on the issue stipulate the effect of tied and untied aid under some conditions, rendering somewhat ambiguous conclusions of the impact-positive or negative. For instance, examining the effect of tied and untied aid on growth, Neanidis and Varvarigos (2009) find that aid tied to spending on productive sectors is more effective than pure lump-sum transfers if, and only if, it is volatile as defined by its standard deviation. In particular, they find that when aid is volatile, tied aid has positive growth effect whereas untied aid has negative effect.

On the same topic, Chatterjee, Sakoulis, and Turnovsky (2003) find that while untied aid can only lead to increases in consumption and welfare in recipient countries, the effect of tied aid is less certain. Depending on structural conditions in recipient countries, tied aid can be either helpful or harmful. Tied aid leads to long-run growth and provides better benefits than does untied aid if the recipient country is poorly endowed with public capital, but it can worsen recipient welfare if otherwise. In a later study, Chatterjee and Turnovsky (2007) take into account three factors: the relative prices of consumption and leisure, production externalities, and government fiscal balance, and find somewhat similar results. The study concludes that untied aid produces a uniform result by increasing welfare of recipient countries in both the short run and long run, but tied aid is much more sensitive to the three factors above with respect to its impact.

Even though previous literature provides some grounds on the impact of tied and untied aid on welfare of recipient countries, it does not specifically answer the question of which income group benefits the most from the increase in welfare. The reason is the welfare level considered in previous research is the overall welfare of recipient countries, not of any specific population. Considering the channel of distribution, tied and untied aid may induce different kinds of incentives from bureaucrats or local elites in charge of aid distribution. In fact, Chatterjee and Turnovsky (2007) also suggest future research on

the topic to take into account the rent-seeking factor of political elites in recipient countries to further understand the implication of choosing tied and untied aid. This suggestion is closely linked to the focus of our study.

Needless to say, if we consider incentives provided by each aid type, tied aid may be better targeted aid than untied. When aid is earmarked for specific sectors, especially social sectors through which the poor can absorb more benefits, we expect that such aid contributes more to improving the living conditions of the poor. The reason is the requirements attached with tied aid is that it has to be allocated to productive sectors reducing the chances that bureaucrats or politicians divert aid monies away from the intended purposes. We continue this line of thinking as we review the studies that examine the relationship between aid types and moral hazard.

Recent studies find that donors use tied aid to control moral hazard behavior on the recipient side. For instance, studying the composition of aid transfers and moral hazard, Ouattara et al. (2009, 2013) find that donors actually use restricted transfers in response to changes in recipient country moral hazard behavior. Specifically, Ouattara et al. (2013) analyze, both theoretically and empirically, how donor response to moral hazard behavior by using *project aid* and *program aid* to proxy for *restricted aid* and *unrestricted aid*, respectively. The study finds that as moral hazard in recipient countries declines, donors also reduce the provision of tied aid in their portfolio. The authors argue that while recipient governments can misappropriate either part or all of program aid, it cannot misappropriate project aid; consequently, smaller proportions of program aid, as compared to that of project aid, is spent on welfare of the people in recipient countries. This suggests that tied aid can be more beneficial to the poor because donors use tied aid to control for such moral hazard behavior.

Nonetheless, fungibility literature suggests that aid intended for specific sectors (e.g., building roads, healthcare centers etc.) can be very fungible (see, for example, Feyzioglu et al., 1998; Khilji & Zampelli, 1991, 1994; Pettersson, 2007b). Most studies on the impact of tied aid argue that recipient governments can be manipulative in their resource allocation by reallocating aid earmarked for specific sectors to fund other uses that donors are neither funding, nor have any knowledge of. In particular, it can

reduce its own-source funding from aid funded sectors and reallocate the resources to fund others, e.g. from aid funded the education sector to military spending. Even so, fungibility would not be as bad as it sounds if the relocated resources are used to finance other sectors that provide better or at least as equal returns as the intended sectors. It would be damaging though if the resources are used for "the conspicuous consumption of the elite" (World Bank, 1998, p. 73). In such cases, tied aid is benefiting the elites, not the intended recipients. Indeed, a model by Lahiri and Raimondos-Moller (2000) predicts that fungibility shifts aid resources away from the targeted group toward special interest groups lobbying the government.

To the extent that the very nature of untied aid makes it legally fungible (Brown, 2012), thus more prone to moral hazard, tied aid is still better targeted despite its fungibility. We, therefore, argue that untied aid carries higher moral hazard in the allocation than tied aid, which can lead to allocation favoring officials and the elites handling the resources.

2.2.4.2 The Role of Institutions in Income Distribution

Literature of institutions and development that has attempted to answer the questions of institutional differences across countries provides extensive explanations to the link between institutions and income inequality. The work of Acemoglu and his colleagues often provide insights into the importance of institutions in the development in a society. The literature mainly stresses the way in which institutions have emerged and evolved since the colonial era. For instance, in their recent work, Acemoglu and Robinson (2012) provide an account for the differences of income inequality among nations particularly between North and South America. The authors postulate that during colonial times, new settlers set themselves up as elites for the native populations. They grabbed land, implemented forced labor, imposed high taxes, and enjoyed their fortune at the cost of the rest. In a very direct and repressive way, the institutions brought about by the newcomers created much inequality among the rich and the poor in Latin America. Acemoglu and Robinson (2012) argue that even though the continent saw some changes to institutions in the later years, the changes were "path-dependent" that lead only to

another form of the same repressive institutions (p. 36). This aspect of institutional persistence is also discussed in Acemoglu, Johnson, and Robinson (2002), Acemoglu and Robinson (2008), Congdon Fors and Olsson (2007), and Cervellati et al. (2008)[9].

Apart from the historical account of institutions as mentioned above, different dimensions of institutions affect income inequality. One dimension is corruption. Corruption is a feature of informal institutions and norms enforced through interpersonal ties and relations. Corruption may emerge in different patterns depending on elite types. As noted in Johnston (1989), the political and wealth elites with strong grip on their positions are more likely to use corruption to keep their power, whereas those with relatively insecure hold on their power use a somewhat rapacious way of corrupting while in power. In any pattern of corruption, it affects the lives of many.

Previous studies of the impact of corruption on inequality seem be mixed but lean towards to the conclusion that more corruption is associated with higher inequality. Corruption affects income inequality through several channels; biasing tax system in favor of the rich and well-connected, diverting public spending away from social programs, creating unequal access to education, and concentrating assets among wealthy elites (Apergis, Dincer, & Payne, 2010; Gupta, Davoodi, et al., 2002; Gyimah-Brempong & de Camacho, 2006). Furthermore, corruption diverts investments away from labor-intensive-sectors (Rose-Ackerman, 1999), limiting the opportunity of some social groups to generate income. Since those in the low-income group usually have less education and work mostly in labor intensive sectors, fewer job opportunities implies further suppression in income.

Studying the effect of corruption on income distribution using both Ordinary Least Square (OLS) and Two-Stage Least Square (2SLS) methods, Gupta, Davoodi, et al. (2002) find that an increase in corruption increases income inequality and reduces income growth of the bottom 20% of population (quintile 1). To be specific, a one-standard deviation increase in corruption increases Gini coefficient by 11 points and decreases

[9] The arguments of how institutions persist are contradicting at best. For instance, Acemoglu and Robinson (2008) argue that elites can stay in power by investing in *defacto* power, whereas Cervellati et al. (2008) defend the persistence of political institutions on the "the possibility of curtailing conflict and preserving good economic institutions" (p. 1355).

income growth of the poor by 4.7 percentage points per year. Considering the average Gini coefficient at 39 and the growth of income of the poor at 0.6 percent per year in their study, the results suggest that corruption has a considerable impact on inequality. Their results are highly significant and robust to different specifications. In a similar line of research, Gyimah-Brempong (2002) finds that corruption is associated with higher income inequality in a sample of 21 African nations. Their results are significant at the 5% level and robust to estimation methodology. In an extended paper, Gyimah-Brempong and de Camacho (2006) further find significant regional differences of the impact. Latin America presents the highest negative impact followed by the African, Asian, and OECD countries.

Li, Xu, and Zou (2000) find the same relationship, except that it follows an inverted U-shape curve. Employing both Ordinary Least Square (OLS) and instrumental variables (IV) estimation techniques, Li et al. (2000) find a quadratic relationship with a positive coefficient on the linear corruption variable and a negative coefficient on its squared term, suggesting that inequality rises as corruption increases, with a decrease starting after reaching a turning point. The literature also identifies the bidirectional effect of institutions and inequality: they determine each other, creating a trap of poor institutions and high inequality (Apergis et al., 2010; Chong & Gradstein, 2007).

In contradiction to Li et al. (2000) though, using OLS and IV techniques on data from 105 rich and poor countries from 1982 to 1995, Chong and Calderón (2000) find a hump shaped relationship between quality of institutions and income inequality, suggesting that better institutions that come with reforms are associated with higher inequality before reaching its later stages. Their sample suggests that while richer countries enjoy more equal distribution from better institutions, poorer countries suffer from the effect, which prompts income to shift away from the poor. The authors argue that this could be the case when informal and underground sectors within where the majority of poor works dominate the economy. Lower corruption, new restrictions and norms, and better-trained bureaucrats to implement the rules, are more likely to add burdens to the informal economy that runs on the realm of underground transactions. Their results are significant and robust to different institutional measurements. Note that

one of their institutional indices comprises of five institutional dimensions, three of which are used in our study.

A series of studies motivated by Chong and Calderón (2000) seem to support their findings. Examining the relationship between corruption and inequality from 1984 to 2003, Dobson and Ramlogan-Dobson (2010) find a trade-off between corruption and inequality suggesting that lower corruption leads to higher income inequality in a sample of 19 Latin American countries, whose economies are heavily dependent on informal sector. The result is confirmed in their extended studies (Andres and Ramlogan-Dobson (2011); Dobson and Ramlogan-Dobson (2012)).

On the other hand, literature on corruption also points to a list of factors that contribute to higher corruption: the way in which law is administered and enforced, lack of independent judicial system, lack of transparency and accountability, and low salary of civil servants (Ades & Di Tella, 1999; Rothstein, 2011; Treisman, 2000). This suggests that bureaucratic quality and the rule of law are also the causes of corruption. Thus, bureaucratic quality and the rule of law determine how resources are distributed among social groups through its effects on corruption. We do not find any empirical studies on the impact of bureaucratic quality and the rule of law on inequality, except in work by Chong and Calderón (2000) as discussed above. Theoretical contributions though may shed some light on the relationship. As previous literature demonstrates that bureaucracy plays a central role in decision making (Huber, 2000; Tirole, 1994), including resource distribution. A model by Blackburn and Forgues-Puccio (2007) predicts that bureaucrats with redistributive authority conspire with the wealthy in concealing information to receive private bribes. Low bureaucratic capacity is another constraint in policy implementation (Huber & McCarty, 2004). When the poor depend mostly on public provisions of goods and services, any constraints in the provisions would limit their access to the services. Taken together, lower quality of bureaucracy can lead to higher income inequality.

The rule of law affects inequality through a means of control on corruption, oversee private capture, and checks on government. Weak rule of law thus provides incentive for bureaucrats to capture rents for personal gain. Among various mechanisms

to fight corruption, punishment of corrupt officials is actually an effective tool to curb on corruption (Gupta, Davoodi, et al., 2002). Indeed, the likelihood that someone will be punished for corruption is negatively related to the number of corrupt officials (Easterly, 2001). The threat of punishment forces bureaucrats to shy away from pursuing their personal benefits, making the redistribution of resources towards elites and the public embezzlement less likely, hence lower inequality.

Taken together, the distributional impact of aid and the impact of institutions on inequality, as well as the link between institutions and aid distribution discussed in Section 2.2.2 provides supports for the claim that the distribution of aid would be better allocated to its intended targets, which generally are the poor, if provided to countries with strong institutional base. We thus are able to construct the following hypotheses:

Hypothesis 2: The poor benefit more from aid in better institutional setting.

Hypothesis 3: The positive effect of aid on income inequality is smaller for recipient countries with better institutional quality.

Also, we expect that both tied and untied aid can reach the poor more if allocated in countries with better institutions. Good institutions lead to better monitoring and management and less rent-seeking.

Note that Chong et al. (2009) also study how aid affects income inequality, but only analyze the effect on Gini coefficient conditional on corruption. Exploring the impact of aid from 1971 to 2002 using a Generalized Method of Moments (GMM) procedure, Chong et al. (2009) find no evidence that corruption is a significant determinant in aid distribution. Similarly, Bjornskov (2010) examines the effect of aid on income distribution, as measured by income quintiles, conditional on democracy, which arguably is a form of government that provides higher checks and balances. Employing random effects feasible least squares estimator to explore the beneficiary of foreign aid in 88 developing countries from 1960 to 2000, Bjornskov (2010) finds that an increase in aid is associated with an income skewed toward the richest segment of the population in

democracy and not in autocracy. The results are statistically significant at the 5% and 10% significance level and robust to different sample restrictions. The author is baffled about his findings, but provides several reasons why this is the case, two of which are: (1) aid inflow might fail democratic policy, and (2) aid might be associated with rent-seeking during the transition to democracy.

In this study, we build upon the work of Chong et al. (2009) and Bjornskov (2010) by exploring both the impact of aid on income share captured by each quintile and on income inequality conditional on a wider aspects of institutions—corruption, bureaucratic quality, and the rule of law.

2.2.4.3 Reverse Causality

Because causality can run in both directions between aid and income inequality, it is not uncommon that the analysis can be complicated. While aid inflow may change the pattern of income distribution in the long run, income inequality also determines aid volume. For instance, donors may reward countries with less inequality by providing more aid for their successful efforts in reducing poverty. Another possibility is countries with high income inequality may keep receiving more aid because a large proportion of its population lives in poverty (Herzer & Nunnenkamp, 2012; Layton & Nielson, 2009). Also, an inflow of aid to a specific country may persist despite high inequality because the country is one of donor's strategic interests. As a consensus of the literature of aid selectivity, the allocation of aid is based not only on humanitarian, but also on donors' strategic interests. For that same reason, the level of income inequality in a recipient country may be irrelevant to the amount of aid it receives. Although the primary causal link will be the impact of aid on income inequality, there are reasons to believe that causality can go either way between aid and income inequality.

Previous aid research attempts to solve this reverse causal impact by using instrumental variables. Some popular instrumental variables used, particularly in aid and growth literature, include: arms imports, population, infant mortality, and regional dummies to capture donors' strategic interests. In selecting which instruments to use, we

must acknowledge that it is not easy to identify one (or a set of) good instrumental variable(s) for aid and that most literature reports the results despite poor econometric tests. In this study, we discuss our choice of instruments in detail in the data and methodology section.

2.2.5 Other Variables to Consider

This section briefly describes a set of control variables used in our study. The variables are commonly used in previous literature, those include:

Kuznets curve

As in much of income inequality determinant literature, this study includes GDP per capita and its squared term to test the classical Kuznets hypothesis of an inverted U-shape relationship between GDP and income inequality. Kuznets (1955) postulates that the degree of income inequality increases as a country develops, but then begins to decrease after reaching a certain level. In essence, growing inequality is inevitable in a growing economy because some are more equipped to reap the growing opportunity than others. Until the rest can slowly take advantage of the opportunity that the level of inequality dwindles. This study also tries to capture the existence of the Kuznets curve.

Education

Education plays a significant role in determining the degree of income inequality. Education provides opportunity for the poor to escape from poverty by offering them better chances into higher paying jobs. According to Martinez-Vazquez, Vulovic, and Liu (2010), however, it is not clear whether education increases or decreases income inequality. The reason is the return to education can only be captured by those with education; thus when education expands, income inequality also widened, particularly in poor countries where low level of education is a norm. However, as more and more

people acquire education, the return to education decreases, leading to lower inequality. Gupta, Davoodi, et al. (2002), however, find no significant results of the inequality effect of education, as measured by average years of secondary schooling in their study.

Rural population

Poverty is highly concentrated in the rural areas where most are subsistence farmers. Rural inhabitants mostly earn their living on agricultural-based activities or on household farming. They have fewer opportunities to gain income from other non-farm activities. Therefore, the differences in income inequality may be attributable to the differences in share of population living in rural area. Bjornskov (2010) finds that income share captured by the lowest four quintiles is significantly lower for countries with larger share of population in the rural areas. Conversely, using share of urban population instead of share of rural population, Chong and Calderón (2000) find no evidence of the relationship between the share of urban population and income inequality.

Openness

A general argument to the effect of trade openness on income distribution posits that only small groups of the population who are already well-off are able to gain the benefits from trade openness and globalization. This view runs contrary to the standard trade theory, which argues that the effect of openness on income inequality depends upon the country's resources endowment (Barro, 2000). Empirical work has not yet reaching an understanding of the consensus of the effect of openness on income inequality. Barro (2000) and Martinez-Vazquez et al. (2010) find that trade openness widens income inequality, while Reuveny and Li (2003) find the opposite. Some other works do not find any significant impact (Bjornskov, 2010; Li et al., 2000).

Inflation

There seems to be a consensus of a positive relationship between inflation and income inequality (Cysne, Maldonado, & Monteiro, 2005). Inflation increases the level of income inequality because it affects the poor harder. Much of the poor's income goes to consumption, while the rich can diversify their income on different sectors, for instance on property such as land or capital (Layton & Nielson, 2009). In the midst of high inflation, the low-income population is inevitably the core victims.

Survey Type

Most research on income inequality utilizes income distribution data from surveys conducted using different conceptual measurement of income, i.e. consumption based or income based. Income based data are more likely to present higher inequality than consumption based one. Since income inequality varies depending on measurement of income used in each survey, this study also includes a variable survey type to control for the differences. The variable captures the magnitude of the conceptual measurement of each quintile and Gini coefficient.

2.3 Data and Methodology

This section of the analysis reiterates the hypotheses drawn from the theoretical discussion above, presents the empirical model, data sources, and describes the empirical methodology.

Hypotheses

Formed along the discussion in the literature review, our three hypotheses are:

Hypothesis 1: An increase in aid decreases the income shares of the poor (Q1-Q2) but increases the income shares of those in the upper quintiles (Q4-Q5), thereby increasing income inequality (Gini coefficient).

Hypothesis 2: The poor benefit more from aid in better institutional setting.

Hypothesis 3: The positive effect of aid on income inequality is smaller for recipient countries with better institutional quality.

In order to test the above hypotheses, this study employs a model that has been widely used by previous literature of conditional aid and growth nexus. In the aid effectiveness literature, the variable considered as "condition" enters into the estimation equation through second order condition, which means that aid is multiplied by the variable called "condition" (Doucouliagos & Paldam, 2010). As for the estimations, this study employs Two-Stage Least Squares (2SLS) method to control for potential reverse causality that can go between income inequality and aid. We discuss the choice of instruments for aid in a section below.

Modified from Dietrich (2011) and following the standard model of aid effectiveness literature, the model of conditional impact of aid can be written as:

$$Inequality_{it} = \beta_0 + \beta_1 Aid_{it} + \beta_2 Institutions_{it} + \beta_3 Aid_{it} * Institutions_{it} + \beta_4 Controls_{it} + \gamma_{1t} + \varepsilon_{1it} \quad (1)$$

$$Aid_{it} = \alpha_0 + \alpha_1 Z_{it} + \alpha_2 X_{it} + \varepsilon_{2it} \quad (2)$$

$$Aid_{it} * Institutions_{it} = \Omega_0 + \Omega_1 Z_{it} + \Omega_2 X_{it} + \varepsilon_{3it} \quad (3)$$

Where *i* indexes countries and *t* indexes time. $Inequality_{it}$ denotes the share of income captured by each income group (Q1-Q5) and Gini coefficient. Aid_{it} represents the measure of aid relative to GDP. $Institutions_{it}$ measures the institutional quality. $Aid * Institutions_{it}$ is the interaction term between aid and institutions which captures the joint effects of aid and institutions on income inequality. $Controls_{it}$ is a vector of exogenous variables commonly found to be important in explaining the variation of income inequality. The control variables include two variables that capture the Kuznets curve, percent of population living in rural area, trade openness, inflation, average years of schooling, and survey type, which captures conceptual measurement of income distribution. Z_{it} are the excluded instruments, and X_{it} are the included instruments. γ_t is

fixed-time effect to control for global business cycle or other common time effects. For instance, a group of countries may attract aid flow into their countries concurrently due to several reasons such as natural disasters, regional war, or famine, while at the same time globalization of trade and investment may affect income inequality for a group of countries (Herzer & Nunnenkamp, 2012). Finally, ε_{it} is the error term.

We use Equation (1) *without* the interaction term, *Aid*Institutions*, to test hypothesis 1 and that *with* the interaction term to test hypotheses 2 and 3. When *Aid*Institutions* is not in the model, we expect the sign on the *Aid* coefficient to be negative in equation where Q1 and Q2 are dependent variables as we hypothesize that income shares of the poor decrease when aid increases. When the interaction *Aid*Institutions* presents, however, we expect to see positive coefficients on *Aid*Institutions* as we hypothesize that aid increases the portion of income held by the poor if given to countries with good institutional quality. On the contrary, we expect to see negative signs on the coefficient of *Aid*Institutions* in equations where Q4 and Q5 are dependent variables. As a result, in the Gini coefficient equation, the study expects the sign of the coefficient on *Aid*Institutions* to be negative, indicating that the positive effect of aid on inequality is less in countries where institutions is of better quality.

General Data and Countries Included

This study uses data from 85 countries collected from 1960 to 2004. The research follows Rajan and Subramanian (2008) in selecting countries to include in the analysis, contingent upon data availability. Regardless of the income status a country is currently in, the country is selected based on the criteria that it had/has received foreign aid at least once during the period 1960 and 2004. By using this selection criterion, high-income countries are also included in our sample. See Appendix A for the list of countries.

As in many income inequality studies, the research uses a five-year average in the analysis (see, for example, Bjornskov, 2010; Davis & Hopkins, 2011; Li et al., 2000). The advantage of having our variables averaged over a five-year period is that it can reduce the short-run fluctuations, business cycle factors, and measurement error, allowing

us to focus on the structural relationships of interest (Boone, 1996; Li et al., 2000). In addition, since the inequality data does not change drastically over a short period of time, the method of averaging does not appear to be that big of an issue. Thus, an observation for a country in a time period is the average of the corresponding observations for that five-year time period. For example, an X observation is the average of X in Year 1, Year 2, Year 3, Year 4, and Year 5. However, because not all variables are available for all countries in all time periods, the actual number of observations in our regressions is far smaller than the perfect scenario of full dataset.

Dependent Variables (Income Quintiles and Gini Coefficient)

The dependent variables in our study are the share of income held by each income group (Q1-Q5) and the Gini coefficient. Each quintile captures the percentage of income attributable to each fifth of the population, with Q1 being the poorest population and Q5 being the richest population. Gini coefficient is a measure inequality in a society, which ranges from 0 to 1, with 0 being the perfect equal society and 1 being the perfect unequal society.

As in much income inequality research, the data on income distribution and income inequality derives from the World Income Inequality Database of the United Nations (UNU-WIDER, 2008), which comes from various surveys of different quality. The quality of the surveys is based on a scale from 1 to 4, with 1 being the highest quality and 4 being the poorest quality. In some cases, the data contains different surveys for one observation. In such cases, this study chooses to use the one with the highest survey quality. Furthermore, surveys included are based on different measurement concepts such as gross income, net income, consumption or expenditure. Even though the UNU-WIDER data set is a mix of different surveys and sources, the data is homogenized to account for different definitions (Chong et al., 2009). As also pointed out in Hansen, Rants, and Buhl-Wiggers (2010), we understand that data quality is one of the main concerns in any cross country analysis; however, since the data set comes from a

homogenized database and has been used by many studies, the use of the data set can provide results at least comparable to others.

Main Independent Variables (Aid and Institutions Index)

The main explanatory variable in our analysis is aid. Aid is defined as the net Official Development Assistance (ODA) disbursement as a percentage of GDP. This study uses aggregate aid because of its wide availability and how common it is in previous aid literature (see, for example, Burnside & Dollar, 2000; Hansen & Tarp, 2001). The aid data covers aid volume from all official sources of both bilateral and multilateral donors.

Additionally, we disaggregate aid into tied and untied aid. As notated in Section 2.2.3, the common form of tied aid is the tying of aid to procurement in donor countries, but in our study tied aid refers to the tying of aid to specific development sectors. We use *share of sectoral aid to GDP* and *share of non-sectoral aid to GDP* as proxies for tied and untied aid, respectively. Tied aid is tied to different productive sectors in supports for development; those include aid allocated to social and economic infrastructure and services, production services, and multi-sector or crosscutting sector. On the other hand, untied aid are non-sectoral allocable such as general budget support, food security assistance, other commodity assistance, and action relating to debt. The source of all aid data is from the Organisation for Economic Co-operation and Development online database (OECD, 2012a, 2012b), whereas that of GDP is from World Development Indicator (World Bank, 2010). OECD database comprises of two major databases—Development Assistance Committee's (DAC) database and Creditor Reporting System (CRS) Aid Activities database. We extract our aggregated aid data from DAC database, but we have to resort to using CRS database for tied and untied aid. The reason is only CRS database reports sectoral composition of aid. A major drawback of using CRS database, however, is that CRS does not report the actual aid disbursement, but commitment. The use of commitment amount can either understate or overstate the actual disbursement amount. Since CRS is the only source of data for sectoral aid allocation, we

follow previous studies and assume that the committed amount is 100% disbursed and it is also disbursed in the same year when the commitment is made (for similar assumption see Brown, 2012). To obtain the amount of all aid as a percentage of GDP, we divide aid data in current units with GDP in current units.

With respect to another main independent variable, institutions, the study utilizes three most commonly used institutional variables: 1. Corruption, 2. Rule of Law, and 3. Bureaucratic Quality. As Burnside and Dollar (2000) also note, if we interact each institutional variable simultaneously with the aid term in Equation (1), we find it difficult to get precise estimations of the interactive terms. Therefore, we follow many previous aid studies and construct an institutional index from the three institutional variables. We utilize the Principal Component Analysis (PCA) to extract the first eigenvalue of the three dimensions. We use PCA because it produces better weights compared to simple average and it can also account for as much of the variances of the three institutional dimensions.

The source of our institutional data is from the International Country Risk Guide published by the Political Risk Services group (PRS Group, 2008), a private firm providing risk assessments to businesses. The institutional measures provide expert assessments of the quality of institutions based on a range of predetermined criteria across countries. A drawback of using such perception rating is that there may be biases in experts' judgments. However, the institutional indices produced by the PRS group are commonly used in the literature, particularly because of its wide coverage (up to 130 countries) and uninterrupted annual data for a relatively long time period. The data is available from 1984 to the end of our sample year, 2004. To take advantage of wide availability of inequality data, which is available from 1960, the study uses the first available observation of the institutional variable to substitute for the missing period prior to 1984, based primarily on the assumption that institutions do not change drastically over time. Corruption and the rule of law measures take values from 0 (most corrupt or worst rule of law) to 6 (least corrupt or best rule of law). Quality of the bureaucracy, on

the other hand, takes values from 0 (worst bureaucratic quality) to 4 (best bureaucratic quality)[10].

Control Variables

As mentioned in the literature review section, several other variables are important determinants of income distribution and inequality. In this study, we also control for those that include variables capturing the existence of the Kuznets curve, rural population, openness to trade, inflation, average years of schooling, and survey type.

