THREE ESSAYS ON FOREIGN AID AND MACROECONOMIC PERFORMANCE

by

ILKER KAYA

(Under the Direction of Santanu Chatterjee)

ABSTRACT

The first chapter of this dissertation examines fungibility as a possible explanation for the "missing link" between foreign aid and its effectiveness. The composition of aid plays a crucial role in determining the composition of government spending, thereby affecting any potential growth benefits. Embedding fungibility as an equilibrium outcome in an endogenous growth framework, I show that the substitution away from domestic government investment is higher than from government consumption. This leads to a crowding-out of domestic public investment spending and offsets any positive impact that aid might have on growth. Further, I test the predictions of the model by using a panel of 67 countries for 1972-2000. I find strong evidence of fungibility at the aggregate level: almost 70 percent of total aid is fungible in the sample. I also find that investment aid is more fungible than other categories of aid, crowding out about 90 percent of government investment. There is also no statistically significant relationship between foreign aid and private investment, whereas aid has a positive impact on household consumption.

In chapter 2, by using a new panel of 95 countries for 1995-2007, I test the main empirical findings of the first chapter on total foreign aid fungibility in the presence of governance quality measures. The results reveal that fungibility is still an existing problem for the governments with higher governance quality but the degree of fungibility is lower in those

countries. This suggests that poor governance quality might be one of the missing pieces in foreign aid's ineffectiveness puzzle.

In the last chapter, I investigate whether the amount of foreign aid received by the governments in the developing and emerging economies affects the probability of equity market liberalization. Findings suggest that the amount of foreign aid received is positively related to the probability of equity market liberalization. In addition to the amount of foreign aid, the level of economic and financial development, the availability of growth opportunities, the quality of investor protection, and the level of the government's involvement in the economy are among the main determinants of the government's decision to liberalize their equity markets.

INDEX WORDS: Economic Growth, Foreign Aid, Fungibility, Governance, Government Spending, Growth Model, Liberalization

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DEDICATION

I dedicate this study to my family.

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CHAPTER I

FOREIGN AID, GOVERNMENT SPENDING AND ECONOMIC GROWTH

1.1. Introduction

Studies on foreign aid and economic growth indicate that there might be many implicit reasons for why aid donor countries pour their taxpayers' money to aid recipient countries. However what the donor countries officially claim and what public of the recipient countries expect and hope is that all these effort helps to fight poverty and promote economic growth in those countries. To achieve this 'noble' goal, during the last five decades, donor countries established many bilateral and multilateral aid agencies and regional and global development organizations, hired thousands of people to run and evaluate the aid projects and transfer billions of dollars to the recipient countries. Today when we look at the general picture, despite all these efforts and money that is spent, it is very hard to mention a great success story with few exceptions. This obvious failure of foreign aid to promote economic growth and reduce poverty in recipient countries which include many third world countries has become a puzzle. This intriguing and thought provoking puzzle has created its own special branch in the economic literature as well as in other related social disciplines.

This dissertation chapter will include the following subsections. Introduction part will start by giving a brief history and institutional background of foreign aid. Then the previous studies and ideas about determinants of the foreign aid distribution, why foreign

aid fails to help economic growth and possible scenarios where foreign aid might serve as a tool to promote economic development and increase standards of living in the recipient countries will be reviewed.

In the following section, a theoretical framework which shows that fungibility of foreign aid can be one of the reasons for foreign aid's ineffectiveness on economic growth by introducing an endogenous growth model that assumes government investment on infrastructure is a key determinant for the economic growth will be introduced.

In the last section, the outcome of the theoretical model will be tested by using cross section and time series econometrics methods.

1.1.1. A Brief History of Foreign Aid

The simplest definition of foreign aid in general is a transfer of money, goods or services from one country or organization to another. It is possible to trace aid back to the middle ages or even classical times as gifts from one king to another (Hjertholm and White, 2000). However the foreign aid we will focus on here is different in a way that the population of the recipient country is aimed to benefit from it and it is provided by the aid agencies under different programs for certain periods.

The Act for the Relief of the Citizens of Venezuela which was passed by the US Congress in 1812 and UK's official finance for colonies in 1870s can be cited among the first examples of aid according to the criteria described above. Nevertheless, it would not be wrong to say that the underlying principles of aid as we understand nowadays were established in 1944 by The United Nations Monetary and Financial Conference at Bretton Woods, New Hampshire, USA, in an assembly of 44 nations. This meeting later would lead to the establishment of the International Bank for Reconstruction and Development

(World Bank) and the International Monetary Fund (IMF). These organizations started operating in 1946.

Starting from the 1940s, we can summarize the main developments in aid programs and since then institutions as follows:

There are two significant things that marked the 1940s; the Marshall Plan and the establishment of the United Nations. In June 1947, U.S. Secretary of State George Marshall proposed a European Recovery Program of aid to Western Europe. This program sought to provide funds for rebuilding European countries which were largely destroyed in Second World War. The Marshall plan is considered a great success which has not been accomplished by later aid programs for different parts of the world.

The 1950s can be expressed as a decade of US dominance. Because of the success of the Marshall Plan, foreign aid was included as a component of US foreign policy. During this period, almost more than 60% of the total aid in the world was provided by the United States. Foreign aid offered at that time was generally in forms of food aid and commodity aid. The main strategy in this period followed by the US was to use foreign aid to prevent the spread of communism led by the Soviet Union.

Bilateral aid programs started to be established in 1960s. The biggest bilateral aid program, USAID, was founded in 1961 by President J.F. Kennedy.

1970s and 1980s can be generalized as the expansion of multilateral aid programs and agencies. Especially World Bank, IMF and Arab-Funded agencies became more effective. Furthermore another salient change during that time was the reduction in the share of food and commodity aid and the rise in the share of financial program aid and debt relief in total aid.

During the 1990s, the end of the Cold War led to two major changes. The first one was that the Eastern Europe and the Former Soviet Unions became aid recipients rather than donors. The other one was fighting against poverty became the main agenda with the disappearance of the communist threat.

Nowadays, foreign aid is mostly used to strengthen democratic regimes around the world and for disaster relief.

1.1.2. Foreign Aid Types

The most general aid classification can be made as loans and grants. The main difference between loans and grants is that loans must be paid back while grants are given on the basis that the recipient party should not have to repay. Starting from early 1960s, loans are used more frequently than grants under the impression that they are used more efficiently since they are expected to be repaid. However today most of the recipient countries have a massive debt accumulation because of this excessive lending and they are struggling to repay. Moreover for the donors to monitor and collect the aid money has been very costly. Under these circumstances, recently there is a shift from loans to grants.

Other type of classification of aid can be made as Bilateral and Multilateral Aid. Bilateral Aid is given by the government of one country directly to another. Multilateral aid is the assistance given through international organizations. Each organization has its own aid program and is funded by the world's richer, more developed countries.

Aid can also be either “tied” or “untied”. Tied aid is assistance given for a specific purpose usually with conditions attached. These conditions may range from demands that some or all of the donated money be spent on goods or services from the

donor country. Although tied aid is criticized because it does not allow the recipient to contract or buy from the lowest bidder and the recipient is not able to buy local goods or hire local companies, European Union used tied aid efficiently by contributing to the economic development for its new members during its expansion process (specific examples will be added).

Other types of aid can be listed as food aid, humanitarian aid, technical assistance and emergency aid.

1.1.3. Major Aid Agencies and Trends in ODA Volumes and Terms[1]

USAID in the United States and Department for International Development in England can be cited as two major examples of bilateral aid agencies. Although bilateral aid agencies are individually and independently founded organizations, today they work together under The Development Assistance Committee[2] (DAC) of Organization for Economic Co-operation and Development (OECD) to increase the effectiveness of their efforts to support sustainable economic growth in recipient countries. Flows from OECD to developing countries are called Official Development Assistance (ODA)[3] in general. ODA has five elements: (a) the type of flows (grants, loans or technical cooperation); (b) the source (official sector of donor countries); (c) the recipients (they must be on the

[1] The statistics are taken from OECD website and from the IDA Report "Aid Architecture: An Overview of the Main Trends in ODA Flows."

[2] In 1960, the then Organization for European Economic Co-operation (OEEC) established a Development Assistance Group (DAG) as a forum for consultations among aid donors on assistance to less-developed countries. One year later, OEEC was renamed Organization for Economic Co-operation and Development (OECD) with the significant addition of "development" to the name and DAG was renamed Development Assistance Committee (DAC)

[3] ODA is defined as "grants or loans provided by official agencies (including state and local governments, or by their executive agencies) to developing countries (countries and territories on the DAC List of Aid Recipients) and to multilateral institutions for flows to developing countries, each transaction of which meets the following test: (a) it is administered with the promotion of the economic development and welfare of developing countries as its main objective; and (b) it is concessional in character and contains a Grant Element of at least 25 per cent (calculated at a rate of discount of 10 per cent). In addition to financial flows, Technical Co-operation is included in aid.

DAC list); (d) the development/welfare purpose of the related transactions; and (e) their concessional character.

The major multilateral agencies to give aid are the World Bank and the IMF. The International Development Association (IDA) was established in 1960 and radically changed the nature of the World Bank. Through IDA the Bank started its concessional lending activities. However, IDA had to be replenished periodically and the views and priorities of shareholding countries started to play a larger role in the Bank's activities.[4] In the early 1960s, the Development Assistance Committee (DAC) was created as a key forum of major bilateral donors.

There are also several regional development banks, each lending funds to developing countries in its region. The oldest and largest is the Inter-American Development Bank, founded in 1959, which lends to Latin-American countries. The African Development Bank, founded in 1964, has had relatively little success in attracting large amounts of capital. The Asian Development Bank, founded in 1965, has been more successful. European countries have established two institutions for multilateral aid as well; the European Development Fund and the European Investment Bank. Both are organs of the European Community (EC). There are also a number of economic-aid programs through which grants are awarded by specialized agencies. For example the United Nations finances UNESCO, the World Health Organization, and the Food and Agriculture Organization.

[4] "The establishment of IDA meant the recognition that there was a legitimate need for concessional assistance and that the Bank could provide this assistance without compromising its strict standards for lending. However, IDA, with its periodic replenishments by member governments, meant that the Bank had to pay increasing attention to the views and priorities of the parliamentary bodies that provided the replenishment funds. Whereas the Bank had previously to consider only the productive and economic aspects of lending, now the internal politics of the shareholding governments began to play a larger role in the Bank's activities." World Bank, profile of its 3rd President, Eugene R. Black (from website).

ODA terms have become increasingly concessional, with almost 90 percent of bilateral ODA being in the form of grants.

There has been an increase in bilateral and multilateral agencies which interact with recipient countries. For instance, the average number of donors per country rose from about 12 in the 1960s to about 33 in the 2001-2005 periods. In addition, there are currently over 230 international organizations, funds, and programs.

Today, most of the total aid comes as ODA. Net ODA disbursements have consistently risen in real terms since the late 1990s, and reached US$105 billion (at constant 2004 prices) in 2005, up from about US$58 billion in 1997. Net ODA disbursements in 2005 can be decomposed as follows: 64 percent for core development programs; 24 percent for debt relief; 8 percent for emergency assistance; and 4 percent for donors' administrative costs.

Much of the recent increase in ODA has been due to debt relief, and to a lesser extent to emergency assistance and administrative costs of donors. Debt relief grew steeply since the end of the Cold War, having reached an average annual growth rate – at 2004 prices – of 63 percent between 2001 and 2005. In addition, in real terms, debt relief explains almost 70 percent of the increase in ODA between 2004 and 2005 – most of which (US$19 billion) benefiting Iraq and Nigeria.

About 70 percent of ODA flows have been provided through bilateral organizations and 30 percent through multilateral organizations. The share of bilateral ODA has remained relatively stable at 70 percent of total aid flows since the mid 1970s, with the exception of 2005 when bilateral ODA reached 78 percent of the total. However, there is a great deal of donor-by-donor variance in terms of bilateral vs. multilateral

contributions: the shares of multilateral contributions in total ODA flows for the 2000-2005 period range from 9 to 64 percent.

1.1.4. Primary Players

The biggest donors in absolute terms are respectively the United States, Japan, France, United Kingdom and Germany. Even though the United States is the world's largest contributor of foreign aid in absolute terms ($15.7 billion, 2003), it is the smallest among developed countries as a percentage of its GDP (0.14% in 2003). The UN target for development aid is 0.7% of donors' GDP; currently only five countries (with Norway in the lead with 0.92%, Netherlands, Denmark, Luxemburg and Sweden) achieve this[5].

During the Post War Security phase (1946-1959), most aid (88%), according to aggregate DAC data at current prices, came from the United States (58%), France (22%), and the United Kingdom (8%). The share of the United States, France and the United Kingdom over total net ODA declined substantially in the 1970s and 1980s and has now stabilized at slightly over a third of total net flows.

In the late 1960s, Sweden, Netherlands, Norway and Denmark decided to increase their aid above 0.7 of GNI, a level all of them crossed by the mid to late 1970s. In 1978, Japan launched its first "doubling-of-ODA" plan. Japan became the second largest DAC donor by 1984 and the largest by 1989.

The five largest recipients of foreign aid (including debt relief) in absolute terms have been Israel, Egypt, Argentina, Mexico and Poland, historically. Recently Iraq, Congo Democratic Republic and Afghanistan are added to this list.

[5] See Figure 1.

1.1.5. Why Do Donors Give Money to the Poor and How Do They Decide the Allocation of It?

Although the donors' decision for bilateral or multilateral aid might depend on several different political and other strategic reasons, World Bank describes the primary goal of financial aid from one country or an organization to another country as to fight against poverty and to promote economic development.

In an early attempt to explore the aid allocation criteria of the donor countries, Dudley and Montmarquette (1976) set up a theoretical model in order to explain bilateral aid allocation mechanism and they empirically test it. In their study, they look at two decisions to be made by the donor country. The first one is whether the donor should award a particular recipient or not. Their result reveals that the economic needs of the recipient countries are effective as much as the political and/or bandwagon considerations. Also increase in size of the population in the recipient country generates a higher probability of granting aid. The second is that when they decide to give the money, the "small country effect" (the tendency for small countries to receive more aid per capita than large countries) is not the criterion for the amount of the aid to be determined as suggested earlier by an OECD review[6].

Trumbull and Wall (1994) extend Dudley and Montmarquette's (1976) model into a simultaneous optimization by multiple donors. They suggest that political and civil rights play a crucial role for aid allocation rather than recipient needs through per capita income.

Apodaca and Stohl (1999) investigate if a state's human rights record affects the amount of U.S. bilateral aid it receives. Even though they confirm human rights records

[6] OECD, Development Assistance, 1969 Review, Paris,1969

of the recipient country is a consideration for U.S. economic (not military) aid allocation, it is neither the only nor the primary one.

Alesina and Dollar (2000) address the central question of "*Who Gives Foreign Aid to Whom and Why?*" They find substantial evidence that donor's decision on the allocation of foreign aid is guided by political and strategic considerations as much as the economic needs and policy performance of the recipient countries. In most cases the amount of aid is weakly related to the recipient country's economic performance and strongly related to indicators of cultural, historical and political closeness between the countries. For instance, the "big three" donors (US, Japan and France) has a different distortion. While the United States gives about one third of its foreign aid to Egypt and Israel, France focuses heavily on its former colonies. Japan prefers to assist those countries with the similar voting patterns in the United Nations as Japan. They also reveal a trend for nations who introduce democratic reforms to get a significant boost in assistance.

While Alesina and Weder (2002) focus on the correlation between the level of corruption in the recipient country and the amount of foreign aid received, in their analysis, they confirm the result of Alesina and Dollar (2000) which states that the amount of aid is more related to indicators of historical and political closeness between the countries. Even for those multinational aid organizations these motives are still important. Moreover they raise the question whether a receiving country "buys" foreign aid by its political moves parallel to donors or whether foreign aid "rewards" recipient country's past political behaviors and leave this question unanswered. In general, they

find that donors do not discriminate against more corrupt governments for their choice of aid allocation.

Another result in an attempt to explain aid allocation among recipients comes from Burnside and Dollar (2004). The authors show that in 1990s, donors' decision on the allocation of aid to under-developed countries were in favor of those with better institutional quality.

Kuziemko and Werker (2006) provide statistical evidence that there is a strong relationship between the amount of aid received from the United States and United Nations and holding a seat on the U.N. Security Council. They suggest that the foreign aid flows are used to buy those recipient countries' votes who are currently serving on the U.N. Security Council. This effect increases during years in which key diplomatic events take place.

Another interesting finding is from Kaya, Lyumibov and Miletkov (2007). Their study imply that the donor countries might use foreign aid to affect the financial liberalization decisions of the recipient countries which allows foreign investors buy domestic equities.

1.1.6. Aid Effectiveness: Is Aid Working to Reduce Poverty and Promote Economic Growth?

After reviewing a number of influential studies which attempt to examine the decisions of foreign aid allocation for the donors, political, historical and strategic closeness between donor and recipient countries seems as the main determinant. Recipient countries' demand for financial aid due to their poor economic conditions, donors' economic interest and donors' rewarding (not all but for some donors) of

recipient's good policies and good governance are also primal factors on aid allocation decision.

While the donors' decision for bilateral or multilateral aid depends on several different political and other strategic reasons, according to the World Bank, the primary goal of financial aid from one country or an organization to another country is to fight against poverty and to promote economic development. This main objective defined by the World Bank is not a groundless argument furthermore it stems from macroeconomic foundations. According to any growth model, including the early classical growth theories by Adam Smith (1776) and David Ricardo (1821), capital accumulation is one of the essential factors for sustainable economic growth. When you give a few billion dollars to some small third world country, it is very natural and reasonable to expect them to show some positive and significant signs that imply that they are on a track to break the cycle of poverty trap and to show some indication for economic development according to those macroeconomic foundations. Although extensive bilateral and multilateral aid programs which aim to reduce poverty and promote economic growth have started after Second World War, there is still no compelling evidence that many recipient countries make progress in either of both directions during the last five decades.

At this point of the study, it might be critical and helpful to look at the foreign aid literature to see what other researchers point out about aid effectiveness. Namely, I will go over whether there is evidence for the positive effect of foreign aid on economic growth, if there is, under which circumstances aid provide this positive effect. Furthermore, if there is counter evidence about foreign aid's effectiveness, what are the possible explanations for this aid failure?