The study uses log of GDP per capita (constant 2000 US$) and its squared value to capture the inverted U-shape of the Kuznets curve. Rural population is the percentage of people living in rural areas, as defined by national statistical offices in each country. As in previous studies (e.g., Baliamoune-Lutz (2009) and Dobson and Ramlogan-Dobson (2012)), openness to trade is the sum of imports and exports as a percentage of GDP. Another control variable is inflation rate, based on annual percentage change in consumer price index. Our education variable measures the average schooling years of the total population aged 15 and over. We also control for "survey type." As already noted, our income inequality data comes from different surveys that are either "income-based" or "consumption-based." In this study, we code "income-based" as 0 and "consumption-based" as 1. Since an observation is a five-year average of its correspondent observations, our "survey type" variable captures the magnitude of the surveys that are "consumption-based." The source of data for all variables, except education, is from World Development Indicator (World Bank, 2010). Education data is from Barro and Lee (2000) which is available periodically, i.e. 1960, 1965, 1970 and so on. See Appendix B for variable descriptions and sources.

[10] According to the PRS group, corruption measures the degree of corruption prevailing in a country which is concerned with "actual or potential corruption in the form of excessive patronage, nepotism, job reservations, 'favor-for-favors', secret party funding, and suspiciously close ties between politics and business". The rule of law assesses "the strength and impartiality of the legal system; [..] and popular observance of the law". Bureaucratic quality measures "the strength and expertise to govern without drastic changes in policy or interruptions in government services; [..] and an established mechanism for recruitment and training". Source: http://www.prsgroup.com/ICRG_methodology.aspx

Instrumental Variables

To control for potential reverse causality between aid and income inequality, the study employs a Two-Stage Least Squares (2SLS) procedure for the estimation. We have to acknowledge that the results of previous aid effectiveness literature are somewhat limited to finding right instruments for aid. Previous literature provides some different choices of instruments. In this study, we use a set of instrumental variables informed by aid selectivity literature. Those include: log of total population, Franc zone, Central American countries, and Egypt dummies.

Past studies on aid allocation show that, on average, smaller countries, as defined by its population, receive higher aid volume (see, for example, Clist, 2011; Fink & Redaelli, 2011). Kosack (2003) notates two reasons why this can be the case. First, it is likely that donors would want their limited resources to have the most impact per person, thus giving aid to a smaller country with fewer populations would allow them to achieve their goal. Secondly, since the practice of aid giving is based on country level (e.g. donor A gives X amount of aid to country B), not people, the allocation of aid to different countries may provide more advantage to countries with smaller population than those with bigger ones. The source of data for "total population" is from World Development Indicator (World Bank, 2010).

Aid allocation literature also suggests that alongside recipient's need, donors also consider whether the country has any strategic value to them (see, for example, Alesina & Dollar, 2000; Dreher et al., 2011; Harrigan & Wang, 2011). Three dummy variables often used to capture strategic importance are: Egypt, Central America, and Franc zone dummies. Egypt is a major US aid recipient. Central American countries are also in the US sphere of influence. Franc zone are former French colonies that continue to receive aid from the EU, especially from France (Burnside & Dollar, 2000; Hansen & Tarp, 2001). In our sample, eight countries are in Franc zone: Burkina Faso, Cameroon, Cote d'Ivore, Gabon, Guinea-Bissau, Mali, Niger, and Senegal; and six countries are Central American countries: Costa Rica, El Salvado, Guatemala, Honduras, Nicaragua, Panama.

The potential weakness of our instrumental variables, especially the three regional dummies, is their possible correlation with the error term in the main regression, i.e. while explaining the volume of aid a country receives, the level of inequality can be related. Specifically, as the literature on the connections between institutions and inequality suggests countries included in these regional dummies are former colonies in which their level of inequality today is shaped by their colonial experience. Because of this reason, being one of the countries in the regions already presents a certain level of income inequality, violating the basis requirement that instrumental variables should affect inequality only through its effect on aid. The alternative sets of instrumental variables used in previous studies include: lagged value of aid and dummies captures the political determinants of aid flows, such as Friends of US, Friends of OPEC, and Friends of France (see, for example, Boone, 1996); lagged value of the ratio of ODA disbursements to ODA commitments and distance from recipient country's national capital to Paris, Tokyo and Washington (see, for example, McGillivray et al., 2011); General Assembly voting patterns and presence of countries in the Security Council (see, for example, Bjornskov, 2010); dummies for Development Bank membership, such as the Inter-American Development Bank, the International Bank for Reconstruction and Development, the International Development Association, and the Asian Development Bank (see, for example, Layton & Nielson, 2009); and dummies for common land border, common official language, and common majority religion (see, for example, Angeles & Neanidis, 2009). Similar to the instrumental variables used in our study, though, each set of instruments has its potential weaknesses.

Since we use instrumental variable technique, we carry out tests for exogeneity and for the validity of the overidentifying restrictions. The study utilizes the F-test to determine the relevance of the excluded instruments, through which we can conclude whether the instruments are providing predictive power in the first-stage regression. The null hypothesis of the F-test is that the instruments do not explain any cross-country variation in the aid regression in Equation (2). We follow the rule of thumb suggested by Staiger and Stock (1997) which requires that the F-statistics should be higher than 10. Then, the study considers another specification test—Hansen's J test of overidentifying restriction—to examine the overall validity of the instruments. The null hypothesis for

Hansen test is that the excluded instruments are uncorrelated with the error term in Equation (1), and that the estimated Equation (1) has correctly excluded them. Generally, the null hypothesis of the Hansen test is that the instruments are valid instruments.

The summary statistics, based on a five-year average, of the variables included in our models is presented in Table 2.1. If we had a full data set with no missing value, we would have up to 765 observations from 85 countries observed over 9 time periods. However, due to data limitations, we have a very unbalanced data set with a lot of missing values; thus, the highest possible number of observations is only 414. As shown in Table 2.1, the maximum income captured by the top quintile (Q5) is as high as 78% of total income, whereas the income share captured by the lowest quintile is as low as 1.1%. A few countries where the top quintile hold more than 70% of total income include Gabon (in the 1960s), Ecuador (in the 1970s), and Gambia, Zimbabwe, Namibia, and Lesotho (in the 1990s). As a result, Gini coefficient in our sample ranges from 21.8% to 73.9%, which represents a fairly unequal society to a very unequal one.

On aid variable, aid volume ranges from -0.022 % of GDP to 51.4% of GDP with the mean of 4.2%. Because *Aid* is net ODA disbursement as a percentage of GDP, negative net aid signifies that a country receives less amount of aid than its loan repayment. Countries with negative aid as a percentage of GDP include Peru in the 1960s, Chile in the 1980s, and Malaysia and the Republic of Korea in the 1990s. The percentage of tied aid to GDP is generally higher than that of untied aid, with the mean value of 2.9% and the maximum value of 24.8% of GDP. The mean and maximum values of untied aid are relatively lower at 1.4% and 19.5% of GDP, respectively. The relatively lower level of untied aid as compared to tied one indicates somehow that aid is mostly given to support development sectors. Note also that due to data limitations, commitment amounts are coupled to both tied and untied aid, which can be different from actual aid disbursement.

Since countries included in the analysis are from low-income economies to high-income ones, our institutional scores also spread from the lowest possible ratings to the highest ones, with the exception of bureaucratic quality where the minimum score is 0.8. Cronbach's alpha for the three institutional scores combined is 0.748. Countries with no

rural population are Hong Kong and Singapore; those with high concentrations of rural population are mostly African countries including Botswana, Kenya, Malawi, Niger, and Uganda, where more than 90% of population live in rural areas at one period during our time span. The "average years of schooling" has the lowest number of observations in our sample with the maximum value of about 10 years.

Turning to variable correlations in Table 2.2, most of our variables are not highly correlated. Though, we notice a few interesting points from the relationships. While the first through the fourth quintiles tend to move in the same direction, the fifth quintile is negatively related from the previous four. As a result, Gini coefficient is strongly and positively related only with the top quintile (fifth quintile). With respect to the correlation between our aid variables, we are not surprised to see very high correlations between our aggregate, tied, and untied aid; the correlations of which are more than 0.8. The correlations between all aid types and income inequality (Q1-Q5 and Gini coefficient) are very low.

As it pertains to the three variables that make up our institutional index (i.e. corruption, the rule of law, and quality of bureaucracy), the variables are positively correlated. From the relationships, we may expect a country with better control on corruption to also have high scores on the rule of law and bureaucratic quality; though the relationships are not particularly strong. All aid variables are negatively, but very weakly, related with the three institutional variables. The correlations suggest that countries with poor institutional quality are not always major aid recipients. Last but not least, GDP per capita, percentage of people living in rural area, and average years of schooling are somewhat highly correlated, with a negative correlation between GDP per capita and rural population, and a positive correlation between GDP per capita and average schooling years. This may imply that countries with high GDP per capita tend to have smaller population living in the rural area and their people tend to obtain more years of schooling. On the contrary, the correlations between GDP per capita and all aid types are negatives, but again the relationship is not strong, suggesting that poorer countries do not always receive more aid.

2.4 Results

We begin the analysis of the impact of aid and institutions on all five quintiles and Gini coefficient with OLS regressions, which is followed by 2SLS. Table 2.3 presents regression estimates of the full model using OLS. The first columns (Column 1) under each quintile and Gini coefficient in Table 2.3 present results of the estimates *without* the interaction terms, *Aid*Institutions*, whereas the second columns (Column 2) present results of the models *with* the interaction terms. As Column 1 in Table 2.3 show, the coefficients on aid are negatively and significantly related to Q1 through Q4, but only those in Q1 and Q2 are significantly different from zero. In contrast, aid is significantly and positively related to Q5, which is the income share of the elites in each country. By reducing income shares of Q1 and Q2 and increasing that of Q5, aid increases Gini coefficient. This can be seen through the significant coefficient on *Aid* in Gini coefficient regression. Analyzing the results from an institutional standpoint, none of the coefficient on *Institutions* is significant, suggesting that institutions are not important determinants of income distribution. Similarly, in Column 2, where we introduce the interactive term into the models, none of the coefficients on *Aid*Institutions* is significant, suggesting that the impact of aid on income distribution does not differ with different institutions. Nonetheless, as mentioned in the methodology section, causality can go either way between aid and inequality; thus, we need to take into account the potential reverse causality by using 2SLS.

Table 2.4 presents regression estimates using 2SLS where each additional control variable is added to the models. Each column under each quintile and Gini coefficient shows regression result corresponding to each additional control variable. The last two columns thus, Column 5 and Column 6, are the results of the full models on which we focus. As each control variable enters the model, the number of observations reduces, leading to a much smaller observation in the full models. The results are presented in

parallel so that the impact can be seen clearly with each additional control[11].

We approach the analysis using 2SLS with a more general picture of the impact by examining the regressions *without* the interaction terms *Aid*Institutions* (i.e., Column 1 through Column 5). As Table 2.4 indicates, the estimators in each model have almost the same results with respect to both sign and significance of coefficients. To be exact, the coefficients on *Aid* are negatively and significantly related to Q1 and Q2 in all columns. Similarly, the signs on aid coefficients in Q3 are also negative; however, the coefficient loses its significance after controlling for all variables. The aid coefficients in Q4 regressions are negative in all cases, but in Column 5. Furthermore, none of the coefficients are significant, except that in Column 3 where the significance is only at the 10% level. Finally, aid is significantly and positively related to Q5, the elites' income share, and also to Gini coefficient. In general, by reducing the income shares of Q1 and Q2 while at the same time increasing that of Q5, aid increases Gini coefficient.

On the other hand, the effects of institutions on income inequality are somewhat inconsistent with respect to the signs of coefficients, with the exceptions in Q3, Q4, and Q5 regressions. Negative signs on *Institutions* in Q3 and Q4, and positive sign on that in Q5 suggest that as institutional quality improves income shares of Q3 and Q4 decrease while that of Q5 increases. The relationships contradict our expectation, but are in line with some corruption and inequality studies. Chong and Calderón (2000) and Dobson and Ramlogan-Dobson (2010) find that better institutions are associated with higher inequality at the early stage of development and with lower inequality at the later stage. Since countries in our sample are mostly developing countries, these countries most likely depend more on the informal sectors where improved institutions widen inequality. Nonetheless, as these coefficients are only sparsely significant and significant only at the 5% level at best. We cannot draw any general conclusion from the relationships.

[11] Of all control variables, the variable "average years of schooling" has the lowest number of observations. However, we choose to control for "average years of schooling" first because doing so allows us to get better test statistics in addition to more consistent estimators (especially, Rural population, Openness, Log inflation). We provide a separate table in Appendix C where each additional control variable is added to the regressions in order of its number of observations. In Column 5 and 6 in Appendix C, where "average years of schooling" is added to the final models, coefficients on percentage of rural population, openness, and inflation turn significant in most cases, suggesting that the variations in income distribution are strongly associated with average years of schooling and that the four estimators share significant amount of information.

We now focus only on the full models in Column 5 under the same Table 2.4. As mentioned in the methodology section, we utilize F-statistics from first stage regression to determine if our instruments are good predictors of aid, and Hansen J's statistics of excluded instruments to evaluate the overidentification restriction. The F-statistics from first stage regressions are all exceed the rule of thumb level of 10, suggesting that our excluded instruments—log of population and the regional dummies—are good predictors of aid level. However, if we examine Hansen's J statistics, the tests do cast some doubts on the validity of instruments due to its low power. Therefore, we need to interpret our coefficients with caution.

In Table 2.4 under Column 5, the aid coefficients in Q1 and Q2 regressions are negatively and significantly different from zero at the 1% and 5% significance level, respectively. This indicates that an increase in aid to GDP by 1% decreases the share of income captured by the lowest two quintiles by 0.15% and 0.08%, respectively, holding other things constant. In contrast, a 1% increase in aid to GDP increases income share of the top quintile, Q5, by 0.27%, consequently widening the gap between the rich and poor, Gini coefficient, by 0.46%, all else constant. The coefficients are significant at the 5% and 1% level, respectively. The results are consistent with most theoretical and empirical studies examining the effect of aid on income inequality and with our hypothesis 1 arguing that the poor are not the main beneficiary of aid and that aid increases income inequality in receiving countries. However, we do not have enough evidence to make any claim on the impact of aid on quintile 3 and 4.

If examining the results from an institutional standpoint, none of the variable *Institutions* is significant, except the negative and slightly significant coefficient in Q4, suggesting that income share of Q4 decreases as institutional quality increases (Table 2.4, Column 5 under Q4). If quintile 4 is the rich population as we categorized, the result is consistent with what we expected, in particular that the rich capture a smaller share of income in better institutions. However, we notice that the fourth quintile (Q4) moves concurrently with the lower three quintiles (Q1 through Q3), somehow suggesting that quintile 4 is not the rich. If so, the negative sign on *Institutions* in Q4 regression is

contradictory to what we would expect. In any case, though, the result is only significant at the 10% level.

Next, we move to the last column (Column 6) where we introduce the interaction term, *Aid*Institutions*, to test hypothesis 2 and 3. The sign and significance of all variables remain intact for the most part after adding the interactive terms. Also, if we consider only results with significant *Aid* coefficients (Table 2.4, Column 6 under Q1, Q2, Q5, and Gini), the signs on our variable of interest, *Aid*Institutions*, are all as expected—positive in regressions on Q1 and Q2 and negative in those on Q5, and Gini coefficient. All these signs suggest that if given to countries with better institutions, aid would reduce the income share of the lowest two quintiles (Q1 and Q2), increase the income share held by the top quintile (Q5), thereby, increasing the gap between the rich and the poor (Gini coefficient) by *smaller* magnitudes. Unfortunately, none of the coefficients are significant, indicating that we acquired the sign we expected but do not have enough statistical evidence to support our main hypothesis arguing that institutions play a role in aid distribution[12]. These results are in line with a study by Chong et al. (2009) who also find that the impact of aid on income inequality is not conditional on corruption level in recipient countries. Later in our analysis, we will restrict the sample and check if any outliers drive our results.

Turning to other control variables in Column 6 under Table 2.4, we see a strong support for the Kuznets curve. The coefficients on log of GDP per capita and its squared term are highly significant in all cases. The results suggest that in the early stage of development, the income shares of the lower four quintiles decrease as GDP increases. Until a later stage of development (after reaching a turning point), the income shares of

[12] We run regressions of the impact of aid and institutions by using each institutional component (i.e. corruption, bureaucratic quality, and the rule of law) in three separate regressions. The results are largely consistent with those using institutional index constructed by the Principal Component Analysis. We present the results in Appendix D. We also estimate regressions using the three institutional variables (without constructing an index) in the same regression and examine if they are jointly different from zero. We present the results in Appendix E. The results are very similar to the baseline regressions. Specifically, aid decreases the income shares of Q1 and Q2, but increases that of Q5, thereby widening income inequality. Also, none of the coefficients on institutional variables and the interaction terms is statistically significant from zero, except that on bureaucratic quality (Column 1 under Q4 in Appendix E). The p-values of the joint tests of corruption, bureaucratic quality, and the rule of law are not significant, except those of Q4 and Gini coefficient which are significant at the 5% and 10% level.

the four quintiles start to grow as GDP grows. Conversely, the richest population (Q5) enjoys a larger income share as the economy grows in the early stage; and, as a consequence, the Gini coefficient follows the same inverted U-shape pattern.

Table 2.4 also indicates that countries whose population acquires more years of schooling have significantly higher income share captured by the lower four quintiles. Both the magnitude and significance of the effects are generally strong. To be precise, an additional year of schooling increases income share of Q1 through Q4 in between 0.16% and 0.34%. On the other hand, the effect of percentage of rural population on income distribution is less prevalent. The coefficient on rural population is positive and significantly different from zero only in regressions on Q3 and Q4, indicating that income shares held by Q3 and Q4 tend to be larger for countries with higher percentage of rural inhabitants. The results are in contradiction to those found by Bjornskov (2010) and our expectation. Despite so, the coefficients are significant at the 5% level and the sizes are fairly small.

On the effects of trade openness, Table 2.4 suggests that only those who are already better-off (Q5) take advantage of trade openness, while the rest of the population (Q1 through Q4) hurt from the policy. The findings are in line with the general argument and some previous studies such as Barro (2000) and Martinez-Vazquez et al. (2010). Yet, the magnitudes of the effects are not at all large, so do the strength of the effect. Similarly, the lower four quintiles seem to bear the most hardship during high inflation which is reflected through negative coefficients on inflation in regressions on Q1 through Q4. The statistical significance though is at the 5% level in most cases.

On survey type, Table 2.4 shows that income inequality varies depending on whether the data is based on income or consumption surveys. Positive and highly significant coefficients on variable “survey type” from Q1 through Q4 indicate that consumption-based surveys display significantly higher income share held by the first through fourth quintiles, and a lower income share held by the top quintile. In other words, income inequality is significantly smaller when survey data is based on consumption rather than on income; the case is mainly attributable to the ability of the wealthy in hiding their income and savings in consumption-based surveys (Bjornskov,

2010). The finding is consistent with other empirical studies (see, for example, Bjornskov, 2010; Martinez-Vazquez et al., 2010).

The estimates above are based on the full sample. In this later analysis, we restrict the sample and confirm whether the findings on our variables of interest, *Aid* and *Aid*Institutions*, hold. This study follows some of Bjornskov (2010) robustness checks, which include: (1). using only data from surveys with quality better than 4 in order to keep the results clear of dubious observations; (2). keeping only data with the income share of top quintile less than 60%; (3). limiting aid volume to normal amount of 1% to less than 30% of GDP; and (4). restricting sample to low and lower-middle income countries only, where income dynamics can be different than those of the upper-middle and high-income countries. Table 2.5 presents results from each sample restrictions in Panel A through Panel D respectively. Column 1 under each dependent variable shows results of the full models *without* the interactive term, whereas Column 2 presents those *with* the interaction term, *Aid*Institutions*.

Results from our full sample above suggest that aid reduces income share captured by the poorest two quintiles to favor that of the top quintile, thereby widening inequality gap. In Panel A and Panel B, where we restrict the sample by survey quality and income held by the top quintile, the results from our main analysis hold. In addition, none of the coefficients on *Aid*Institutions* is significant, except in regression on Q4 under Panel A where the coefficient is negative. The result suggests that the effect of aid on Q4 in countries with *better* institutional quality is *lower* than that in poorer ones. However, the coefficient is significant only at the 10% level. Note also that the number of observations in these two panels is not much different from that of the full sample, which may partly explain why the results do not alter by much.

Nonetheless, even in Panel C and Panel D, where the sample size reduces by almost half from that of the full sample, the results still support the main findings that aid has an inequality increasing effect. In addition to the negative effect of aid on the lowest two quintiles, we see some evidence of the same effect of aid on income share of quintile 3. Similarly, the interactive terms, *Aid*Institutions*, are not significant in all, but in Q4 under Panel C, suggesting that aid reduces income share of quintile 4 by more if giving to

countries with better institutions. The finding is contrary to our hypothesis if Q4 is not the rich as discussed above. Like in Panel A though, the coefficient is only slightly significant at the 10% level.

Overall, the results from our main sample hold true in all panels. Specifically, an increase in aid as a percentage of GDP reduces income shares of the lowest two quintiles (and the third quintile, in some cases), but increases that of the top quintile, thereby increasing the gap between the rich and the poor. Similarly, the evidence does not indicate any different effect of aid on income distribution given different institutional environment, which is contrary to our main hypotheses.

Next, we move on to examine the effects of tied and untied aid on income distribution and explore whether institutions play any role in the effects; Table 2.6 and 2.7 present the estimates accordingly. As in the preceding table, we present our results the same way—Column 1 and 2 show results *without* and *with* the interaction term, *Aid*Institutions*, respectively. Here, we use the full sample without any restrictions. As Column 1 in Table 2.6 illustrates, an increase in tied aid as a percentage of GDP decreases income shares of Q1 through Q3 and favors income distribution toward Q5, and again, widening income inequality. The coefficients are highly significant at the 1% significance level, except that in Q3. Indeed, the results go against our expectation that posits the belief that tied aid is less flexible in the allocation, hence less prone to moral hazard, allowing the poor to benefit more from it.

The main reason why tied aid does not increase income share of the poor as expected is probably related to the underlying nature of some aid efforts, which are categorized as social programs but not necessarily target the poorer population. In particular, even though aid tied to productive sectors, such as infrastructure or education, it does not guarantee that the main beneficiaries are the poor. For instance, despite marked as education and health aid, higher education or tertiary health would not benefit the poor much compared to primary education or basic healthcare. Indeed, Gupta, Davoodi, et al. (2002) argue that the well-connected actually lobby government to favor these higher education or tertiary health sectors, through which the upper income group can enjoy more benefits. Other examples of tied aid that do not benefit the poor include:

the building of major water treatment facilities to supply clean water not to areas where the most needy and vulnerable live; the construction of hydroelectric dam to supply power to the already well-off urban neighborhood; or the building of airport that benefit mainly the richer population.

Furthermore, from an institutional standpoint, none of the coefficients on *Institutions* is significant, but that on Q4, indicating again that income share of Q4 is significantly smaller in countries with better institutions, though only at the 10% level. Concerning the conditional impact of tied aid on institutions, we expect that tied aid can reach the poor more in better institutions. However, in Column 2 where *Tied aid*Institutions* enters the model, we see the same pattern of the effect as in Panel A of Table 2.5—institutions is generally not important in tied aid distribution, except for quintile 4.

Table 2.7 indicates untied aid has the same effect as aggregated and tied aid on income distribution. Thus, neither tied nor untied aid favors the poor. Interestingly, though, if we compare the magnitude of the effects of tied aid (Table 2.6) and untied aid (Table 2.7) on income distribution, the coefficients on tied aid are smaller than those on untied one. For instance, while a one percent increase in tied aid to GDP reduces income share of the poorest quintile by 0.36% (Table 2.6, Column 1 under Q1), an increase of the same amount of untied aid to GDP reduces the share of income by up to 0.52% (Table 2.7, Column 1 under Q1). Therefore, while both aid types have adverse effects on the income share of the poor, tied aid seems to carry less negative effects, which is partly consistent with our expectation. On the interactive term, similar to previous cases, none of the coefficients on *Untied aid*Institutions* (Table 2.7, Column 2), are significant, signifying again that institutions do not have a role to play in aid distribution.

Taken together, aid does, in fact, reduce income share of the poor, favor the rich, and increase inequality in recipient countries as hypothesized. The findings are very much consistent with those from previous studies. However, we do not have any evidence to support our main hypothesis arguing that the poor benefit more from aid in countries with better institutions. The same conclusion applies to both tied and untied aid. Several reasons could be attributed to the findings in our study, those include:

First, the richer population might have greater advantage than the poorer one in reaping the benefits generated by aid. Particularly, in developing countries where the richer population is usually more equipped with better education, network, and other resources, chances are the group is more likely to have the opportunity to participate and enjoy aid inflow. The case can be even more pronounced when a large sum of aid resources are not directly provided from donors to the poor, but to the national system.

Second, as briefly mentioned in Section 2.2.3, according to the aid allocation literature, donors are not purely altruistic, but self-centered and practice their aid giving under different agendas and motivations (Alesina & Dollar, 2000; Clist, 2011; Harrigan & Wang, 2011). Indeed, many argue that donors are more likely to focus their aid giving on strategic or political interests. Accordingly, they use aid as a tool to buy support from the political elites who hold the voting power (for literature on aid as a vote buying tool, see Dreher, Nunnenkamp, & Thiele, 2008b; Dreher & Sturm, 2012; Fink & Redaelli, 2011). Additionally, this study cannot detect any discernible negative effect of poor institutions in aid distribution possibly due to another aid-giving motive that partially redirects aid resources back to donor countries. Specifically, donors with commercial interest can either tie aid back to their account through requirement of procurement of goods and services or favor only projects with high commercial benefits. In such cases, aid is less likely to be designed for the poor, explaining why recipient's institutions play no role in the distribution of aid.

Third, as Herzer and Nunnenkamp (2012) and McGillivray et al. (2011) contend, aid agencies sometimes have the incentive to bypass the poor. As the agents to taxpayers in donor countries, aid agencies are under pressure to prove success, mostly short-term. They thus have more incentive to allocate their aid money to projects with higher chances of immediate success. Accordingly, they choose a location of their activities in less difficult environments, which generally are not the areas with the most needy population. In that respect, regardless of how good recipient institutions are, aid cannot benefit the poor more.

Fourth, the channels of aid delivery can pose as another possible reason why we cannot detect the role of institutions in the aid distribution. Before aid gets to the final

beneficiary in the form of goods and services, aid resources go through a chain of delivery systems starting from taxpayers in donor countries, to bilateral aid agencies, to intergovernmental organizations, to recipient governments or international NGOs, and to local NGOs. This chain does not count for private-sector firms carrying out aid contracts (Werker & Ahmed, 2008). The multiple layers of the chain causing remarkable fragmentations, hence high overhead costs, coupled with the proclaimed ineffective aid modalities such as technical assistance (Easterly & Pfutze, 2008), suggest that only a certain amount of aid money is actually reaching the intended beneficiaries. Just like what Werker and Ahmed (2008) state "How many dollars from the initial transfer actually reach the final beneficiary is anybody's guess" (p. 88).

Last but not least, we cannot detect the impact of institutions in aid distribution possibly because the study is plagued by much noise at a macro level. As illustrated in Section 2.2.2, mounting evidence from case studies and project level exploratory survey work have shown that corruption, quality of bureaucracy, and the rule of law indeed have the power to change the course of aid distribution. Failing to find any significant role of institutions at this macro level may render directions for future studies toward a more micro one.