Studies on foreign aid effectiveness can be traced back to early 1960s, even late 1950s. However I would like to start reviewing studies mostly after 1990s because the early studies lack sufficient data to explore the full story.

Boone (1996) claims that instead of fostering economic development, foreign aid can cause a poverty trap since it supports predatory governments that consume aid inflows instead of investing in their country. He also reviews the effect of foreign aid on recipient regimes and finds that aid most benefits local political elites. His explanation for why aid does not promote economic growth depends on two rationales. According to him the capital shortage is not the reason for poverty, in fact, distortionary policies enforced by the policymakers is the source of the poverty problem and as long as aid money flows into the poor countries because of their low standards of living caused by poverty, it would not be favorable for policymakers to eliminate their distortionary policies.

Easterly (1999) shows that the financing gap approach (Harrod–Domar–Chenery two-gap model) fails to predict aid's effect and points out that for some recipient countries, increase in foreign aid is associated with a decrease in investment rate and eventually prevents short run economic growth.

The idea that aid works only in the presence of strong macroeconomic policy (good fiscal, monetary and trade policies) comes out as result of empirical study by Burnside and Dollar (2000). Based on their result, they suggest that conditional on macroeconomic policy, aid indeed is capable of promoting economic growth. Therefore foreign aid should be distributed to countries that implement appropriate policies. This study is heavily criticized in different aspects.

Hansen and Tarp (2000) criticize the results of Burnside and Dollar not to be robust. They show that those results are sensitive to the data and model specification.

By developing a neoclassical growth model, Dalgaard and Hansen (2001) provides a result that aid can stimulate growth even if it is not in the production function directly and show that the relationship between good policies and aid is unclear in contradistinction to what Burnside and Dollar claim.

Easterly, Levine and Rodman (2003) raise new doubts about the results of Burnside and Dollar as well as about aid effectiveness after updating and filling in missing data that Burnside and Dollar originally used. They also advise scholars and policymakers to be more cautious about concluding that foreign aid will work to promote economic growth for countries which adopt good policies.

A unique contribution to the foreign aid literature in order to relax the lack of a comprehensive theoretical framework constraint comes from Chatterjee , Sakoulis and Turnovsky (2003) and Chatterjee and Turnovsky (2005, 2007). Their general equilibrium endogenous growth model in an attempt to analyze the dynamic effects of aid gives us better understanding for the mechanism where foreign aid might effect economic growth. Their analysis suggests that the positive impact of aid depends crucially on (i) the restrictions imposed by the donor on how aid must be spent, (ii) the recipient's structural conditions, as embodied by the input-flexibility of the production sector, access to capital markets, the size of the government, and the choice between labor and leisure, and (iii) the duration of the aid program. However, these theoretical contributions do not account for the behavioral response of the recipient to an inflow of foreign aid and,

consequently, can not explain why an increase in aid could be associated with a decline in growth.

So far, the studies I cited mainly focused on the policy issues which might influence and shape the macroeconomic conditions in the recipient countries. Let's now visit some other studies that try to explain the aid ineffectiveness from a behavioral perspective. According to many studies in this part of the literature, corruption, fungibility, and rent-seeking activities are some of the behavioral characteristics of aid-recipient economies that might potentially offset the positive impact that foreign aid is intended to have on growth by affecting the macroeconomic performance.

Fungibility and rent seeking (maybe even corruption)[7] in general arise in circumstances where monitoring the actual disbursement of aid in the recipient country is too costly for the donor according to Clements Gupta, Pivovarsky and Tiongson (2004)

One of the possible explanations that foreign aid wasn't successful as it was expected and desired is corruption in the recipient countries. The World Bank (1998) realized that fact and made a clear statement that says "there is no value in providing large amounts of money to a country with poor policies". Moreover the World Bank has argued that it was the corruption among bureaucracy and officials of the many recipient countries that caused poor policies.

Rent-seeking is an economic activity to obtain an economic gain from society's resources without reciprocating any benefits back to society through wealth creation. Rent seeking activities mostly take place in countries where powerful social, political or ethnic groups have access to a common pool of public resources, allocated for public expenditure or investment, along with weak institutions in the recipient economy.

[7] Author's note

Mauro (1995) can be considered as one of the earliest scholars empirically studied the relationship between corruption, investment and growth. In his study, he finds that corruption and bureaucratic efficiency are statistically significant determinants of the average level of investment. He identifies reduced investment as the cause for reduction in the growth by the influence of corruption.

By analyzing an economy that has weak legal and political structure and is populated by multiple powerful (such as ethnic) groups , Tornell and Lane (1999) offers that competition of those powerful groups, in equilibrium, yields to slow economic growth and a voracity effect[8]. Rationale of their theory is when there is a terms of trade windfall (which is foreign aid in our case), powerful groups start to compete with each other to get their share from this windfall and at the end of the process, total cost of this competition including redistribution of the income is higher than the initial windfall. Their explanation found a noticeable place among the studies and some other scholars used the voracity affect to explain how foreign aid can be perceived as a windfall and result in less economic growth.

Svensson (2000) presents a game theoretic rent seeking model and statistical result that foreign aid is on average associated with higher corruption which implies that providing more aid does not have to result in an increase in the welfare of the recipient country. To get this result, he shows that provision of the public goods does not necessarily increase as government's income increases. He presents a dilemma in this study which could be a starting point to explain why foreign aid fails fighting against poverty. He points out that the recipient has no incentives to implement conditions to

[8] A shock, such as a terms of trade windfall, perversely generates a more-than-proportionate increase in fiscal redistribution and reduces growth.

reduce poverty as long as the amount of aid is determined by the level of poverty. He argues that foreign aid promotes corruption by increasing the size of the cake fought over by powerful groups and parties, and those in ethnically divided countries, foreign aid windfalls tend to increase corruption.

One of the most influential articles in the area of corruption, growth and foreign aid interactions was authored by Alesina and Weder (2002). In their study, they find no evidence that corruption in the recipient countries is a negative factor for the donors' decision on aid allocation. In fact for some cases, donors (such as United States) provide more aid to corrupt countries than others. Possible explanation for this, according to their study, is donors' considerations on political, historical and other strategically issues (as stated by many others earlier) might dominate other factors which channels aid allocation. As parallel to Tornell and Lane (1999) and Svensson (2000), their results show that in ethnically fragmented countries, foreign aid increases corruption.

Fungibility of foreign aid is another possible cause for foreign aid ineffectiveness which draws an increasing attention from many scholars in the literature as well as mine. In the theoretical and empirical part of this chapter, fungibility will lie in the center of my discussions.

Fungibility can be described in layman's term as recipient government's usage of aid money to finance the provision of a public good that was not intended to be financed by the donors. In this case, foreign aid may replace domestic government spending instead of increasing it or may lead to a reduction in the recipient government's effort of revenue generation, thus offsetting the positive effect of aid on poverty reduction and economic growth.

Pack and Pack (1990, 1993) studies, the case of Indonesia provides no evidence of aid fungibility whereas the case of Dominican Republic provides strong evidence for aid fungibility. The merit of their studies which contributes to my study also is that they focused on how specific aid types affect the targeted categories of public expenditures that they are assigned to.

Another single country (the case of India) study is presented by Swaroop, Jha and Rajkumar (2000.) They show that an important portion of foreign aid was used for the purposes unintended by the donors.

As it turns out, single country studies dedicated to different recipients might give us different results on the existence of foreign aid fungibility. In order to conclude whether there is a foreign aid fungibility issue which might distort foreign aid's effectiveness in the recipient countries at aggregate level as a general outcome, we need results from the multi country studies. I found two studies worth to mention at this stage.

In their study, Feyzioglu Swaroop and Zhu (1998) draw two incompatible results conditional on two different data that vary only in their samples sizes (14 and 38 countries). They do not find aid to be fungible and any statistically significant evidence that there is a reduction in tax revenues due to foreign aid with the smaller sample whereas they find the opposite results for both aid fungibility and tax relief by using the larger sample.

Gupta Clements, Pivovarsky and Tiongson (2003) examine aid's effect on government revenue and spending by using composition of aid as loans versus grants. They find that loans are not fungible. In addition, they discover a nonlinear positive relationship between loans and domestic revenue. Based on their result, they also suggest

that the decline in domestic revenue is compensated by the increase in grants in the recipient countries which are captivated by corruption.

1.2. The Model: Theoretical Framework

The model assumes a representative household, who infinitely lives in a closed economy and tries to maximize his/her overall utility by consuming a private consumption good and a public consumption good which is provided by the government, as given by the following utility function:

$$U = \int_0^{\infty} \frac{1}{\gamma} (C G_C^{\theta})^{\gamma} e^{-\beta t} dt \qquad -\infty < \gamma < 1 \qquad \theta(1-\theta\gamma) > 0 \qquad (1)$$

where C and G_C represents private consumption good and public consumption good respectively. θ in this utility function symbolizes relative weight of the public consumption good, β indicates rate of time preference (i.e. when β gets larger, household becomes more impatient) and γ shows elasticity of marginal utility of consumption.

Representative household has the following production function:

$$Y = G_I^{\eta} K^{1-\eta}, \; 0 < \eta < 1 \qquad (2)$$

where Y is output, G_I is the public investment good which is productivity enhancing (i.e. infrastructure) and K is stock of private capital that belongs to the representative household. In the production function, η shows output elasticity of public investment good (i.e. marginal product of G_I)[9]

[9] The interpretation of η can be given as following: 1% increase in public investment good, G_I results η % increase in output, Y.

The representative household has the following flow budget constraint which determines the accumulation of private capital:

$$\dot{K} = (1-\tau)Y - C - T \tag{3}$$

In this budget constraint, τ is the income tax rate which is set by the government. The government also imposes a lump-sum tax which is represented by T. The role of the government in this model is providing the public consumption good which enters the representative household's utility function and the public investment good which provides a positive externality to production financed by taxes and other inflows which is foreign aid in this model.

In this closed economy, the government always has a balanced budget where the cost of providing public goods (G_I and G_C) must be equal to the sum of tax revenues and foreign aid, F.

$$G_C + G_I = \tau Y + F + T \tag{4}$$

In a closed economy, we must have a "balanced growth" equilibrium which implies that the provision of consumption and investment public goods depends on the size of the economy. Since in this model size of the economy is determined by output, Y, provision of public goods and other variables must be tied to it. Additionally, this approach provides a better framework to test this model empirically.

$$G_I = G_I^d + \phi F = \left(g_I^d + \phi\varepsilon\right)Y \tag{5a}$$
$$G_C = G_C^d + (1-\phi)F = \left[g_c^d + (1-\phi)\varepsilon\right]Y \tag{5b}$$

where $\varepsilon = \frac{F}{Y}$ (i.e. ratio of foreign aid to output). ϕ is the ratio of a foreign aid category which is set by the donors, such as investment aid, to total foreign aid and $(0 \le \phi \le 1)$.

G_C^d and G_I^d are the amounts that government spends for the provision of consumption and investment public goods by using its domestic revenue and given by the ratios g_c^d and g_I^d respectively as follows:

$$G_I^d = g_I^d Y \quad \text{and} \quad G_C^d = g_c^d Y$$

By substituting the government's budget constraint into private budget constraint, we can derive new $\dot{K}$ as following:

$$\dot{K} = Y - C - G_I - G_C + F \qquad (6)$$

which gives us the resource constraint for the whole economy.

When foreign aid inflow is received, two alternative behaviors can be manifested by the government conditional on the constraints and monitoring imposed by the donors. Sometimes foreign aid is given tied to specific projects. In those cases, aid is provided in several slices such as completion of different stages of the project is the key to receiving a new slice of the aid for the recipient. In other cases, some donors (such as Scandinavian countries)[10] monitor carefully whether aid is used for the purposes intended by them. In either case, it is very hard for the recipient government to use foreign aid money for the alternative expenditures which were not targeted by the donors or for tax relief in order to obtain political gain by pleasing their fellow constituents. When recipient government has the flexibility of using the aid money regardless of the type and purpose, it can readjust

[10] See Alesina and Weder (2002), "Do Corrupt Governments Receive Less Foreign Aid?" for the empirical evidence.

its own expenditure ratios and/or tax rates. In such cases, we have foreign aid fungibility. The remaining part of the theoretical model will try to simulate two possible scenarios where aid is fungible and not. In these scenarios, the primary players are the composition of foreign aid, government expenditure and long run economic growth. How the relationship between these players will form needs to be determined by the following part.

1.2.1. Scenario 1: Foreign Aid is not Fungible

In this closed economy model, representative household maximizes his/her intertemporal utility from consumption over the infinite planning horizon under the neo-classical production and individual private budget constraints. Since the government has to sustain a balanced budget and can not use foreign aid to relax this condition, government expenditures for the public goods and the tax rate, τ , are exogenous to him/her. The representative household takes the foreign aid inflow and its allocation also as given since the amount and spending of it is determined and controlled by the donors. So foreign aid inflows can not affect g_c^d , g_I^d and τ .

The Hamiltonian function in this non-fungible aid scenario yields a balanced budget closed economy growth rate and the consumption-capital ratio in equilibrium as follows:

$$H = \frac{1}{\gamma}(CG_C^{\theta})^{\gamma} e^{-\beta t} + \lambda e^{-\beta t}\left[(1-\tau)Y - C - T - \dot{K}\right]$$

Substitute for $G_I = \left(g_I^d + \phi\varepsilon\right)Y$ into $Y = G_I^{\eta} K^{1-\eta}$ yields

$$Y = \left[(g_I^d + \phi\varepsilon)Y\right]^{\eta} K^{1-\eta} = (g_I^d + \phi\varepsilon)^{\eta} Y^{\eta} K^{1-\eta} \qquad (7)$$

So, after the rearrangement, we can write the production function as

$Y = (g_I^d + \phi\varepsilon)^{\frac{\eta}{1-\eta}} K$ and substitute into the Hamiltonian function:

$$H = \frac{1}{\gamma}(CG_C^{\theta})^{\gamma} e^{-\beta t} + \lambda e^{-\beta t}\left[(1-\tau)(g_I^d + \phi\varepsilon)^{\frac{\eta}{1-\eta}} K - C - T - \dot{K}\right] \qquad \text{(H.1)}$$

First order individual representative household equilibrium conditions with respect to maximum principle and transversality condition are:

$$\frac{\partial H}{\partial C} = 0 \quad \Rightarrow \quad C^{\gamma-1} G_C^{\theta\,\gamma} = \lambda \qquad \text{(H.1a)}$$

$$\frac{\partial H}{\partial K} = \frac{\partial}{\partial t}\left(\frac{\partial H}{\partial \dot{K}}\right) \quad \Rightarrow \quad (1-\tau)(g_I^d + \phi\varepsilon)^{\frac{\eta}{1-\eta}} = \beta - \frac{\dot{\lambda}}{\lambda} \qquad \text{(H.1b)}$$

$$\dot{K} = (1-\tau) G_I^{\eta} K^{1-\eta} - C - T \qquad \text{(H.1c)}$$

$$\lim_{t\to\infty} \lambda K e^{-\beta t} = 0 \qquad \text{(H.1d)}$$

Solving first order conditions gives us economy's balanced growth rate:

$$\Psi = \frac{\dot{K}}{K} = \frac{(1-\tau)(g_I^d + \phi\varepsilon)^{\frac{\eta}{1-\eta}} - \beta}{1-\gamma(\theta+1)} \qquad (8)$$

and the following consumption-capital ratio.

$$\frac{C}{K} = \mu = \frac{\left\{[1-\gamma(\theta+1)]\left(1-g_I^d-g_c^d\right)-(1-\tau)\right\}(g_I^d + \phi\varepsilon)^{\frac{\eta}{1-\eta}} + \beta}{1-\gamma(\theta+1)} \qquad (9)$$

The equilibrium growth rate and consumption-capital ratio's response to foreign aid shocks, ε , in the long run can be observed as follows[11]:

$$\frac{\partial \psi}{\partial \varepsilon} = \frac{\phi\eta(1-\tau)(g_I^d + \phi\varepsilon)^{\frac{2\eta-1}{1-\eta}}}{(1-\eta)[1-\gamma(1+\theta)]} > 0$$

[11] These results hold under the mild restrictions that $\gamma<0$ and $[1-\gamma(1+\theta)]>(1-\tau)$.

$$\frac{\partial \mu}{\partial \varepsilon} = \frac{\phi\eta[\{1-\gamma(1+\theta)\}(1-g_I^d-g_c^d)-(1-\tau)](g_I^d+\phi\varepsilon)^{\frac{2\eta-1}{1-\eta}}}{(1-\eta)[1-\gamma(1+\theta)]} > 0$$

as long as $0 < \phi \leq 1$ which implies that a positive amount of investment aid shock increase in foreign aid has positive effect on both economy's growth rate and consumption-capital ratio. This result is consistent with the structure of individual representative household production function which contains public investment good provided by the government that makes private capital more productive. Because high productivity is the engine of economic growth, provision of more investment aid yields higher economic growth.

1. **2.2. Scenario 2: Foreign Aid is Fungible**

As we concluded in the introduction part of this dissertation chapter, there is strong evidence that donors do not monitor the usage of foreign aid by the recipient countries closely due to either high cost of monitoring process or some other political concerns (which may imply that they do not intend to monitor the aid money in the first place at all.) Now in this scenario, since government can access the foreign aid inflow in order to use it as a substitute for its own domestic revenues and finance different expenditures which is contrary to the intentions of the donors, part of the government's expenditures that are financed by its domestic revenue (the ratios represented by g_c^d and g_I^d in the model) is not pre-determined anymore. Under these circumstances, the government will try to maximize the individual representative household utility subject to the representative household's production function, private budget constraint, its own budget constraint and funding constraints for the public good's provision.

Hamiltonian function formed by the constraints in the fungible aid scenario is then:

$$H = \frac{1}{\gamma} C^{\gamma} G_c^{\theta\,\gamma} e^{-\beta t} + \lambda_1 e^{-\beta t}\left[(1-\tau) G_I^{\eta} K^{1-\eta} - C - T - \dot{K}\right] + \lambda_2 e^{-\beta t}\left[G_c - \left(g_c^d + (1-\phi)\varepsilon\right)Y\right]$$

$$+ \lambda_3 e^{-\beta t}\left[G_I - (g_I^d + \phi\varepsilon)Y\right] + \lambda_4 e^{-\beta t}\left[\tau Y + F + T - G_c - G_I\right] \qquad \text{(H.2)}$$

First order equilibrium conditions with respect to maximum principle are:

$$\frac{\partial H}{\partial C} = 0 \quad \Rightarrow \quad C^{\gamma-1} G_c^{\theta\,\gamma} = \lambda_1 \qquad \text{(H.2a)}$$

$$\frac{\partial H}{\partial G_I} = 0 \quad \Rightarrow \quad \eta\lambda_1 (1-\tau) G_I^{\eta-1} K^{1-\eta} + \lambda_3 + \lambda_4 = 0 \qquad \text{(H.2b)}$$

$$\frac{\partial H}{\partial G_C} = 0 \quad \Rightarrow \quad \theta\, C^{\gamma} G_c^{\theta\,\gamma-1} + \lambda_2 - \lambda_4 = 0 \qquad \text{(H.2c)}$$

$$\frac{\partial H}{\partial \tau} = 0 \quad \Rightarrow \quad -\lambda_1 G_I^{\eta} K^{1-\eta} + \lambda_4 Y = 0 \qquad \text{(H.2d)}$$

$$\frac{\partial H}{\partial g_c^d} = 0 \quad \Rightarrow \quad -\lambda_2 = 0 \qquad \text{(H.2e)}$$

$$\frac{\partial H}{\partial g_I^d} = 0 \quad \Rightarrow \quad -\lambda_3 = 0 \qquad \text{(H.2f)}$$

From first order conditions and the individual representative household's decision for consumption-capital ratio $\frac{C}{K}$ (which is exogenous for the government), optimal values of g_c^d and g_I^d can be obtained as the following equations:

$$g_I^d = \eta(1-\tau) - \phi\varepsilon \qquad \text{(10)}$$

$$\hat{g}_c^d = \frac{1}{\theta+1}\left\{\frac{\theta\left[\gamma(\theta+1)-\beta\{\eta(1-\tau)\}^{\frac{\eta}{\eta-1}}-\tau\right]}{\gamma(\theta+1)-1}+\left[\phi(\theta+1)-1\right]\varepsilon\right\} \qquad (11)$$

The response of optimal rate of domestic expenditure for public investment good is very straightforward.

$$\frac{\partial \hat{g}_I^d}{\partial \varepsilon} = -\phi < 0$$

which indicates that foreign aid for investment is fungible.

When it comes to the foreign aid's effect on public consumption good, the respond for the aid shocks can be seen by considering possible values of the parameters.

$$\frac{\partial \hat{g}_c^d}{\partial \varepsilon} = \phi - \frac{1}{\theta+1}$$

If we assume $\phi = 0$, which means that the investment aid is zero, in this case the effect of foreign aid shock on domestic expenditure of public consumption good will be negative.

$$\frac{\partial \hat{g}_c^d}{\partial \varepsilon} = -\frac{1}{\theta+1} < 0$$

This negative relationship implies that an increase in foreign aid is associated with a decrease in domestic expenditure on public consumption good but it will be less than the increase (or change) proportionately.

If we assume $\phi = 1$, it would mean that the aid is totally intended for the public investment good. In this case,

$$\frac{\partial \hat{g}_c^d}{\partial \varepsilon} = \frac{\theta}{\theta+1} < 1$$

which implies that an increase in foreign aid increases the domestic expenditure on public consumption good. But as it can be seen from the value of the partial effect equation above (it is positive but less than 1), the increase in $\hat{g}_c^d$ is going to be less than the increase in ε proportionately.

Now we look at how the total government expenditure (including both domestic revenue and foreign aid) responds to the foreign aid shocks on the following total public expenditure equation,

$$\overline{g} = \hat{g}_I^d + \hat{g}_c^d + \varepsilon \text{ and } \frac{\partial \overline{g}}{\partial \varepsilon} = -\phi + \phi - \frac{1}{\theta+1} + 1 = \frac{\theta}{\theta+1} < 1 \qquad (12)$$

This result also shows us that in general foreign aid is fungible. An increase in total foreign aid results in an increase in total government expenditure but less than proportionately. It clearly indicates that some part of the aid is never being spent for the provision of public good and being transferred to different agents other than the government or government is using the aid money for the expenditures on public good by reducing its own domestic share.

Now that $\hat{g}_c^d$ and $\hat{g}_I^d$ are known in the case of foreign aid fungibility, we can substitute for g_I^d into equation (8) and get the growth rate of the economy,

$$\widetilde{\psi} = \frac{(1-\tau)[(1-\tau)\eta]^{\frac{\eta}{1-\eta}} - \beta}{1-\gamma(1+\theta)} \qquad (13)$$

It is very straightforward from the equation that aid does not appear in the equilibrium growth rate which implies that it has no effect in the long run economic growth i.e.

$$\frac{\partial \widetilde{\psi}}{\partial \varepsilon} = 0. \qquad (14)$$

On the contrary, given the government's allocation decisions in response to the aid flow, it can easily be shown that the consumption-capital ratio increases when aid is fungible, indicating that the decline in domestic spending on public goods is, in some way, rebated back to the private sector in the form of higher private consumption:

$$\frac{\partial \mu}{\partial \varepsilon} > 0 \qquad (15)$$

1.3. Empirical Analysis

The existing literature on fungibility has used time series data in individual countries and cross sectional time series data across countries to examine the effect of foreign aid on domestic expenditures. Pack and Pack (1990) study, the case of Indonesia, finds no evidence of fungibility Pack and Pack (1993) study, on the Dominican Republic, finds strong evidence for fungibility. In the case of India, Swaroop, Jha and Rajkumar (2000) show that an important portion of foreign aid was used for the purpose not intended by donors.

In a multi-country study, Feyzioglu et al. (1998) do not find aid to be fungible. Also they do not find any statistically significant evidence that there is a reduction in tax revenues due to foreign aid. This result is based on a sample of 14 countries. When they extend their sample to 38 countries, they find the opposite results about both fungibility and tax relief.

Gupta et al. (2003) examine the effect of aid on government revenue and spending by breaking down the composition of aid into loans and grants. They find that loans are not fungible. In addition, they discover a nonlinear positive relationship between loans and revenue while getting a corresponding negative relationship between grants and revenue.

In this part of the chapter, I will test the main predictions of the theoretical model in an unbalanced panel of 67 countries over the 1972-2000 period[12]. No specific selection method was adopted for the countries included in this study. Rather, it was the availability of the data that determined the panel.

I will first investigate whether total aid is fungible. I will do so by examining how total public expenditures respond to changes in total foreign aid. I will continue the investigation by looking at whether specific aid types are used for the targeted categories of public expenditures that they are assigned to. Finally I will test whether, in the presence of fungibility, foreign aid has any impact on economic growth.

1.3.1. Statistical Method

I assume that there may be country specific unobserved heterogeneity which does not change across time with this model so I could employ fixed or random effects regression models to correct for omitted variable bias. I used fixed effects regression model based on the Hausman test. The Hausman test is distributed Chi-Squared Asymptotic around the null hypothesis that Random Effects is appropriate. This test evaluates whether the coefficients between the two models are statistically different from one another (See Wooldridge, 2003: Introductory econometrics, chapter 13-14, Thomson, for more information)

[12] The list of aid-recipient countries used in the sample is provided in Appendix A (Table A1).

1.3.2. Data Description

I use the following dependent variables: annual total and sectoral government expenditures and the annual GDP growth rate.[13]

The data on government spending are from the International Monetary Fund's Government Financial Statistics. Data on the GDP growth rate are from the World Bank's World Development Indicators Online (WDI) and Global Development Finance Online (GDF).

The main explanatory variable in this analysis is foreign aid. Data on foreign aid are available from the Organisation for Economic Co-operation and Development's (OECD) International Development Statistics (IDS) online databases. These databases cover bilateral and multilateral donors' aid and other resource flows to developing countries and countries in transition. I use two different aid data, provided by the Creditor Reporting System (CRS) and Development Assistance Committee (DAC) databases.[14]

The DAC report consists of aggregated data for Net Official Development Assistance (ODA), while the CRS report presents sectoral and geographical information on aid. Further, the data on total foreign aid from DAC show disbursements whereas data from CRS show commitments.

To test whether the composition of aid matters for fungibility, data are needed on the composition of aid and government spending, as the theoretical model makes

[13] Note that total expenditures do not include defense expenditures, which on average exceed 10 % of the total expenditure for the recipient countries. I exclude defense expenditures as it is unlikely for that type of expenditure to be affected by the social and economic indicators that are included in this model.
[14] See Appendix B for further details.

predictions on how total and sector-specific expenditures respond to changes in total and sector-specific foreign aid.[15]

Although the DAC report presents more data on disbursements, it does not provide as detailed a sectoral allocation of aid as the CRS report does. These two databases may show some differences for some years and sectors due to their underlying information gathering systems and tools. However, using the CRS database has become more feasible recently because of its increased coverage, especially starting from 1990s[16].

To check for robustness, I use total aid data from both the CRS and DAC databases and find that the results are practically unchanged.

I classify domestic government expenditures and foreign aid into three categories: investment, non-investment and social infrastructure. Since there are no precise definitions of these categories in the databases, I use the following strategy: in the CRS (commitments) dataset, I define investment aid as the sum of economic infrastructure aid and aid to the production sector. Then I use the corresponding spending amounts listed under the Economic Affairs and Services Section in the IMF's Government Financial Statistics (GFS) to construct government investment expenditures for the recipient country. I create social-infrastructure aid by using aid to social infrastructure and services in the CRS data. General public services, education, health, social security, housing and recreational and cultural expenditures in the GFS data are then used to construct the

[15] For this part of the analysis, two distinct aid datasets obtained are used from the DAC and CRS database as described above. I compare the results obtained by using these two types of aid data to see if data source selection affects the results considerably. The tables are designed in a way that the reader can see and compare results with these aid data.

[16] I examined the correlation between the two series in the panel in each year starting from 1973 (which is the initial year of the CRS data). In the sample, the correlation between the two series increases as we approach the present time. The correlation between the two measures is 0.6574 in 1973, 0.8057 in 1990 and 0.9289 in 2000. The overall correlation in the panel between the two series is 0.8355.

corresponding domestic government expenditure on social infrastructure. The remaining components in both the aid and expenditure datasets are used to construct the non-investment categories. Total and sectoral aid and expenditures are expressed as a share of the aid-recipient's GDP[17].

The control variables for the fungibility analysis include agricultural value-added, literacy rate, infant mortality rate, the dependency ratio (the fraction of population 65 years and above), exports plus imports as a percentage of GDP and real per-capita GDP. Agricultural value-added[18], the dependency ratio, and the literacy rate are obtained from the WDI and GDF. Data on infant mortality rates and real per-capita GDP are obtained from the U.S Census Bureau's International databases (IDB) and the Penn World Table, respectively. The list of the recipient countries and the descriptive statistics for the variables of interest are presented in Tables A1 and A5 in Appendix A, respectively. In the growth regressions, I have included population growth, inflation rate, and FDI in addition to some of the control variables used in the fungibility analysis[19].

1.3.3. The Composition of Foreign Aid and Fungibility

I begin by examining the sensitivity of total and sector-specific (as defined above) expenditures to changes in total and sector-specific foreign aid in a panel of 67 countries, using annual data for the 1972-2000 period. The following specification is estimated:

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[17] Complete aid (CRS) and expenditure classification charts are provided from the data sources in Appendix A (Table A3 and Table A4).

[18] Value-Added means "The incremental value that is realized by the producer from an agricultural commodity or product as a result of: (1) a change in its physical state, or (2) differentiated production or marketing, as demonstrated in a business plan, or (3) product segregation. Also, (4) the economic benefit realized from the product of farm- or ranch-based renewable energy." See http://www.rurdev.usda.gov/rbs/coops/faq.htm for more details.

[19] The additional variables come from the WDI and the GDF databases.

$$GovExp_{it} = \alpha_0 + \alpha_1 Aid_{it} + \alpha_2 X_{it} + \varepsilon_{it}$$

where $GovExp_{it}$ represents total government expenditures as a share of GDP, Aid_{it} measures total aid as a fraction of GDP, and X_{it} is a set of controls, including variables that are considered standard determinants of government expenditure in the literature. Specifically, I include the recipient's infant mortality rate and the dependency ratio as proxies for health-care and social security spending. The literacy rate and agricultural value-added are used to control for spending in the education and agriculture sectors. Finally, I include trade dependence (imports plus exports as a percentage of GDP) as international exposure could increase government expenditures (see Alesina and Wacziarg, 1998) and real per capita GDP (to control for the size of the government) as a proxy for income[20].

I use lagged values of the above controls to minimize concerns about simultaneity. To address the potential for omitted country-level variables, I include country fixed effects and also cluster errors by country. Finally, by including time effects, I take away the time component that is common to all countries in a given period.

In their study, Feyzioglu et al. (1998) expressed their concern about the simultaneity problem of the expenditure and foreign aid variables. To minimize the effect of this problem, they use aid disbursement numbers and lagged values of a few of the economic and social indicators of the recipient country as explanatory variables in their regression analysis. They argue that they picked disbursement numbers on the aid

[20] Real GDP per capita of the recipient countries is included as an indicator of development levels which is likely to affect the size of the government, as Feyzioglu et al. (1998) have suggested, based on Wagner's Law. Wagner's law states that the development of an industrial economy will be accompanied by an increased share of public expenditure in GNP.

variable because these numbers are largely predetermined. Since this model and the variables in the empirical part are similar to their analysis, I am aware of this problem as well. In an attempt to reduce the effect of this problem on the results, I used lagged values of the control variables. Since lags of an endogenous variable are exogenous (at time t, past values are fixed which means they are pre-determined), I hope to minimize the simultaneity problem by doing that. Although I find Feyzioglu et al.'s (1998) argument that disbursement numbers on foreign aid are largely pre-determined reasonable, I do not have a big concern that using commitments data on foreign aid would increase the simultaneity problem more than using disbursements because the commitment data is also pre-determined according to the data description provided by the OECD database. Also existing studies provide considerable amount of evidence and largely agree on the phenomenon that for the aid allocation, decisions of the donors on political and other strategic concerns dominate the economic needs of the recipients. Eventually, I can assume that simultaneity problem between aid variable and the control variables which show mostly economic state of the recipient is not a big concern. Therefore I use the CRS aid activities data (all commitments) for the sectoral aid which is not available on disbursements.

The effect of foreign aid on total government expenditures is presented in Table 1.1. The results indicate a less-than proportionate positive and statistically significant relationship between total government expenditure and total foreign aid. This indicates that foreign aid is indeed fungible and confirms the theoretical prediction in (12). This result holds for both measures of aid (CRS and DAC). From columns 1 and 2 in Table 1.1, I see that a 1 percentage point increase in foreign aid leads to an increase of about

0.35 percentage point in total government spending when the DAC aid data is used, and about 0.29 percentage point when the CRS data is used. Both coefficients are statistically significant at the 1% level. Table 1.1 provides strong evidence of fungibility at the aggregate level: since total government expenditure already includes foreign aid spending, I see that on average (depending on which aid data is used), about 70 percent of total aid is fungible.

The evidence presented in Table 1.1 supports the prediction that total aid is fungible, but it does not identify how and if the composition of aid matters. To shed light on the link between fungibility and the composition of aid, I split the sample into three categories of government expenditures and three corresponding categories of foreign aid. The dependent variables are now the recipient government's investment expenditures, non-investment expenditures, and social infrastructure expenditures. The independent variables are the corresponding categories for foreign aid, while the control variables remain the same as in Table 1.1. One of the main predictions of the theoretical model in scenario 2 is that aid designated for public investment is unambiguously fungible, while fungibility from non-investment aid is lower than from investment aid (see equations 10 and 11). The effects of the composition of aid on the composition of government spending are reported in Table 1.2.

Equation (10) in scenario 2 predicts that a 1 percentage point increase in investment aid will lead to an equal and proportionate decline in government investment expenditure. The empirical results in Table 1.2 are very close to the theoretical prediction: a one dollar increase in investment aid is associated with approximately a $0.12 increase in total government investment expenditure (significant at the 1% level),

indicating that about $0.88 of every dollar of investment aid is fungible. In comparison, while $0.84 of every dollar of non-investment aid is fungible (however this result is not statistically significant), the corresponding number for social infrastructure aid is $0.78. Therefore, the empirical results reported in 1.2 seem to confirm the theoretical predictions, i.e., investment aid appears to be the most fungible category of aid, while social infrastructure aid is associated with lower degree of fungibility.

1.3.4. Implications for Economic Growth

Having illustrated the fungibility of foreign aid and the effect of its composition, I now turn to the impact of aid on growth. According to the model, when aid is fungible, the equilibrium growth rate should be independent of aid and its composition. This prediction is tested in Table 1.3, by running a standard growth regression, where I regress the annual growth rate of GDP on total and investment aid, using lags of real GDP per capita, imports plus exports, the annual population growth rate, inflation rate, foreign direct investment, gross domestic fixed investment and the literacy rate as controls. Although Table 1.3 shows positive relationships between total aid, investment aid and growth, none of these results are statistically significant. Therefore, consistent with the theoretical predictions (and the sizable empirical literature), foreign aid does not seem to have any impact on economic growth.

1.3.5. Instrumental Variable Regressions

OLS estimations of the relationship between fungibility and foreign aid might be biased due to the potential endogeneity of foreign aid distributions (foreign aid can be sent where governments fail to provide public goods to their countries; these same countries could be characterized by corruption, weaker institutions and lower preferences

for public goods). A similar problem exists for growth, since countries that have high growth rates may tend to receive more aid. In this section, I test the robustness of the earlier results by employing instrumental variable regressions.

Following Tavares (2003), I use a combination of geographical and cultural ties between major donors and recipient countries as instruments for aid, which in turn are interacted with aid outflows from donors. These interaction terms serve as instrumental variables, determining foreign aid inflows to each recipient country. The procedure I adopt can be described as follows. For each country in the sample, I construct an instrument for aid which captures the exogenous component of the aid sample. I use the inverse of bilateral distance and a contiguity dummy (the presence of a common land border) for geographical proximity, and common language and religion as measures of cultural affinity. For each country in the sample, I sum the product of aid outflows from 22 donor countries (listed in Table A2 of Appendix A) after multiplying each of them by the bilateral exogenous measures described above[21].

I consider the interaction of the aid variable and instruments for two main reasons: First, since I use country fixed effects in the regressions and the instruments are time-invariant, I am not able to observe their individual effects on foreign aid distributions. Second, the instruments under consideration exist only between donors and recipients on bilateral basis. Since I use total aid from all donors in the empirical study, this method allows me to link bilateral comparisons to total aid.