2.5 Conclusion

This essay studies the impact of aid on income distribution with the central focus on the role of institutions. Employing data for 85 countries from 1960 to 2004, our results suggest that aid has a negative effect on income shares captured by the lowest two quintiles, but positive one on that of the rich, which ultimately widens inequality gap. To this extent, the results are very much consistent with previous studies of the impact of aid on income distribution. Note, however, that the results do not suggest in any way that aid makes the poor poorer; all the study finds is aid leads to relatively smaller income share of the poor, or the poor benefit the least from aid. Also, the same findings can be applied to both tied and untied aid. While exploring the effect of aid on income distribution, we

also argued that good institutions would divert more aid money towards the poor. Unfortunately, we do not find any evidence to prove that this is the case.

Beside the ability of the rich to capture more benefit from aid, we attribute our findings to several other causes, one of which is the donor's motivation in giving aid. When donors are not altruistic and use aid mainly for political purposes or self-interest, aid is initially not designed with the poor in mind, making them the least beneficiary under any circumstances; be it in good institutions or not. Both donors and recipient governments should be concerned about the findings (i.e., aid decreases the income shares of the poor and increases inequality), especially given the whole premises, or at least the hope, that aid giving is for poverty reduction. Even if aid can increase the overall living standards in recipient countries, the increasingly wider gap between the rich and the poor can bring about social unjust that can sometimes leads to social unease.

The results thus call for increase accountability on both the donor and recipient sides, specifically with respect to aid delivery, design, and better targeting. One way of overcoming the issue of aid delivery is for donors to allocate more funds to agencies that work closely with those who often understand the poor's needs and constraints the most. The results also suggest that the wide perception that aid serves the poor more in good institutions may not be as compelling as was thought. This study does not suggest in any way that institutions are irrelevant, hence should be ignored. While donor's motivation seems to play a larger role here, the effect of institutions may possibly not be detectable at a macro level. If we explore how institutions affect the distribution of aid at project/local level, we might be able to see a clearer picture of the importance of institutions in aid distribution.

CHAPTER 3

THE IMPACT OF FOREIGN AID AND INSTITUTIONS ON HUMAN WELFARE

3.1 Introduction

Since its inception in 2000, the Millennium Development Goals (MDGs) have become a widely accepted yard stick to measure development progress across the globe. Achieve universal primary education, improve maternal health, reduce child mortality, combat HIV/AIDS and other diseases are among the eight goals of the MDGs to be reached by the year 2015. A list of selected indicators has also been put in place to monitor the progress of each goal. The latest report on the MDGs shows that significant and substantial progress has been made in reaching some targets. Generally, the success of the progresses is by and large inconsistent: some indicators are enjoying positive and promising results, while others are still lagging behind. Disparities between rural and urban gaps, between countries, and even regions are another concern. Among all targets, health seems to be an area highlighted by some successes, such as a decline in new HIV infection, a drop in under-five and maternal mortality rates by 41percent and 47 percent over the past twenty years (respectively), and remarkable accomplishments are occurring in the global fight against malaria and tuberculosis (United Nations, 2013). Some improvements in education are also noticeable even though they seem to be occurring at a slower pace than the health sector. The story, however, tells us little about whether development assistance is attributable to these positive changes.

Undoubtedly, the international donor community has committed and increasingly provided more aid to developing countries to reach the MDGs by the soon approaching

deadline; until only recently this upward trend has been interrupted by tight national budget on the donor's side. The increase in the provision of aid, coupled with an on-going effort to enhance the effectiveness of development assistance, has motivated much empirical research to explore whether aid has been successful. The focus of the literature has long been on the impact of aid on economic growth. Only recently has the shift occurred from examining the growth impact of aid to exploring its impact on human development. Certainly, aid can benefit recipient countries in many ways other than through its impact on monetary outcomes, such as health, education, sanitation—simply put *quality of life* or *human welfare*—all of which are integrated within the MDGs and are arguably more important than monetary outcomes. Additionally, the quest to examine the effect of aid on welfare outcomes is even more important when health and education are noticeably the two sectors that have enjoyed constant and generous aid.

At the same time, aid literature has also increasingly recognized the importance of institutions in aid effectiveness mainly because institutions provide not only a conducive environment in which things can operate effectively, but institutions can also have the potential to determine the use of public resources. Since aid is a form of public resources funneled through the recipient government, the government's institutions can clearly play a crucial role in the process of converting the resources into goods and services, some of which are health and education. The importance of these institutions is even more substantial when billions of aid dollars are transferred directly to the government for distribution annually (Moyo, 2009). Institutions encompass different dimensions, among which corruption in government, bureaucratic quality, and the rule of law are the focus of this study. The three components feed each other and constitute an environment that can either facilitate or impede the very effort of aid to improve human welfare.

Corruption can siphon off aid money or redirect the resources from productive expenses that work to improve quality of life (e.g., health and education), to nonproductive ones (e.g., military). Corruption is arguably an important aspect of the recipient government's abilities to allocate and manage aid resources effectively. Similarly, bureaucratic quality, which signifies the quality of service provision and competency of civil servants, is another indicator of aid success or failure at the implementation stage, particularly because recipient governments are often the main

projects/programs implementers. Health and education outcomes are directly related to the quality of health professions and teachers, but in many developing countries these two professionals are often under-qualified and underpaid. Shirking, absenteeism, lack of training, and limited professional ability among public officials are not uncommon in countries where bureaucratic system has a low accountability. Each of these can lead to ineffective service provisions and losing of public confidence in the system, undermining aid intervention in enhancing recipient welfare.

Weak rule of law is a major cause leading to rampant corruption and public accountability failing in many developing countries. Allegedly, the rule of law provides institutional checks on government and is supposively effective in monitoring the corruption and punishment of dishonest officials. When such a supervisory body is fragile, however, the authority can use aid resources inefficiently by redirecting funds towards its unintended use, or diverting it for personal gain without the fear of being caught or even prosecuted when caught. In that sense, a strong rule of law is greatly needed to provide proper monitoring and accountability. In this study, we argue that aid is more effective in improving recipient's welfare if given to countries with better institutional quality.

The relationship between foreign aid and human welfare also depends on the mechanisms through which aid is absorbed (Chatterjee & Turnovsky, 2007). Development aid flows into recipient countries in different shapes and forms, so its transmission channels affects welfare. Generally, aid is thought to supplement domestic resources in boosting investments, thereby enhancing growth (Asiama & Quartey, 2009). If aid affects growth and growth in turn affects human welfare, we can postulate that aid has an indirect effect on welfare through growth. Additionally, aid can affect welfare by influencing the composition of public expenditure that mainly contributes to improving social sectors. The expenditure is usually known as pro-poor public expenditure (PPE). Finally, aid affects welfare directly through the work of Non-Governmental Organizations (NGOs) whose efforts involve improvements in health, education, and sanitation at the local levels. To further extend our understanding of how aid works, this study also takes into account its transmission channels, mainly the direct and the PPE channels.

Research Questions

In this study, we therefore ask two important questions:

1. Does aid increase human welfare in recipient countries?
2. What is the impact of institutions on the effectiveness of aid on human welfare? Specifically, does the effect of aid on welfare conditions on recipient countries' institutions?

Possible Contributions

The potential contributions of this research to aid effectiveness literature are three fold:

First, the literature of aid effectiveness has been overwhelmingly taken up by the impact of aid on economic growth. Only recently have aid scholars turned their focus to studying the effect of aid on other outcomes. Among those outcomes, human development is receiving growing attention. In that respect, this study adds to the relatively underexplored, yet growing, literature on the impact of aid on human welfare.

Second, as an extension of existing aid and welfare literature, this study explores the importance of institutions on improving aid effectiveness. Most aid effectiveness studies are not concerned with recipient countries' institutional quality, and they do not seem to take into consideration the importance of institutions in shaping and determining how aid can possibly work best. Even when researchers consider institutions as conditional aid effectiveness, they only examine a narrower aspect of institutions separately, that is, democracy or corruption. In particular, in conducting a literature review, we have not been able to locate any study that conditions welfare effectiveness of aid on various aspects of institutions (i.e., corruption in government, bureaucratic quality, and the rule of law) as we do in this study.

Third, while most studies focus on two indicators of welfare (i.e. Human Development Index (HDI) and infant mortality rate), this study disaggregates HDI to include its subcomponents of health and education indicators. The advantage of

disaggregating HDI allows us to examine not only the effectiveness of aid at aggregate level, but also to elucidate the specific improvements at sectoral level, which can be varied under different institutional settings. In addition, the research also studies the effect of aid by source, i.e. bilateral and multilateral aid, broadening its contribution to the literature.

Structure of the Essay

The rest of the research is organized as follows: Section 3.2, presents relevant literature which includes studies of the impact of aid on human welfare and the impact of institutions on welfare upon which we build our hypotheses. While reviewing the literature, the section also takes into account the channels through which aid affects human welfare. Section 3.3 introduces the model, methodology, and describes the data. Section 3.4 discusses estimation results, which is followed by the conclusion in Section 3.5.

3.2 Literature Review

Much of the literature on aid effectiveness focuses on its macroeconomic impact, such as its impact on economic growth, savings, and investment. In particular, the literature places heavy emphasis on growth. The earlier studies on the effectiveness of aid on growth yielded inconclusive results. Some find aid stimulates growth, while others find the contrary. Given the inconclusive nature of these earlier studies, much of the later research has focused on the conditions that might be crucial to aid effectiveness. Burnside and Dollar's (2000) influential, yet controversial study concludes that aid accelerates growth in countries where good policies are in place, but on average, aid has little impact on growth. Even though the results have created much debate among researchers in the field, the aid literature increasingly focuses on the conditions, if any, under which aid works. This emerging research suggests a non-linear relationship between aid and growth.

Kosack (2003) extends conditional aid and growth research as he focuses on aid's effect on the quality of life or human welfare. He adopts the cross-country growth regression approach by replacing the growth impact of aid with the welfare impact of aid and uses democracy as an institutional condition to aid effectiveness. Using Two-Stage Least Squares (2SLS) on a group of 48 countries from 1974 to 1985, the study finds that aid combined with democracy improves quality of life, proxied in the study by the Human Development Index (HDI). Since then, the aid literature seems to ignore the welfare effect of aid conditional on institutions.

In a recent study, Dietrich (2011) explores a similar effect, but focuses on the conditioning effect of corruption on aid effectiveness in health sector. Instead of grounding his argument on the role of institutions, though, Dietrich (2011) utilizes a strategic compliance basis arguing that corrupt leaders actually have incentives to use aid effectively in some sectors. He maintains that corrupt recipient governments are more likely to comply with donor objectives in sectors that incur the cheapest compliance costs (for example, the health sector). Specifically, health aid is often implemented alongside other Non-Governmental Organizations (NGOs) and multinational agencies, making it less susceptible to corruption as compared to other sectors like transportation, energy, and mining, where corruption can be lucrative. Cheaper compliance costs in health aid thus lend itself for corrupt leaders to forgo this sector to meet with donors' objectives, thus maintaining aid inflow. Studying the effect of health aid on immunization rates in 64 developing and transitioning countries from 1994-2004, Dietrich (2011) finds that aid is more effective in increasing immunization coverage in countries with poorer institutions. The result is highly robust to many specifications. Other than Kosack (2003) and Dietrich (2011), the literature on conditional aid and welfare is lightly addressed.

In the area of literature about aid effectiveness on human welfare, most scholars focus on monetary welfare indicators. Those indicators include the headcount index, the percentage of population living under $1 or $2 a day, and the percentage of people living below the national poverty line (see, for example, Alvi & Senbeta, 2011; Chong, Gradstein, & Calderon, 2009; Garces-Ozanne, 2011). However, some argue that these monetary welfare indicators cannot measure the true quality of life that people have. For

instance, Gomanee, Morrissey, Mosley, and Verschoor (2005) ask whether those who earn more than $1 a day but have no access to any social service facilities are better off than those who earn less than $1 a day but have sufficient access to the provision of basic healthcare, education, and other social services. Their argument is extreme because those living at the subsistence levels also have very low access to basic social services. Yet, it is still justifiable that non-monetary welfare is of higher value and preferable than the monetary ones. Thus, investigating the impact of aid on non-monetary welfare in recipient counties can be even more worthwhile, particularly when non-monetary welfare is another measurable outcome of aid. Of the already limited literature on how welfare effect aid, we only find a small number of studies that focus on the non-monetary welfare indicators such as the Human Development Index, life expectancy, infant mortality rate, child mortality rate, and primary enrollment/completion rate.

Interestingly, the literature also brings to the discussion how aid affects welfare. Many scholars, such as Alvi and Senbeta (2012), Mosley, Hudson, and Verschoor (2004), and Mosley and Suleiman (2007), to name a few, criticize the idea that growth is the only channel through which aid affects poverty/welfare. In particular, since a majority of aid provided can have a more direct impact on welfare than through growth, evaluating the effectiveness of aid based only on the growth may underestimate the actual effectiveness. Accordingly, one of the first to tackle the issue, Gomanee, Morrissey, Mosley, and Verschoor (2003) take into account other aid channels in their empirical work. One of the channels is aid's direct impact such as donor-funded projects to Non-Governmental Organizations (NGOs), whose work involves health, sufficient sanitation, and education. Another channel, arguably a more important one, is through financing government expenditure. A large part of foreign aid is used to finance government expenditure. If the expenditure affects welfare, aid then influences welfare outcomes through its effect on the composition of public expenditure.

Needless to say, not all types of government expenditure go toward improving human welfare. The literature has identified "pro-poor public expenditure" (PPE), or social sector spending by some (Gomanee, Morrissey, Mosley, et al., 2005; Mosley et al., 2004; Pettersson, 2007b), to be important in increasing the welfare of the poor because

they can potentially get access to healthcare and basic education through these kinds of spending. Using Three-Stage Least Squares (3SLS) and Generalized Method of Moments (GMM) estimation techniques for a sample of 34 countries from 1980 to 2000, Mosley et al. (2004) find that aid improves welfare, proxied in their study by poverty headcount and infant mortality rate, through its effect on pro-poor public expenditure.

Even though Asiama and Quartey (2009) do not explicitly specify the channel through which aid affects welfare, the types of aid examined in the study imply the direct and indirect channel of the impact. Asiama and Quartey (2009) explore the effectiveness of bilateral, sectoral, and program aid on increasing HDI and infant mortality in 49 Sub-Saharan African countries. Sectoral or project aid affect welfare directly, whereas program aid complements public expenditure affects welfare through social spending. They find that aggregate aid does not have any significant impact on human development indicators, but when disaggregating aid into project/sectoral aid and program aid, these specific aid types have positive and significant impacts on HDI, but not infant mortality rate. They thus suggest that aid should be targeted for the specific sectors that have proven to be the most effective. Indeed, when studying the effectiveness of aid in poverty reduction using a sample of 39 developing and transitional economics from 1980 to 2002, Mosley and Suleiman (2007) find aid allocated for agriculture, infrastructure, and education is more effective in reducing poverty headcount and infant mortality rate.

In a similar vein, Verschoor and Kalwij (2006) also present the positive effects of aid. Specifically, they find that aid not only tends to increase the share of government expenditure on social sectors in recipient countries, but it also increases the responsiveness of infant mortality rate to economic growth. That is, economic growth in countries receiving a higher amount of aid tends to reduce infant mortality at a faster rate than the growth in countries receiving less aid. Even though the impact of aid on the responsiveness of infant mortality to growth is not the impact of aid on infant mortality rate per se, the results signify a positive effect of aid. The result in Verschoor and Kalwij's (2006) study does not come without any drawbacks, though. Since part of aid complements public sector spending, there appears to be a potential double counting of aid amount in their social service expenditure. In order to avoid this drawback, our study

adopts the method employed by Gomanee, Morrissey, Mosley, et al. (2005), which takes out the aid component from public sector spending.

To remove the aid component from pro-poor public expenditure (PPE), Gomanee, Morrissey, Mosley, et al. (2005) calculate the residual of PPE, which is a function of foreign aid. By using a PPE residual, the study finds that aid actually does not affect welfare through PPE because regardless of whether they include PPE in their models, aid significantly works to improve human welfare by increasing HDI and lowering infant mortality rate. On the contrary, in their unpublished article, Gomanee et al. (2003) find a different result—aid works *only* through PPE to improve welfare. What is notable about the main difference between these two studies is the size of their samples (38 countries from 1980-1998 in the working paper version as opposed to 104 countries from 1980-2000 in the published one). Thus, as also noted in Pettersson (2007a, 2007b), the results appear to be sensitive to the sample chosen. Notwithstanding the contradiction in their two studies, both results suggest that aid improves recipients' quality of life.

With respect to the effect by country groups, Gomanee, Morrissey, Mosley, et al. (2005) find that aid is more effective in low-income countries than in middle-income countries. This finding is in line with that found in their extended research Gomanee, Morrissey, and Girma (2005). Specifically, using the same countries' sample and time frame but employing quantile regression for the estimations, this later study also finds aid to be more effective in improving HDI and reducing infant mortality in countries with lower levels of human development.

Employing the same method of stripping out aid from PPE to study aid fungibility, another field of aid literature, Pettersson (2007b) finds that aid contributes to reducing infant mortality through PPE, though the result is not robust to small changes in model specifications. In another study, though, Pettersson (2007a) does not take out the aid component from PPE, and he finds aid reduces child mortality only in democracies.

Contrary to most work above, Boone (1996) finds no evidence that aid affects infant mortality rate, primary schooling ratio, or life expectancy. However, Gomanee, Morrissey, and Girma (2005) criticize Boone's (1996) findings on the grounds that the

study is based on "inappropriately specified regressions" because aid might not have any direct impact on welfare but through the mechanism of public expenditure (p. 300). Similar to Boone (1996) though, Williamson (2008) findings support the ineffectiveness of foreign sectoral aid on human development. One of the first to examine health aid on its corresponding health outcomes, Williamson (2008) finds that health aid does not exhibit positive results on infant mortality rate, life expectancy, death rate, and immunizations (DPT and measles). Her findings are robust to various sensitivity checks.

Wilson (2011) joins the faction who claims that aid is ineffective. Using different estimation techniques (i.e. the dynamic panel model, GMM, and the latent growth model) on a sample of 96 high mortality rate countries from 1975-2005, Wilson (2011) finds that health aid does not reduce infant mortality rate. In fact, most of health aid coefficients in his study are not only insignificant, but also positive, which is not the correct sign. He contends that possibly the "too small" level of health aid is the reason why it is so difficult to see any notable effects in aggregate measures (p. 2040). Yet, the study finds some optimistic results, but in a small magnitude, of the effectiveness of sub-sector health aid such as those for family planning and for fighting against HIV/AIDS. Of the few studies examining health aid, only Mishra and Newhouse (2009) reach a positive conclusion that more health aid results in lower infant mortality rate. The magnitude of the effect though is very small, e.g. doubling health aid per capita from $1.60 to $3.20 leads to a reduction of roughly 1.5 infant deaths per 1,000 live births. With that small impact, Mishra and Newhouse (2009) emphasize that it would require an increase of 15 folds of the current health aid amount in order to reach the MDGs targets by the soon approaching deadline.

With respect to education aid, Christensen, Homer, and Nielson (2011), who disaggregate aid by type, do not find the effectiveness of aggregate primary aid for primary education, but do find that bilateral primary aid is highly and statistically significant in improving primary school enrollment rate in receiving countries. Similarly, studying the effectiveness of aid at sectoral level, Michaelowa and Weber (2007), also find that education aid is effective in increasing primary education, as measured by net enrollment rate and primary completion rate. However, the magnitude of the impact is

minimal; for example, an increase in education aid of 200% increases completion rate by merely 2.5 percentage points. The results of which is also shared by Dreher, Nunnenkamp, and Thiele (2008a) who find a positive, though small, relationship between education aid and primary school enrollment. Despite small effect, insofar as aid improves education outcomes, it may in fact contribute to bettering human development overtime.

With a few exceptions of the studies that find the ineffectiveness of aid, especially at the sectoral level, the empirical literature has provided a somewhat coherent finding that aid is effective in advancing the quality of life in recipient countries. Drawing from the literature, thus we can construct our hypothesis as below:

Hypothesis 1: An increase in aid increases human welfare.

Even though the aforementioned literature draws a conclusion that aid is effective in increasing HDI, reducing infant mortality rate, bringing more children to school or keeping them in school, generally the magnitude of the end product is minimal, especially when taking into consideration the billions of dollars allocated every year to recipient countries' accounts. That aid has too few results is attributed to many setbacks in recipient countries, in particular its poor institutional quality. Despite the aid literature repeatedly arguing for, only a dearth of empirical studies actually examine the interplay between aid and institutions on welfare outcomes. Beside the abovementioned two studies, Kosack (2003) and Dietrich (2011), who use democracy and corruption as institutional aspects, respectively, little is known of the connection between aid, institutions, and human welfare. Building on Dietrich (2011) in particular, we focus on a broader concept of institutions, i.e. corruption, the rule of law, and quality of bureaucracy. In the rest of this section, we will discuss how institutions play a role in linking aid and human welfare upon which we construct our main hypothesis.

Two main components constituting human development indicator (health and education) are regularly receiving a large sum of development aid compared to other sectors. However, the aid effort is unlikely to reach its full potential of advancing the

quality of life when channeling to a system often characterized by corruption, low quality of bureaucracy, and weak rule of law. The importance of recipient institutions is even more pronounced when billions of aid resources are transferred directly to the system (Moyo, 2009). Indeed, there is no shortage of anecdotal evidence of how aid funds is being misused or captured. For example, in a corruption scandal in one low-income country, a local newspaper accused the government of misappropriating US$50 million of aid funds in health sector; the health ministry then accused the newspaper of overstating the incidence by defending that the funds was not misappropriated in one year, but over a period of three years (Filmer, Hammer, & Pritchett, 2000).

Clearly, rampant corruption is especially the main concern in many developing countries. As Mosley et al. (2004) contends, corruption leads to leakages of aid funds at different stages before reaching the intended targets. The most prevailing act of corruption is direct stealing of aid resources such as the selling of medicines funded by aid money in black market (Easterly, 2006), the siphoning off non-wage education funds in Uganda leaving just roughly 30% of the expenditures to local facilities during 1991-95 (Ablo & Reinikka, 1999), or the missing of roughly 80% of school entitlements from the Ugandan central government in 2001 (Reinikka & Svensson, 2003). Because part of foreign aid is financing health and education through recipient governments, any misuse or private capture of the resources at the implementation stage can surely lower the impact of aid on improving the health and education conditions in recipient countries. Conversely, any endeavors to control corruption can lead to better health and education results.

The aid studies that explore the effectiveness of aid in the health and education sectors also find that curbing corruption can lead to higher welfare results. For instance, Mosley et al. (2004) find that corruption control significantly reduces infant mortality rate and increases pro-poor public expenditure (PPE—the expenditure category believed to have the utmost potential to improving human welfare discussed earlier in the section). The same result is shared by Dietrich (2011), who finds a positive effect of corruption control on increasing the immunization rate. Likewise, in the education sector, Christensen et al. (2011) find the same encouraging result of corruption control on

primary school enrollment in a sample of 63 aid receiving countries. The results in the above studies are mostly highly significant at the 1% level.

Even though the empirical literature that exclusively examines the causal relationships between corruption and welfare outcomes is relatively scarce, the findings from the literature cannot stress enough that corruption has dire consequences for social service provisions. Of the few studies implemented in this field, Gupta, Davoodi, and Tiongson (2000) explore the impact of corruption on various indicators of both health and education outcomes. Using Ordinary Least Squares (OLS) and Two-Stage Least Squares (2SLS) estimation techniques on data covers 128 countries for the period from 1985 to 1997, Gupta et al. (2000) find that an increase in corruption leads to higher rates in primary school dropout, higher percent of low-birthweight babies to total births, and more child and infant mortality. The results are largely statistically significant at least at the 5% level.

Similarly, Kaufmann, Kraay, and Zoido-Lobatón (1999), who study the relationship between governance and development outcomes find similar relationships between governance and welfare. Using 2SLS to control for reverse causality on a cross-sectional data for about 150 countries, Kaufmann et al. (1999) find that good governance leads to an increase in welfare by reducing infant mortality and raising adult literacy rates. In particular, an increase in one-standard deviation in governance leads to an increase between 15 to 25 percentage points in the literacy rate; the results are also favorable for infant mortality. Their governance index includes six indicators, two of which are government effectiveness (or quality of bureaucracy) and the rule of law. Furthermore, the evidence on the link between corruption and welfare outcomes also derives from studies within countries. Studying the effect of corruption in health sector in the Philippines using data from 80 local municipalities, Azfar and Gurgur (2008) find many adverse consequences of corruption, in particular corruption increases waiting time at public health clinics, lowers public satisfaction over public health services, discourages the use of the services, and finally it delays newborn vaccination and reduces immunization rate.

Besides affecting human welfare directly, corruption also affects other functions that work to support the aid efforts. For instance, aid for improved sanitation

implemented by NGOs would be slow or only partially successful if corrupt officials divert government resources away from relevant budget line deemed important for public sanitation (e.g., budget line for national campaign on sanitation awareness). Indeed, existing literature actually illuminates the role of corruption in the composition of public expenditure, in particular pro-poor public expenditure that supports welfare improvement. Among the studies, Mauro (1998) finds that an increase in corruption is associated with a reduction in government expenditure on education; he also finds similar bias against spending in the health sector. Because the majority of the population in developing countries relies mainly on government-provided education and health services, the reduction of government spending in these sectors may impede improvement in overall welfare.

However, even when the allocation on the health and education sectors is sufficient, the efficacy of the spending is another issue. As in the case of Uganda, the allotted education funds from the central government would not entirely reach its local facilities in the presence of corruption. Such misuse, mismanagement, and leakage of funds might explain why a large number of empirical studies find little, if any at all, evidence of significant effect of public spending on outcomes. In an earlier study, for example, Filmer and Pritchett (1999) explore the impact of health expenditure on its corresponding outcomes using cross-national data from 100 (both developing and developed) countries in 1990. They find that the share of health spending as a percentage of GDP is not a significant determinant of infant and under-5 mortality rates once different socioeconomic variables, such as GDP per capita, female education, income inequality, and ethno-linguistic fractionalization, are controlled for. The coefficients on health spending are numerically small, if not at all significant, at conventional level. Specifically, health expenditure explain less than one percent of the variance in both infant and under-5 mortality rates.

These results are also shared by McGuire (2006) who uses two cross-sectional datasets—46 countries in 1995/1996 and 94 countries in 1999—to study the relationship between spending and outcomes in the same health sector. McGuire (2006) finds no association between any healthcare spending indicators used in the study and under-5 mortality rate in both of his samples. Interestingly though, under-5 mortality rate is

strongly associated with programs targeting to reducing it, particularly to maternal and infant healthcare services. Other studies also support the weak contribution of public spending to welfare outcomes (see for example, Filmer et al., 2000; Gupta et al., 2000; Kim & Moody, 1992).

Of the many studies, only a few find that public spending matters. For instance, using OLS and 2SLS estimation techniques on a data for 50 developing and transition countries, Gupta, Verhoeven, and Tiongson (2002) find that an increase in education spending leads to higher education outcomes including higher primary and secondary enrollment rates and lower primary dropout rate, at the same time an increase in health spending is also associated with lower infant and child mortality rates. The results are robust to different specifications; however, the statistical significance is relatively weak at the 5% level at best.