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[21] The instrumental variable for aid is constructed in the following manner:

$Instrumental\ Variable\,(Aid * Inst)_{i,t} = \sum_{j=1}^{22} Aid_{i,j,t} * Instrument_{i,j}$ where i : recipient country, j : donor country, t : year.

In the first stage of the instrumental variable regression, I regress aid inflows for each developing country on the four exogenous instruments above. The predicted value of the dependent variable in that regression is then used in the second stage regression to examine the link between fungibility and growth. The results of the first stage regressions are presented in Table 1.4. All the exogenous variables have the expected signs (an increase in distance reduces the amount of aid received whereas common borders, religion and official language increase the amount of aid). Three of the instruments (distance, language, and religion) are statistically significant for the total foreign aid variable from the DAC data and two of them (distance and religion) are statistically significant for the total foreign aid variable from the CRS data. The specification passes the Anderson (1984) canonical correlations likelihood-ratio test for identification and instrumental variable relevance, the Cragg-Donald F-statistic for weak identification and the Hansen J-statistic for over-identification tests for all instruments. As for the second stage regression, Table 1.5 presents the impact of total aid on total government expenditures when aid is instrumented for. The earlier results still remain valid (the coefficients are now slightly lower than the ones in Table 1.2), even after instrumenting foreign aid: a $1 increase in total aid is associated with approximately a $0.33 increase in government spending for the DAC variable, and a $0.21 increase for the CRS variable. Finally, Table 1.6 uses an IV regression for the aid-growth link and, as before, I am unable to find a statistically significant relationship between the two.

To summarize, I examine the effect of foreign aid and its composition on government spending and its composition. At the aggregate level, I find that foreign aid is fungible. I also find that investment aid is more fungible than other categories of aid,

namely non-investment and social infrastructure aid. The results also indicate that foreign aid, when fungible, does not have any impact on growth. All the empirical findings are consistent with the theoretical predictions.

1.3.6. Foreign Aid and Private Spending

Though I find that total aid is fungible, the results above do not suggest a cross subsidization of government spending: investment aid reduces domestic government investment, but does not finance any other category of government spending. The question, then, is that what type of spending does the fungible aid finance? This is no doubt a complex question, and one that is not obvious from the data. However, the theoretical results do point to one potential channel: private spending. Equations (14) and (15) indicate that when aid is fungible, it should have no effect on private investment (and consequently, growth), but would finance an increase in private consumption. In this section, I test this simple prediction.

Table 1.7 presents a summary of results relating foreign aid and its composition to private investment and household consumption. Columns (1)-(5) indicate that foreign aid or its composition has no significant effect on private investment expenditures. Columns (6)- (10) report the effects of aid and its composition on household consumption expenditures.

The findings are broadly consistent with theory: a 1 unit increase in the aid to GDP ratio increases the household consumption-GDP ratio by approximately .49 unit for the DAC aid variable, and .39 unit for the CRS aid variable (both significant at the 1% level). Moreover, the composition of aid matters too: a 1 unit increase in the investment aid-GDP ratio increases household consumption by .3 unit (significant at the 5% level).

Social infrastructure aid and non-investment aid increase household consumption by amounts larger than investment aid. These results suggest that aid, by releasing domestic public spending resources, might end up financing private consumption on the margin. The transmission mechanism could be through government transfer programs such as unemployment benefits or subsidies. The fact that aid has no effect on private investment expenditures is consistent with the results regarding the crowding out of domestic public investment. By reducing domestic public investment, aid offsets any positive externalities for private investment (through higher productivity of private capital), which consequently might explain why economic growth remains unaffected.

1.3.7. Conclusions

Foreign aid fungibility is a candidate to explain foreign aid ineffectiveness in the recipient countries. With this dissertation chapter, I tried to create an environment where possible effects of aid fungibility can be seen both theoretically and empirically.
In order the capture foreign aid's effect on the macroeconomic foundations and equilibrium long-run economic growth, I looked at the relationship between the government expenditure on public goods (services) provision and shocks to the foreign aid flows in the aid recipient countries.

In the theoretical model, foreign aid is inserted into a neo-classical endogenous growth model. This provides me an opportunity to see how other variables in the economy adjust endogenously in response to the foreign aid inflows. Another distinct and important side of the theoretical model is that it provides a framework which allows me to see how specific aid types (i.e. investment) might affect the targeted and not-targeted categories of public expenditures.

The theoretical framework also yields some interesting predictions on foreign aid fungibility and for its affect on the private capital productivity and economic growth. The theory finds that when aid is fungible, it has no affect on the long-run economic growth and also the investment aid seems more fungible than the non-investment aid. These predictions then confront with data. The empirical part of this paper tests the main implications of the theoretical model using a panel dataset of 67 countries for the period 1972-2000. The empirical findings are fully consistent with the theoretical predictions: I find strong evidence of fungibility at the aggregate level, with almost 70 percent of total aid being fungible in the sample. When foreign aid and government expenditure are classified into sub categories, I find that while investment aid is the most fungible type of aid, social infrastructure aid is associated with lower degrees of fungibility. Again as parallel to the theoretical result in the presence of fungibility, there is no statistically significant relationship between foreign aid and economic growth. Finally, I confirm that in the presence of fungibility, there is no statistically significant relationship between foreign aid and private investment, but aid does have a strong positive impact on household consumption. Results of the empirical section are robust to both heteroskedasticity and serial correlation and consistent with the instrumental variable method.

The results suggest us the foreign aid should target the investment expenditures in the recipient countries which may lead to an economic growth in the long run and also donors should monitor and enforce the recipient governments to use the aid money for these intended purposes. Having said that, it is clear fungibility is not sufficient to explain

foreign aid's ineffectiveness by itself. Additional studies on rent-seeking and corruption's effects on the foreign aid's ineffectiveness are needed to explore further details.

Table 1.1. The Effect of Foreign Aid on Total Expenditures

Variable	Dependent Variable	
	Total Expenditure (% of GDP)	
Aid DAC (% of GDP)	0.347 (6.02)***	
Aid CRS(% of GDP)		0.288 (5.28)***
Real GDP per capita	-0.0000 (0.18)	-0.0001 (0.40)
Infant mortality rate, lag ged	-0.103 (2.16)**	-0.095 (2.01)**
Agricultural value added (% of GDP), lagged	-0.227 (2.91)***	-0.252 (3.31)***
Literacy rate, lagged	-0.213 (1.24)	-0.235 (1.36)
Import plus export (% of GDP), lagged	-0.037 (1.57)	-0.038 (1.61)
Dependency ratio (65+), lagged	-0.883 (0.96)	-0.726 (0.73)
Constant	52.878 (4.10)***	53.684 (3.93)***
Observations	620	620
Adj. R-squared	0.90	0.90
Country Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Cluster (by country)	Yes	Yes
t statistics in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%	

Table 1.2. The Effects of Sectoral Foreign Aid on Sectoral Government Expenditures

	Dependent Variable					
Variable	Investment expenditure (% of GDP)	Non investment expenditure (% of GDP)	Social infrastructure expenditure (% of GDP)	Investment expenditure (% of GDP)	Non investment expenditure (% of GDP)	Social infrastructure expenditure (% of GDP)
Investment aid (% of GDP)	0.115 (2.72)***	0.087 (1.07)	0.107 (1.76)*	0.100 (2.27)**		
Non investment aid (% of GDP)	0.008 (0.22)	0.162 (1.57)			0.158 (1.68)*	0.122 (1.00)
Social infrastructure aid (% of GDP)			0.235 (2.21)**	0.030 (0.45)	0.065 (0.71)	0.221 (2.73)***
Real GDP per capita	0.0002 (1.29)	-0.0000 (0.08)	-0.0003 (0.85)	0.0003 (1.58)	0.0000 (0.00)	-0.0003 (0.81)
Infant mortality rate, lagged	-0.013 (0.59)	-0.099 (3.81)***	-0.011 (0.43)	-0.015 (0.66)	-0.104 (3.95)***	-0.011 (0.44)
Agricultural value added(% of GDP), lagged	-0.070 (3.08)***	-0.082 (1.41)	-0.075 (0.97)	-0.043 (1.60)	-0.077 (1.27)	-0.086 (1.17)
Literacy rate, lagged	-0.072 (0.91)	0.031 (0.48)	-0.207 (1.75)*	-0.052 (0.64)	0.035 (0.49)	-0.181 (1.58)
Import plus export (% of GDP), lagged	0.019 (1.86)*	-0.009 (0.65)	-0.044 (2.60)**	0.019 (1.95)*	-0.007 (0.50)	-0.043 (2.46)**
Dependency ratio 65, lagged	-0.169 (0.31)	-0.713 (1.09)	-0.427 (0.72)	-0.329 (0.53)	-0.637 (0.93)	-0.318 (0.55)
Constant	8.466 (1.12)	12.537 (1.42)	31.782 (4.49)***	9.171 (1.43)	11.643 (1.30)	29.849 (4.01)***
Observations	604	586	598	591	584	610
Adj. R-squared	0.80	0.71	0.93	0.81	0.71	0.93
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (by country)	Yes	Yes	Yes	Yes	Yes	Yes
t statistics in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%					

Table 1.3. The Effects of Total and Sectoral Foreign Aid on Economic Growth

Variable	Dependent Variable		
	GDP growth rate (annual)	GDP growth rate (annual)	GDP growth rate (annual)
Aid DAC (% of GDP)	0.038		
	(0.71)		
Aid CRS (% of GDP)		0.036	
		(0.73)	
Investment aid (% of GDP)			0.161
			(1.54)
Real GDP per capita, lagged	-0.001	-0.001	-0.001
	(4.18)***	(4.34)***	(5.18)***
Population growth (annual), lagged	0.341	0.359	0.444
	(2.17)**	(2.30)**	(3.11)***
Import plus export, (% of GDP) lagged	0.050	0.052	0.052
	(3.29)***	(3.40)***	(3.36)***
Literacy rate, lagged	-0.150	-0.184	-0.225
	(2.13)**	(2.59)**	(3.37)***
Gross fixed capital formation of GDP, lagged	-0.071	-0.081	-0.082
	(1.99)*	(2.15)**	(2.12)**
Inflation consumer prices annual, lagged	-0.001	-0.001	-0.001
	(3.59)***	(3.60)***	(3.89)***
Foreign direct investment net inflow, lagged	0.208	0.220	0.235
	(2.68)***	(2.81)***	(2.87)***
Constant	13.880	15.936	22.667
	(3.77)***	(4.43)***	(4.34)***
Observations	1360	1354	1305
Adj. R-squared	0.20	0.18	0.21
Country Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Cluster (by country)	Yes	Yes	Yes
t statistics in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%		

Table 1.4. Instrumental Variable Regressions for Total Aid

Variable	Dependent Variable	
	Total Expenditure (% of GDP)	Total Expenditure (% of GDP)
Aid DAC (% of GDP)	0.329 (4.72)***	
Aid CRS (% of GDP)		0.212 (2.47)**
Real GDP per capita	-0.000 (0.23)	-0.000 (0.58)
Infant mortality rate, lagged	-0.104 (2.23)**	-0.106 (2.35)**
Agricultural value added (% of GDP), lagged	-0.226 (2.94)***	-0.242 (3.20)***
Literacy rate, lagged	-0.216 (1.28)	-0.232 (1.43)
Total trade, lagged	-0.037 (1.61)	-0.030 (1.24)
Dependency ratio 65, lagged	-0.863 (0.98)	-1.083 (1.12)
Observations	613	596
Country Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Cluster (by country)	Yes	Yes
Anderson canonical correlations test (p value)	0.0000	0.0000
Cragg-Donald F statistic	313.628	108.054
Hansen J statistic (p value)	0.8303	0.1377
z statistics in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%	

Table 1.5. The results of first stage for IV regressions

Variable	Dependent Variable	
	Aid DAC (% of GDP)	Aid CRS (% of GDP)
Aid/Distance	1865.634 (2.38)**	2714.921 (1.78)*
Aid*Border	10.2954 (1.05)	10.9746 (0.85)
Aid*Language	0.8379 (3.77)***	0.0333 (0.07)
Aid*Religion	0.8468 (4.86)***	0.8032 (1.75)*
Real GDP per capita	-0.00038 (-1.72)*	-0.00043 (-1.40)
Infant mortality rate, lagged	0.0326 (0.65)	-0.0381 (-1.62)
Agricultural value added, lagged (% of GDP)	-0.0871 (-2.48)**	0.0595 (1.53)
Literacy rate, lagged	-0.0212 (-0.32)	-0.0542 (-0.67)
Total trade, lagged (% of GDP)	0.0096 (1.52)	0.0114 (1.37)
Dependency ratio 65, lagged	0.7265 (1.35)	0.8573 (1.76)*
Observations	613	596

t statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

Table 1.6. Growth (Instrumental Variable) regressions

Variable	Dependent Variable		
	GDP growth rate (annual)	GDP growth rate (annual)	GDP growth rate (annual)
Aid DAC (% of GDP)	-0.060 (1.35)		
Aid CRS (% of GDP)		-0.051 (0.77)	
Investment aid (% of GDP)			-0.680 (1.34)
Real GDP per capita, lagged	-0.001 (4.54)***	-0.001 (5.20)***	-0.002 (4.00)***
Population growth (annual), lagged	0.375 (2.50)**	0.340 (2.01)**	0.174 (1.10)
Import plus export, (% of GDP) lagged	0.058 (3.62)***	0.059 (3.94)***	0.078 (3.52)***
Literacy rate, lagged	-0.202 (2.52)**	-0.202 (2.39)**	-0.306 (4.06)***
Gross fixed capital formation of GDP, lagged	-0.085 (2.41)**	-0.086 (2.39)**	-0.090 (1.69)*
Inflation consumer prices annual, lagged	-0.001 (3.16)***	-0.001 (3.46)***	-0.000 (1.32)
Foreign direct investment net inflow, lagged	0.180 (2.36)**	0.184 (2.30)**	0.191 (1.79)*
Observations	1304	1309	949
Country Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Cluster (by country)	Yes	Yes	Yes
z statistics in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%		

Table 1.7. The impact of foreign aid on private investment and household consumption

Each regression controls for year and country fixed effects. The private investment regression controls for lagged private investment, openness to trade, per capita GDP growth, inflation and interest rate spread (the difference between the lending rate and the deposit rate) The consumption regression controls for per capita GDP growth, trade and inflation. All control variables are taken from the WDI dataset.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Investment					Consumption				
Aid DAC (% GDP)	0.080					0.489				
	(0.121)					(0.119)***				
AID CRS (% GDP)		0.023					0.387			
		(0.080)					(0.098)***			
Investment aid (% GDP)			0.002	0.010				0.289	0.283	
			(0.096)	(0.118)				(0.113)**	(0.134)**	
Non Investment aid (% GDP)				-0.001	-0.018				0.569	0.493
				(0.113)	(0.132)				(0.111)***	(0.094)***
Social infrastructure aid (% GDP)			0.097		0.113			0.717		0.517
			(0.244)		(0.301)			(0.391)*		(0.379)
Observation	590	591	560	560	556	1494	1424	1273	1321	1291
R-squared	0.85	0.84	0.85	0.85	0.85	0.84	0.83	0.84	0.84	0.84

Robust standard errors in parenthesis. * significant at 10%; ** significant at 5%; *** significant at 1%

FIGURES

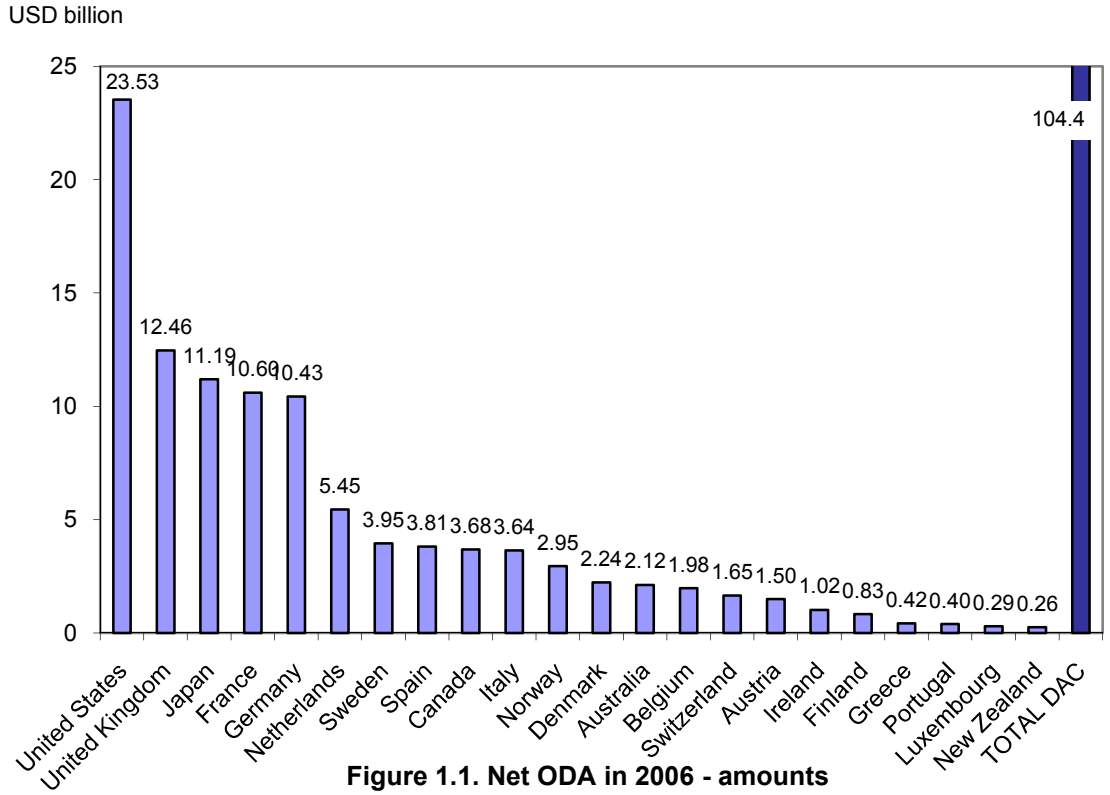

Figure 1.1. Net ODA in 2006 - amounts

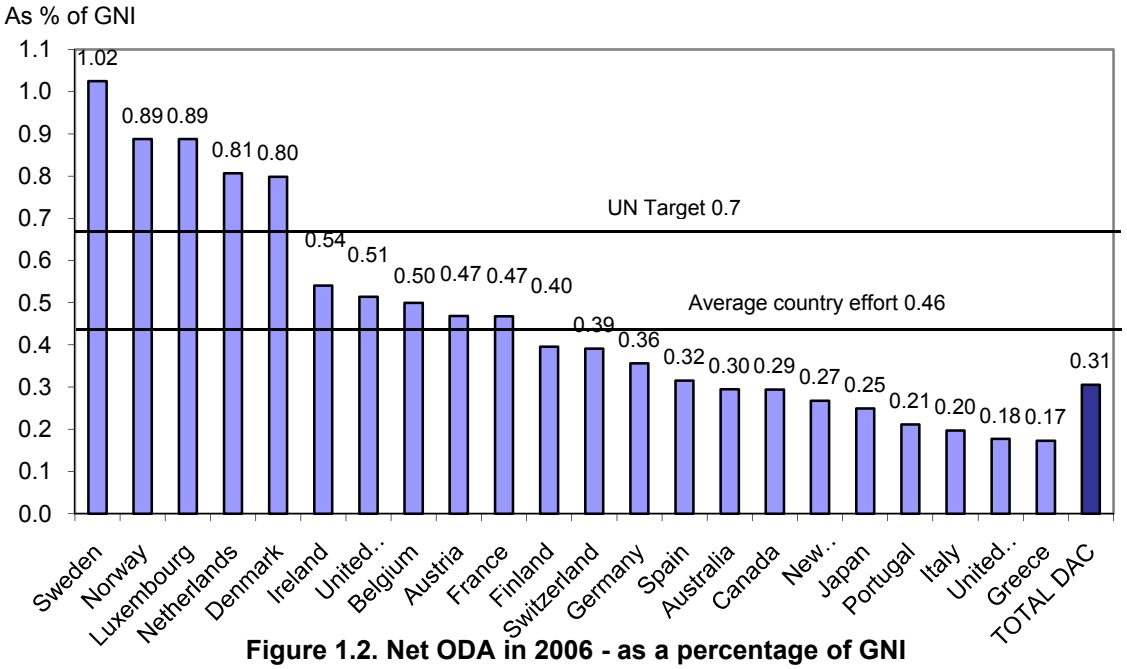

Figure 1.2. Net ODA in 2006 - as a percentage of GNI

Source: OECD Journal on Development: Development Co-operation - 2007 Report - OECD © 2007 - ISBN 9789264041479

CHAPTER 2

FOREIGN AID, GOVERNANCE QUALITY AND GOVERNMENT SPENDING

2.1. Introduction

In the previous chapter, I tried to address the possible problem of fungibility for the aid recipient countries when the marginal dollar of aid ends up financing provision of goods that was not intended by the donors to finance. Results presented in the earlier chapter confirm the existence of fungibility problem for the aid recipient countries included in the sample. Those results, however, did not take the quality of the governance for the aid recipient countries into account due to lack of existing data on this matter for the sample period. The data which measures quality of the political and institutional environment is provided by Kaufmann et al (2008) since 1996 on a yearly basis. Thus, I recreate my sample for the fungibility regressions between 1995 and 2007 by including measures of governance quality. By doing that, I try to see if neglecting those political and institutional environment quality measures affected the significance and magnitudes of the earlier findings which suggest very high level of substitution away from government expenditure in response to an increase in foreign aid in the recipient countries.

Recently the number of studies that focus on the relation between governance and economic growth is increasing in the economic growth literature. Hall and Jones (1999) states that the institutions and government policies of a country shape the economic environment in that country therefore, they are among the main determinants of the long-run economic performance.

In a recent World Bank report (2008), Acemoglu focuses on the interaction between governance and growth. He argues that institutions of a country may lead the politicians in two separate ways; good institutional environments can motivate politicians to create a growth enhancing setting whereas lack of those institutions may promote rent seeking activities and corruption.

Collier and Dollar (2004) argues that good governance is highly desirable and has a significant impact on achieving donor's objectives and aid effectiveness in the recipient countries.

The theoretical model in the earlier chapter of this dissertation predicts that productive government expenditure can promote economic growth by improving total government expenditure which includes growth enhancing investment expenditures. This is a very reasonable argument since most of the aid given as development assistance to recipient governments and its agencies is tied to infrastructure and investment expenditures. Therefore, aid's success in promoting economic growth is subject to its ability to increase the productive government expenditure. Consequently, under good governance we should expect a lower degree of fungibility indicating that aid is a complement but not a substitute for government expenditure as intended by the donors.

2.2. Data

The dependent variable "general government final consumption expenditure" is expressed as a percentage of gross domestic product. General government final consumption expenditure includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most definitions on national defense and security but excludes government military expenditures that are part of government capital

formation[22]. Data are obtained from World Development Indicators and United Nations Statistics Division.

The foreign financial aid and the governance quality indicators are the main explanatory variables in this analysis. The foreign aid data are obtained from the Organisation for Economic Co-operation and Development's (OECD) International Development Statistics (IDS) online databases. These databases cover bilateral and multilateral donors' aid and other resource flows to developing countries and countries in transition. There are two different aid data on OECD's website provided by the Creditor Reporting System (CRS) and Development Assistance Committee (DAC) databases.[23] The DAC report consists of aggregated data for Net Official Development Assistance (ODA), while the CRS report presents sectoral and geographical information on aid. Further, the data on total foreign aid from DAC show disbursements whereas data from CRS show commitments. Although the DAC report presents more data on disbursements, it does not provide as detailed a sectoral allocation of aid as the CRS report does. These two databases may show some differences for some years and sectors due to their underlying information gathering systems and tools. However to check for robustness, I use total aid data from both the CRS and DAC databases[24].

The governance quality indicators are obtained from World Bank's online database. The Governance Indicators report aggregate and individual governance indicators over the period 1996–2007, for six dimensions of governance: Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law,

[22] WDI 2007
[23] See Appendix B for further details.
[24] In the sample, the correlation between the two series increases as we approach the present time. The correlation between the two measures is 0.8648.

and Control of Corruption[25]. These measures are provided by Kaufmann et al (2008) as yearly reports. These indicators are distributed around zero ranging from approximately -2.5 to +2.5 where a lower score indicates a low quality of governance. In order to interact these governance indicators with foreign aid data and for ease of inference, I rescaled those indicators by equating the minimum value to 1.

Other control variables include agricultural value-added, literacy rate, infant mortality rate, the dependency ratio (the fraction of population 65 years and above), exports plus imports as a percentage of GDP, real per-capita GDP, regional dummies East Asia and Sub-Saharan Africa, civil war, and land area of the recipient countries. Agricultural value-added[26], exports plus imports as a percentage of GDP, land area of the recipient countries and real per-capita GDP are obtained from the WDI and GDF. Data on infant mortality rate and the literacy rate are obtained from the United Nations Statistics Division's website. Civil war variable is constructed according to the Clemens et al. (2004) specification. Yearly period dummies are also included with regional dummies to capture time specific unobservables.

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[25] Definitions are from Kaufmann et al. (2008)
1. *Voice and Accountability (VA)* – measuring perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.
2. *Political Stability and Absence of Violence (PV)* – measuring perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.
3. *Government Effectiveness (GE)* – measuring perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
4. *Regulatory Quality (RQ)* – measuring perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
5. *Rule of Law (RL)* – measuring perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
6. *Control of Corruption (CC)* – measuring perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

[26] Value-Added means "The incremental value that is realized by the producer from an agricultural commodity or product as a result of: (1) a change in its physical state, or (2) differentiated production or marketing, as demonstrated in a business plan, or (3) product segregation. Also, (4) the economic benefit realized from the product of farm- or ranch-based renewable energy." See http://www.rurdev.usda.gov/rbs/coops/faq.htm for more details.

Money and quasi money (M2) as a percentage of GDP , dummies for Egypt and Central America, log of population and aid's interactions with governance quality indicators, inflation, location in the tropics, and openness indicator are used as instruments in the first stage regressions to estimate aid and governance quality indicators with GMM and 2SLS regressions. Selections of instruments are based on Hansen and Tarp (2004). These variables are from the World Bank's World Development Indicators (WDI) 2007 CD-ROM and United Nations Statistics Division's website.

2.3. Statistical Model and Estimation Procedure

In this section, I will examine the sensitivity of total expenditures to changes in total foreign financial aid and governance quality in a panel of 95 countries, using annual data for the 1995-2007 period. The following specification is estimated:

$$GovExp_{it} = \alpha_0 + \alpha_t + \alpha_1 aid_{it} + \alpha_2 govquality_{it} + \alpha_2 X_{it} + \varepsilon_{it}$$

where $GovExp_{it}$ represents total government expenditures as a share of GDP, α_t is time specific dummies, aid_{it} measures total aid as a fraction of GDP, $govquality_{it}$ measures governance quality and X_{it} is a set of controls, including variables that are considered standard determinants of government expenditure in the literature.

I include the recipient's infant mortality rate and the dependency ratio as proxies for health-care and social security spending. The literacy rate and agricultural value-added are used to control for spending in the education and agriculture sectors. Land area of the recipient country is used as measures of country size and civil war indicator is used to control for substantial increase in government expenditure for recovery efforts. Unique intercepts for East Asian countries[27] and sub Saharan African countries[28] are included to control for the persistent

[27] Rep. of Korea, China, Indonesia, Malaysia, Philippines, Singapore, and Thailand.
[28] Classified according to WDI 2007 specification.

high and low economic performance in those regions respectively. I include trade dependence (imports plus exports as a percentage of GDP) as international exposure could increase government expenditures (see Alesina and Wacziarg, 1998) and real per capita GDP (to control for the size of the government) as a proxy for income[29]. Finally, by including time effects to all specifications, I try to account for the time component that is common to all countries in a given period.

2.4. A Discussion on the Selection of Statistical Model

I used Generalized Method of Moments (GMM) and Two Stage Least Squares (2SLS) estimation techniques to test the hypothesis that whether the quality of governance affects the degree of substitution away from the government expenditure in response to changes in the amount of foreign financial aid. The reason that I adapt these techniques over OLS is the possible endogeneity between aid, government quality indicators and government expenditure. Specifically, aid might be endogenous if donors allocate more resources to countries that lack adequate government spending on social and economic projects. Moreover, higher government expenditure on administrative, social and economic projects might also improve the quality of governance which would cause reverse causation between government expenditure and quality of governance indicators. To further investigate these possible endogeneties among aid, governance indicators and government expenditure, I performed a Durbin-Wu-Hausman-type test and I reject the null hypothesis that aid and governance indicators are exogenous for government expenditure which indicates that Instrumental Variable (IV) techniques are required.

[29] Real GDP per capita of the recipient countries is included as an indicator of development levels which is likely to affect the size of the government, as Feyzioglu et al. (1998) have suggested, based on Wagner's Law. Wagner's law states that the development of an industrial economy will be accompanied by an increased share of public expenditure in GNP.

These endogeneity test results are also robust to various violations of conditional homoskedasticity (Baum et al. 2007)

As discussed in Baum et al 2003, if the homoskedasticity of the error term is violated when one or more regressors are endogenous, GMM would be preferable to IV estimates. In the presence of heteroskedasticity, the IV coefficient estimates remain consistent but not the standard errors which would result in invalid inference. Moreover, the endogeneity and overidentifying restrictions tests would be also invalid under the violation of homoskedastic errors. For this reason, I performed the test of Pagan and Hall (1983) and based on the results, I reject the hypothesis of homoskedastic errors at the 1% level which suggests that the generalized method of moments (GMM) would provide more efficient inference than 2SLS (Baum et al. 2003). However, I will report the results from both GMM and IV estimations for comparison.

2.5. Results

Foreign aid fungibility is confirmed based on the regression results in the earlier chapter[30]. We saw that increase in government expenditure in response to increase in foreign aid is less than proportionate. I start my estimations by testing the same relationship between aid and total government expenditure on this new sample to see whether fungibility of aid exists or not (Column1.) A one unit increase in aid to GDP ratio leads to an increase of about 0.57 unit increase in the ratio of total government spending to GDP when the DAC aid data is used (Table 2.1 column 1), and about 0.37 unit increase when the CRS data is used(Table 2.2 column 1),. Both coefficients are statistically significant at 1% level. The results confirm that, in this new sample, foreign aid is fungible for both DAC and CRS aid categories.

[30] Please note that the number of countries and time coverage of sample was different in the earlier chapter i.e. sample contains data from 67 countries between the years 1972 and 2000.

In the following step, I include the governance quality indicators in the specifications one at a time and try to see whether better governance quality affects the use of foreign aid money for the recipient government and lower the degree of fungibility of aid. As can be followed from the columns 2 to 7 of Table 2.1 (where the DAC aid variable is used), in the presence of any of the governance quality indicators, the aid coefficient is greater which implies a lower substitution away from the government expenditure in response to an increase in the amount of the foreign aid. When we look at the coefficients of the governance quality indicators, 5 out of 6 has a negative sign meaning better quality of governance is associated with a lower government expenditure to GDP ratio. Three of these negative indicator coefficients are statistically significant at the conventional levels. These are "Voice and Accountability", "Political Stability and Absence of Violence/Terrorism" and "Regulatory Quality". Higher values of Political Stability and Absence of Violence (PV), which measures perceptions about government stability, and Voice and Accountability (VA), which measures the perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media, indicator variables yield the lowest fungibility among all indicators. Results suggest that in the presence of higher public participation and monitoring in the political system or political stability, government spending is more responsive to increases in foreign aid. This result is also valid where the regulatory power of the government in implementing sound policies regarding business environment is higher but with a lower coefficient on aid. In general, we can conclude that as long as we have statistically significant results on the government quality indicators, we have a lower degree of foreign aid fungibility. This trend does not change whether DAC or CRS aid variables are used. These

results are also robust in other specifications where governance quality indicators are treated as exogenous to government expenditure.

In addition to the affects of the individual governance quality measures, I tried to capture the effect of the all indicators simultaneously. Although governance quality indicators are highly correlated, I used them all in the same regression to see if this would change the result on the aid fungibility. Table 2.5 columns 1 and 4 show the results when DAC and CRS aid variables are used, respectively. The coefficients on the aid variables are very similar to earlier results where one governance quality indicator is used at a time.

Since governance quality indicators are highly correlated, the standard errors of the coefficients tend to be large due to multicollinearity when all of them are used in the same regression. In the later step, in an attempt to see governance indicators' simultaneous affect by avoiding the possible multicollinearity problem, I constructed two indices of governance quality indicators by taking simple and weighted averages of the indicator measures. For the latter, I followed Burnside and Dollar (2000) and used government expenditure regression to determine the relative importance of the different governance quality indicators. The weighted index of quality indicators are formed as follows;

Governance Quality Index = 14.35696 -.3954475 *Voice and Accountability -.247474 *Political Stability +2.104492*Control of Corruption +.0964762*Rule of Law -1.0364*Regulatory Quality -.1811437*Gov. Effectiveness

where the constant, 14.35696, is the intercept. The index can be interpreted as a country's predicted government total expenditure, given its governance quality measures, assuming that it had the mean values of other characteristics.

Table 2.5 columns 2 and 5 show the results for governance quality index where the simple average of the indicators is used for the DAC and CRS aid variables, respectively. The coefficient of the index is still negative as most of the individual indicators' coefficients in the earlier regressions. Also, in the presence of better governance (index), the degree of fungibility of aid is lower and the results are statistically significant.

Columns 3 and 6 are the results for the weighted governance quality indicator with the DAC and CRS aid variables, respectively. The relationship between the better governance and low degree of fungibility still exists. In these regressions, sign of the governance quality index is positive due to the large impact of the Control of Corruption measure on the index. Table 2.6 presents the results with 2SLS.

2.6. Conclusion

In this chapter, I try to investigate the fungibility of foreign financial aid in the presence of governance quality measures. The results suggest that fungibility is still an existing problem for the governments with higher governance quality but the degree of fungibility is lower in those countries. Government spending is more responsive to increases in foreign aid in the presence of higher public participation and monitoring in the political system. The same result is valid when there is political stability in the recipient country and the government has a higher regulatory power in implementing sound policies regarding business environment. These results suggest that poor governance quality might be one of the missing pieces in foreign aid's ineffectiveness puzzle and requires more attention.