The finding from Rajkumar and Swaroop (2008), who examine the interplay between institutions and spending on welfare, can undeniably provide some insights into explaining why the impact of health and education spending on outcomes is small if not at all significant. Using data for 91 countries over three years, 1990, 1997, and 2003, Rajkumar and Swaroop (2008) find that health and primary education expenditures at the margin are less effective in reducing under-5 mortality and primary education failure rates, respectively, in countries with poor institutions measured by corruption and bureaucratic quality. Since most aid recipient countries are characterized with poor institutions, that is, very corrupt with a low quality of bureaucracy, the results from Rajkumar and Swaroop (2008) can clearly depict how poor institutional quality limits the impact of health and education aid on its corresponding welfare outcomes.

Arguably, rampant corruption is a norm in many developing countries because weak rule of law allows corrupt officials to get away from being held accountable for their actions or even lets loose of the officials when get caught. Additionally, lack of proper institutional checks provides the government with the incentive to renege on their commitments (Haggard & Tiede, 2011), including those related to resource allocation. The aid literature focusing on fungibility suggests that recipient governments do in fact divert part of their own resource from sectors financed by aid to fund other sectors that donors do not intend for, which sometimes even work against the improvement of

welfare; for instance, a redirection from education to military spending (Feyzioglu et al., 1998; Khilji & Zampelli, 1994; Pettersson, 2007b). Some studies such as Devarajan, Rajkumar, and Swaroop (1999) and Chatterjee, Giuliano, and Ilker (2007) find only a portion of aid stays in the sectors it was initially financed for; thereby, providing an indication of how aid may be ineffective for countries with weak rule of law, low accountability, and transparency.

Along the same line, institutional capacity is vital to any provision of services. Because recipient governments are the aid implementing agencies, the capacity is especially relevant at the implementation stage. Even in cases when the governments are not the main projects/program implementers, they still work in close collaboration with other NGOs or donor agencies carrying out the projects. Clearly, health and education outcomes are directly linked to the service providers. In many developing countries, doctors, teachers, nurses, are often under-qualified and underpaid, which in many ways affect how aid is implemented. For example, in the case of HIV/AIDS intervention, lack of proper training of local healthcare providers to handle the somewhat complicated drugs, the intervention not only saved fewer lives than it promised, but it also lead to serious issue of drug resistance (Easterly, 2006). Similarly, the impact of health aid in the form of other medicines or vaccinations would not go very far if the providers lack incentive to clearly instruct and follow-up on patients. Also, poor government bureaucracy only works against the very effort of aid in providing basic care and bringing more children to school when healthcare providers receive bribes from patients or teachers collect illicit fees from students.

Finally, shirking, absenteeism, and lack of motivation among public officials often undermine the quality, accessibility, and utilization of basic public services in many aid receiving countries. The absenteeism among public service providers in some countries can be alarmingly high. Based on surveys done in six developing countries between 2001-2002, Chaudhury, Hammer, Kremer, Muralidharan, and Rogers (2006) report that the average absenteeism rate for teachers is 19% and that for health workers, both doctors and nurses, is 35%. The authors further note that the number is more generous than the real picture considering that it does not take into account the number of providers who were not working even when showing up. On top of that, when the quality

of public health workers competency is limited and performance is low, arguably as a result of low salary, the care providing in itself would not be effective (Filmer et al., 2000; Dupas, 2011). All these factors lead the public to lose confidence in the system altogether. Thus, any aid efforts mediated through such system may not have much impact on welfare outcomes.

The discussion above suggests that the impact of aid on welfare is contingent upon recipient countries' institutions; therefore, we build our second hypothesis as below: *Hypothesis 2: The positive effect of aid on welfare is larger for countries with better quality of institutions.*

3.3 Data and Methodology

As a recap from previous section, the study tests the following hypotheses:

Hypothesis 1: An increase in aid increases human welfare.

Hypothesis 2: The positive effect of aid on welfare is larger for countries with better quality of institutions.

In order to test the above hypotheses, this study utilizes the traditional model of conditional aid and growth literature which is also adopted in aid and welfare studies such as Kosack (2003) and Dietrich (2011). As in many aid effectiveness studies, endogenous causation between aid amount a country receives and its development status is a widely problematic issue often discussed. Intuitively, donors can respond to low human welfare in the developing world by providing more aid. At the same time, they can also award countries with positive trend or good performance (i.e. high level of human welfare) with more aid. To put it another way, there is a possibility that the level of human welfare determines the amount of aid received by recipient countries. The aid literature though provides no clear theory as to what direction this relationship might take. One common approach to correct for endogeneity is to utilize instrumental variables. This study therefore employs Two-Stage Least Squares (2SLS) as the estimation method to account for potential endogeneity between aid and welfare indicators.

Modified from Dietrich (2011) and following previous research, the interplay between aid and institutions is captured by their interactions in the model, which takes the form of:

$$W_{it} = \beta_0 + \beta_1 Aid_{it} + \beta_2 Institutions_{it} + \beta_3 Aid_{it} * Institutions_{it} + \beta_4 Controls_{it} + \gamma_{1it} + \varepsilon_{1it} \quad (1)$$

$$Aid_{it} = \alpha_0 + \alpha_1 Z_{it} + \alpha_2 X_{it} + \varepsilon_{2it} \quad (2)$$

$$Aid_{it} * Institutions_{it} = \Omega_0 + \Omega_1 Z_{it} + \Omega_2 X_{it} + \varepsilon_{3it} \quad (3)$$

From (1), the aggregate welfare (*W*) is a function of aid as a percentage of GDP (*Aid*), the quality of institutions (*Institutions*), the interaction between aid and institutions (*Aid*Institutions*), and other control variables that also have the impact on welfare (*Controls*). Our model is very parsimonious where control variables include initial human welfare level, GDP per capita, and total population. γ is time period dummy to control for fixed-time effects and ε is the error term. From (2) and (3), *Z* is a vector of excluded instruments and *X* is a vector of included instruments. The subscript *i* and *t* denote country and time period, respectively. Except for *Institutions*, all variables are in logarithmic forms; thus the coefficients have to be interpreted as the percentage change in dependent variables given the percentage change in independent variables. In essence, they represent elasticities.

Regarding instrumental variables for aid, the aid effectiveness literature uses a different set of instruments. The popular ones are those proposed by Burnside and Dollar (2000). We use three regional dummies as found in most research to capture donors' strategic interests and special treatment as instruments for aid. The three regional dummies include Egypt, a US ally and a major US aid recipient, Franc zone, a major EU aid recipient, and Central America, which is also a region under the sphere of the US influence. To assess our instruments, we report F-statistics for the excluded instruments in the first stage and the Hansen's J statistics for overall validity of the instruments. The null hypothesis of the F-test, which indicates if excluded instruments are related to the

instrumented variable, is that the instruments do not explain any cross-country variation in the aid regression in Equation (2). The rule of thumb suggested by Staiger and Stock (1997) requires that the F-statistics should be higher than 10. On the other hand, the null hypothesis of the overidentifying test (Hansen test) is the instruments are uncorrelated with the error term in the main structural model (Equation 1). A rejection of the null hypothesis indicates the instruments pass the test.

Incorporating Pro-Poor Public Expenditure

As discussed in the literature review section, aid can affect welfare through different channels. A notable channel is the effect of aid on the composition of pro-poor public expenditure (PPE). In order to take into account this channel of transmission, we incorporate PPE into Equation (1), and estimate:

$$W_{it} = \theta_0 + \theta_1 Aid_{it} + \theta_2 Institutions_{it} + \theta_3 Aid_{it} * Institutions_{it} + \theta_4 Controls_{it} + \theta_5 PPE_{it} + \gamma_{4it} + \varepsilon_{4it} \quad (4)$$

Based on the literature on pro-poor expenditure, pro-poor spending can include different categories of government expenditure. We follow Pettersson (2007a, 2007b) in determining the composition of our PPE variable. PPE is the sum of expenditure on three social sectors: education, health, and housing and amenities. Since part of foreign aid is actually used to finance the government's PPE, there can be double counting in the amount of aid in Equation (4). For that reason, we follow the method proposed by Gomanee, Morrissey, Mosley, et al. (2005) in removing the aid component from PPE. By replicating their method, PPE index is constructed as a function of income, foreign aid, and other government revenue. The equation for PPE is as follows:

$$PPE_{it} = \omega_0 + \omega_1 GDP_{it} + \omega_2 Aid_{it} + \omega_3 TR_{it} + \varepsilon_{5it} \quad (5)$$

Where *PPE* is pro-poor public expenditure, *GDP* is gross domestic product per capita, *Aid* is foreign assistance as a percentage of GDP, and *TR* is government tax revenue. All variables are in logarithmic form. As laid out in the process, we calculate residual of Equation (5) and derive "*PPEresid*". *PPEresid* represents government's pro-poor public expenditure that is *not* financed by foreign aid. Some may argue that aid directed to finance pro-poor public expenditure can be fungible since it can be diverted to finance unproductive expenditure instead (Asiama & Quartey, 2009). For the purpose of the study, we assume no fungibility. We thus follow Gomanee, Morrissey, Mosley, et al. (2005) and ensure only that aid is not double counted in the estimations.

After constructing the residual regressor, the marginal effect of aid on welfare indicators conditional on institutions is represented in a model below:

$$W_{it} = \Phi_0 + \Phi_1 Aid_{it} + \Phi_2 Institutions_{it} + \Phi_3 Aid_{it} * Institutions_{it} + \Phi_4 Controls_{it} + \Phi_5 PPEresid_{it} + \gamma_{6it} + \varepsilon_{6it} \quad (6)$$

From Equation (6), any potential effects of aid on human welfare that come through PPE are now controlled for.

This study conducts an analysis of a panel data for a sample of 80 countries over the period from 1980 to 2004. We follow Rajan and Subramanian (2008) in selecting countries to be included in the analysis through the selection criterion that is based primarily on historical aid receipts. Regardless of its current economic status, a country is included in this study as long as it received development assistance at least once during our time span. By including any country that was once an aid recipient, the study avoids the issue of sample selection biases that can occur if a country developed and no longer is an aid recipient. Appendix F provides a list of countries included in our sample. Since not all variables are available for all countries in all time periods, the number of total observations is noticeably smaller. Furthermore, due to limited data availability to construct PPE index, we expect a substantial reduction in the number of observations, when we include PPE into the models. Following many previous aid and welfare studies,

this research considers a non-overlapping five-year period in the analysis (for similar method, see Dreher et al., 2008a; Williamson, 2008). Grouping the time into period analysis allows us to take into account the fluctuations of business cycle and measurement error (Boone, 1996).

Dependent Variables

The study utilizes various indicators of human welfare as dependent variables. The main welfare indicator is the Human Development Index (HDI). HDI is the composite of three components: the health index, the education index, and income as measured by real GDP per capita in purchasing power parity. The final component of HDI, i.e. income, is intended to capture the standard of living in a given country; however, we do not examine the income component in this study[1]. Health index or life expectancy is a measure of longevity demonstrating the ability of the population to lead a long and healthy life. In addition to health index, the study also uses infant mortality as another indicator of health outcome, mainly because of its rich data availability which made it a popular indicator for human welfare beside life expectancy and education (Feeny & Rogers, 2008). Infant mortality measures the number of infant dying before reaching the age of one year-old per 1,000 live births. On the other hand, education index measures overall educational attainment or knowledge acquisition of the total population (UNDP, 2012a)[2]. Education index comprises of two components—total adult literacy rate and gross enrollment rate. In addition to using education index, we use average years of schooling in the population over the age of 15 as another indicator of educational attainment.

In short, we have five separate dependent variables: those including the HDI, the health index, the infant mortality rate, the education index, and the average schooling years. This study chooses the five indicators based on how common the measures are in the literature and also on data availability.

[1] The income component of HDI is not examined in this study because "income" is considered as monetary welfare.
[2] For details on how to calculate HDI, health index, and education index, see, UNDP (2012a).

Main Independent and Other Control Variables

The main independent variable is aid defined as the net Official Development Assistance (ODA) received as a percentage of GDP. We also disaggregate aid by sector—health and education aid—and by source—bilateral and multilateral aid. Another main variable is institutions comprising of three commonly used institutional measures: corruption in government, bureaucratic quality, and the rule of law. To get a more precise estimate of the interaction term between *Aid* and *Institutions* in Equation (1), we follow a large number of aid studies and construct an institutional index using Principal Component Analysis (PCA) to extract the first eigenvalue from the three variables. We use PCA because it produces better weights compared to a simple average method, and it can also account for as much of the variances of the three institutional dimensions.

Other control variables include initial welfare level, GDP per capita, and total population. We introduce welfare levels from previous time periods and GDP per capita into the model to capture the country's initial welfare status and its economic development. Especially in the context of social sector aid, a country's economic status represents largely its absorptive capacity to benefit from aid. Richer countries with better established infrastructure, for instance, can anticipate higher aid impact because its infrastructure enables higher access to the provision of health and education services. Also, we control for total population because countries with higher population requires higher resources to have the same impact as those with smaller population. GDP per capita (constant 2000 US$) is calculated as gross domestic product divided by midyear population, and population is total population.

Data Sources

Data on the HDI, the health index, and the education index are obtained from UNDP's International Human Development Indicators online database (UNDP, 2012b). Another education variable, average years of schooling in total population, is from Barro and Lee (2000), and the data on government public expenditure by social sectors (PPE) is from Government Finance Statistics CD-ROM of the International Monetary Fund (2010).

With respect to our aid data, we use Development Assistance Committee's (DAC) database of the Organisation for Economic Co-operation and Development (OECD, 2012b). However, we have to resort to using OECD's Creditor Reporting System (CRS) Aid Activities database (OECD, 2012a) to extract aid by type and by source. Since this later database reports only the commitment amount, we have to make an assumption that the committed amount is 100% disbursed and is disbursed in the same year that the commitment is made (for similar assumption, see Brown, 2012). We obtain the three institutional variables from the International Country Risk Guide (PRS Group, 2008). The rest of the variables are from World Development Indicator CD-ROM (World Bank, 2010). See Appendix G for variable descriptions and sources.

Table 3.1 reports summary statistics for all variables, based on a five-year averaged, whereas Table 3.2 shows variable correlations. Table 3.1 shows that the mean value of HDI in our sample is 0.52, on a scale of 0 to 1, with minimum and maximum values of 0.17 and 0.83, respectively. The former corresponds to HDI of Mali during the 1980s, and the later corresponds to that of Republic of Korea in early 2000s. Sierra Leone (in the 1980s) and Republic of Yemen (in the 1990s) have the lowest health index of .27 and lowest education index of 0.03, respectively, whereas Hong Kong and Republic of Korea in the early 2000s have the highest indices. With respect to infant mortality rate, the average infant death rate in our sample is about 61 deaths per 1,000 live births[3]. Mozambique has the highest infant death rate of 173 deaths in the 1980s, whereas Cyprus has the lowest rate of about 5 deaths per the same live births during 2000s. The average aid in our sample is 5.81% of GDP, with the minimum value of -0.03% in Trinidad and Tobago, indicating that the country's loan repayment is higher than its aid receipt.

Table 3.2, on the other hand, shows that countries receiving higher aid as a percentage of GDP, including by type and by source, tend to have lower human welfare as shown through negative correlation between aid and human development indicators

[3] According to the World Health Organization (WHO), the average infant death rate is falling from an estimated 61 deaths per 1,000 live births in 1990 to 37 deaths per 1,000 live births in 2011 globally. The rate is higher for developing countries and more prevalent in the African region where progress has been slow (World Health Organization, 2013).

and positive correlation between aid and infant mortality rate. Nonetheless, the strength of the relationships is not considered strong (around 0.3 and 0.5). Since health index and education index are two of the three composites of HDI, the indices are very highly correlated with HDI. The other two dependent variables, infant mortality rate and average schooling years, are also highly correlated with health index and education index, respectively, as expected. As Table 3.2 further illustrates, aid and institutional variables—corruption rating, the rule of law, and quality of bureaucracy—are negatively and weakly related. Corruption, the rule of law, and bureaucratic quality are positively correlated with each other, but the relationships are not strong (around 0.4 or 0.5). Cronbach's alpha for the three institutional variables is 0.729. Similarly, pro-poor public expenditure has weak but positive relationships with all human welfare indicators, except infant mortality rate. On instrumental variables, seven countries in our sample are in Franc zone; those include: Mali, Niger, Togo, Cameroon, Cote d'Ivoire, Senegal, and Republic of Congo. Five countries are Central American Countries: El Salvador, Guatemala, Honduras, Nicaragua, and Costa Rica.

3.4 Results

We start our analysis with Table 3.3 illustrating the results of the impact of aggregate aid and institutions on human development. In our main hypothesis, we believe that aid effectiveness differs by recipient countries' institutional quality. In our model, we test this hypothesis by interacting aid with institutions. For each welfare indicator, the estimates are shown in both OLS and 2SLS in four columns. The first and third columns under each indicator (Column 1 and 3) present the results from estimating a simple version of Equation (1)—one that does not include the interactive variable—whereas the second and fourth columns (Column 2 and 4) present the main findings of the hypothesis of the interplay between aid and institutions.

Under the OLS estimation technique, from which we can observe the patterns in the data, the coefficients on *Aid* in the model *without* the interaction term are positively related to HDI and health index, and negatively related to infant mortality rate, education

index, and average years of schooling (Column 1 in Table 3.3). None of the coefficients, though, is statistically significant, except in infant mortality regression. This finding suggests that the infant mortality rate decreases as aid increases. Similarly, none of the coefficients on *Institutions* is significant, except that in HDI regression where institutions are positive and significant at the 1% level. Here, we introduce the interaction of aid and institutions to the model in OLS (Column 2 in Table 3.3). The coefficient on the interactive term is positively and significantly different from zero, only in "average of schooling years" regression, suggesting that aid contributes more to improving the average years of schooling in countries with better institutional quality (Column 2 under Average Schooling Years in Table 3.3). However, the coefficient is significant at only the 5% level.

As we move to 2SLS estimation, the results in these columns change the whole picture of the estimations, especially with respect to the significance of coefficients (Column 3 and 4 in Table 3.3). Under Column 3 in Table 3.3, where no interaction term is included, aid has a consistently positive effect on welfare by increasing all welfare indicators, except infant mortality. The coefficients are all significantly different from zero, except that of the education index. Among the significant coefficients, only that of average schooling years is significant at the 5% level, the rest are highly significant at the 1% level. As mentioned in the methodology section, we utilize two statistical tests: the Hansen J's statistics and the F-statistics from first-stage regression. These tests allow us to determine if our results pass the overidentification restriction and the relevance tests, respectively. Out of five regressions above, only three have p-values of the Hansen tests above conventional rejection level. This suggests that the test of overidentifying restrictions cannot reject its null hypothesis that the excluded instruments are uncorrelated with the error term in three cases (i.e. HDI, infant mortality, and average schooling years). On the other hand, when we examine the F-statistics from first-stage regression, none of our models has F-statistics higher than the rule of thumb of 10. For that reason, we have to interpret the results with caution.

Thus, with some reservations, we draw from the results that an increase in aid (as a percentage of GDP) increases health index, average schooling years, and reduces infant

mortality rate, resulting in overall increase of human development index (HDI). The magnitude of the effects is very small, though. A one percentage point increase in the share of aid to GDP increases HDI by approximately 0.052 percentage point, that is, the estimated elasticity of HDI is 0.052. The effect is about the same for health index, where the estimated elastic is 0.059. On infant mortality rate, the negative coefficient on *Aid* of -0.239 suggests that a one percentage point increase in aid to GDP reduces in infant mortality rate by about 0.239 percentage point. For a more practical example, we examine the effect in a country with infant mortality rate of 53 deaths per 1,000 live births, which is the median rate in our sample. In that particular country, a ten percentage point increase in the share of aid to GDP reduces infant mortality by about 1 death (2.39% * 53). The result also indicates that aid has a positive effect on average schooling years—a one percentage point increase in aid to GDP at the margin is associated with roughly 0.14 percentage point more schooling years. The magnitude of the impact of aid on these welfare indicators is minimal, which is in line with many previous studies that find positive but small relationship.

Examining the results from an institutional standpoint, the variable *Institutions* is positively and significantly different from zero only in HDI regression, indicating that improvement in quality of institutions leads to higher human development. The result is as what we expected. Despite meeting our expectations, the coefficients on *Institutions* for other indicators are somewhat mixed and none of them are significant.

Turning to other regressors, Table 3.3 illustrates that the initial level of welfare consistently and positively determines the level of welfare in the subsequent period. The other two control variables—GDP per capita and population—have positive effects as expected. For the most part, these two variables are highly statistically significant. In particular, higher GDP per capita is associated with higher human welfare (positive signs in all regressions, but infant mortality). As an example, a one percentage point increase in GDP per capita leads to a reduction in infant mortality rate by 0.186 percentage point (Table 3.3, Column 1 under Infant mortality). For a more precise example, we consider a country with GDP per capita of $1,180 and an infant mortality rate of 53 deaths per 1,000 live births, both of which are the median values in our sample. A ten percentage point

increase in the country's GDP per capita of approximately $118 is associated with a decrease in infant mortality rate of about 1 death (1.86% * 53), ceteris paribus. A country with median GDP per capita might not have the median infant mortality rate, but the example can trigger a comparison of the effect of GDP per capita on infant mortality and that of aid on the same indicator.

As we move to the second column of 2SLS, where we test the main hypothesis of the interactive effect of aid and institutions, the signs on *Aid* remain positive in all regressions, but that of infant mortality. On the other hand, our variable of interest, *Aid*Institutions*, is statistically significant only in HDI regression with a surprisingly negative sign, suggesting that the marginal effectiveness of aid on HDI appears smaller for those countries with better institutional quality. This result contradicts our hypothesis, but resonates the finding in a study of the relationship between corruption and health aid by Dietrich (2011), who finds that, for strategic compliance purposes, countries with higher level of corruption use health aid more effectively. The core argument in Dietrich (2011) is that corrupt recipient governments compare the difference between the aid funded sectors looking for those with the lowest compliance costs, i.e. leverage from corruption is small. From their observations, they choose to comply with donors' objectives only in sectors where compliance cost is cheap and outcomes are easily monitored. They do so simply to signal their willingness and ability to manage aid effectively so as to be awarded with more aid.

The argument seems to be valid for our case in the health and education sectors, in where compliance cost is normally cheaper, say than infrastructure or energy where corruption can be much more lucrative. In particular, bribe collecting from infrastructure projects such as the building of an airport or irrigation systems can be more substantial than from stealing from textbooks or typical medical supplies. Furthermore, the results are contrary to our hypothesis also because of the nature of health and education aid. Aid supporting human development, specifically health aid as Dietrich (2011) notes, are often small scale projects implemented by recipient governments in collaboration with other NGOs or even other multinational donors, allowing for less chances for rent-seeking as compared with other sectors. In our results though, the interactive term is significant only

at the 5% level. The coefficients on *Aid*Institutions* in other regressions appear to have the right signs supporting strategic compliance argument, but none are significant.

We also examine the effectiveness of aid using lagged value of aid and institutions. Specifically, it is possible that the effect of aid on welfare is not contemporaneous, but lagged. Since all our variables are in five-year average, we examine the effect using a one-period lagged value. We present the results from the estimation in Appendix H. The results show that an increase in aid increases HDI and decreases infant mortality rate. The coefficients are highly significant at the 1% level. However, aid seems to have no impact on education sector as we could only detect weak, yet positive, effects of aid on education index, and not on average schooling years. Also, none of the interactive variables, *Lagged Aid*Institutions*, is statistically significant, except that in average schooling years. The results from the lagged effects are somewhat similar to those produced by OLS estimation using contemporaneous values in Table 3.3.

Since our institutional index comprises of three components: corruption, bureaucratic quality, and the rule of law, we also examine the effects of each underlying component separately. We present the results in Appendix I. Overall, the main findings in Table 3.3 using 2SLS hold finds that: Aid improves human development, and countries with poorer institutions (particularly, those with higher corruption and lower bureaucratic quality) tend to comply more with donors' objectives. Interestingly, Appendix I shows no evidence of the relationship between corruption and human development, which is in contrast to most findings in previous studies (Panel A, Column 1 under HDI). On the other hand, better bureaucratic quality and stronger rule of law are associated with higher human welfare, which is in line with the findings in Kaufmann et al. (1999) (Panel B and C, Column 1 under HDI).

Furthermore, we estimate a model of individual effect of institutions (without constructing an index), where all three institutional variables enter a regression at once. Also, each institutional variable is interacted with aid simultaneously. The results are shown in Appendix J. As Appendix J illustrates, aid is effective in improving all welfare outcomes where the coefficients are significant at least at the 5% level (Column 1 in Appendix J). From an institutional standpoint, however, the signs of coefficients on

institutional variables are mixed. Additionally, the coefficients are statistically significant only in a few cases: *Corruption control* in average years of schooling regression, *Bureaucratic quality* in education index and average years of schooling regressions, and *Rule of law* in HDI regression. When the interactive terms enter the models, the coefficient on *Aid*Corruption Control* is negatively and significantly different from zero at the 10% only in HDI regression, which is in line with our main findings in Table. 3.3. In contrast, the other variable of interest, *Aid*Rule of law*, is positively and significantly different from zero at the 5% level in education index and average years of schooling regressions, indicating that aid is more effective in improving education outcomes in countries with better rule of law. We also check the joint F test that the three institutional variables are zero. The p-values for the joint test are significant only for HDI and education index, in which they are significant at the 5% level and 10% level, respectively.

The results using the above individual institutional variables seem to vary depending on the effect of individual institutional variable on each welfare outcome. For the rest of our analysis, we utilize the index of institutions constructed using the Principal Component Analysis and 2SLS estimation technique.

To better gauge the effect of aid and institutions on human welfare in recipient countries, we disaggregate aid into health and education aid and present the results in Table 3.4. As Column 1 in Table 3.4 shows, health aid appears to be very important in improving health index and reducing infant mortality rate, whereas education aid does not appear to have the same result. The coefficients on health aid in both regressions are highly significant at the 1% level. Also, both F-statistics and Hansen's J statistics improve noticeably when we disaggregate aid, giving us even higher confidence to conclude that health aid is indeed effective. Our results are in line with those from Mishra and Newhouse (2009), who too find a very minimal but positive impact of health aid. Comparing the magnitude of the effect in Table 3.3 and Table 3.4, the coefficients on health aid are much smaller than those on aggregate aid, especially in infant mortality regression, indicating that other sectoral aid partly contributes to improvements in health outcomes. For instance, infrastructure aid for road construction also contributes to better health when it connects remote area to health centers. This may also be a reason why

studies such as Williamson (2008) and Wilson (2011) who examine specifically health aid effectiveness cannot detect any discernible impact of the assistance.

Furthermore, Column 2 in Table 3.4 illustrates that none of the coefficients on the interactive term is significant, with the exception of that for health index. Like aggregate aid, health aid turns out to be more effective in increasing health index in poorer institutional settings. Again, this result goes against our hypothesis in support of Dietrich's (2011) strategic compliance argument. In general, education aid seems to be ineffective.

On welfare effect of aid by source, Table 3.5 and Table 3.6 present results of the impact for bilateral and multilateral aid, respectively. For better comparison, we also restrict the two samples to the same size. At the first glance, we see the same pattern of the effects as in aggregate aid. Both bilateral and multilateral aid lead to improvement in recipient countries' quality of life as seen through an increase in HDI and health index, and a reduction in infant mortality. All coefficients are highly significant at the 1% level. The magnitude of the impact of bilateral aid on HDI is slightly higher than that of multilateral aid (0.0203 vs. 0.0148), while both have strikingly similar effects on health index and infant mortality. Contrary to the general perception thus, bilateral and multilateral aid affect recipient's welfare at about the same degree. Also, consistent with the results from the main findings, bilateral and multilateral aid appear to be more effective in less favorable environment.

Furthermore, comparing the magnitude of the interaction terms, we notice the coefficients on *Bilateral aid*Institutions* are slightly bigger than that on *Multilateral aid*Institutions*, indicating that recipient countries with poorer institutions are more likely to comply with bilateral donors than with multilateral ones. Christensen et al. (2011) may provide an explanation as to why this is the case. They notate that developing countries, who are also aid recipients, usually have sufficient voting power on the executive board of multilateral institutions, the results from which could affect policy decisions in multilateral institutions. Additionally, multilateral donors are constrained by their strong need to lend the money as if to justify their existence. Bilateral donors, on the other hand, are not bind by any institutional constraints, providing them the ability to

allocate their aid resources more strategically. Sometimes this allows them to bypassing various corrupt or poorly managed aid recipients. In that sense, bilateral donors have more advantage over multilateral ones in responding to recipients' adverse selection. Alesina and Weder (2002) find that that bilateral donors, especially Scandinavian countries and Australia, give more aid to less corrupt recipients while multilateral donors do not differentiate between recipient types. As development cooperation between donors and recipients become more mature and recipient governments understand donors' behavior and constraints, the governments with poor institutions are more likely to comply with the restrictions and limitations put forth by bilateral than multilateral donors. This explains the different magnitude, and even the significance, of coefficients on *Bilateral aid*Institutions* and *Multilateral aid*Institutions* in our study.

As a final note about Table 3.5 and 3.6, the impact on the education sector is, as in previous cases, less prevalent—only bilateral aid slightly increases average years of schooling. This result supports the findings in Christensen et al. (2011) who agree that bilateral primary-education aid is effective in increasing primary school enrollment. Also, we note that the F-statistics from first stage regression are all well above the acceptable rule of thumb of 10, suggesting that our excluded instruments, which comprises mainly of strategic regions, are very good predictors of bilateral aid, supporting the widely known observation that bilateral donors care more about their strategic interests when allocating aid.

Next, we move further in the analysis by incorporating the government's pro-poor public expenditure (PPE). As mentioned in the methodology section, we follow Gomanee, Morrissey, Mosley, et al. (2005) and acknowledge that some part of PPE must be financed by foreign aid; hence, we take into this fact account by taking out the aid financed part. *PPEresid* represents the aid-free portion of *PPE*. Table 3.7 reports both the inclusion of *PPE* and *PPEresid* into our baseline models. Due to very limited expenditure data availability, the inclusion of the expenditure variable reduces the sample size by more than half. In this subsample, the mean values for GDP per capita, human welfare scores, and institutional scores, are all higher than in the full sample, while the mean value for aid is lower, suggesting that this subsample consists of relatively higher income

countries, who receive less aid on average, as compared to the full sample. For the purpose of comparing the results, we also limit the sample size for regressions without the expenditure variable and report the results in the first column. In this subsample, the impact of aid on human welfare remains positive despite losing some statistical significance in some cases. The coefficient on *Aid* in Education Index regression gains some small significance while it has never been significant in any previous cases.

The second model in Table 3.7 controls for pro-poor public expenditure, *PPE*. The third model controls for the same expenditure with the only difference being that *PPE* is now the residual from the aid-financed component. We now focus only on the HDI regressions. In Table 3.7 under HDI, once pro-poor public expenditure, *PPE*, is taken into account, the coefficient on *Aid* loses some statistical significance from the 1% to the 5% level, but regains its significance when controlling for *PPEresid* (Column 2 and 3). This suggests that the aid component in *PPE* also contributes to increasing HDI and that double counting indeed matters. However, since the *Aid* regressors are statistically significant in both cases (with *PPE* and *PPEresid*), we conclude that aid has a *direct* positive impact on HDI, i.e. not through PPE. Such impact may come from various aid projects, often implemented by NGOs, aiming to improve health and education outcomes at the grassroots level. The finding is consistent with that found in Gomanee, Morrissey, Mosley, et al. (2005), but not with Gomanee et al. (2003) or Pettersson (2007b). All these differences may be attributable to the sample chosen as discussed in the literature review.

Equally important, both *PPE* and *PPEresid* are positively and statistically significant, suggesting that government pro-poor public expenditure also contributes to increasing the human development index. The results contradict most previous studies that do not find any association between public spending and welfare outcomes such as Filmer and Pritchett (1999) and McGuire (2006), but is in line with Gupta, Verhoeven, et al. (2002). Yet, the coefficients are significantly different from zero only at the 5% level, which is also similar to that in Gupta, Verhoeven, et al. (2002).

The last column adds the interaction term, *Aid*Institutions*, to the model where the aid component is already separated from pro-poor public expenditure (Table 3.7,

Column 4 under HDI). This model examines whether aid works differently in different environments controlling for recipient government's public expenditure. Unlike the result in our baseline model (Table 3.3), *Aid*Institutions* is not significant, indicating that for a given level of pro-poor public expenditure, the impact of aid on human development index does not differ by recipient's institutional quality. Likewise, pro-poor public expenditure is no longer a significant determinant of human welfare index. The result seems to indicate that our previous findings on the main hypothesis are somewhat tenuous.

Finally, we focus on the rest of the regressions in Table 3.7. As Column 2 and Column 3 of Table 3.7 report, aid remains positive and statistically significant in all regressions whether the models take into account *PPE* or *PPEresid*. Therefore, like in the case of human development index, aid contributes *directly* to increasing other welfare indicators. Nonetheless, government expenditure variables are not significant in all four cases. Also, in the last column (Column 4), *Aid*Institutions* are all insignificant, pointing to the same conclusion that aid does not work differently in different institutions when government public expenditure is taken into account.

Overall, aid is effective in improving human welfare in recipient countries by increasing HDI, health index, and reducing infant mortality, though the effect is small, all of which is in line with most previous studies. However, the pattern is less consistent for education index and average years of schooling. Furthermore, the results do not support our main hypothesis arguing that aid given to countries with good institutions has more impact on improving recipient's quality of life. Instead, recipient governments with poor institutions seem to comply more with donors' objectives, resulting in higher human development outcomes. The compliancy is even more prevalent for bilateral aid. However, the result is not robust to controlling for pro-poor public expenditure.

3.5 Conclusion

This study uses data from 80 countries from 1980 to 2004 to extend the literature of the impact of aid on welfare by examining the effect under different institutional settings. Taking some caveats into account, our results resonate a consensus finding that aid works to improve human welfare in recipient countries; in particular, we find some convincing evidence of such effects on HDI and health sector, though not so much on the education sector. Nonetheless, those effects are very small. As we disaggregate aid into health and education aid, the effect of health aid on health outcomes is also more pronouncing than that of education aid on its outcomes. Additionally, the positive effect of aid on raising quality of life in recipient countries is dominated by its direct impact, most likely through institutions as NGOs whose work involve directly with the health and education sectors at the grassroots level. These results have important implications for enhancing the effectiveness of development assistance by placing more emphasis on aid efforts coming through agencies that work closely with the locals in recipient countries.

On the main argument that centers on the interplay between aid and institutions, we do not find any indication of weak institutions being associated with lowering aid effectiveness. Instead, our results support the strategic compliance argument made by Dietrich (2011) who argues that corrupt leaders choose to comply with donors' objectives in sectors where compliance cost is cheap and outcomes are easy to monitor. In our study, such compliance is in the health and education sectors. Furthermore, such strategic compliance is more prevalent for bilateral than multilateral aid. The results may be attributable to the fact that bilateral donors face less constraint in its aid allocation than multilateral donors, thus allowing them the ability to allocate their aid portfolio more selectively. Understanding the complex behavior of different donors, corrupt recipients may seek to comply more with bilateral than multilateral donors. The result suggests that the international donor community should pay more attention to quality of government in receiving countries, take firm action to any misuse and mismanagement of aid money, and be more selective when providing aid.

CHAPTER 4

CONCLUSION

This dissertation examines empirically the impact of aid on income distribution and human welfare with the focus on the interplay between aid and institutions. We argue that recipient countries' institutions play a major role in both the distribution of aid among different income groups and its effectiveness in improving human development. The dissertation studies the impacts in two separate essays.

Essay 1 suggests that an increase in aid decreases the income shares of the poorest two quintiles and that the impact is not conditional on recipient's institutions, which contradicts our initial hypothesis. Specifically, the income share of the poor shrinks with more aid not because bad institutions enable the elites to capture rents from aid, but rather because aid by itself is not designed for the poor. In addition to the rich's higher ability to absorb aid resources, donors' political and commercial interests, which appear to overshadow their altruistic motivations, also attribute to the findings in this study. Donor's political interests (where donors use aid to buy supports from local elites prompting the distribution to shift away from the poor), and its commercial interests (where donors use aid to support businesses and jobs in donor countries through requirements of the use of donor firms or technical assistance), may explain the weak link of aid and institutions on income inequality. Furthermore, the requirement that aid money be spent on goods from donor countries also contributes to the shrinking income share of the poor. In particular, such requirement can hurt the poor producing the same goods locally.

An important implication from these findings calls for more focus on donors' own motives in aid allocation that by no means targets the poorer population. Many studies on aid and income distribution attribute their findings of increased inequality effect of aid to

rent-seeking behavior of elites in recipient countries. The conclusion of this study, however, is in line with the claim made by Herzer and Nunnenkamp (2012) who maintain that donors' own incentive problems, rather than recipients' institutions, have more to do with the inequality increasing effects. Therefore, to direct more aid toward the poor depends predominantly on donors' willingness to change their own behavior.

While Essay 1 paints a somewhat negative image of aid, Essay 2 finds a positive impact of aid in bettering human welfare in a recipient country. On average, aid increases human development, though small, and the increase appears to be driven more by health than education sector. Additionally, we find that in countries with poorer institutional quality aid is more effective in increasing human welfare; however, the results do not hold true when taking into account government's pro-poor public expenditure. The result is partly consistent with the strategic compliance argument. The argument postulates that corrupt recipients would comply more with donors' goals in sectors where they know the leverage is limited (e.g., health or education), but they would not do so in sectors where compliance costs are high (e.g., rural development or infrastructure). The empirical analysis also highlights the effects of bilateral and multilateral aid on different welfare outcomes. While the results suggest that both bilateral and multilateral aid have very similar effects on improving recipient welfare, corrupt recipients comply more with bilateral than with multilateral donors, most likely because bilateral donors have less constraints in their aid allocation.

When combining the findings from both studies, we conclude that aid does increase human welfare in recipient countries, but the poor represented in our studies by the two lowest quintiles benefit the least from aid. In other words, aid may benefit recipient countries to an extent that people' lives are improved, but the improvement does not necessarily occur among its poorer population, or if it does, it does not have any discernible average effect on the poor's income.

Returning to the aid debate between the two main camps—Sachs vs. Easterly—this dissertation provides two distinct, yet related, issues that can build a case for both camps. If the benchmark measurement of aid effectiveness is based on the MDGs, the improvement in human development found in Essay 2 is clearly part of aid's success,

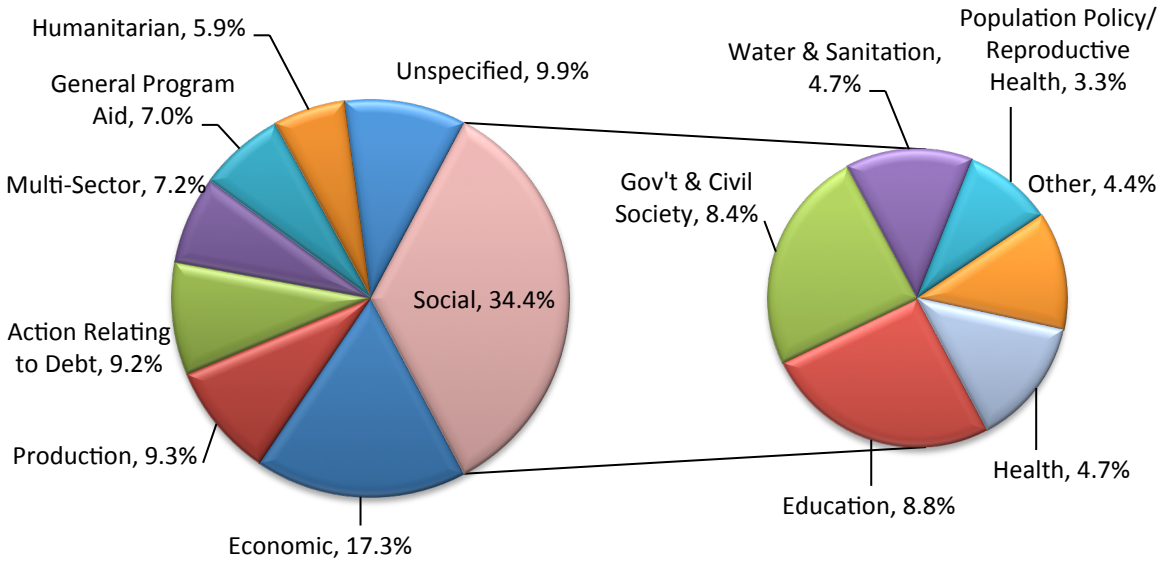
justifying the current top-down approach Sachs promotes. Certainly, the world's poor is characterized by high infant, child, and maternal mortality rates, widespread diseases such as malaria, tuberculosis, and HIV/AIDS. If people's lives do not justify moral obligation to help, nothing does. In contrast, the opponents of aid would argue that development aid is not humanitarian aid that exists only to keep people alive. Instead, its success should be measured against "sustainable economic growth and poverty alleviation" (Moyo, 2009, p. 150) . This argument comes not from Easterly per se, but from another aid opponent, Dambisa Moyo, who joins Easterly to make the case that aid does not work. Indeed, the results from Essay 1 somewhat support the anti-aid rhetoric from the Easterly and Moyo camp. Also, considering the colossal amount money spent thus far and the minimal outcomes that occur from the money provided, the practicality of bringing policy change to recipient countries looks somewhat pessimistic.

Of course, reconciling between needs and effectiveness is not an easy task. On the one hand, Sachs seems to use recipient's needs to call for more aid while the problem with aid is not about the amount but the very little oversight in how the money is spent and who the real beneficiaries are. The current aid practices, which often lack independent auditing and scrutiny from the public to hold either recipient governments or donors responsible, do in fact warrant only limited outcomes, while at the same time, provide minimal benefits to the most needy and vulnerable. Thus, more funding using the same system would only lead to additional waste of scarce resources. In that sense, aid proponents should shift their attention to searching for ways to make aid more beneficial to the genuine poor and to use it more effectively than simply calling for more of it.

On the other hand, Easterly advocates for basic assistance by placing heavy emphasis on recipient countries' own ability to lift themselves out of poverty through what he called *S*earchers. While Easterly seems to be cynical about the top-down approach, his idea is not very practical as he places much emphasis on the free-market. Specifically, the poor face many constraints and lack critical information to make informed decisions, thus leaving them to the market to do the job is not a smart option either. Therefore, both Sachs and Easterly are at the extreme ends when considering how to help the world's poor. Banerjee and Duflo's (2011) work, which tries to dig deeper

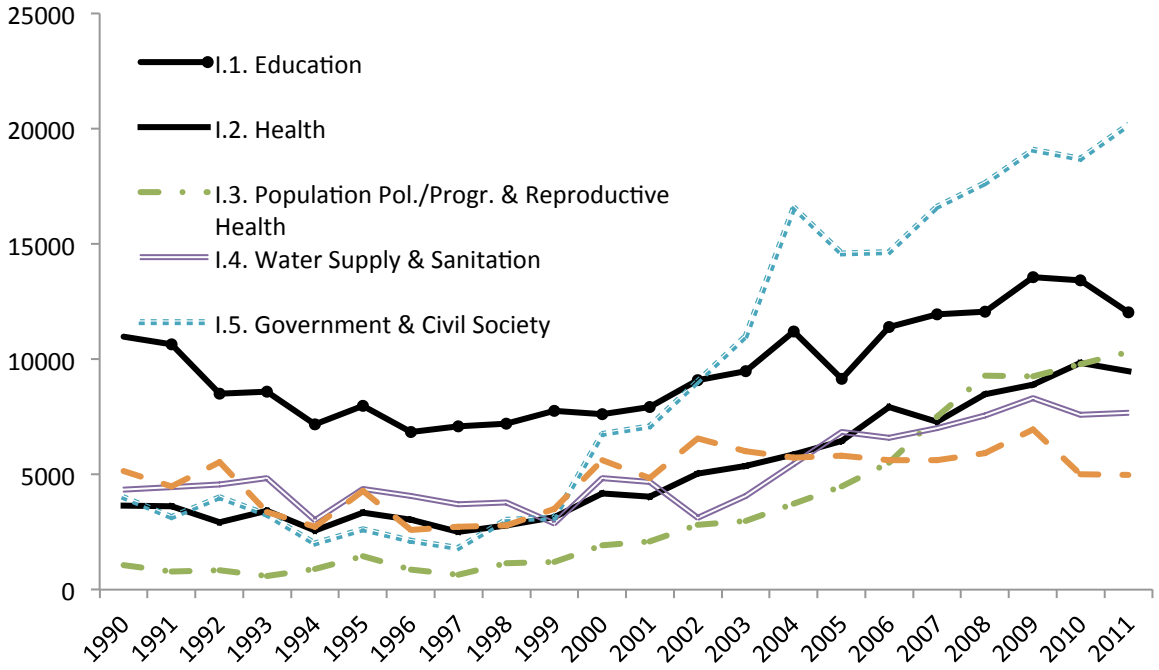
into understanding the poor's behavior and constraints, may be more versatile and practical under different institutional settings. Empowering the less advantage and less powerful people to bring about incremental changes to the state of their institutions, their lives, seems to provide better guarantee that can lead to long term significant differences. Also, the poor can escape poverty only when they organize and come up with solutions to liberate themselves. After all, there is no easy formula to move from poverty to prosperity, but a consistent engagement between the grassroots people, recipient governments, and international community might bring about positive changes overtime.

Figure 2.1: Sector Allocation from 1990 to 2011 (percentage of total disbursement)



Source: OECD (2012b) database and author's calculation.

Figure 2.2: Social Sector Sub-Allocation from 1990 to 2011 (in 2010 million dollars)



Source: OECD (2012b) database.

Table 2.1: Summary Statistics for Essay 1 (five-year averaged)

	Observations	Mean	Standard deviation	Minimum	Maximum
Q1	369	5.2	2.0	1.1	10.4
Q2	359	9.2	2.2	2.0	15.2
Q3	359	13.6	2.3	5.5	19.8
Q4	359	20.5	2.2	11.1	27.2
Q5	369	51.5	7.8	30.9	78.3
Gini coefficient	414	45.6	9.2	21.8	73.9
Aid/GDP	414	4.2	6.6	-0.022	51.4
Tied aid/GDP	346	2.9	4.2	0.0001	24.8
Untied aid/GDP	342	1.4	2.7	0.00002	19.5
Corruption	414	2.8	1.1	0	6
Rule of Law	414	3.0	1.2	0.8	6
Bureaucratic quality	414	1.8	1.0	0	4
GDP per capita ($US)	414	2,532	3,456	120	24,055
Rural population (%Total)	414	53.3	23.4	0	94.6
Openness	397	63.1	40.3	8.7	264.9
Inflation	378	61.1	315.4	-0.1	4447.9
Avg. schooling years	343	4.5	2.0	0.277	10.6
Survey type	414	0.4	0.5	0	1
Survey quality	414	2.6	0.7	1	4

Table 2.2: Correlations for Essay 1 (five-year averaged)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1)	Q1	1																
(2)	Q2	0.934	1															
(3)	Q3	0.817	0.953	1														
(4)	Q4	0.485	0.666	0.825	1													
(5)	Q5	-0.888	-0.974	-0.982	-0.806	1												
(6)	Gini coefficient	-0.927	-0.983	-0.958	-0.731	0.9862	1											
(7)	Aid/GDP	0.018	-0.006	-0.023	-0.103	0.033	0.024	1										
(8)	Tied aid/GDP	0.023	-0.018	-0.062	-0.162	0.060	0.043	0.932	1									
(9)	Untied aid/GDP	0.035	0.037	0.025	-0.060	-0.010	-0.017	0.888	0.843	1								
(10)	Corruption	-0.179	-0.125	-0.096	-0.026	0.119	0.124	-0.098	-0.127	-0.079	1							
(11)	Rule of Law	-0.097	-0.047	-0.019	0.025	0.038	0.048	-0.140	-0.117	-0.096	0.460	1						
(12)	Bureaucratic quality	0.010	0.015	0.009	-0.027	-0.004	-0.010	-0.338	-0.352	-0.305	0.520	0.444	1					
(13)	GDP per capita ($US)	-0.141	-0.010	0.086	0.166	-0.025	0.017	-0.313	-0.369	-0.235	0.422	0.342	0.357	1				
(14)	Rural population	0.287	0.215	0.150	0.034	-0.191	-0.215	0.369	0.460	0.281	-0.335	-0.221	-0.261	-0.656	1			
(15)	Openness	-0.172	-0.135	-0.098	-0.010	0.116	0.129	0.069	0.046	0.058	0.225	0.312	0.122	0.411	-0.149	1		
(16)	Inflation	-0.086	-0.091	-0.085	-0.073	0.093	0.093	-0.036	-0.056	-0.019	0.025	-0.111	-0.092	0.019	-0.155	-0.160	1	
(17)	Avg. schooling years	-0.142	-0.034	0.038	0.138	0.005	0.037	-0.474	-0.481	-0.356	0.307	0.332	0.384	0.652	-0.626	0.355	0.037	1

Table 2.3: Regression Estimates of the Impact of Aid and Institutions on Income Distribution and Inequality using OLS

	Q1		Q2		Q3		Q4		Q5		Gini	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Aid	-0.077***	-0.078***	-0.049**	-0.052**	-0.028	-0.029	-0.007	-0.009	0.165**	0.171*	0.275***	0.286***
	(-3.807)	(-3.468)	(-2.280)	(-2.068)	(-1.211)	(-1.133)	(-0.296)	(-0.368)	(2.056)	(1.851)	(2.710)	(2.599)
Institutions	0.023	0.027	-0.008	0.005	-0.094	-0.078	-0.177	-0.155	0.266	0.219	-0.039	-0.134
	(0.267)	(0.303)	(-0.084)	(0.044)	(-0.943)	(-0.717)	(-1.645)	(-1.322)	(0.784)	(0.601)	(-0.106)	(-0.331)
Aid*Institutions		-0.001		-0.004		-0.006		-0.007		0.016		0.032
		(-0.129)		(-0.314)		(-0.390)		(-0.517)		(0.328)		(0.584)
Log GDP per capita	-4.754***	-4.740***	-6.052***	-6.008***	-6.057***	-6.001***	-3.645***	-3.571***	20.04***	19.88***	22.44***	22.08***
	(-5.050)	(-5.182)	(-5.839)	(-5.914)	(-5.648)	(-5.627)	(-3.163)	(-3.066)	(5.411)	(5.413)	(5.273)	(5.252)
Log GDP per capita^2	0.299***	0.298***	0.420***	0.416***	0.447***	0.443***	0.300***	0.294***	-1.443***	-1.430***	-1.552***	-1.524***
	(4.599)	(4.720)	(5.897)	(5.964)	(6.196)	(6.163)	(3.909)	(3.780)	(-5.781)	(-5.773)	(-5.337)	(-5.294)
Avg. schooling years	0.268***	0.268***	0.387***	0.389***	0.366***	0.369***	0.278***	0.282***	-1.239***	-1.248***	-1.419***	-1.433***
	(3.850)	(3.887)	(4.675)	(4.706)	(4.303)	(4.314)	(3.401)	(3.418)	(-4.466)	(-4.486)	(-4.419)	(-4.462)
Rural population (%Total)	-0.0009	-0.0009	0.0085	0.0085	0.0147**	0.0147**	0.0186**	0.0186**	-0.0444**	-0.0444**	-0.0227	-0.0231
	(-0.146)	(-0.147)	(1.380)	(1.373)	(2.201)	(2.191)	(2.595)	(2.583)	(-2.001)	(-1.993)	(-0.916)	(-0.929)
Openness	-0.009***	-0.009***	-0.0133***	-0.0132***	-0.0135***	-0.0133***	-0.0101***	-0.0098***	0.0467***	0.0462***	0.0498***	0.0488***
	(-3.670)	(-3.600)	(-4.371)	(-4.333)	(-4.235)	(-4.203)	(-3.219)	(-3.159)	(4.439)	(4.396)	(4.033)	(3.942)
Log Inflation	-0.246**	-0.245**	-0.278**	-0.275**	-0.267**	-0.263**	-0.258**	-0.252**	1.027**	1.014**	1.170***	1.149**
	(-2.442)	(-2.405)	(-2.346)	(-2.315)	(-2.248)	(-2.207)	(-2.229)	(-2.169)	(2.471)	(2.430)	(2.631)	(2.585)
Survey type	2.567***	2.569***	2.864***	2.872***	2.657***	2.667***	1.601***	1.614***	-9.675***	-9.704***	-11.77***	-11.82***
	(10.57)	(10.54)	(9.256)	(9.249)	(7.680)	(7.653)	(3.935)	(3.941)	(-8.081)	(-8.058)	(-9.682)	(-9.735)
Constant	23.57***	23.52***	29.14***	28.99***	31.62***	31.43***	29.36***	29.11***	-11.44	-10.90	-29.80*	-28.53*
	(6.634)	(6.801)	(7.384)	(7.492)	(7.601)	(7.589)	(6.480)	(6.359)	(-0.799)	(-0.767)	(-1.829)	(-1.775)
Observations	271	271	267	267	267	267	267	267	271	271	297	297
R-squared	0.473	0.473	0.425	0.425	0.378	0.378	0.232	0.232	0.398	0.398	0.393	0.393

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. Period dummies are included in all regressions, but not reported.