Table 2.1. GMM Results with DAC Aid Variable

Variable	Dependent Variable: Total Expenditure (% of GDP)						
Aid DAC (% of GDP)	0.574	0.804	0.880	0.654	0.675	0.658	0.658
	(0.157)***	(0.166)***	(0.191)***	(0.164)***	(0.135)***	(0.153)***	(0.142)***
Land area	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Sub-Saharan Africa	3.659	4.699	4.658	4.034	4.182	4.110	3.874
	(1.720)**	(1.557)***	(1.729)***	(1.706)**	(1.695)**	(1.684)**	(1.682)**
Civil war	4.065	2.917	1.374	3.370	3.245	3.567	4.088
	(1.625)**	(1.700)*	(1.541)	(1.648)**	(1.777)*	(1.580)**	(2.037)**
East Asia	-3.179	-2.873	-3.368	-2.678	-2.774	-2.797	-2.815
	(1.219)***	(1.444)**	(1.288)***	(1.244)**	(1.178)**	(1.278)**	(1.178)**
GDP per capita, lagged	0.00025	0.00033	0.00037	0.00027	0.0003	0.00026	0.00020
	(0.00021)	(0.0002)	(0.00023)	(0.00022)	(0.00021)	(0.00022)	(0.00022)
Agricultural value added (% of GDP), lagged	-0.121	-0.159	-0.161	-0.141	-0.148	-0.138	-0.136
	(0.052)**	(0.056)***	(0.056)***	(0.055)**	(0.053)***	(0.053)***	(0.052)***
Infant mortality rate, lagged	-0.005	-0.030	-0.022	-0.007	-0.015	-0.008	-0.003
	(0.030)	(0.030)	(0.029)	(0.031)	(0.030)	(0.030)	(0.030)
Import plus export (% of GDP), lagged	0.025	0.018	0.031	0.024	0.022	0.023	0.022
	(0.011)**	(0.012)	(0.011)***	(0.012)*	(0.011)**	(0.012)**	(0.012)*
Literacy rate, lagged	-0.050	-0.054	-0.058	-0.055	-0.052	-0.051	-0.044
	(0.033)	(0.034)	(0.035)*	(0.033)*	(0.034)	(0.033)	(0.033)
Dependency ratio (65+), lagged	0.531	0.495	0.530	0.553	0.523	0.531	0.526
	(0.248)**	(0.234)**	(0.240)**	(0.246)**	(0.231)**	(0.242)**	(0.251)**
Voice and Accountability		-1.604					
		(0.656)**					
Political Stability			-1.314				
			(0.814)				
Control of Corruption							0.145
							(0.921)
Rule of Law						-0.455	
						(0.717)	
Regulatory Quality					-1.149		
					(0.641)*		
Gov. Effectiveness				-0.631			
				(0.902)			
Constant	10.386	15.495	14.134	12.123	14.312	11.677	10.150
	(3.388)***	(3.635)***	(3.816)***	(3.790)***	(3.958)***	(3.529)***	(3.554)***
Observations	412	361	361	361	361	361	348
Underidentification test (p value)	0.0189	0.0082	0.0101	0.0224	0.0116	0.0141	0.0272
Hansen J statistic (p value)	0.4586	0.5613	0.4270	0.6336	0.6963	0.6514	0.6997
Robust standard errors in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%						

Table 2.2. GMM Results with CRS Aid Variable

Variable	Dependent Variable: Total Expenditure (% of GDP)						
Aid CRS(% of GDP)	0.367	0.450	0.434	0.355	0.401	0.347	0.403
	(0.104)***	(0.120)***	(0.133)***	(0.105)***	(0.104)***	(0.104)***	(0.107)***
Land area	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Sub-Saharan Africa	3.439	4.502	4.395	3.611	3.787	3.787	3.174
	(1.680)**	(1.496)***	(1.707)**	(1.681)**	(1.670)**	(1.641)**	(1.648)*
East Asia	-3.043	-2.756	-3.511	-2.710	-2.542	-2.750	-2.767
	(1.250)**	(1.525)*	(1.350)***	(1.270)**	(1.240)**	(1.326)**	(1.219)**
Civil war	4.796	3.801	1.945	4.317	4.123	4.181	4.915
	(1.558)***	(1.566)**	(1.369)	(1.559)***	(1.648)**	(1.498)***	(1.938)**
GDP per capita, lagged	0.00026	0.00037	0.00041	0.00028	0.00034	0.00031	0.00027
	(0.00021)	(0.00020)*	(0.00024)*	(0.00023)	(0.00021)	(0.00023)	(0.00023)
Agricultural value added (% of GDP), lagged	-0.134	-0.173	-0.155	-0.144	-0.163	-0.140	-0.156
	(0.052)***	(0.053)***	(0.058)***	(0.053)***	(0.052)***	(0.052)***	(0.052)***
Infant mortality rate, lagged	0.003	-0.021	-0.014	0.002	-0.005	0.001	0.011
	(0.029)	(0.029)	(0.028)	(0.030)	(0.030)	(0.030)	(0.030)
Import plus export (% of GDP), lagged	0.024	0.016	0.030	0.022	0.019	0.023	0.021
	(0.011)**	(0.012)	(0.011)***	(0.012)*	(0.011)*	(0.012)**	(0.011)*
Literacy rate, lagged	-0.051	-0.054	-0.060	-0.049	-0.050	-0.052	-0.045
	(0.034)	(0.034)	(0.034)*	(0.034)	(0.035)	(0.033)	(0.033)
Dependency ratio (65+), lagged	0.557	0.473	0.487	0.542	0.519	0.528	0.526
	(0.252)**	(0.235)**	(0.242)**	(0.248)**	(0.230)**	(0.241)**	(0.253)**
Voice and Accountability		-1.709					
		(0.682)**					
Political Stability			-1.236				
			(0.851)				
Control of Corruption							-0.063
							(0.934)
Rule of Law						-0.794	
						(0.714)	
Regulatory Quality					-1.460		
					(0.698)**		
Gov. Effectiveness				-0.627			
				(0.923)			
Constant	9.907	15.574	13.985	11.449	14.879	11.921	9.918
	(3.327)***	(3.641)***	(3.853)***	(3.740)***	(4.034)***	(3.366)***	(3.498)***
Observations	412	361	361	361	361	361	348
Underidentification test (p value)	0.0043	0.0028	0.0020	0.0071	0.0044	0.0036	0.0060
Hansen J statistic (p value)	0.5431	0.5242	0.3708	0.7032	0.7638	0.7052	0.8720

Robust standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

Table 2.3. IV Results with DAC Aid Variable

Variable	Dependent Variable: Total Expenditure (% of GDP)						
Aid DAC (% of GDP)	0.634	0.892	0.880	0.775	0.810	0.777	0.779
	(0.212)***	(0.234)***	(0.233)***	(0.210)***	(0.214)***	(0.220)***	(0.225)***
Land area	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Sub-Saharan Africa	4.585	4.841	4.808	4.669	4.598	4.678	4.364
	(1.778)***	(1.654)***	(1.793)***	(1.768)***	(1.736)***	(1.769)***	(1.767)**
Civil war	3.588	2.567	1.880	3.250	3.026	3.385	4.475
	(1.862)*	(2.033)	(2.097)	(1.910)*	(2.117)	(1.876)*	(2.183)**
East Asia	-3.531	-3.179	-3.678	-3.056	-3.008	-3.180	-3.233
	(1.300)***	(1.487)**	(1.332)***	(1.312)**	(1.305)**	(1.371)**	(1.233)***
GDP per capita, lagged	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Agricultural value added (% of GDP), lagged	-0.132	-0.173	-0.162	-0.158	-0.171	-0.151	-0.151
	(0.056)**	(0.060)***	(0.063)***	(0.060)***	(0.060)***	(0.059)***	(0.058)***
Infant mortality rate, lagged	-0.014	-0.028	-0.019	-0.017	-0.023	-0.016	-0.016
	(0.038)	(0.037)	(0.037)	(0.039)	(0.037)	(0.037)	(0.036)
Import plus export (% of GDP), lagged	0.030	0.026	0.036	0.028	0.026	0.027	0.024
	(0.013)**	(0.013)**	(0.012)***	(0.014)**	(0.013)**	(0.013)**	(0.013)*
Literacy rate, lagged	-0.072	-0.073	-0.076	-0.069	-0.071	-0.067	-0.052
	(0.038)*	(0.038)*	(0.040)*	(0.038)*	(0.039)*	(0.037)*	(0.037)
Dependency ratio (65+), lagged	0.532	0.598	0.579	0.534	0.525	0.524	0.483
	(0.267)**	(0.248)**	(0.257)**	(0.262)**	(0.250)**	(0.263)**	(0.265)*
Voice and Accountability		-1.785					
		(0.698)**					
Political Stability			-1.344				
			(0.870)				
Control of Corruption							0.016
							(1.046)
Rule of Law						-0.415	
						(0.901)	
Regulatory Quality					-1.557		
					(0.729)**		
Gov. Effectiveness				-0.729			
				(1.063)			
Constant	12.591	16.358	15.151	14.097	17.339	13.211	11.988
	(4.443)***	(4.442)***	(4.904)***	(5.095)***	(4.899)***	(4.423)***	(4.421)***
Observations	412	361	361	361	361	361	348
Robust standard errors in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%						

Table 2.4. IV Results with DAC Aid Variable

Variable	Dependent Variable: Total Expenditure (% of GDP)						
Aid CRS(% of GDP)	0.449	0.543	0.505	0.453	0.489	0.438	0.478
	(0.133)***	(0.154)***	(0.162)***	(0.142)***	(0.143)***	(0.143)***	(0.148)***
Land area	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Sub-Saharan Africa	4.368	4.572	4.612	4.471	4.344	4.540	3.995
	(1.793)**	(1.681)***	(1.816)**	(1.807)**	(1.752)**	(1.802)**	(1.800)**
East Asia	-3.319	-3.140	-3.736	-3.042	-2.956	-3.207	-3.216
	(1.349)**	(1.578)**	(1.404)***	(1.357)**	(1.369)**	(1.438)**	(1.288)**
Civil war	4.565	3.615	2.833	4.112	3.966	4.144	5.098
	(1.732)***	(1.776)**	(1.908)	(1.737)**	(1.862)**	(1.712)**	(2.061)**
GDP per capita, lagged	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Agricultural value added (% of GDP), lagged	-0.162	-0.200	-0.181	-0.178	-0.196	-0.167	-0.181
	(0.058)***	(0.061)***	(0.066)***	(0.061)***	(0.062)***	(0.060)***	(0.061)***
Infant mortality rate, lagged	-0.010	-0.027	-0.016	-0.015	-0.021	-0.015	-0.013
	(0.036)	(0.036)	(0.036)	(0.038)	(0.037)	(0.036)	(0.035)
Import plus export (% of GDP), lagged	0.028	0.025	0.035	0.027	0.025	0.028	0.023
	(0.013)**	(0.013)*	(0.012)***	(0.013)**	(0.013)**	(0.012)**	(0.013)*
Literacy rate, lagged	-0.070	-0.071	-0.073	-0.068	-0.070	-0.066	-0.051
	(0.038)*	(0.037)*	(0.039)*	(0.037)*	(0.038)*	(0.036)*	(0.036)
Dependency ratio (65+), lagged	0.522	0.570	0.545	0.507	0.495	0.497	0.450
	(0.272)*	(0.250)**	(0.260)**	(0.263)*	(0.250)**	(0.263)*	(0.268)*
Voice and Accountability		-1.918					
		(0.731)***					
Political Stability			-1.371				
			(0.912)				
Control of Corruption							-0.061
							(1.056)
Rule of Law						-0.650	
						(0.906)	
Regulatory Quality					-1.748		
					(0.782)**		
Gov. Effectiveness				-0.839			
				(1.055)			
Constant	12.344	16.714	15.225	14.405	18.006	13.787	12.385
	(4.437)***	(4.393)***	(4.856)***	(5.042)***	(5.001)***	(4.332)***	(4.381)***
Observations	412	361	361	361	361	361	348
Robust standard errors in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%						

Table 2.5. GMM Results for Governance Quality Index with DAC and CRS Aid Variables

Variable	Dependent Variable: Total Expenditure (% of GDP)					
Aid DAC (% of GDP)	0.883	0.725	0.730			
	(0.128)***	(0.157)***	(0.163)***			
Aid CRS (% of GDP)				0.593	0.450	0.454
				(0.095)***	(0.110)***	(0.106)***
Voice and Accountability	-1.168			-1.285		
	(0.745)			(0.764)*		
Political Stability	-0.896			-1.138		
	(0.824)			(0.810)		
Gov. Effectiveness	-3.104			-0.633		
	(1.691)*			(1.756)		
Regulatory Quality	-0.387			-0.685		
	(0.892)			(0.931)		
Rule of Law	1.020			0.171		
	(1.388)			(1.355)		
Control of Corruption	3.618			2.724		
	(1.821)**			(1.681)		
Gov. Quality Index (Average)		-1.671			-1.760	
		(0.969)*			(1.002)*	
Gov. Quality Index (Weighted Average)			1.181			1.162
			(0.479)**			(0.470)**
Land area	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Sub-Saharan Africa	3.791	4.227	3.835	3.669	3.606	3.181
	(1.497)**	(1.609)***	(1.595)**	(1.369)***	(1.499)**	(1.543)**
Civil war	0.028	3.574	4.116	2.085	4.501	5.289
	(1.729)	(1.986)*	(2.321)*	(1.643)	(1.824)**	(2.194)**
East Asia	-2.821	-2.718	-2.852	-2.874	-2.629	-2.695
	(1.404)**	(1.198)**	(1.293)**	(1.503)*	(1.260)**	(1.373)**
GDP per capita, lagged	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)*	(0.000)	(0.000)	(0.000)**	(0.000)
Agricultural value added (% of GDP), lagged	-0.216	-0.147	-0.155	-0.226	-0.180	-0.187
	(0.050)***	(0.054)***	(0.055)***	(0.050)***	(0.051)***	(0.056)***
Infant mortality rate, lagged	-0.028	-0.016	-0.013	-0.016	-0.005	0.001
	(0.027)	(0.030)	(0.028)	(0.026)	(0.028)	(0.025)
Import plus export (% of GDP), lagged	0.032	0.024	0.019	0.025	0.022	0.017
	(0.011)***	(0.011)**	(0.012)	(0.011)**	(0.011)**	(0.012)
Literacy rate, lagged	-0.085	-0.054	-0.042	-0.064	-0.054	-0.042
	(0.029)***	(0.033)	(0.033)	(0.030)**	(0.033)	(0.032)
Dependency ratio (65+), lagged	0.525	0.533	0.498	0.426	0.510	0.471
	(0.226)**	(0.238)**	(0.247)**	(0.224)*	(0.240)**	(0.252)*
Constant	18.968	18.145	-0.837	21.061	18.350	-0.797
	(3.620)***	(4.938)***	(6.875)	(4.741)***	(4.797)***	(6.758)
Observations	348	348	348	348	348	348
Underidentification test (p value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hansen J statistic (p value)	0.4766	0.6774	0.8039	0.4960	0.6437	0.7345
Robust standard errors in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%					

Table 2.6. IV Results for Governance Quality Index with DAC and CRS Aid Variables

Variable	Dependent Variable: Total Expenditure (% of GDP)					
Aid DAC (% of GDP)	0.900	0.842	0.831			
	(0.228)***	(0.218)***	(0.211)***			
Aid CRS (% of GDP)				0.620	0.547	0.540
				(0.167)***	(0.160)***	(0.148)***
Voice and Accountability	-1.288			-1.420		
	(0.816)			(0.822)*		
Political Stability	-1.128			-1.132		
	(0.911)			(0.931)		
Gov. Effectiveness	-2.117			-1.706		
	(2.419)			(2.414)		
Regulatory Quality	-0.439			-0.791		
	(1.151)			(1.166)		
Rule of Law	0.421			-0.072		
	(1.603)			(1.609)		
Control of Corruption	3.211			3.443		
	(2.127)			(2.027)*		
Gov. Quality Index (Average)		-1.962			-2.232	
		(1.045)*			(1.109)**	
Gov. Quality Index (Weighted Average)			1.451			1.500
			(0.521)***			(0.523)***
Land area	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Sub-Saharan Africa	4.242	4.561	4.002	3.625	4.089	3.487
	(1.631)***	(1.691)***	(1.644)**	(1.588)**	(1.690)**	(1.640)**
Civil war	2.670	3.676	4.079	3.491	4.343	4.840
	(2.243)	(2.145)*	(2.594)	(2.098)*	(1.960)**	(2.428)**
East Asia	-3.006	-3.068	-3.117	-2.776	-2.952	-3.008
	(1.463)**	(1.226)**	(1.339)**	(1.566)*	(1.296)**	(1.419)**
GDP per capita, lagged	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)*	(0.000)	(0.000)	(0.000)*	(0.000)
Agricultural value added (% of GDP), lagged	-0.187	-0.165	-0.171	-0.235	-0.204	-0.209
	(0.063)***	(0.059)***	(0.059)***	(0.067)***	(0.063)***	(0.064)***
Infant mortality rate, lagged	-0.022	-0.028	-0.012	-0.022	-0.027	-0.009
	(0.034)	(0.036)	(0.035)	(0.034)	(0.035)	(0.033)
Import plus export (% of GDP), lagged	0.029	0.028	0.022	0.026	0.026	0.020
	(0.012)**	(0.012)**	(0.013)*	(0.012)**	(0.012)**	(0.013)
Literacy rate, lagged	-0.059	-0.068	-0.041	-0.061	-0.070	-0.039
	(0.035)*	(0.037)*	(0.036)	(0.035)*	(0.036)*	(0.036)
Dependency ratio (65+), lagged	0.608	0.531	0.508	0.574	0.501	0.473
	(0.249)**	(0.248)**	(0.262)*	(0.247)**	(0.249)**	(0.266)*
Constant	15.845	20.734	-3.910	22.479	21.847	-4.149
	(4.796)***	(5.731)***	(7.740)	(5.967)***	(5.795)***	(7.625)
Observations	348	348	348	348	348	348
Underidentification test (p value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hansen J statistic (p value)	0.4766	0.6774	0.8039	0.4960	0.6437	0.7345
Robust standard errors in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%					

CHAPTER 3

POLITICAL AND ECONOMIC DETERMINANTS OF EQUITY MARKET LIBERALIZATION: DOES FOREIGN AID MATTER?

3.1. Introduction

Financial liberalization is considered as one of the key elements of economic growth in developing countries since McKinnon (1973) and Shaw (1973) introduced their ideas on "Financial Repression". They used this term to refer to government's repression on the rates of return to financial assets, specifically on real interest rates. They suggest that this type of government intervention with financial markets will reduce the incentives for agents to hold financial asset which harms the economic development by lowering the rate of savings and investment. They believed that a change in government's behavior by relaxing the repression on financial markets would be coupled with higher real interest rates which results in higher rate of private savings. Liberalization of the financial markets would also increase efficiency by channeling funds to the more productive projects. When efficiency is combined with higher level of investment, this eventually will promote economic growth.

McKinnon and Shaw's prediction on the interest rate increase after the financial liberalization had been confirmed by many empirical studies during the last two decades. Based on a sample of 28 countries, Galbis (1993) concludes that higher real interest rates are usually resulted from financial liberalization. Naude (1996) points out that a significant interest rate risk is generated by financial liberalization which might reduce the supply of private credit by banks

and this would yield very high levels of interest rates if the bank management cannot be handled properly. Rajan (1999) states that after the introduction of foreign competition that comes with financial liberalization, the amount of bad loans may increase due to riskier investment decisions among domestic banks that are trying to protect their market share. As a result, an inadequate increase in the supply of the loans for a given substantial boost on the demand side increases domestic interest rates following financial liberalization and this may offset the efficiency gains caused by liberalization. Honohan (2000) claims that we have unambiguous evidence for a higher general level of real interest rates resulted from financial liberalization even though his empirical analyses are restricted to the countries for which data is available.

Although the idea of higher real interest rates would lead higher private savings as introduced by McKinnon (1973) and Shaw (1973) is a sound argument in theory, most existing empirical studies could not provide strong evidence in this direction. Giovannini (1985) suggest that an increase in the private saving in response to an increase in the interest rate is not permanent and the effect of the real interest rate on aggregate saving is insignificant. Ostry and Reinhart (1992) provide similar results for developing countries. In a more recent study Loayza, Schmidt-Hebbel, and Serven (2000) provide more controversial results for the relationship between the real interest rate and private saving. They report a negative effect of the real interest rate on the private saving most likely due to a higher income effect than the total of its substitution and wealth effects.

As we can follow from the empirical evidence, higher saving rate due to higher interest rate is not the way how financial liberalization helps economy to perform better for the countries that choose to liberalize their financial markets. On the other hand, over the past two decades, a number of emerging market and developing countries have liberalized their equity markets

which can be cited as a type of financial liberalization[31]. Blair Henry (2000a), Blair Henry (2003), Bekaert and Harvey (2000), and Chari and Blair Henry (2004b) document that the stock market liberalizations substantially reduce the cost of capital. Pain (1993) and Eicher and Hull (2004) studies suggest that opening financial markets to foreign investors increase capital inflows. Reinhart and Tokatlidis (2005) confirm the higher level of foreign direct investment and high gross capital inflows after liberalization only for the higher income countries. Blair Henry (2000b) study reveals that stock market liberalization increases aggregate investment. Finally, Levine (2001) and Bekaert, Harvey, and Lundblad (2005) confirm that liberalization of stock markets promote economic growth.

Given the abundance of studies examining the effects of financial liberalization, specifically stock market liberalization on firm's performance and economic growth, it is surprising that there is a lack of research on the potential determinants of the stock market liberalization decision. After providing a selection of results from the related literature, we can raise the main question which motivates this study; if the equity market liberalization leads to higher economic growth and positive welfare effects as documented in the literature, why some governments still choose either to delay or completely resist the liberalization of their stock markets?[32]

In this paper we examine some of the potential determinants of the government's decision to liberalize their national stock markets. We use an extensive list of countries for which we can identify if and when a stock market liberalization occurred, and use a probit model and a duration model to analyze the stock market liberalization decision. Our results suggest that both

[31] The concept of financial liberalization is a broader definition that includes equity-market (stock market) liberalization. Please see Section 1.1 for further discussion.
[32] For instance, in our sample, 36 of the 70 countries liberalized their equity markets between 1980 and 2000 while the remaining 34 did not.

political and economic factors influence the government's decision whether and when to liberalize their national equity markets. Among the economic factors, the level of financial development, the structure of the economy, the level of investor protection, and the level of the government's involvement in the economy are significant determinants of the stock market liberalization decision. The significant political factors include the government's political orientation and the influence of foreign governments and agencies through the allocation of foreign financial aid.

Our finding that the amount of foreign financial aid received by the governments in the emerging market and developing countries is significantly and positively related to the probability of a stock market liberalization contributes to the long-standing debate about the effectiveness of foreign aid. Specifically, economists have long sought to demonstrate that foreign financial aid promotes economic growth. The majority of the empirical studies, however, fail to identify a robust positive effect of foreign financial aid on economic growth (Easterly (2003), Easterly, Levine, and Roodman (2004), Rajan and Subramanian (2005)).

Easterly, Levine, and Roodman (2004) state the need for further research which ". . . will continue to explore pressing macroeconomic and microeconomic questions surrounding foreign aid, such as whether aid can foment reforms in policies and institutions that in turn foster economic growth. . ." Our paper provides some evidence in this direction. We find that foreign financial aid is positively related to the likelihood of a stock market liberalization, which in turn fosters economic growth (Bekaert, Harvey, and Lundblad (2005)).

3.1.1. A Brief Discussion to Clarify the Difference Between the Terms Financial Liberalization and Equity Market Liberalization

The term "financial liberalization" has a broad coverage. In the literature, generally, it is used to describe the type of liberalization which allows all types of (both equity and debt) capital inflows. In this sense, it is usually considered a substitute for capital account liberalization. Equity market (or stock market) liberalization on the other hand allows equity inflows. Free flow of foreign direct investment and portfolio equity investment is allowed by the equity market liberalization. However, free flow of portfolio bond investment and bank landings is not achieved under equity market liberalization.

In this study we will focus on the equity (stock) market liberalization specifically. The reason that we choose the stock market liberalization instead of capital account liberalization is based on the following factors:

There are differences between the types of capital inflows brought by these liberalizations. Capital account liberalization brings debt inflows that usually include bond financing, commercial bank lending and official lending by governments and/or other official international financial institutions such as World Bank and International Monetary Fund. Since the government and its agencies are involved in this process, it is hard to monitor how efficiently these funds are used. Also, it is clear that this type of financing requires repayment of the principle plus the interest rate in any case whether the economy is in good or bad condition. Based on these factors, empirical studies in literature reveal mixed results about the effects of capital account liberalization on the economic performance. On the other hand equity market liberalization allows and encourages more foreign direct and portfolio investment. These types of capital inflows are more selective when it comes to financing projects and thus increase

efficiency. The positive effects of the equity market liberalization on the economy are supported by many empirical results as mentioned earlier.

The other factor is related to determining the date of the liberalization. Dating the capital account liberalization is more complex and harder since it includes many types of capital flows and usually it is not an instantaneous change. However, the coverage of equity (stock) market liberalization is narrower and usually an instantaneous change is achieved by a change in the law. So, it is easier to date equity market liberalization and observe the effects later on.

3.2. Data: Discussion for Selection of Dependent and Control Variables

3.2.1. Financial Liberalization Indicator

As we discussed earlier, we use the official equity market liberalization date as the financial liberalization indicator. The data are obtained from Bekaert, Harvey, and Lundblad (2005). The official liberalization dates in this study are mainly based on Bekaert and Harvey's (2002) chronology of important financial, economic and political events in emerging markets. Since the stock market liberalization dates are the dates on which foreign investors are officially allowed to invest in domestic equity securities, the indicator for financial liberalization takes the value of zero for the years before the liberalization and takes the value of one on and after the year of the stock market liberalization.

The original data set for the official equity market liberalization dates from Bekaert, Harvey, and Lundblad (2005) includes 95 countries. Since the main purpose of this paper is to analyze the factors of financial liberalization in developing countries, we exclude the developed countries that mainly liberalized their equity markets before 1980[33]. After excluding the

[33] These countries are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, United Kingdom, and United States.

developed countries, we are left with 70 emerging market and developing countries. However not all of the 70 emerging market and developing countries have liberalized their stock market between 1980 and 2000. 36 of these liberalized their stock market in the mentioned period and the remaining 34 did not.

Alternative methods to date the equity market liberalizations exist in the literature such as "First Sign" equity market liberalization date which is based on the earliest of the following three dates: the launching of a country fund, the announcement of an American Depository Receipt (ADR) or the official liberalization. Another alternative method would be a continuous measure of equity market liberalization following Bekaert (1995) and Edison and Warnock (2003) that reflects the availability of domestic equity securities to foreign investors. Since the objective of this study is to examine the factors that influence the government's decision to liberalize their stock markets, we choose to use the official stock market liberalization dates because we believe that these dates are not random and determined by other economic and political factors.

3.2.2. Economic and Political Factors that Determine the Likelihood of Financial Liberalization

In this section, we will introduce the control variables which are used as proxies for economic and political factors which might affect the government's decision on financial liberalization. We will also discuss, why and how we think these factors are important under the light of previous studies in the literature.

Level of economic and financial development, country size, structure of the economy, business environment and level of government intervention in the economy are considered main economic factors which may affect the government's decision on financial liberalization. The political orientation of the government, special interest groups' influence on the government, and

the amount of foreign aid received are considered as main political factors. Appropriate proxies which are widely accepted in the literature and suitable with our statistical approach are used for economic and political factors.

Our proxy for the level of economic development is gross national income (GNI) per capita. There might be two possible scenarios for the relationship between the level of economic development and the decision on equity market liberalization. One might argue that the countries with higher levels of economic development may be more likely to liberalize their equity markets because the demand for shares of companies in those countries are expected to be higher after liberalization and also they are likely to benefit more from liberalization. On the other hand, one may think that countries with low development and investment capital level cannot resist to foreign ownership and therefore they are more likely to liberalize their equity markets. So at this point, the level of economic development's effect on the likelihood of financial liberalization is ambiguous and we will get the answer with empirical results.

Population (in millions) is used as a proxy for country size. The country size is controlled in the empirical analysis because it possible that the costs of structural reforms may be higher in larger countries.

To measure the level of financial development, we look at the development of the banking sector and the stock market. Credit to private sector (private credit supplied by the banks as percentage of GDP) which refers to financial resources provided to the private sector is used as a proxy for the development of the banking sector. Market turnover which is the ratio of annual equity value-traded to market capitalization is used to measure the development of the stock market. The expected sign of the level of financial development on the decision of financial liberalization is positive. The rationale behind this expectation is that countries with

better developed financial markets are more likely to have the institutions necessary to support a market economy, and therefore are more likely to attract foreign investors following the liberalization of their stock markets.

Annual share of value added in agriculture and in industry as a percentage of gross domestic product are included in the empirical analysis as a measure for the structure of the economy. In countries where the share of agriculture is higher (which might also imply that capital requirements are smaller), the desire for the stock market liberalization might be lower. On the other hand, in countries where industry value added has a higher weight in the total output (which presumably indicates higher capital requirements), the probability of financial liberalization is expected to be higher.

Business environment is controlled with the following proxies in the empirical analysis: common versus civil law dummy variable, the level of openness to trade and the amount of foreign direct investment. The common-law/civil-law dummy variable is used as a proxy for the level of investor protection and for the presence of institutions supporting financial development which is proposed by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998). According to them, the countries with common law legal origin have stronger legal protection of investor rights than the countries with civil law legal origin. Based on this result, we expect that the countries that have institutions protecting the rights of the shareholders (meaning those adopted common law legal origin) are more likely to attract foreign investors and benefit from the stock market liberalization. This in turn would increase the likelihood of stock market liberalization in those countries.

The sum of the exports and imports of goods and services as a percentage of gross domestic product and the amount of the net foreign direct investment as a percentage of gross

domestic product are used as measures of trade openness and openness to foreign capital respectively. Rajan and Zingales (2003) argue in their study that the trade openness is correlated with financial market development, especially when capital can flow across borders freely. They also state that strong interest groups' involvement in the politics is a major factor of the financial development of the domestic markets in the international arena. Specifically, they propose that the reason for the sluggish development of the financial sector in the 20th century is due to an interest group theory of financial development. According to this theory, incumbent interest groups resist to financial development because it creates competition. In our discussion, specifically, the incumbent firms which are well-established with a strong political influence on the government and which can raise all the required funds from local financial intermediaries are more likely to oppose the financial development of the domestic markets because this can bring foreign capital and outside financing opportunities to the less established competing firms and increase competition.

In order to control the level of government intervention in the economy, we use the following proxies: government consumption and the black market premium index. The government consumption represents all government current expenditure for the purchase of goods and services as a percentage of gross domestic product. Government intervention in the economy is another major determinant of financial liberalization decision. In the economies where resources are directed and production is coordinated by the government instead of market forces, it is less likely to observe financial liberalization in the equity markets. Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2002) assert that countries with higher entry barriers tend to be more corrupt and suggest that government regulation of economic activity benefits politicians and bureaucrats. Under these discussions, governments highly involved in economic

activities and the officials of these governments are less likely to liberalize their equity market. The black market premium index indicates the premium one must pay to exchange the domestic currency for dollars in the black market relative to the official exchange rate. The original index ranges from 0 to 10 where higher values of the index represent smaller differences between the official exchange rate and the black market exchange rate. By multiplying the index by -1, we range the values of the index from -10 to 0 where smaller values of index indicate smaller differences between the official and the black market exchange rate.

Other proxies we use for the government intervention in the economy are first privatization and first share issue privatization (first SIP) indicators. These indicators are binary variables which take the value of one on and after the year of the countries' first privatization and first SIP and zero otherwise. The privatization can be considered as a signal for the government's commitment to adopt reforms which yield to a market-oriented economy. Consequently, governments which adopt privatization programs are more likely to liberalize their equity markets[34].

In order to control for the political orientation of the government, the empirical literature has identified a set of proxies that might be correlated with financial liberalization. These are executive nationalist and executive special interests indicators where the former is equal to one if the party of the executive is identified as nationalist and zero otherwise and the latter is equal to one if the party of the executive represents special interest groups and zero otherwise in all years. The political orientation of the government is considered to affect the liberalization decision through the mechanism where a nationalist government is considered more likely to contest

[34] For a more detailed discussion on the privatization and the relationship between privatization and the development of the financial markets, see Martell and Stulz (2003), Megginson, Nash, Netter, and Poulsen (2004), and Boehmer, Nash, and Netter (2005)

financial liberalization due to foreign ownership of domestic assets. Also if the government is represented by a special interest group, more opposition for financial liberalization is expected.

3.2.3. A Special Focus on Foreign Aid's Relationship with the Decision of Equity Market Liberalization as a Political Factor

The following question "Why Do Donors Give Money to the Poor and How Do They Decide the Allocation of It?" is discussed widely among scholars, researchers last two decades. First, we will try to outline the discussions in the literature and then we will discuss our hypothesis on the subject.

Although the donors' decision for bilateral or multilateral aid might depend on several different political and other strategic reasons, World Bank describes the primary goal of financial aid from one country or an organization to another country as to fight against poverty and to promote economic development.

In an early attempt to explore the aid allocation criteria of the donor countries, Dudley and Montmarquette (1976) set up a theoretical model in order to explain bilateral aid allocation mechanism and they empirically test it. In their study, they look at two decisions to be made by the donor country. The first one is whether the donor should award a particular recipient or not. Their result reveals that the economic needs of the recipient countries are effective as much as the political and/or bandwagon considerations. Moreover, increasing size of the population in the recipient country generates a higher probability of granting aid. The second one is that when the donors decide to give money, the "small country effect" (the tendency for small countries to receive more aid per capita than large countries) is not a criterion for the amount of the aid to be determined as suggested earlier by an OECD review.[35]

[35] OECD, Development Assistance, 1969 Review, Paris.

Trumbull and Wall (1994) extend Dudley and Montmarquette's (1976) model into a simultaneous optimization by multiple donors. They suggest that political and civil rights play a crucial role for aid allocation rather than recipient needs through per capita income.

Alesina and Dollar (2000) address the central question of "*Who Gives Foreign Aid to Whom and Why?*" They find substantial evidence that donor's decision on the allocation of foreign aid is guided by political and strategic considerations as much as the economic needs and policy performance of the recipient countries. In most cases the amount of aid is weakly related to the recipient country's economic performance and strongly related to indicators of cultural, historical and political closeness between the countries. They also reveal a trend for nations who introduce democratic reforms to get a significant boost in assistance.

While Alesina and Weder (2002) focus on the correlation between the level of corruption in the recipient country and the amount of foreign aid received, in their analysis, they confirm the result of Alesina and Dollar (2000) which states that the amount of aid is more related to indicators of historical and political closeness between the countries. Even for those multinational aid organizations these motives are still important. Moreover they raise the question whether a receiving country "buys" foreign aid by its political moves parallel to donors or whether foreign aid "rewards" recipient country's past political behaviors and leave this question unanswered. In general, they find that donors do not discriminate against more corrupt governments for their choice of aid allocation.

Another result in an attempt to explain aid allocation among recipients comes from Burnside and Dollar (2000). The authors show that in 1990s, the donors' decision on the allocation of aid to under-developed countries were in favor of those with better institutional quality.

Kuziemko and Werker (2006) provide statistical evidence that there is a strong relationship between the amount of aid received from the United States and United Nations and holding a seat on the U.N. Security Council. They suggest that the foreign aid flows are used to buy those recipient countries' votes who are currently serving on the U.N. Security Council. This effect increases during years in which key diplomatic events take place.

Bourguignon and Sundberg (2007) state that when the donors allocate the aid, they try to promote "right development policies" in the recipient countries. Public enterprise privatization and finance liberalization are among the most common promoted policies regardless of local conditions in the recipient countries which can make such changes ineffective and more risky for them.

As we documented, there is substantial evidence in the literature on the fact that aid distribution is based on more political and strategic motivations than the need of the recipient countries. Because of the political and strategic agenda of the donor countries, aid usually comes with conditions. At this point, we assume that equity market liberalization in the recipient countries could be one of these conditions that come with aid. If this is the case then we should expect a positive relationship between the amount of foreign financial aid and the likelihood of equity market liberalization. The exact channels through which foreign financial aid influences the domestic government's decision to liberalize the stock markets is unclear, but some possible scenarios are that the recipient governments use the foreign financial aid to compensate the politically powerful constituencies that may be adversely affected by the liberalization reforms, or that the donors use the foreign financial aid to purchase the support of the government officials for the liberalization reforms.

We use the Total Official Development Assistance (ODA) amount which includes the aid disbursements from all donors including OECD's Development Assistant Committee (DAC) members and non DAC members. We also use the following categories of aid: DAC Bilateral and Multilateral Aid. Bilateral Aid is given by the government of one country directly to another. DAC Bilateral is sum of the bilateral aid given by the DAC members. Multilateral aid is the assistance given through international organizations. Each organization has its own aid program and is funded by the world's richer, more developed countries.

3.3. Statistical Method

3.3.1. Cross-Sectional Probit Estimation

Our dependant variable, the indicator for the equity market liberalization is a discrete binary variable which takes the value of 0 before the stock market liberalization and 1 afterwards. Since we have a dichotomous dependant variable, the simplest way to deal with this problem would be to ignore the problem and just treat it like any other left-hand-side variable and perform OLS. However our estimated coefficients can imply probabilities that are not constrained to lie between 0 and 1 which can make the interpretation of the results quite confusing. Another problem would be that probability model is heteroskedastic. Thus using a binary response model would be the most appropriate approach for this study. We employ a cross sectional probit model which reveals the partial effects of the independent variables on the likelihood of a stock market liberalization. Suppose a latent or unobserved variable y_i^* range from -∞ to +∞.

$$y_i^* = x_i\theta + e_i$$

where e_i is independent of x_i , θ is the vector of parameters and e_i is normally distributed with a mean of 0 and var(e)=1. Instead of observing y_i^*, we observe a binary variable

$$y_i = \begin{cases} 1 & if\ y_i^* > 0 \\ 0 & if\ y_i^* \leq 0 \end{cases}$$

or equivalently written as $y_i = 1[y_i^* > 0]$ where 1[.] is the indicator function.

We can obtain the distribution of y_i given x_i

$$P(y_i = 1|x_i) = \Phi(x_i\theta)$$

where $\Phi(.)$ is the standard cumulative normal probability distribution function and $x_i\theta$ is called the probit score or index[36].