Table 2.4: Regression Estimates of the Impact of Aid and Institutions on Income Distribution and Inequality

	Q1						Q2					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Aid	-0.176***	-0.183***	-0.177***	-0.168***	-0.152***	-0.160***	-0.160***	-0.161***	-0.160***	-0.125***	-0.084**	-0.098***
	(-5.836)	(-6.401)	(-6.385)	(-5.417)	(-4.683)	(-5.005)	(-4.226)	(-4.702)	(-4.746)	(-3.281)	(-2.353)	(-2.713)
Institutions	0.036	-0.065	-0.062	-0.055	0.013	-0.056	0.028	-0.097	-0.097	-0.078	-0.012	-0.074
	(0.473)	(-0.898)	(-0.866)	(-0.687)	(0.154)	(-0.443)	(0.315)	(-1.134)	(-1.135)	(-0.821)	(-0.127)	(-0.572)
Aid*Institutions						0.023						0.020
						(0.608)						(0.592)
Log GDP per capita	-5.674***	-6.506***	-6.402***	-6.488***	-5.963***	-6.454***	-7.401***	-7.933***	-7.919***	-7.395***	-6.598***	-7.156***
	(-6.431)	(-7.297)	(-7.307)	(-7.091)	(-6.152)	(-6.344)	(-6.704)	(-7.151)	(-7.156)	(-7.209)	(-6.134)	(-6.291)
Log GDP per capita^2	0.353***	0.396***	0.381***	0.394***	0.368***	0.401***	0.497***	0.513***	0.513***	0.489***	0.451***	0.487***
	(5.917)	(6.436)	(6.261)	(6.183)	(5.570)	(5.765)	(6.698)	(6.670)	(6.684)	(6.971)	(6.209)	(6.274)
Avg. schooling years		0.191***	0.195***	0.205***	0.197***	0.169**		0.298***	0.299***	0.354***	0.355***	0.323***
		(2.710)	(2.779)	(2.896)	(2.796)	(2.248)		(3.490)	(3.524)	(4.121)	(4.264)	(3.658)
Rural population (%Total)			-0.0073	-0.0037	-0.0046	-0.0053			0.0008	0.0069	0.0067	0.0056
			(-1.309)	(-0.622)	(-0.701)	(-0.812)			(0.137)	(1.128)	(1.043)	(0.874)
Openness				-0.0011	-0.0054*	-0.0053*				-0.0052	-0.0117***	-0.0112***
				(-0.389)	(-1.858)	(-1.926)				(-1.585)	(-3.545)	(-3.413)
Log Inflation					-0.178*	-0.181*					-0.247**	-0.244**
					(-1.697)	(-1.719)					(-2.089)	(-2.010)
Survey type	1.963***	2.427***	2.423***	2.463***	2.631***	2.605***	2.187***	2.658***	2.657***	2.642***	2.890***	2.870***
	(8.132)	(10.17)	(10.29)	(10.63)	(10.98)	(10.43)	(7.381)	(9.388)	(9.398)	(9.445)	(9.710)	(9.349)
Constant	27.18***	30.41***	30.84***	30.46***	28.84***	30.77***	35.63***	37.74***	37.58***	34.54***	31.55***	33.80***
	(8.312)	(9.208)	(9.360)	(8.796)	(7.787)	(7.888)	(8.637)	(9.262)	(9.071)	(8.776)	(7.603)	(7.698)
Observations	369	309	309	297	271	271	359	301	301	292	267	267
F-statistics from first stage	24.50	21.91	21.95	18.81	17.43	-	24.71	22.14	21.99	19.53	17.46	-
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	-	0.0000	0.0000	0.0000	0.0000	0.0000	-
Hansen test (p-value)	0.0795	0.143	0.120	0.124	0.157	0.350	0.0342	0.124	0.123	0.142	0.147	0.116

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. Exogenous instruments for aid include: log of total population, Franc zone, Central American countries, and Egypt dummies. Period dummies are included in all regressions, but not reported.

Table 2.4: Regression Estimates of the Impact of Aid and Institutions on Income Distribution and Inequality (continued)

	Q3						Q4					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Aid	-0.120***	-0.119***	-0.122***	-0.065*	-0.026	-0.042	-0.069	-0.063	-0.069*	-0.008	0.003	-0.023
	(-2.987)	(-3.395)	(-3.582)	(-1.719)	(-0.686)	(-1.114)	(-1.574)	(-1.456)	(-1.678)	(-0.173)	(0.0687)	(-0.466)
Institutions	-0.088	-0.187**	-0.189**	-0.148	-0.094	-0.112	-0.164*	-0.206**	-0.209**	-0.200**	-0.176*	-0.052
	(-0.996)	(-2.166)	(-2.194)	(-1.587)	(-0.967)	(-0.910)	(-1.760)	(-2.109)	(-2.178)	(-2.030)	(-1.688)	(-0.351)
Aid*Institutions						0.005						-0.043
						(0.184)						(-1.224)
Log GDP per capita	-7.191***	-7.243***	-7.292***	-6.590***	-6.026***	-6.380***	-4.526***	-4.456***	-4.572***	-3.721***	-3.482***	-3.203**
	(-5.994)	(-6.246)	(-6.246)	(-6.294)	(-5.453)	(-5.622)	(-3.925)	(-3.743)	(-3.803)	(-3.354)	(-2.699)	(-2.556)
Log GDP per capita^2	0.507***	0.491***	0.503***	0.472***	0.445***	0.467***	0.337***	0.324***	0.349***	0.308***	0.291***	0.265***
	(6.313)	(6.148)	(6.239)	(6.774)	(6.089)	(6.077)	(4.452)	(4.025)	(4.253)	(4.335)	(3.616)	(3.207)
Avg. schooling years		0.279***	0.277***	0.358***	0.368***	0.347***		0.151*	0.146*	0.263***	0.287***	0.302***
		(3.264)	(3.295)	(4.002)	(4.272)	(3.846)		(1.892)	(1.882)	(3.190)	(3.779)	(3.612)
Rural population (%Total)			0.0077	0.0157**	0.0148**	0.0139**			0.0147**	0.0240***	0.0192***	0.0185**
			(1.164)	(2.406)	(2.194)	(2.056)			(2.085)	(3.371)	(2.594)	(2.538)
Openness				-0.0082***	-0.0136***	-0.0129***				-0.0091***	-0.0106***	-0.0088**
				(-2.789)	(-4.170)	(-3.814)				(-3.224)	(-3.265)	(-2.502)
Log Inflation					-0.269**	-0.256**					-0.267**	-0.225**
					(-2.367)	(-2.189)					(-2.471)	(-2.005)
Survey type	2.131***	2.563***	2.565***	2.546***	2.656***	2.660***	1.305***	1.599***	1.606***	1.575***	1.594***	1.676***
	(6.575)	(8.270)	(8.257)	(8.221)	(7.923)	(7.833)	(3.730)	(4.562)	(4.606)	(4.457)	(4.110)	(4.548)
Constant	37.59***	38.18***	37.47***	33.36***	31.48***	32.99***	34.50***	34.45***	33.20***	28.51***	28.64***	27.85***
	(8.386)	(8.954)	(8.578)	(8.120)	(7.229)	(7.401)	(7.835)	(7.698)	(7.253)	(6.217)	(5.337)	(5.469)
Observations	359	301	301	292	267	267	359	301	301	292	267	267
F-statistics from first stage	24.71	22.14	21.99	19.53	17.46	-	24.71	22.14	21.99	19.53	17.46	-
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	-	0.0000	0.0000	0.0000	0.0000	0.0000	-
Hansen test (p-value)	0.0249	0.0417	0.0517	0.0607	0.0883	0.204	0.0585	0.0139	0.0244	0.0563	0.0540	0.200

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. Exogenous instruments for aid include: log of total population, Franc zone, Central American countries, and Egypt dummies. Period dummies are included in all regressions, but not reported.

Table 2.4: Regression Estimates of the Impact of Aid and Institutions on Income Distribution and Inequality (continued)

	Q5						Gini					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Aid	0.526***	0.539***	0.537***	0.377***	0.277**	0.343**	0.698***	0.769***	0.760***	0.596***	0.464***	0.551***
	(3.933)	(4.430)	(4.536)	(2.917)	(2.044)	(2.529)	(4.477)	(5.213)	(5.262)	(3.851)	(2.994)	(3.550)
Institutions	0.213	0.597**	0.599**	0.485	0.276	0.294	-0.116	0.281	0.283	0.149	-0.043	-0.005
	(0.706)	(2.017)	(2.032)	(1.545)	(0.843)	(0.674)	(-0.369)	(0.896)	(0.900)	(0.427)	(-0.122)	(-0.009)
Aid*Institutions						-0.004						-0.013
						(-0.038)						(-0.090)
Log GDP per capita	24.12***	26.28***	26.28***	24.18***	21.87***	23.00***	27.58***	30.37***	30.24***	28.72***	25.67***	27.36***
	(6.284)	(7.000)	(7.000)	(6.541)	(5.548)	(5.721)	(6.381)	(7.076)	(7.084)	(6.655)	(5.769)	(5.641)
Log GDP per capita^2	-1.646***	-1.737***	-1.750***	-1.667***	-1.547***	-1.612***	-1.833***	-1.946***	-1.934***	-1.899***	-1.736***	-1.836***
	(-6.514)	(-6.806)	(-6.822)	(-6.721)	(-5.951)	(-5.912)	(-6.435)	(-6.658)	(-6.649)	(-6.487)	(-5.868)	(-5.524)
Avg. schooling years		-0.822***	-0.823***	-1.112***	-1.133***	-1.068***		-1.084***	-1.089***	-1.308***	-1.242***	-1.152***
		(-2.912)	(-2.950)	(-3.803)	(-4.068)	(-3.595)		(-3.336)	(-3.360)	(-3.919)	(-3.833)	(-3.402)
Rural population (%Total)			-0.0106	-0.0438**	-0.0385*	-0.0350			0.0045	-0.0284	-0.0138	-0.0094
			(-0.458)	(-1.982)	(-1.657)	(-1.510)			(0.182)	(-1.129)	(-0.522)	(-0.354)
Openness				0.0239**	0.0413***	0.0381***				0.0246**	0.0414***	0.0378***
				(2.331)	(3.637)	(3.259)				(1.976)	(3.121)	(2.760)
Log Inflation					0.923**	0.865**					1.022**	0.960**
					(2.260)	(2.068)					(2.310)	(2.113)
Survey type	-7.487***	-9.094***	-9.088***	-9.253***	-9.761***	-9.805***	-8.624***	-10.98***	-10.97***	-11.16***	-11.85***	-11.86***
	(-6.794)	(-8.475)	(-8.460)	(-8.801)	(-8.576)	(-8.561)	(-7.753)	(-9.899)	(-9.923)	(-10.31)	(-10.17)	(-10.05)
Constant	-32.52**	-41.42***	-40.16***	-26.69*	-19.48	-24.43	-54.49***	-65.60***	-65.57***	-53.93***	-43.88**	-51.17***
	(-2.233)	(-2.960)	(-2.823)	(-1.854)	(-1.257)	(-1.557)	(-3.315)	(-4.076)	(-4.008)	(-3.219)	(-2.498)	(-2.711)
Observations	369	309	309	297	271	271	414	343	343	327	297	297
F-statistics from first stage	24.68	22.11	22.20	19.18	17.72	-	25.39	23.03	22.85	19.95	19.40	-
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	-	0.0000	0.0000	0.0000	0.0000	0.0000	-
Hansen test (p-value)	0.0307	0.0772	0.0812	0.0753	0.0991	0.235	0.0472	0.0477	0.0459	0.0442	0.0638	0.0894

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. Exogenous instruments for aid include: log of total population, Franc zone, Central American countries, and Egypt dummies. Period dummies are included in all regressions, but not reported.

Table 2.5: Robustness to Sample Restrictions

Panel A: Survey quality better than 4

	Q1		Q2		Q3		Q4		Q5		Gini	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Aid	-0.155***	-0.158***	-0.086**	-0.090***	-0.026	-0.031	0.004	-0.013	0.283**	0.315**	0.485***	0.535***
	(-4.762)	(-5.376)	(-2.529)	(-2.689)	(-0.746)	(-0.852)	(0.091)	(-0.265)	(2.224)	(2.438)	(3.179)	(3.620)
Institutions	0.017	0.007	-0.015	-0.008	-0.103	-0.058	-0.158	0.025	0.272	0.049	-0.094	-0.389
	(0.208)	(0.063)	(-0.159)	(-0.069)	(-1.092)	(-0.499)	(-1.505)	(0.160)	(0.866)	(0.121)	(-0.272)	(-0.809)
Aid*Institutions		0.003		-0.002		-0.014		-0.057*		0.071		0.091
		(0.091)		(-0.079)		(-0.641)		(-1.798)		(0.868)		(0.827)
Observations	256	256	254	254	254	254	254	254	258	258	283	283
F-stat. from first stage	17.79	-	17.80	-	17.80	-	17.80	-	18.06	-	19.75	-
Hansen test (p-value)	0.155	0.208	0.114	0.0383	0.0558	0.113	0.0077	0.0132	0.0926	0.109	0.0633	0.0247

Panel B: Q5 less than 60%

	Q1		Q2		Q3		Q4		Q5		Gini	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Aid	-0.153***	-0.147***	-0.073**	-0.067**	-0.014	-0.005	0.041	0.033	0.223**	0.212*	0.440***	0.468***
	(-4.860)	(-4.721)	(-2.324)	(-2.086)	(-0.452)	(-0.148)	(1.027)	(0.815)	(2.036)	(1.897)	(3.176)	(3.230)
Institutions	0.035	-0.072	0.048	-0.077	0.029	-0.065	0.006	0.053	-0.080	0.180	-0.329	-0.093
	(0.388)	(-0.524)	(0.510)	(-0.574)	(0.322)	(-0.547)	(0.056)	(0.347)	(-0.252)	(0.418)	(-0.901)	(-0.161)
Aid*Institutions		0.033		0.039		0.030		-0.015		-0.083		-0.074
		(0.866)		(1.161)		(1.101)		(-0.487)		(-0.801)		(-0.477)
Observations	229	229	224	224	224	224	224	224	228	228	261	261
F-stat. from first stage	14.33	-	14.24	-	14.24	-	14.24	-	14.53	-	16.70	-
Hansen test (p-value)	0.144	0.534	0.0837	0.405	0.108	0.396	0.455	0.153	0.153	0.468	0.0635	0.164

Panel C: Aid higher than 1%, lower than 30%

	Q1		Q2		Q3		Q4		Q5		Gini	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Aid	-0.211***	-0.208***	-0.184***	-0.185**	-0.166***	-0.190**	-0.0807	-0.111*	0.655***	0.712***	0.937***	1.016***
	(-3.393)	(-3.401)	(-2.739)	(-2.426)	(-2.607)	(-2.472)	(-1.425)	(-1.946)	(3.125)	(2.940)	(4.033)	(4.081)
Institutions	0.032	-0.020	-0.045	0.021	-0.057	0.233	-0.231*	0.099	0.280	-0.369	-0.002	-0.774
	(0.227)	(-0.067)	(-0.293)	(0.069)	(-0.402)	(0.868)	(-1.790)	(0.437)	(0.576)	(-0.391)	(-0.004)	(-0.719)
Aid*Institutions		0.011		-0.014		-0.058		-0.066*		0.129		0.150
		(0.187)		(-0.255)		(-1.366)		(-1.782)		(0.819)		(0.770)
Observations	134	134	132	132	132	132	132	132	132	132	149	149
F-stat. from first stage	12.60	-	12.69	-	12.69	-	12.69	-	12.69	-	16.21	-
Hansen test (p-value)	0.0648	0.0827	0.0701	0.0705	0.116	0.242	0.330	0.658	0.0925	0.203	0.0477	0.0964

Panel D: Low and lower-middle income countries only

	Q1		Q2		Q3		Q4		Q5		Gini	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Aid	-0.165***	-0.173***	-0.132**	-0.136**	-0.099**	-0.102**	-0.033	-0.047	0.445***	0.474***	0.633***	0.672***
	(-3.506)	(-3.287)	(-2.572)	(-2.462)	(-2.133)	(-2.164)	(-0.828)	(-1.236)	(2.666)	(2.779)	(3.144)	(3.104)
Institutions	0.040	-0.177	0.060	-0.078	0.004	-0.012	-0.164	-0.013	0.088	0.297	0.283	0.661
	(0.236)	(-0.819)	(0.335)	(-0.341)	(0.025)	(-0.060)	(-0.821)	(-0.070)	(0.142)	(0.428)	(0.392)	(0.780)
Aid*Institutions		0.039		0.025		0.003		-0.029		-0.037		-0.069
		(0.985)		(0.700)		(0.096)		(-1.388)		(-0.342)		(-0.457)
Observations	114	114	114	114	114	114	114	114	115	115	123	123
F-stat. from first stage	10.32	-	10.21	-	10.21	-	10.21	-	10.38	-	11.21	-
Hansen test (p-value)	0.0762	0.458	0.0961	0.267	0.329	0.549	0.371	0.209	0.261	0.447	0.243	0.483

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. Exogenous instruments for aid include: log of total population, Franc zone, Central American countries, and Egypt dummies. All control variables and period dummies are included in all regressions, but not reported.

Table 2.6: Regression Estimates of the Impact of Tied Aid and Institutions on Income Distribution and Inequality

	Q1		Q2		Q3		Q4		Q5		Gini	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Tied Aid	-0.358***	-0.344***	-0.243***	-0.246***	-0.134*	-0.132**	-0.048	-0.053	0.829***	0.814***	1.153***	1.185***
	(-6.029)	(-5.763)	(-3.770)	(-3.903)	(-1.924)	(-2.001)	(-0.492)	(-0.568)	(3.265)	(3.425)	(3.806)	(4.217)
Institutions	0.020	-0.036	-0.039	-0.050	-0.156	-0.097	-0.186*	0.063	0.369	0.132	0.010	-0.209
	(0.207)	(-0.224)	(-0.373)	(-0.324)	(-1.523)	(-0.712)	(-1.687)	(0.359)	(1.059)	(0.271)	(0.027)	(-0.352)
Tied Aid*Institutions		0.025		0.005		-0.027		-0.111**		0.107		0.010
		(0.359)		(0.083)		(-0.654)		(-2.013)		(0.655)		(0.429)
Log GDP per capita	-7.124***	-7.248***	-7.342***	-7.421***	-6.274***	-5.957***	-3.175**	-1.991	23.93***	22.57***	28.15***	27.39***
	(-6.332)	(-5.669)	(-5.960)	(-5.767)	(-4.949)	(-4.840)	(-2.052)	(-1.389)	(5.227)	(5.057)	(5.390)	(4.989)
Log GDP per capita^2	0.431***	0.443***	0.488***	0.493***	0.457***	0.435***	0.266***	0.180**	-1.647***	-1.552***	-1.869***	-1.809***
	(5.610)	(5.132)	(5.881)	(5.678)	(5.517)	(5.316)	(2.864)	(1.989)	(-5.515)	(-5.229)	(-5.464)	(-4.886)
Avg. schooling years	0.197**	0.190**	0.313***	0.310***	0.294***	0.307***	0.239***	0.288***	-0.948***	-1.003***	-1.060***	-1.086***
	(2.478)	(2.367)	(3.508)	(3.432)	(3.402)	(3.548)	(3.089)	(3.570)	(-3.254)	(-3.471)	(-3.047)	(-3.196)
Rural population (%Total)	0.0027	0.0024	0.0124**	0.0123**	0.0198***	0.0200***	0.0225***	0.0236***	-0.0609***	-0.0620***	-0.0480*	-0.0498**
	(0.405)	(0.370)	(2.049)	(2.033)	(3.174)	(3.203)	(3.394)	(3.408)	(-2.878)	(-2.918)	(-1.905)	(-1.971)
Openness	-0.0029	-0.0035	-0.0080**	-0.0080**	-0.0102***	-0.0100***	-0.0077**	-0.0066*	0.0285**	0.0279**	0.0282**	0.0264*
	(-0.995)	(-1.288)	(-2.427)	(-2.431)	(-3.137)	(-3.008)	(-2.369)	(-1.878)	(2.499)	(2.411)	(2.064)	(1.924)
Log Inflation	-0.097	-0.117	-0.196	-0.197	-0.246**	-0.235**	-0.263**	-0.209*	0.764*	0.725*	0.872*	0.808
	(-0.837)	(-1.076)	(-1.584)	(-1.619)	(-2.111)	(-1.993)	(-2.335)	(-1.741)	(1.778)	(1.703)	(1.746)	(1.627)
Survey type	2.432***	2.414***	2.662***	2.656***	2.503***	2.530***	1.511***	1.620***	-9.017***	-9.134***	-10.84***	-10.91***
	(9.550)	(9.054)	(8.761)	(8.586)	(7.350)	(7.505)	(3.488)	(4.014)	(-7.639)	(-7.860)	(-8.613)	(-8.780)
Constant	32.68***	33.08***	34.22***	34.54***	32.19***	30.94***	27.23***	22.65***	-26.57	-21.16	-51.59**	-48.79**
	(7.401)	(6.462)	(6.967)	(6.719)	(6.229)	(6.224)	(4.056)	(3.743)	(-1.420)	(-1.175)	(-2.411)	(-2.226)
Observations	229	229	227	227	227	227	227	227	231	231	252	252
F-statistics from first stage	21.67	-	21.63	-	21.63	-	21.63	-	22.03	-	23.75	-
p-value	0.0000	-	0.0000	-	0.0000	-	0.0000	-	0.0000	-	0.0000	-
Hansen test (p-value)	0.161	0.252	0.0989	0.0367	0.0670	0.108	0.00523	0.0121	0.113	0.104	0.122	0.0583

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. Exogenous instruments for aid include: log of total population, Franc zone, Central American countries, and Egypt dummies. Period dummies are included in all regressions, but not reported.

Table 2.7: Regression Estimates of the Impact of Untied Aid and Institutions on Income Distribution and Inequality

	Q1		Q2		Q3		Q4		Q5		Gini	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Untied Aid	-0.511***	-0.516***	-0.313**	-0.319***	-0.131	-0.128	-0.007	-0.006	1.058**	1.067**	1.505***	1.603***
	(-4.084)	(-4.061)	(-2.546)	(-2.637)	(-1.094)	(-1.096)	(-0.0454)	(-0.0362)	(2.307)	(2.429)	(2.665)	(2.944)
Institutions	-0.002	-0.098	-0.049	-0.095	-0.159	-0.135	-0.186*	0.014	0.408	0.320	0.087	0.051
	(-0.018)	(-0.628)	(-0.451)	(-0.654)	(-1.507)	(-1.018)	(-1.672)	(0.078)	(1.119)	(0.673)	(0.217)	(0.088)
Untied Aid*Institutions		0.096		0.047		-0.025		-0.205		0.092		0.043
		(0.607)		(0.398)		(-0.294)		(-1.565)		(0.270)		(0.084)
Log GDP per capita	-6.140***	-6.547***	-6.477***	-6.693***	-5.573***	-5.457***	-2.732**	-1.921	20.97***	20.66***	23.74***	24.14***
	(-4.803)	(-5.107)	(-5.018)	(-5.301)	(-4.563)	(-4.622)	(-1.994)	(-1.385)	(4.567)	(4.710)	(4.347)	(4.352)
Log GDP per capita^2	0.382***	0.411***	0.442***	0.457***	0.420***	0.412***	0.244***	0.186**	-1.496***	-1.473***	-1.637***	-1.659***
	(4.428)	(4.788)	(5.116)	(5.393)	(5.209)	(5.224)	(2.890)	(2.073)	(-4.947)	(-5.018)	(-4.543)	(-4.429)
Avg. schooling years	0.229***	0.189*	0.346***	0.327***	0.317***	0.327***	0.242***	0.323***	-1.039***	-1.073***	-1.196***	-1.191***
	(2.654)	(1.873)	(3.755)	(3.204)	(3.637)	(3.500)	(3.033)	(3.297)	(-3.393)	(-3.249)	(-3.308)	(-3.088)
Rural population (%Total)	-0.0046	-0.0052	0.0078	0.0075	0.0177***	0.0178***	0.0217***	0.0227***	-0.0449**	-0.0452**	-0.0263	-0.0253
	(-0.649)	(-0.732)	(1.211)	(1.175)	(2.742)	(2.776)	(3.174)	(3.255)	(-1.966)	(-1.982)	(-0.950)	(-0.911)
Openness	-0.0046	-0.0047	-0.0097***	-0.0098***	-0.0119***	-0.0119***	-0.0091***	-0.0087**	0.0346***	0.0343***	0.0367**	0.0352**
	(-1.320)	(-1.456)	(-2.657)	(-2.737)	(-3.540)	(-3.489)	(-2.914)	(-2.396)	(2.774)	(2.717)	(2.500)	(2.359)
Log Inflation	-0.095	-0.096	-0.208	-0.208	-0.275**	-0.276**	-0.305***	-0.299**	0.829*	0.822*	0.959*	0.912*
	(-0.748)	(-0.779)	(-1.586)	(-1.589)	(-2.277)	(-2.283)	(-2.625)	(-2.479)	(1.818)	(1.817)	(1.801)	(1.720)
Survey type	2.893***	2.843***	2.960***	2.938***	2.648***	2.659***	1.552***	1.662***	-10.03***	-10.09***	-12.24***	-12.30***
	(10.18)	(9.756)	(8.896)	(8.665)	(7.372)	(7.330)	(3.863)	(4.330)	(-7.990)	(-8.012)	(-9.243)	(-9.124)
Constant	28.04***	29.78***	30.22***	31.14***	29.01***	28.51***	25.27***	21.80***	-12.91	-11.57	-31.51	-33.28
	(5.512)	(5.659)	(5.835)	(6.108)	(5.849)	(5.988)	(4.300)	(3.798)	(-0.688)	(-0.653)	(-1.421)	(-1.493)
Observations	229	229	227	227	227	227	227	227	231	231	252	252
F-statistics from first stage	9.859	-	9.917	-	9.917	-	9.917	-	10.03	-	11.07	-
p-value	0.0000	-	0.0000	-	0.0000	-	0.0000	-	0.0000	-	0.0000	-
Hansen test (p-value)	0.130	0.171	0.0745	0.0337	0.0424	0.0870	0.0216	0.0668	0.0678	0.0860	0.0763	0.0452

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. Exogenous instruments for aid include: log of total population, Franc zone, Central American countries, and Egypt dummies. Period dummies are included in all regressions, but not reported.

Table 3.1: Summary Statistics for Essay 2 (five-year averaged)

	Observations	Mean	Standard Deviation	Minimum	Maximum
HDI	372	0.52	0.15	0.17	0.83
Health index	400	0.67	0.15	0.27	0.95
Education index	400	0.44	0.17	0.03	0.86
Infant mortality	395	61.21	38.98	5.40	173.50
Avg. schooling years	322	4.48	2.09	0.34	10.84
Aid/GDP	377	5.81	8.27	-0.03	53.51
Health aid/GDP	352	0.58	0.83	2.65E-06	4.50
Education aid/GDP	361	0.32	0.53	5.5E-05	5.85
Bilateral aid/GDP	375	3.78	5.23	0.00092	34.79
Multilateral aid/GDP	304	1.77	2.53	5.49E-06	15.71
Corruption	400	2.68	1.02	0	6
Rule of Law	400	3.04	1.22	0.73	6
Bureaucratic quality	400	1.75	0.98	0	4
GDP per capita ($US)	386	2911.39	4770.27	83.00	39088.18
Total population	400	4.75E+07	1.62E+08	204972	1.28E+09
PPE	161	6.57	2.56	0.80	12.93
Tax revenue	200	15.60	6.31	0.93	41.42

Table 3.2: Correlations for Essay 2 (five-year averaged)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1)	HDI	1																
(2)	Health index	0.914	1															
(3)	Education index	0.939	0.787	1														
(4)	Infant mortality	-0.893	-0.952	-0.807	1													
(5)	Avg. schooling years	0.890	0.795	0.901	-0.807	1												
(6)	Aid/GDP	-0.578	-0.584	-0.487	0.569	-0.523	1											
(7)	Health aid/GDP	-0.539	-0.530	-0.446	0.503	-0.491	0.897	1										
(8)	Education aid/GDP	-0.460	-0.475	-0.310	0.455	-0.406	0.688	0.700	1									
(9)	Bilateral aid/GDP	-0.507	-0.505	-0.404	0.488	-0.458	0.940	0.832	0.681	1								
(10)	Multilateral aid/GDP	-0.471	-0.478	-0.361	0.462	-0.390	0.899	0.813	0.644	0.850	1							
(11)	Corruption	0.370	0.416	0.308	-0.459	0.266	-0.102	-0.027	-0.174	-0.019	-0.096	1						
(12)	Rule of Law	0.451	0.455	0.337	-0.444	0.376	-0.331	-0.221	-0.298	-0.297	-0.369	0.504	1					
(13)	Bureaucratic quality	0.291	0.325	0.250	-0.385	0.263	-0.410	-0.249	-0.324	-0.337	-0.412	0.540	0.457	1				
(14)	GDP per capita ($US)	0.771	0.611	0.714	-0.612	0.690	-0.404	-0.382	-0.389	-0.412	-0.375	0.287	0.461	0.275	1			
(15)	Total population	-0.208	-0.118	-0.225	0.145	-0.090	-0.186	-0.136	-0.151	-0.170	-0.141	-0.044	0.051	0.274	-0.199	1		
(16)	PPE	0.152	0.238	0.125	-0.225	0.186	-0.041	-0.112	0.012	0.019	-0.009	0.090	0.154	-0.031	0.023	0.001	1	
(17)	Tax revenue	-0.118	-0.131	-0.042	0.081	-0.067	0.203	0.118	0.305	0.265	0.259	-0.046	-0.171	-0.193	-0.181	-0.241	0.442	1

Table 3.3: Regression Estimates of the Impact of Aid and Institutions on Human Welfare

	HDI				Health Index				Infant Mortality			
	OLS		2SLS		OLS		2SLS		OLS		2SLS	
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Aid	0.0007	0.0009	0.0525***	0.0734***	0.0073	0.0073	0.0593***	0.0647***	-0.0353***	-0.0346***	-0.239***	-0.288***
	(0.114)	(0.141)	(2.852)	(3.065)	(0.979)	(0.971)	(3.247)	(3.173)	(-3.219)	(-3.124)	(-4.188)	(-4.280)
Institutions	0.0075***	0.0015	0.0056**	0.0345**	7.25e-05	0.0028	-0.0018	0.0139	-0.0011	-0.00835	0.0084	-0.0503
	(3.101)	(0.381)	(2.181)	(2.504)	(0.0305)	(0.670)	(-0.699)	(1.073)	(-0.233)	(-1.096)	(1.255)	(-1.193)
Aid*Institutions		0.0041		-0.0201**		-0.0017		-0.0102		0.00441		0.0371
		(1.338)		(-2.296)		(-0.713)		(-1.234)		(1.241)		(1.496)
Lagged dependent variable	0.925***	0.919***	0.942***	0.983***	0.998***	1.002***	1.033***	1.058***	1.043***	1.042***	1.104***	1.106***
	(54.54)	(48.50)	(48.57)	(39.73)	(32.04)	(31.58)	(33.37)	(32.92)	(67.45)	(66.88)	(44.07)	(37.56)
GDP per capita	0.0146**	0.0172***	0.0511***	0.0536***	0.0077	0.0068	0.0421***	0.0405***	-0.052***	-0.0518***	-0.186***	-0.217***
	(2.574)	(2.992)	(3.758)	(3.146)	(1.548)	(1.334)	(3.017)	(2.751)	(-5.517)	(-5.436)	(-4.865)	(-4.771)
Population	0.0063***	0.0065***	0.0222***	0.0278***	0.0074***	0.0073***	0.0224***	0.0238***	-0.0238***	-0.0237***	-0.0868***	-0.103***
	(2.941)	(3.139)	(3.813)	(3.762)	(3.268)	(3.232)	(3.863)	(3.704)	(-4.465)	(-4.407)	(-4.855)	(-4.874)
Constant	-0.211***	-0.236***	-0.787***	-0.902***	-0.134*	-0.126*	-0.710***	-0.720***	0.515***	0.518***	2.501***	3.058***
	(-2.604)	(-2.982)	(-3.750)	(-3.422)	(-1.874)	(-1.738)	(-3.334)	(-3.156)	(3.582)	(3.599)	(4.349)	(4.370)
Observations	284	284	284	284	306	306	306	306	303	303	303	303
R-squared	0.986	0.986			0.956	0.956			0.984	0.984		
F-statistics from first stage	-	-	7.02	-	-	-	8.78	-	-	-	6.88	-
p-value	-	-	0.0001	-	-	-	0.0000	-	-	-	0.0002	-
Hansen test (p-value)	-	-	0.803	0.577	-	-	0.0540	0.0492	-	-	0.463	0.651

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. All variables are in logs, except Institutions. Exogenous instruments include: Franc zone, Central American countries, and Egypt dummies. Period dummies are included in all regressions, but not reported.

Table 3.3: Regression Estimates of the Impact of Aid and Institutions on Human Welfare (continued)

	Education Index				Avg. Schooling Years			
	OLS		2SLS		OLS		2SLS	
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Aid	-0.00546	-0.00535	0.0382	0.0642*	-0.00340	-0.00159	0.141**	0.150**
	(-0.796)	(-0.771)	(1.476)	(1.920)	(-0.345)	(-0.162)	(2.285)	(2.275)
Institutions	0.00326	0.00207	0.0021	0.0304	0.00686	-0.00464	-0.0007	0.003
	(0.875)	(0.493)	(0.541)	(1.118)	(1.393)	(-0.756)	(-0.103)	(0.113)
Aid*Institutions		0.000746		-0.0182		0.00698**		-0.0026
		(0.241)		(-1.055)		(2.176)		(-0.162)
Lagged dependent variable	0.890***	0.890***	0.897***	0.904***	0.897***	0.897***	0.911***	0.912***
	(62.73)	(62.30)	(57.53)	(55.36)	(53.60)	(54.35)	(42.44)	(41.37)
GDP per capita	0.0126**	0.0128**	0.0443**	0.0587**	0.0224**	0.0250***	0.132***	0.138***
	(2.197)	(2.229)	(2.299)	(2.555)	(2.424)	(2.710)	(2.765)	(2.771)
Population	-0.00104	-0.00102	0.0123	0.0207**	0.00404	0.00453	0.0508**	0.0539**
	(-0.413)	(-0.408)	(1.507)	(1.990)	(0.911)	(1.023)	(2.484)	(2.467)
Constant	-0.0704	-0.0724	-0.557*	-0.830**	0.00939	-0.0158	-1.755**	-1.869**
	(-0.844)	(-0.864)	(-1.872)	(-2.227)	(0.0720)	(-0.122)	(-2.331)	(-2.335)
Observations	306	306	306	306	250	250	250	250
R-squared	0.983	0.983			0.975	0.975		
F-statistics from first stage	-	-	6.65	-	-	-	6.97	-
p-value	-	-	0.0002	-	-	-	0.0002	-
Hansen test (p-value)	-	-	0.0474	0.569	-	-	0.158	0.243

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. All variables are in logs, except Institutions. Exogenous instruments include: Franc zone, Central American countries, and Egypt dummies. Period dummies are included in all regressions, but not reported.

Table 3.4: Regression Estimates of the Impact of Aid and Institutions on Human Welfare (by Sector)

	Health Index		Infant Mortality		Education Index		Avg. Schooling Years	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Health aid	0.0296***	0.0363***	-0.0744***	-0.0814***				
	(4.955)	(3.687)	(-5.710)	(-5.255)				
Health aid*Institutions		-0.0109**		0.0104				
		(-2.244)		(1.077)				
Institutions	-0.0008	-0.0209**	0.0054	0.0223	0.0028	0.0057	0.0063	0.0255
	(-0.255)	(-2.281)	(0.780)	(1.501)	(0.704)	(0.280)	(1.107)	(1.529)
Education aid					-0.007	-0.0073	0.0200	0.0238
					(-0.705)	(-0.608)	(1.044)	(1.089)
Education aid*Institutions						0.0012		0.0084
						(0.154)		(1.306)
Lagged dependent variable	0.969***	1.031***	1.073***	1.073***	0.892***	0.891***	0.886***	0.879***
	(32.08)	(27.20)	(47.44)	(48.41)	(61.81)	(57.30)	(46.81)	(44.66)
GDP per capita	0.055***	0.0459***	-0.127***	-0.132***	0.0067	0.0076	0.0573*	0.0718**
	(4.774)	(2.778)	(-6.986)	(-6.574)	(0.438)	(0.487)	(1.785)	(2.054)
Population	0.0168***	0.0165***	-0.0416***	-0.0429***	-0.003	-0.0031	0.0165	0.0193
	(4.463)	(3.568)	(-5.370)	(-5.379)	(-0.554)	(-0.506)	(1.478)	(1.551)
Constant	-0.609***	-0.513***	1.029***	1.089***	-0.0094	-0.0135	-0.408	-0.531
	(-4.586)	(-2.868)	(4.330)	(4.366)	(-0.0532)	(-0.0735)	(-1.153)	(-1.364)
Observations	289	289	286	286	300	300	250	250
F-statistics from first stage	15.09	-	17.29	-	20.12	-	16.67	-
p-value	0.0000	-	0.0000	-	0.0000	-	0.0000	-
Hansen test (p-value)	0.454	0.413	0.130	0.214	0.0581	0.124	0.00200	0.00496

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. All variables are in logs, except Institutions. Exogenous instruments include: Franc zone, Central American countries, and Egypt dummies. Period dummies are included in all regressions, but not reported.

Table 3.5: Regression Estimates of the Impact of Bilateral Aid and Institutions on Human Welfare

	HDI		Health Index		Infant Mortality		Education Index		Avg. Schooling Years	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Bilateral aid	0.0203***	0.042***	0.0357***	0.0507***	-0.093***	-0.125***	0.0046	0.0132	0.0345*	0.0437
	(3.981)	(3.136)	(4.939)	(3.798)	(-6.305)	(-5.150)	(0.495)	(0.740)	(1.834)	(1.640)
Institutions	0.0064**	0.026**	-0.0024	0.015	0.0048	-0.0284	0.0033	0.012	0.0091	0.0166
	(2.338)	(2.498)	(-0.740)	(1.598)	(0.786)	(-1.552)	(0.752)	(0.814)	(1.577)	(1.195)
Bilateral aid*Institutions		-0.0241**		-0.0205**		0.0372**		-0.0099		-0.0088
		(-2.504)		(-1.985)		(2.139)		(-0.598)		(-0.620)
Observations	236	236	251	251	251	251	251	251	212	212
F-statistics from first stage	20.02	-	18.66	-	19.71	-	20.69	-	20.99	-
p-value	0.0000	-	0.0000	-	0.0000	-	0.0000	-	0.0000	-
Hansen test (p-value)	0.719	0.773	0.177	0.364	0.279	0.322	0.035	0.211	0.0103	0.0478

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. All variables are in logs, except Institutions. Exogenous instruments include: Franc zone, Central American countries, and Egypt dummies. All control variables and period dummies are included in all regressions, but not reported.

Table 3.6: Regression Estimates of the Impact of Multilateral Aid and Institutions on Human Welfare

	HDI		Health Index		Infant Mortality		Education Index		Avg. Schooling Years	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Multilateral aid	0.0148***	0.0248**	0.0359***	0.0427***	-0.0706***	-0.0789***	-0.0053	-0.0052	0.0003	-0.0128
	(2.843)	(2.551)	(3.739)	(3.262)	(-3.918)	(-3.933)	(-0.820)	(-0.504)	(0.0243)	(-0.721)
Institutions	0.0069**	-0.0026	-0.0014	-0.011	0.001	0.0128	0.0037	0.0022	0.0106*	0.0206**
	(2.545)	(-0.497)	(-0.381)	(-1.606)	(0.145)	(1.295)	(0.848)	(0.241)	(1.933)	(2.208)
Multilateral aid*Institutions		-0.0112**		-0.0116*		0.0163		-0.0019		0.0137
		(-2.057)		(-1.731)		(1.390)		(-0.205)		(1.457)
Observations	236	236	251	251	251	251	251	251	212	212
F-statistics from first stage	7.42	-	5.61	-	7.03	-	8.00	-	6.71	-
p-value	0.0001	-	0.0010	-	0.0001	-	0.0000	-	0.0002	-
Hansen test (p-value)	0.260	0.571	0.417	0.426	0.0836	0.189	0.0581	0.155	0.00409	0.0239

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. All variables are in logs, except Institutions. Exogenous instruments include: Franc zone, Central American countries, and Egypt dummies. All control variables and period dummies are included in all regressions, but not reported.

Table 3.7: Regression Estimates of the Impact of Aid and Institutions on Human Welfare Considering PPE

	HDI				Health Index				Infant Mortality			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Aid	0.0385***	0.0340**	0.0369***	0.0267**	0.0389**	0.0361*	0.0363**	0.0423**	-0.172***	-0.177***	-0.176***	-0.180***
	(2.690)	(2.478)	(2.632)	(2.129)	(2.227)	(1.923)	(2.024)	(2.281)	(-4.333)	(-4.211)	(-4.246)	(-4.210)
Institutions	0.009***	0.0075***	0.0083***	-0.009	0.0028	0.0025	0.0027	0.0092	-0.0046	-0.0049	-0.0046	0.0336**
	(2.832)	(2.595)	(2.797)	(-1.187)	(0.833)	(0.806)	(0.829)	(1.439)	(-0.597)	(-0.653)	(-0.606)	(2.267)
PPE		0.0157**				0.0075				0.0093		
		(2.063)				(0.666)				(0.462)		
PPEresid			0.0171**	0.0144			0.0125	0.0123			0.0154	0.0201
			(1.993)	(1.518)			(0.935)	(0.896)			(0.638)	(0.815)
Aid*Institutions				0.0173				-0.0066				-0.0563
				(0.815)				(-1.136)				(-1.377)
Observations	123	123	123	123	127	127	127	127	127	127	127	127
F-statistics from first stage	6.51	6.56	6.48	-	6.75	6.62	6.66	-	5.74	5.46	5.51	-
p-value	0.0004	0.0004	0.0004	-	0.0003	0.0004	0.0003	-	0.0011	0.0015	0.0014	-
Hansen test (p-value)	0.425	0.713	0.731	0.833	0.196	0.303	0.442	0.247	0.0917	0.0835	0.0800	0.524

	Education Index				Avg. Schooling Years			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Aid	0.0423*	0.0416*	0.0417*	0.0169	0.119*	0.114*	0.118*	0.0786
	(1.819)	(1.788)	(1.791)	(0.798)	(1.819)	(1.703)	(1.796)	(1.456)
Institutions	0.0066	0.006	0.0062	-0.0451***	0.009	0.0073	0.0081	-0.0168
	(1.305)	(1.187)	(1.236)	(-3.564)	(0.933)	(0.806)	(0.868)	(-1.071)
PPE		0.0076				0.0138		
		(0.656)				(0.637)		
PPEresid			0.0126	0.0044			0.0101	-0.0007
			(0.937)	(0.272)			(0.480)	(-0.037)
Aid*Institutions				0.0720				0.0077
				(1.200)				(0.237)
Observations	127	127	127	127	109	109	109	109
F-statistics from first stage	6.51	6.63	6.52	-	6.96	6.28	6.53	-
p-value	0.0004	0.0004	0.0004	-	0.0003	0.0006	0.0005	-
Hansen test (p-value)	0.134	0.148	0.148	0.279	0.323	0.336	0.333	0.211

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. All variables are in logs, except Institutions. Exogenous instruments include: Franc zone, Central American countries, and Egypt dummies. All control variables and period dummies are included in all regressions, but not reported.

Appendix A: Countries Included in the Analysis in Essay 1

Low Income	Lower Middle Income	Upper Middle Income	High Income
Ethiopia	Bolivia	Algeria	Israel
Gambia	Cameroon	Argentina	Korea, Rep.
Haiti	Cote d'Ivoire	Botswana	Slovenia
Kenya	Egypt	Brazil	Trinidad and Tobago
Madagascar	El Salvador	Chile	Bahamas
Malawi	Ghana	Colombia	Croatia
Mali	Guatemala	Costa Rica	Cyprus
Niger	Guyana	Dominican Republic	Hong Kong SAR, China
Sierra Leone	Honduras	Ecuador	Malta
Tanzania	India	Gabon	Singapore
Zimbabwe	Indonesia	Jamaica	
Bangladesh	Morocco	Malaysia	
Burkina Faso	Nicaragua	Mexico	
Guinea	Nigeria	Peru	
Guinea-Bissau	Pakistan	Thailand	
Liberia	Paraguay	Tunisia	
Mozambique	Philippines	Turkey	
Uganda	Senegal	Uruguay	
	Sri Lanka	Venezuela	
	Zambia	Albania	
	Armenia	Azerbaijan	
	Iraq	China	
	Moldova	Iran	
	Mongolia	Jordan	
	Papua New Guinea	Namibia	
	Sudan	Panama	
	Vietnam	South Africa	
	Yemen	Suriname	
		Kazakhstan	

Appendix B: Variable Descriptions and Sources for Essay 1

Variable	Description	Source
Q1-Q5	Income share captured by each fifth of the population ordered according to the size of their incomes. Expressed as percentage of total income.	UNU/WIDER (2008)
Gini coefficient	Income inequality given as a percentage.	UNU/WIDER (2008)
Aid	Net Official Development Assistance (ODA) disbursement in current units as a share of GDP in current units.	OECD (2012b) and World Bank (2010)
Tied aid	Sectoral aid commitment in current units as a share of GDP in current units.	OECD (2012a) and World Bank (2010)
Untied aid	Non-sectoral aid commitment in current units as a share of GDP in current units.	OECD (2012a) and World Bank (2010)
Corruption	Corruption index, ranging from 0 to 6. Higher rating reflects lower corruption.	PRS Group (2008)
Rule of law	Rule of law index, ranging from 0 to 6. Higher rating corresponds to better quality of the rule of law.	PRS Group (2008)
Bureaucracy	Bureaucratic quality index, ranging from 0 to 4. Higher rating corresponds to better quality of bureaucracy.	PRS Group (2008)
Population	Total population	World Bank (2010)
GDP per capita	Gross domestic product divided by midyear population, in constant 2000 U.S. dollars.	World Bank (2010)
Rural population (%total)	People living in rural areas as a percentage of total population.	World Bank (2010)
Inflation rate	Inflation rate based on annual percentage change in the consumer price index.	World Bank (2010)
Openness	Sum of exports and imports of goods and services as a percentage of GDP.	World Bank (2010) and Author's Calculation
Average schooling years	Average years of schooling in the total population aged 15 and over.	Barro and Lee (2000)
Survey type	Conceptual measurement of each quintile and Gini coefficient, 1 being consumption-based and 0 being income-based.	UNU/WIDER (2008)

Appendix C: Regression Estimates of the Impact of Aid and Institutions on Income Distribution and Inequality (Additional)

	Q1						Q2					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Aid	-0.176***	-0.177***	-0.183***	-0.162***	-0.152***	-0.160***	-0.160***	-0.162***	-0.157***	-0.113***	-0.084**	-0.098***
	(-5.836)	(-6.198)	(-5.708)	(-4.943)	(-4.683)	(-5.005)	(-4.226)	(-4.532)	(-4.049)	(-3.062)	(-2.353)	(-2.713)
Institutions	0.036	0.036	0.032	0.136	0.013	-0.056	0.028	0.028	0.038	0.150	-0.012	-0.074
	(0.473)	(0.473)	(0.377)	(1.503)	(0.154)	(-0.443)	(0.315)	(0.311)	(0.392)	(1.495)	(-0.127)	(-0.572)
Aid*Institutions						0.023						0.020
						(0.608)						(0.592)
Log GDP per capita	-5.674***	-5.692***	-6.073***	-5.228***	-5.963***	-6.454***	-7.401***	-7.419***	-7.337***	-6.080***	-6.598***	-7.156***
	(-6.431)	(-6.452)	(-6.431)	(-5.345)	(-6.152)	(-6.344)	(-6.704)	(-6.737)	(-6.568)	(-5.491)	(-6.134)	(-6.291)
Log GDP per capita^2	0.353***	0.354***	0.381***	0.333***	0.368***	0.401***	0.497***	0.498***	0.496***	0.428***	0.451***	0.487***
	(5.917)	(5.835)	(5.827)	(5.001)	(5.570)	(5.765)	(6.698)	(6.727)	(6.615)	(5.769)	(6.209)	(6.274)
Rural population (%Total)		-0.0002	0.0008	0.0043	-0.0046	-0.0053		0.0007	0.0029	0.0073	0.0067	0.0056
		(-0.0224)	(0.105)	(0.515)	(-0.701)	(-0.812)		(0.0829)	(0.334)	(0.827)	(1.043)	(0.874)
Openness			0.0019	0.0004	-0.0054*	-0.0053*			-0.0002	-0.0032	-0.0117***	-0.0112***
			(0.618)	(0.115)	(-1.858)	(-1.926)			(-0.062)	(-0.911)	(-3.545)	(-3.413)
Log Inflation				0.0508	-0.178*	-0.181*				0.00301	-0.247**	-0.244**
				(0.394)	(-1.697)	(-1.719)				(0.012)	(-2.089)	(-2.010)
Avg. schooling years					0.197***	0.169**					0.355***	0.323***
					(2.796)	(2.248)					(4.264)	(3.658)
Survey type	1.963***	1.964***	2.025***	2.241***	2.631***	2.605***	2.187***	2.188***	2.193***	2.531***	2.890***	2.870***
	(8.132)	(8.111)	(8.387)	(8.958)	(10.98)	(10.43)	(7.381)	(7.379)	(7.396)	(8.187)	(9.710)	(9.349)
Constant	27.18***	27.28***	28.29***	24.71***	28.84***	30.77***	35.63***	35.64***	34.81***	29.26***	31.55***	33.80***
	(8.312)	(8.090)	(7.846)	(6.567)	(7.787)	(7.888)	(8.637)	(8.214)	(7.844)	(6.676)	(7.603)	(7.698)
Observations	369	369	356	325	271	271	359	359	349	319	267	267
F-statistics from first stage	24.50	25.18	22.77	21.08	17.43	-	24.71	25.43	23.90	21.08	17.46	-
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	-	0.0000	0.0000	0.0000	0.0000	0.0000	-
Hansen test (p-value)	0.0795	0.0817	0.0832	0.0403	0.157	0.350	0.0342	0.0343	0.0277	0.00389	0.147	0.116

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. Exogenous instruments for aid include: log of total population, Franc zone, Central American countries, and Egypt dummies. Period dummies are included in all regressions, but not reported.

Appendix C: Regression Estimates of the Impact of Aid and Institutions on Income Distribution and Inequality (Additional -continued)

	Q3						Q4					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Aid	-0.120***	-0.122***	-0.101***	-0.063	-0.026	-0.042	-0.069	-0.068*	-0.047	-0.040	0.003	-0.023
	(-2.987)	(-3.267)	(-2.581)	(-1.559)	(-0.686)	(-1.114)	(-1.574)	(-1.673)	(-1.053)	(-0.841)	(0.0687)	(-0.466)
Institutions	-0.088	-0.089	-0.053	0.053	-0.094	-0.112	-0.164*	-0.164*	-0.148	-0.070	-0.176*	-0.052
	(-0.996)	(-1.002)	(-0.559)	(0.530)	(-0.967)	(-0.910)	(-1.760)	(-1.761)	(-1.527)	(-0.691)	(-1.688)	(-0.351)
Aid*Institutions						0.005						-0.043
						(0.184)						(-1.224)
Log GDP per capita	-7.191***	-7.197***	-7.004***	-5.950***	-6.026***	-6.380***	-4.526***	-4.506***	-4.143***	-3.531***	-3.482***	-3.203**
	(-5.994)	(-6.027)	(-5.854)	(-4.928)	(-5.453)	(-5.622)	(-3.925)	(-3.935)	(-3.628)	(-2.809)	(-2.699)	(-2.556)
Log GDP per capita^2	0.507***	0.508***	0.504***	0.445***	0.445***	0.467***	0.337***	0.337***	0.321***	0.281***	0.291***	0.265***
	(6.313)	(6.434)	(6.443)	(5.656)	(6.089)	(6.077)	(4.452)	(4.562)	(4.477)	(3.619)	(3.616)	(3.207)
Rural population (%Total)		0.0013	0.0043	0.0079	0.0148**	0.0139**		0.0009	0.0048	0.0042	0.0192***	0.0185**
		(0.134)	(0.449)	(0.842)	(2.194)	(2.056)		(0.0923)	(0.503)	(0.433)	(2.594)	(2.538)
Openness			-0.0026	-0.0044	-0.0136***	-0.0129***			-0.0038	-0.0023	-0.0106***	-0.0088**
			(-0.786)	(-1.131)	(-4.170)	(-3.814)			(-1.340)	(-0.653)	(-3.265)	(-2.502)
Log Inflation				-0.026	-0.269**	-0.256**				-0.065	-0.267**	-0.225**
				(-0.165)	(-2.367)	(-2.189)				(-0.487)	(-2.471)	(-2.005)
Avg. schooling years					0.368***	0.347***					0.287***	0.302***
					(4.272)	(3.846)					(3.779)	(3.612)
Survey type	2.131***	2.131***	2.128***	2.361***	2.656***	2.660***	1.305***	1.303***	1.266***	1.395***	1.594***	1.676***
	(6.575)	(6.582)	(6.507)	(6.919)	(7.923)	(7.833)	(3.730)	(3.730)	(3.564)	(3.724)	(4.110)	(4.548)
Constant	37.59***	37.48***	36.00***	31.47***	31.48***	32.99***	34.50***	34.32***	32.28***	30.32***	28.64***	27.85***
	(8.386)	(7.798)	(7.357)	(6.402)	(7.229)	(7.401)	(7.835)	(7.216)	(6.608)	(5.659)	(5.337)	(5.469)
Observations	359	359	349	319	267	267	359	359	349	319	267	267
F-statistics from first stage	24.71	25.43	23.90	21.08	17.46	-	24.71	25.43	23.90	21.08	17.46	-
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	-	0.0000	0.0000	0.0000	0.0000	0.0000	-
Hansen test (p-value)	0.0249	0.0256	0.0204	0.00853	0.0883	0.204	0.0585	0.0731	0.123	0.260	0.0540	0.200

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. Exogenous instruments for aid include: log of total population, Franc zone, Central American countries, and Egypt dummies. Period dummies are included in all regressions, but not reported.

Appendix C: Regression Estimates of the Impact of Aid and Institutions on Income Distribution and Inequality (Additional -continued)

	Q5						Gini					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Aid	0.526***	0.531***	0.486***	0.396***	0.277**	0.343**	0.698***	0.692***	0.653***	0.502***	0.464***	0.551***
	(3.933)	(4.256)	(3.692)	(2.803)	(2.044)	(2.529)	(4.477)	(4.634)	(4.218)	(3.174)	(2.994)	(3.550)
Institutions	0.213	0.214	0.119	-0.266	0.276	0.294	-0.116	-0.109	-0.259	-0.623*	-0.043	-0.005
	(0.706)	(0.712)	(0.367)	(-0.774)	(0.843)	(0.674)	(-0.369)	(-0.343)	(-0.721)	(-1.670)	(-0.122)	(-0.009)
Aid*Institutions						-0.004						-0.013
						(-0.038)						(-0.090)
Log GDP per capita	24.12***	24.17***	24.18***	20.41***	21.87***	23.00***	27.58***	27.62***	28.47***	23.64***	25.67***	27.36***
	(6.284)	(6.346)	(5.978)	(4.925)	(5.548)	(5.721)	(6.381)	(6.425)	(6.201)	(5.058)	(5.769)	(5.641)
Log GDP per capita^2	-1.646***	-1.652***	-1.684***	-1.468***	-1.547***	-1.612***	-1.833***	-1.823***	-1.906***	-1.631***	-1.736***	-1.836***
	(-6.514)	(-6.635)	(-6.382)	(-5.469)	(-5.951)	(-5.912)	(-6.435)	(-6.467)	(-6.313)	(-5.365)	(-5.868)	(-5.524)
Rural population (%Total)		-0.0028	-0.0166	-0.0315	-0.0385*	-0.0350		0.0134	0.0054	-0.0128	-0.0138	-0.0094
		(-0.0901)	(-0.524)	(-0.987)	(-1.657)	(-1.510)		(0.429)	(0.161)	(-0.379)	(-0.522)	(-0.354)
Openness			0.0051	0.0076	0.0413***	0.0381***			0.0040	0.0032	0.0414***	0.0378***
			(0.452)	(0.603)	(3.637)	(3.259)			(0.315)	(0.236)	(3.121)	(2.760)
Log Inflation				-0.166	0.923**	0.865**				-0.629	1.022**	0.960**
				(-0.303)	(2.260)	(2.068)				(-1.117)	(2.310)	(2.113)
Avg. schooling years					-1.133***	-1.068***					-1.242***	-1.152***
					(-4.068)	(-3.595)					(-3.833)	(-3.402)
Survey type	-7.487***	-7.488***	-7.649***	-8.604***	-9.761***	-9.805***	-8.624***	-8.642***	-8.762***	-9.894***	-11.85***	-11.86***
	(-6.794)	(-6.806)	(-6.908)	(-7.437)	(-8.576)	(-8.561)	(-7.753)	(-7.812)	(-7.927)	(-8.674)	(-10.17)	(-10.05)
Constant	-32.52**	-32.43**	-29.41*	-13.05	-19.48	-24.43	-54.49***	-56.08***	-56.77***	-33.50*	-43.88**	-51.17***
	(-2.233)	(-2.092)	(-1.785)	(-0.777)	(-1.257)	(-1.557)	(-3.315)	(-3.252)	(-3.086)	(-1.781)	(-2.498)	(-2.711)
Observations	369	369	356	325	271	271	414	414	397	362	297	297
F-statistics from first stage	24.68	25.43	23.10	21.35	17.72	-	25.39	25.39	23.48	22.66	19.40	-
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	-	0.0000	0.0000	0.0000	0.0000	0.0000	-
Hansen test (p-value)	0.0307	0.0305	0.0251	0.0148	0.0991	0.235	0.0472	0.0456	0.0412	0.0363	0.0638	0.0894

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. Exogenous instruments for aid include: log of total population, Franc zone, Central American countries, and Egypt dummies. Period dummies are included in all regressions, but not reported.

Appendix D: Regression Estimates of the Impact of Aid and Institutions on Income Distribution and Inequality (by Institutional Component)

Panel A: Corruption Control

	Q1		Q2		Q3		Q4		Q5		Gini	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Aid	-0.153***	-0.279*	-0.083**	-0.193	-0.019	-0.055	0.016	0.170	0.256*	0.392	0.470***	0.767
	(-4.622)	(-1.699)	(-2.341)	(-1.376)	(-0.518)	(-0.573)	(0.313)	(1.451)	(1.893)	(1.018)	(2.978)	(1.298)
Corruption control	0.018	-0.122	-0.004	-0.112	-0.087	-0.103	-0.183	0.041	0.272	0.338	-0.111	0.100
	(0.193)	(-0.674)	(-0.034)	(-0.608)	(-0.776)	(-0.601)	(-1.292)	(0.167)	(0.715)	(0.537)	(-0.261)	(0.131)
Aid*Corruption control		0.043		0.035		0.007		-0.064		-0.029		-0.079
		(0.785)		(0.693)		(0.180)		(-1.274)		(-0.189)		(-0.368)
Observations	271	271	267	267	267	267	267	267	271	271	297	297
F-stat. from first stage	16.77	-	16.78	-	16.78	-	16.78	-	16.89	-	18.50	-
p-value	0.0000	-	0.0000	-	0.0000	-	0.0000	-	0.0000	-	0.0000	-
Hansen test (p-value)	0.162	0.0501	0.148	0.0639	0.0726	0.153	0.0280	0.144	0.0832	0.153	0.0704	0.0234

Panel B: Bureaucratic Quality

	Q1		Q2		Q3		Q4		Q5		Gini	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Aid	-0.155***	-0.233**	-0.092**	-0.155	-0.039	-0.072	-0.018	0.037	0.321**	0.444	0.509***	0.610
	(-4.434)	(-2.386)	(-2.410)	(-1.556)	(-0.969)	(-0.836)	(-0.333)	(0.459)	(2.224)	(1.391)	(3.089)	(1.520)
Bureaucratic quality	-0.021	-0.185	-0.089	-0.214	-0.195	-0.256	-0.337***	-0.203	0.651	0.864	0.482	0.642
	(-0.176)	(-0.827)	(-0.633)	(-0.924)	(-1.387)	(-1.196)	(-2.657)	(-1.048)	(1.389)	(1.159)	(0.930)	(0.698)
Aid*Bureaucratic quality		0.048		0.036		0.017		-0.044		-0.058		-0.042
		(0.847)		(0.593)		(0.293)		(-0.773)		(-0.280)		(-0.162)
Observations	271	271	267	267	267	267	267	267	271	271	297	297
F-stat. from first stage	15.38	-	15.47	-	15.47	-	15.47	-	15.85	-	17.80	-
p-value	0.0000	-	0.0000	-	0.0000	-	0.0000	-	0.0000	-	0.0000	-
Hansen test (p-value)	0.161	0.372	0.166	0.170	0.116	0.231	0.0692	0.425	0.130	0.248	0.0910	0.128

Panel C: Rule of Law

	Q1		Q2		Q3		Q4		Q5		Gini	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Aid	-0.152***	-0.156*	-0.082**	-0.123	-0.020	-0.055	0.014	0.064	0.258*	0.270	0.458***	0.421
	(-4.702)	(-1.824)	(-2.314)	(-1.630)	(-0.545)	(-0.992)	(0.294)	(0.965)	(1.922)	(1.269)	(2.974)	(1.275)
Rule of law	0.035	0.023	0.045	-0.011	-0.009	-0.050	-0.020	0.066	-0.061	-0.065	-0.415	-0.495
	(0.382)	(0.171)	(0.426)	(-0.077)	(-0.081)	(-0.354)	(-0.168)	(0.394)	(-0.161)	(-0.131)	(-1.047)	(-0.818)
Aid*Rule of law		0.003		0.015		0.011		-0.024		0.002		0.022
		(0.114)		(0.542)		(0.452)		(-0.759)		(0.017)		(0.168)
Observations	271	271	267	267	267	267	267	267	271	271	297	297
F-stat. from first stage	17.58	-	17.60	-	17.60	-	17.60	-	17.81	-	19.41	-
p-value	0.0000	-	0.0000	-	0.0000	-	0.0000	-	0.0000	-	0.0000	-
Hansen test (p-value)	0.157	0.399	0.140	0.171	0.0741	0.146	0.0358	0.0380	0.0807	0.145	0.0549	0.192

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. Exogenous instruments for aid include: log of total population, Franc zone, Central American countries, and Egypt dummies. All control variables and period dummies are included in all regressions, but not reported.

Appendix E: Regression Estimates of the Impact of Aid and Institutions on Income Distribution and Inequality (Individual Effects)

	Q1		Q2		Q3		Q4		Q5		Gini	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Aid	-0.156***	-0.248*	-0.094**	-0.183	-0.039	-0.056	-0.015	0.148	0.320**	0.371	0.541***	0.529
	(-4.102)	(-1.659)	(-2.317)	(-1.337)	(-0.926)	(-0.546)	(-0.251)	(1.392)	(2.054)	(0.926)	(3.054)	(0.968)
Corruption control	0.025	-0.067	0.029	-0.030	-0.009	0.131	-0.067	0.304	0.036	-0.197	-0.310	-0.603
	(0.201)	(-0.239)	(0.208)	(-0.111)	(-0.063)	(0.548)	(-0.355)	(0.929)	(0.068)	(-0.222)	(-0.555)	(-0.532)
Bureaucratic quality	-0.056	-0.348	-0.143	-0.386	-0.220	-0.551*	-0.354**	-0.677*	0.781	1.853*	0.999	2.578*
	(-0.367)	(-1.164)	(-0.871)	(-1.164)	(-1.335)	(-1.699)	(-2.055)	(-1.930)	(1.346)	(1.667)	(1.515)	(1.901)
Rule of Law	0.042	0.263	0.079	0.243	0.066	0.180	0.121	0.211	-0.328	-0.955	-0.636	-1.659**
	(0.416)	(1.486)	(0.638)	(1.298)	(0.501)	(1.029)	(0.982)	(1.240)	(-0.750)	(-1.600)	(-1.360)	(-2.238)
Aid*Corruption control		0.037		0.029		-0.021		-0.081		0.002		-0.003
		(0.491)		(0.413)		(-0.383)		(-1.285)		(0.011)		(-0.011)
Aid*Bureaucratic quality		0.069		0.054		0.070		0.057		-0.225		-0.342
		(1.074)		(0.758)		(1.057)		(0.832)		(-0.949)		(-1.129)
Aid*Rule of law		-0.043		-0.031		-0.022		-0.024		0.131		0.223
		(-1.206)		(-0.955)		(-0.814)		(-0.939)		(1.342)		(1.617)
Log GDP per capita	-6.008***	-6.729***	-6.694***	-7.483***	-6.157***	-7.170***	-3.662***	-4.312***	22.29***	25.09***	26.47***	29.81***
	(-5.978)	(-5.429)	(-6.003)	(-5.351)	(-5.339)	(-5.373)	(-2.664)	(-2.866)	(5.360)	(5.203)	(5.759)	(5.088)
Log GDP per capita^2	0.369***	0.416***	0.454***	0.504***	0.451***	0.512***	0.297***	0.328***	-1.562***	-1.728***	-1.772***	-1.971***
	(5.440)	(4.995)	(6.073)	(5.437)	(5.914)	(5.818)	(3.486)	(3.436)	(-5.722)	(-5.453)	(-5.809)	(-4.997)
Avg. schooling years	0.201***	0.159*	0.364***	0.321***	0.378***	0.351***	0.305***	0.322***	-1.176***	-1.075***	-1.296***	-1.172***
	(2.843)	(1.902)	(4.321)	(3.345)	(4.338)	(3.636)	(3.942)	(3.393)	(-4.142)	(-3.275)	(-3.949)	(-3.040)
Rural population (%Total)	-0.005	-0.008	0.006	0.003	0.014**	0.012*	0.018**	0.017**	-0.035	-0.027	-0.010	-0.0004
	(-0.738)	(-1.119)	(0.919)	(0.496)	(2.003)	(1.673)	(2.316)	(2.122)	(-1.470)	(-1.116)	(-0.379)	(-0.014)
Openness	-0.006*	-0.007**	-0.012***	-0.012***	-0.014***	-0.014***	-0.011***	-0.011***	0.042***	0.043***	0.043***	0.045***
	(-1.866)	(-2.204)	(-3.574)	(-3.475)	(-4.198)	(-4.084)	(-3.334)	(-3.012)	(3.665)	(3.585)	(3.152)	(2.955)
Log inflation	-0.179*	-0.186*	-0.250**	-0.247*	-0.270**	-0.261**	-0.267**	-0.236**	0.925**	0.881**	1.051**	1.014**
	(-1.706)	(-1.651)	(-2.081)	(-1.947)	(-2.323)	(-2.167)	(-2.388)	(-2.054)	(2.210)	(2.030)	(2.343)	(2.112)
Survey type	2.649***	2.671***	2.929***	2.956***	2.703***	2.720***	1.659***	1.720***	-9.919***	-10.07***	-12.13***	-12.42***
	(10.80)	(10.34)	(9.807)	(9.660)	(8.143)	(8.535)	(4.592)	(5.300)	(-8.878)	(-9.109)	(-10.47)	(-10.66)
Constant	29.00***	32.22***	32.03***	35.53***	32.42***	36.53***	30.16***	32.33***	-22.44	-34.10*	-47.17***	-60.74***
	(7.430)	(6.703)	(7.317)	(6.383)	(7.082)	(6.791)	(5.338)	(5.354)	(-1.367)	(-1.774)	(-2.597)	(-2.665)
Observations	271	271	267	267	267	267	267	267	271	271	297	297
Joint F test	0.32	2.97	1.18	2.38	2.34	3.20	9.06	4.21	2.77	4.10	3.69	6.72
Prob > F	0.9562	0.3955	0.7582	0.4982	0.5048	0.3617	0.0285	0.2400	0.4286	0.2506	0.2974	0.0812
F-statistics from first stage	13.20	-	13.24	-	13.24	-	13.24	-	13.41	-	15.26	-
p-value	0.0000	-	0.0000	-	0.0000	-	0.0000	-	0.0000	-	0.0000	-
Hansen test (p-value)	0.166	0.290	0.169	0.395	0.109	0.455	0.0489	0.0859	0.121	0.406	0.0999	0.369

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. Exogenous instruments for aid include: log of total population, Franc zone, Central American countries, and Egypt dummies. Period dummies are included in all regressions, but not reported. Joint F test is test of joint significance of corruption control, bureaucratic quality, and the rule of law.

Appendix F: Countries Included in the Analysis in Essay 2

Low Income	Lower Middle Income	Upper Middle Income	High Income
Gambia	Bolivia	Algeria	Trinidad and Tobago
Haiti	Cameroon	Argentina	Bahrain
Kenya	Cote d'Ivoire	Botswana	Brunei Darussalam
Malawi	Egypt	Brazil	Croatia
Mali	El Salvador	Chile	Cyprus
Niger	Ghana	Colombia	Hong Kong SAR, China
Sierra Leone	Guatemala	Costa Rica	Korea, Rep.
Tanzania	Guyana	Dominican Republic	Malta
Togo	Honduras	Ecuador	Saudi Arabia
Zimbabwe	India	Gabon	United Arab Emirates
Bangladesh	Indonesia	Jamaica	
Congo, Dem. Rep.	Morocco	Malaysia	
Liberia	Nicaragua	Mexico	
Mozambique	Pakistan	Peru	
Uganda	Paraguay	Thailand	
	Philippines	Tunisia	
	Senegal	Turkey	
	Sri Lanka	Uruguay	
	Syria	Venezuela	
	Zambia	Albania	
	Armenia	China	
	Congo, Rep.	Iran	
	Moldova	Jordan	
	Mongolia	Namibia	
	Papua New Guinea	Panama	
	Sudan	South Africa	
	Vietnam	Kazakhstan	
	Yemen		

Appendix G: Variable Descriptions and Sources for Essay 2

Variable	Description	Source
HDI	A composite of three components: health index, education index, and income (0-1).	UNDP (2012b)
Health index	A measure of longevity which demonstrates the ability of the population to lead a long and healthy life (0-1).	UNDP (2012b)
Education Index	A measure of overall educational attainment or knowledge acquisition of the total population (0-1).	UNDP (2012b)
Infant mortality	Number of infant dying before reaching the age of one year-old per 1,000 live births.	World Bank (2010)
Average schooling years	Average years of schooling in the total population aged 15 and over.	Barro and Lee (2000)
Aid	Net Official Development Assistance (ODA) disbursement in current units as a share of GDP in current units.	OECD (2012b) and World Bank (2010)
Education aid	Education aid commitment in current units as a share of GDP in current units.	OECD (2012a) and World Bank (2010)
Health aid	Health aid commitment in current units as a share of GDP in current units.	OECD (2012a) and World Bank (2010)
Multilateral aid	Multilateral aid commitment in current units as a share of GDP in current units.	OECD (2012a) and World Bank (2010)
Bilateral aid	Bilateral aid commitment in current units as a share of GDP in current units.	OECD (2012a) and World Bank (2010)
Corruption	Corruption index (0-6). Higher rating reflects lower corruption.	PRS Group (2008)
Rule of law	Rule of law index (0-6). Higher rating reflects better quality of the rule of law.	PRS Group (2008)
Bureaucracy	Bureaucratic quality index (0-4). Higher rating reflects better quality of bureaucracy.	PRS Group (2008)
PPE	Sum of expenditure on education, health, and housing and amenities (% of GDP).	IMF (2010)
Tax revenue	Tax revenue (% of GDP)	IMF (2010)
Population	Total population	World Bank (2010)
GDP per capita	Gross domestic product divided by midyear population (constant 2000 USD).	World Bank (2010)

Appendix H: Regression Estimates of the Lagged Effect of Aid and Institutions on Human Welfare

	HDI		Health Index		Infant Mortality		Education Index		Avg. Schooling Years	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Lagged Aid	0.0156***	0.0155***	0.0089	0.0089	-0.0293***	-0.0290***	0.0112*	0.0111	0.0059	0.0073
	(2.638)	(2.618)	(1.610)	(1.611)	(-3.061)	(-2.997)	(1.665)	(1.639)	(0.532)	(0.657)
Lagged Institutions	0.0003	-0.0027	-0.0074***	-0.0063	0.0053	-0.0001	-0.0012	0.0003	0.0011	-0.0102*
	(0.162)	(-0.980)	(-3.317)	(-1.595)	(1.267)	(-0.0167)	(-0.360)	(0.0766)	(0.256)	(-1.878)
Lagged Aid*Institutions		0.002		-0.0007		0.0034		-0.001		0.0071**
		(1.034)		(-0.277)		(0.859)		(-0.392)		(2.479)
Lagged dependent variable	0.936***	0.934***	1.000***	1.002***	1.041***	1.040***	0.905***	0.905***	0.909***	0.908***
	(58.34)	(55.71)	(32.75)	(31.27)	(65.54)	(65.45)	(68.31)	(68.14)	(65.83)	(67.93)
GDP per capita	0.0256***	0.0267***	0.0127***	0.0123**	-0.0492***	-0.0489***	0.0218***	0.0215***	0.0285***	0.0310***
	(4.960)	(5.080)	(2.593)	(2.441)	(-5.297)	(-5.262)	(3.545)	(3.449)	(2.796)	(3.055)
Population	0.0108***	0.0109***	0.0077***	0.0076***	-0.0217***	-0.0216***	0.0042*	0.0042*	0.0071	0.0075
	(5.697)	(5.759)	(4.225)	(4.187)	(-4.597)	(-4.574)	(1.850)	(1.837)	(1.411)	(1.517)
Constant	-0.386***	-0.396***	-0.207***	-0.203***	0.378***	0.381***	-0.228***	-0.222***	-0.110	-0.135
	(-5.275)	(-5.375)	(-3.196)	(-3.099)	(2.652)	(2.677)	(-2.753)	(-2.604)	(-0.731)	(-0.896)
Observations	287	287	302	302	298	298	302	302	250	250
R-squared	0.986	0.986	0.958	0.959	0.984	0.985	0.984	0.984	0.977	0.977

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. All variables are in logs, except Institutions. Period dummies are included in all regressions, but not reported.

Appendix I: Regression Estimates of the Impact of Aid and Institutions on Human Welfare (by Institutional Component)

Panel A: Corruption Control

	HDI		Health Index		Infant Mortality		Education Index		Avg. Schooling Years	
Aid	0.0482***	0.136***	0.0574***	0.0887	-0.244***	-0.446***	0.0416	0.165*	0.149**	0.169
	(2.736)	(3.045)	(3.076)	(1.583)	(-4.277)	(-2.640)	(1.596)	(1.801)	(2.429)	(1.631)
Corruption control	0.0024	0.0442**	-0.0006	0.0238	0.0148	-0.0991	-0.0022	0.0551	-0.0158	0.0036
	(0.697)	(2.398)	(-0.150)	(0.962)	(1.475)	(-1.321)	(-0.419)	(1.322)	(-1.419)	(0.0978)
Aid*Corruption control		-0.0298**		-0.0155		0.0719		-0.0382		-0.0109
		(-2.398)		(-0.970)		(1.551)		(-1.400)		(-0.501)
Observations	284	284	306	306	303	303	306	306	250	250
F-statistics from first stage	7.95	-	9.45	-	7.45	-	7.26	-	8.83	-
p-value	0.0000	-	0.0000	-	0.0001	-	0.0001	-	0.0000	-
Hansen test (p-value)	0.987	0.314	0.0417	0.00560	0.373	0.228	0.0628	0.382	0.215	0.253

Panel B: Bureaucratic Quality

	HDI		Health Index		Infant Mortality		Education Index		Avg. Schooling Years	
Aid	0.0552***	0.119***	0.0529***	0.0456	-0.231***	-0.322***	0.0478*	0.133**	0.156**	0.218**
	(2.836)	(3.079)	(3.001)	(1.467)	(-4.124)	(-3.606)	(1.773)	(1.995)	(2.374)	(2.057)
Bureaucratic quality	0.0076**	0.0559**	-0.005	-0.0082	0.013	-0.0519	0.0076	0.0691*	0.0128	0.0504
	(2.272)	(2.533)	(-1.575)	(-0.459)	(1.536)	(-0.943)	(1.417)	(1.658)	(1.469)	(0.902)
Aid*Bureaucratic quality		-0.031**		0.002		0.0404		-0.038		-0.023
		(-2.325)		(0.175)		(1.234)		(-1.523)		(-0.699)
Observations	284	284	306	306	303	303	306	306	250	250
F-statistics from first stage	6.86	-	8.49	-	6.76	-	6.49	-	6.76	-
p-value	0.0002	-	0.0000	-	0.0002	-	0.0003	-	0.0002	-
Hansen test (p-value)	0.664	0.676	0.0675	0.0823	0.519	0.828	0.0925	0.573	0.276	0.666

Panel C: Rule of Law

	HDI		Health Index		Infant Mortality		Education Index		Avg. Schooling Years	
Aid	0.0500***	0.0674	0.061***	0.124**	-0.246***	-0.167	0.0383	-0.0295	0.143**	0.0209
	(2.831)	(1.546)	(3.180)	(2.514)	(-4.080)	(-1.568)	(1.467)	(-0.369)	(2.243)	(0.210)
Rule of law	0.0063**	0.0136	0.0002	0.0277	-0.0028	0.0217	0.0011	-0.0248	0.0004	-0.0501
	(2.255)	(0.818)	(0.0523)	(1.372)	(-0.337)	(0.462)	(0.292)	(-0.856)	(0.0474)	(-1.344)
Aid*Rule of law		-0.0057		-0.0212		-0.0187		0.0198		0.0373
		(-0.447)		(-1.398)		(-0.552)		(0.878)		(1.439)
Observations	284	284	306	306	303	303	306	306	250	250
F-statistics from first stage	6.55	-	8.04	-	6.21	-	6.32	-	6.18	-
p-value	0.0003	-	0.0000	-	0.0004	-	0.0004	-	0.0005	-
Hansen test (p-value)	0.703	0.860	0.0443	0.0428	0.448	0.340	0.0495	0.114	0.176	0.507

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. Exogenous instruments for aid include: Franc zone, Central American countries, and Egypt dummies. All control variables and period dummies are included in all regressions, but not reported.

Appendix J: Regression Estimates of the Impact of Aid and Institutions on Human Welfare (Individual Effects)

	HDI		Health Index		Infant Mortality		Education Index		Avg. Schooling Years	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Aid	0.0501***	0.0830**	0.0517***	0.0743*	-0.236***	-0.193**	0.0526**	0.0537	0.158**	0.0572
	(2.876)	(2.046)	(2.890)	(1.721)	(-4.215)	(-2.157)	(1.990)	(0.622)	(2.523)	(0.580)
Corruption control	-0.0024	0.0168	0.0013	0.0191	0.0142	0.0155	-0.0066	0.0197	-0.0276**	-0.0006
	(-0.591)	(1.350)	(0.258)	(0.979)	(1.170)	(0.315)	(-1.125)	(0.902)	(-2.133)	(-0.0158)
Bureaucratic quality	0.0062	0.0289	-0.0062	-0.0133	0.0113	-0.0579	0.0103*	0.0393	0.0237**	0.0368
	(1.629)	(1.459)	(-1.335)	(-0.590)	(1.072)	(-1.010)	(1.831)	(1.192)	(2.172)	(0.706)
Rule of law	0.0053*	-0.0038	0.0016	0.0075	-0.0100	0.0179	0.0003	-0.0317*	0.0034	-0.0610*
	(1.813)	(-0.316)	(0.479)	(0.608)	(-1.079)	(0.518)	(0.0611)	(-1.795)	(0.421)	(-1.730)
Aid*Corruption control		-0.0144*		-0.0106		-0.0001		-0.0209		-0.0195
		(-1.907)		(-0.930)		(-0.0047)		(-1.417)		(-0.891)
Aid*Bureaucratic quality		-0.0147		0.0053		0.0474		-0.0203		-0.0133
		(-1.171)		(0.377)		(1.344)		(-1.018)		(-0.452)
Aid*Rule of law		0.0077		-0.0048		-0.0248		0.0275**		0.0514**
		(0.812)		(-0.482)		(-0.934)		(2.032)		(2.055)
Lagged dependent variable	0.943***	0.965***	1.027***	1.021***	1.101***	1.095***	0.899***	0.898***	0.910***	0.918***
	(49.17)	(41.43)	(32.92)	(29.71)	(44.43)	(43.69)	(55.04)	(56.65)	(42.92)	(45.11)
GDP per capita	0.0485***	0.0349***	0.0381***	0.0285**	-0.185***	-0.150***	0.0529***	0.0487**	0.142***	0.124***
	(3.826)	(2.953)	(2.893)	(2.512)	(-5.058)	(-6.135)	(2.744)	(2.489)	(2.971)	(2.979)
Population	0.0210***	0.0178***	0.0209***	0.0179***	-0.0866***	-0.0719***	0.0155*	0.0142	0.0524***	0.0450**
	(3.972)	(3.564)	(3.850)	(3.903)	(-5.070)	(-6.552)	(1.924)	(1.592)	(2.634)	(2.509)
Constant	-0.769***	-0.666***	-0.646***	-0.568***	2.479***	2.004***	-0.691**	-0.665*	-1.865**	-1.503**
	(-4.046)	(-3.695)	(-3.273)	(-3.135)	(4.590)	(5.277)	(-2.358)	(-1.768)	(-2.558)	(-2.227)
Observations	284	284	306	306	303	303	306	306	250	250
Joint F test	8.17	7.90	2.59	1.11	4.66	1.50	4.07	6.40	6.81	3.42
Prob > F	0.0427	0.0481	0.4584	0.7752	0.1985	0.6822	0.2539	0.0937	0.0782	0.3307
F-statistics from first stage	7.80	-	8.88	-	6.98	-	7.11	-	9.09	-
p-value	0.0001	-	0.0000	-	0.0002	-	0.0001	-	0.0000	-
Hansen test (p-value)	0.352	0.161	0.0593	0.0230	0.422	0.276	0.175	0.450	0.366	0.773

Robust t-statistics in parentheses. *** Significant at 1%, ** Significant at 5%, * Significant at 10%. All variables are in logs, except Institutional variables. Exogenous instruments for aid include: Franc zone, Central American countries, and Egypt dummies. Period dummies are included in all regressions, but not reported. Joint F test is test of joint significance of corruption control, bureaucratic quality, and the rule of law.

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