In order to apply a cross sectional probit model, we need to redefine our dependant variable as follows: if the stock market liberalization takes place between 1980 and 2000 for a country, the dependant variable for equity market liberalization takes the value of 1, and 0 otherwise. For the control variables, we take five year averages prior to stock market liberalization. By doing that, we also try to deal with the simultaneity problem which might exist between the explanatory variables and equity market liberalization indicator. Taking five year averages for the control variables prior to stock market liberalization for the liberalized countries is straightforward. However we have countries in our sample which did not liberalize their stock markets yet. For those countries that did not liberalize their equity markets from 1980 to 2000, in order to create control variables in five year averages, we adopt the following method: we use their closest geographic neighbor's stock market liberalization date to create five year average explanatory variables. This method is adopted from Bekaert, Harvey, and Lundblad (2005).

[36] See Wooldridge 2002: Econometric Analysis of Cross Section and Panel Data, chapter 13 and 15, MIT press, for more information.

3.3.2. Cox Proportional Hazard Estimation

Our choice of method to redefine the dependant variable with the probit model does not allow us to take into account the information included in the time dimensionality of the data and is sensitive to the choice of dates for the countries that are not liberalized yet. Therefore, we employ Cox proportional hazard model to deal with these issues. Cox proportional hazard model is an approach used in duration analysis which is the time elapsed under a certain event occurs (in our model, this is stock market liberalization). Duration analysis is an application of survival analysis where the duration of interest is the survival time of a subject. In this paper, we are interested in the situation where a country begins in an initial state of no liberalization in the stock market and is either observed to exit by liberalizing or censored[37]. Being able to use censoring is especially important for our analysis, because censoring will occur for the countries that did not liberalize their stock markets by the end of the sample period but they still have the possibility of liberalization when the study ends.

There are several different parametric estimation models in the field of survival analysis. The probability distribution of the baseline hazard function should be specified by the researcher beforehand in these methods and using parametric survival analysis involves comprehensive knowledge of the survival time distribution. The Cox proportional hazard model is the most general of the regression models because it is not based on any assumptions concerning the nature or shape of the underlying survival distribution. The model assumes that the underlying hazard rate is a function of the independent variables (covariates); therefore no assumptions are made about the nature or shape of the hazard function. Accordingly, Cox's regression model is

[37] See Wooldridge 2002: Econometric Analysis of Cross Section and Panel Data, chapter 20, MIT press, for more information.

considered to be a semiparametric method. The probability of the endpoint (stock market liberalization in our case) is called the hazard. The hazard is modeled as:

$$h(t) = h_0\,(t)e^{(\beta_1 x_1+\beta_2 x_2+\beta_3 x_3+\cdots+\beta_k x_k)}$$

where $x_1 \ldots x_k$ are the explanatory variables (covariates); and $h_0\,(t)$ is the baseline hazard at time t, representing the hazard for a country when the explanatory variables are equal to 0.

By dividing both sides of the above equation by $h_0\,(t)$ and taking logarithms, we obtain:

$$\ln\left(\frac{h(t)}{h_0\,(t)}\right) = \beta_1 x_1+\beta_2 x_2+\beta_3 x_3+\cdots+\beta_k x_k$$

We call $\frac{h(t)}{h_0\,(t)}$ the hazard ratio. We take three year averages of the explanatory variables, therefore, the Cox proportional hazard models are estimated using a panel that includes seven three-year periods from 1980-1982 through 1998-2000. We use the lagged values of the explanatory variables in order to deal with endogeneity that might exist between the stock market liberalization and other control variables. We believe that averaging the data controls for the effects of the business cycle and persistence in the explanatory variables. In this Cox proportional hazard model estimation and in the next section where we use panel probit, our stock market liberalization indicator variable takes the value of one in the three year period of the stock market liberalization and after, and zero otherwise.

3.3.3. Panel Probit Estimation

Next, using the same panel we employed in Cox proportional hazard model, we test our hypothesis with a panel probit model. In this panel data binary choice model where for each unit i in the population (country), we have a binary outcome y_{it} for each T time periods. In our study,

t represents the year (or the 3-year averages) and y_{it} indicates whether a country was liberalized during year t. Here we have the similar variable form as we had in the cross-sectional probit model;

$$y_{it}^{*} = x_{it}\theta_0 + e_{it}$$

$$y_{it} = 1[y_{it}^{*} > 0]$$

$$e_{it}|x_{it} \sim Normal\ (0,1)$$

where the vector x_{it} contains lagged exogenous variables. The partial log likelihood for a cross section observation i is

$$l_i(\theta) = \sum_{t=1}^{T} \{y_{it} \log \Phi(x_{it}\theta) + (1 - y_{it}) \log [1 - \Phi(x_{it}\theta)]\}$$

and the partial maximum likelihood estimator here is the panel probit estimator[38].

We estimate a random effects probit model that incorporates country heterogeneity by including a specific unobservable country effect in the error term[39]. We control for the unobservable time effects by including time fixed effects.

3.4. Results

3.4.1. A Brief Discussion on Summary Statistics

Before presenting our results from the probit, duration analysis and panel probit estimations, we would like to take a snapshot on the summary statistics for the explanatory variables. As mentioned earlier, data from 70 countries are included in our study. 36 of those countries liberalized their equity markets between 1980 and 2000. The remaining 34 countries

[38] See Wooldridge 2002: Econometric Analysis of Cross Section and Panel Data, chapter 13, MIT press, for more information.

[39] An important restriction of the random effects model is that the unobservable country effect is assumed to be uncorrelated with the explanatory variables.

have not liberalized their equity markets until 2000 yet. We present three tables on summary statistics. The first table, Table 3.1.A, presents the summary statistics for the non-liberalized and liberalized countries in the sample. The second table, Table 3.1.B shows the summary statistics for all 70 countries included in the sample. Results from a two-sample mean comparison test for the countries that liberalized and those that did not liberalize their stock markets are also reported in Table 3.1.A. On average, per capita income and population are higher in liberalized countries. The mean for private credit and market turnover are also higher in liberalized countries which might suggest that on average level of financial development is higher in countries that liberalize their stock markets. These results are statistically significant. The share of the agricultural sector in total output is lower in the liberalized countries. Liberalized countries are also more industrialized (on average they have higher industry value added in total output) relative to non-liberalized countries. These results are also statistically significant. The variables that reflect the general business environment include legal origin, trade openness, and FDI. The results support our prediction that the common law countries are more likely to liberalize their equity markets; 17 out of the 36 countries that liberalized their equity markets in the sample period have a common law legal origin while only 9 out of the 34 non-liberalizing countries have a common law legal origin. Our hypothesis about the government's role in the economy suggests that the more interventionist governments are less likely to remove the barriers to foreign equity ownership. The univariate tests show that government consumption is almost identical in the liberalized and non-liberalized countries, but the black market premium index is higher in the non-liberalized countries. Therefore, the size of the government is roughly the same in the two groups, but the governments in the non-liberalized countries tend to favor more interventionist policies. With respect to our privatization hypothesis, there is some evidence that the privatizing

governments are more likely to liberalize their equity markets. During our sample period 35 of the 36 countries that liberalized their stock markets privatized at least one state owned enterprise and 27 of the 36 countries did a share issue privatization. For the non-liberalized countries 31 out of the 34 countries privatized at least one state owned enterprise and only 6 of the 34 countries did a share issue privatization. The political factors that can potentially influence the government's decision to liberalize the local stock markets include the government's political orientation and the influence of foreign governments and international financial institutions. The evidence in 1.A suggests that liberalized countries are less likely to have a nationalist government, but are more likely to have a government that represents special interest groups (these differences, however, are not statistically significant). Table 3.1.A also shows that the countries, which liberalize their equity markets receive significantly more foreign financial aid than the countries, which do not liberalize their stock markets.

3.4.2. Cross-sectional Probit Model

Table 3.2 presents the results from the following cross-sectional probit model:

$$P(\text{Liberalization} = 1 \mid x) = \boldsymbol{\Phi}\,(\beta_0 + \beta_1 \text{GNI per capita} + \beta_2 \text{population} + \beta_3 \text{common law} + \beta_4 \text{trade openness} + \beta_5 \text{FDI} + \beta_6 \text{black market premium index} + \beta_7 \text{government consumption} + \beta_8 \text{agriculture} + \beta_9 \text{private credit} + \beta_{10} \text{turnover} + \beta_{11} \text{foreign financial aid}) + \varepsilon$$

where $\boldsymbol{\Phi}(.)$ is the standard cumulative normal probability distribution function and the terms in the parenthesis is called the probit score or index. Since the probit score has a normal distribution, interpreting the probit coefficients, **β**, can be done as follows: a one-unit increase in the explanatory variable leads to an increase in the probit score by **β** standard deviations.

Additionally, we include the partial effect coefficients of our regression so that a conventional interpretation can also be done. Rather than reporting coefficients in this column, we report the change in the probability for an infinitesimal change in each independent, continuous variable and the discrete change in the probability for dummy variables.

As can be followed from Table 3.2 which presents the cross sectional probit regression results, an increase in common law, the level of foreign direct investment, market turnover, population and the amount of foreign financial aid would lead to an increase on the likelihood of government's decision of equity market liberalization and these results are statistically significant. The variable foreign direct investment has a coefficient of 0.6856 for the probit estimation and 0.0078 for the partial effect. The coefficient 0.6856 means that a one unit increase in the foreign direct investment/GDP results in a 0.6856 standard deviation increase in the predicted probit index. However, the partial effect coefficient estimates are presented in terms of *probability*. The coefficient 0.0078 means that a one unit increase in the variable foreign direct investment/GDP leads to an increase in the probability of being liberalized of 0.0078 or, 0.78 percentage points.

The coefficient for common law is 2.46 to two decimal places which indicates that the change in the value of the variable from 0 to 1 increases the predicted probit index by 2.46 standard deviations. For a binary right-hand side variable like common law, the interpretation of a partial effect coefficient is different than a continuous variable. Since common law only takes the values 0 and 1, it is not possible to have a really small change in common law. For this reason, the coefficient estimate is presented as the change in probability of going from a zero to a one. This can be interpreted as follows: the coefficient 0.036 means that having common law

increases the probability of government's decision of equity market liberalization by 0.036, or 3.6 percentage points.

The results in Table 3.2 indicate that the countries which receive more foreign financial aid are more likely to liberalize their equity markets. An increase of 1 million US$ in the amount of foreign financial aid leads to an increase in the probability of stock market liberalization by 0.00006, or 0.006 percentage points. Although, the contribution of each additional 1 million US$ of aid seems very small on the decision of stock market liberalization, when we look at the average amount of foreign aid received by the liberalized country in our sample, which is almost 700 million US$, the total effect of foreign aid might be substantial. However, we must be careful when we interpret the effect of the total foreign aid. Because the probit model is non linear, these partial effect estimates are most accurate when we evaluate small changes in the independent variable. In our case here, the partial effect of the 1 million US$ increment is more accurate than the estimate for an increment of 700 million US $. This result is consistent with our hypotheses that foreign governments and international financial institutions can use the allocation of foreign financial aid to influence the domestic government's stock market liberalization decision. This finding has important implications for the long-standing debate about the effectiveness of foreign financial aid. The World Bank asserts that the primary goal of foreign financial aid is to fight poverty and promote economic development. The majority of the empirical studies attempt to document a direct link between foreign financial aid and economic growth; however, most of them fail to identify a robust positive effect of foreign financial aid on economic growth (Easterly (2003), Easterly, Levine, and Roodman (2004), Rajan and Subramanian (2005), Easterly (2007)). Our findings, however, reveal an indirect link between

foreign financial aid and economic growth; foreign financial aid is positively related to the likelihood of a stock market liberalization, which in turn fosters economic growth.

Most of the academic studies on the effects of foreign financial aid measure aid as a percentage of gross national income or on a per capita basis. We, however, use a measure of foreign financial aid that equals the total official development assistance received by the national governments in the recipient countries, and include gross national income per capita (GNI per capita) and population size as separate covariates. This measure is more appropriate for our analysis, because we are investigating the factors that can potentially influence the government's decision to liberalize the domestic equity markets. The actual dollar amount of the foreign financial aid is a better indicator of the influence of the donors on the policies of the domestic governments (potentially a small group of government officials), because as Boone (1996) demonstrates, foreign financial aid mostly benefits local political elites. Furthermore, Kuziemko and Werker (2006) use a similar measure of foreign financial aid to show that foreign aid is used to bribe the rotating members on the U.N. Security Council. The probit model in Table 3.2 is estimated in a static setting, which allows us to investigate the differences in the characteristics of countries that liberalize their stock markets and those that do not. This model alleviates the reverse causality issues since we average the explanatory variables over the five years preceding the official liberalization year, but is sensitive to the choice of dates for the non-liberalizing countries and does not explore the panel nature of our data[40].

The level of financial development is positively and significantly related to the probability of a stock market liberalization. A point increase in the market turnover ratio leads to

[40] Another problem with the cross-sectional probit model is that we cannot test the effects of first privatization, first SIP, executive nationalist, executive special interests on the likelihood of a stock market liberalization. The size of our sample renders the estimation of such a highly parameterized model infeasible. We return to the analysis of these variables in the Cox regressions and in the panel probit model.

an increase in the probability of stock market liberalization by 0.0003, or 0.03 percentage points. Finally, the positive coefficient on population does not support the hypothesis that the costs of structural reforms might be higher in the larger countries. One million increase in population leads to an increase in the probability of stock market liberalization by 0.0010, or 0.10 percentage points.

Black market premium, the level of government consumption and the share of agricultural sector in the total output are negatively related with stock market liberalization decision. These results are also statistically significant at the conventional levels. An increment of 1 to the variable black market premium index leads to a decrease in the probability of stock market liberalization by 0.0043, or 0.43 percentage points. Also, one unit increase in the level of government consumption/GDP and the share of agricultural sector in the total output leads to a decrease in the probability of stock market liberalization by 0.0037 or 0.37 percentage points and by 0.0018, or 0.18 percentage points respectively.

Although per capita income, the level of trade openness and private credit have positive effects on the decision of stock market liberalization, the results are not statistically significant.

3.4.3. Cox Proportional Hazard Model

Our choice of method to redefine the dependant variable with the probit model does not allow us to take into account the information included in the time dimensionality of the data. Therefore we need an approach to account for the censored data without ignoring the time component and thus, we employ Cox proportional hazard model developed by D.R. Cox (1972) to deal with these issues.

We can easily estimate the hazard ratios from a Cox proportional hazard model as follows:

$$\left(\frac{Group\ hazard}{Baseline\ hazard}\right) = e^{(\alpha_1 GNIpc + \alpha_2 population + \alpha_3 common\ law + \cdots + \alpha_k foreign\ aid)}$$

Tables 3.3.A and 3.3.B report the hazard ratios of explanatory variables associated with stock market liberalization decision from six different specifications. If the reported hazard ratio, e^{α_i} , is greater than 1, then the coefficient, α_i, used for the hazard ratio is greater than 0 which means that there is higher hazard (likelihood) of stock market liberalization associated with the i^{th} covariate. If the reported hazard ratio, e^{α_i} , is less than 1, then the coefficient, α_i, used for the hazard ratio is less than 0 which means that there is lower hazard (likelihood) of stock market liberalization associated with the i^{th} covariate. When the reported hazard ratio, e^{α_i} , is equal to 1, then the coefficient, α_i, used for the hazard ratio is equal to 0 and there is no association between hazard (likelihood) of stock market liberalization and the i^{th} covariate.

In Table 3.3.A, Model 1 can be thought as a test of our probit estimation by using the same variables (the only exception is that we add industrial value added as percentage of GDP in order to control the level of industrialization). In general, results are consistent with the cross sectional probit model. An increase in common law, market turnover, and the amount of foreign financial aid would lead to an increase on the likelihood of government's decision of equity market liberalization and these results are statistically significant. Our income per capita and private credit variables gain significance with a negative and positive effect respectively on government's liberalization decision. Thus higher level of income per capita reduces the likelihood of liberalization while private credit increases it.

The hazard ratio for common law is 6.7822 which can be interpreted as countries that are providing better legal protection for their investors are, on average, six times more likely to liberalize their stock markets than those that are not. Market turnover hazard ratio is 1.0658

which implies that a one unit increase in the market turnover ratio increases the likelihood of stock market liberalization by 6.58 percent. This result supports the hypothesis that countries that have higher level of financial development are more likely to liberalize their equity markets. This result is supported by the hazard ratio of the private credit. 1 point increase in the private credit/GDP ratio increases the hazard ratio of liberalization by almost 2 percent. The estimated hazard ratio for the industry variable is 1.0922 which implies a one unit increase will result in 9.22 percent increase on the likelihood of stock market liberalization. This result also supports our hypothesis that more industrialized countries that might have larger capital requirement are more likely to liberalize their equity markets.

In addition to per capita income as mentioned earlier, black market premium index, the level of government consumption and the share of agricultural sector in the total output are negatively related with stock market liberalization decision. These results are also statistically significant at the conventional levels as we found in the cross sectional probit estimation.

Results on the black market premium index and the level of government consumption provide support for our initial hypothesis that governments which are less market oriented and more involved in the economic activities are less likely to support financial development and reluctant to remove the barriers on stock markets for foreign ownership. A one unit increase in the black market premium index and the level of government consumption reduces the likelihood of stock market liberalization by 25 percent and 20 percent respectively. Results on GNI per capita suggest that a 100 US$ increase would reduce the hazard of liberalization by 4 percent whereas a one unit increase in agricultural value added/GDP would lead to a decrease by 7 percent.

We only have one controversial statistically significant result that comes from our population variable. Unlike the probit estimation, high population reduces the hazard of liberalization in the Cox model. A ten million increase in population reduces the likelihood of stock market liberalization by 7 percent. The negative effect of population might indicate that the costs of structural reforms may be higher in the larger countries.

The results on the trade openness and foreign direct investment are not statistically significant in this model as well as the other models that we test using Cox proportional hazard model.

We add executive nationalist and executive special interest binary variables on Models 2 and 3 in Table 3.3.A to test the effect of the government's political orientation on the likelihood of a stock market liberalization decision. These 2 covariates are significant at 10 percent level and they both are negatively related to the probability of a stock market liberalization decision. A change from 0 to 1 in nationalist and executive special interests covariates reduces the likelihood of stock market liberalization by 73 percent. This result is consistent with our hypothesis that a nationalist government or a government that represents a special interest group is more likely to oppose equity market liberalization. We get very similar or same hazard rate estimates with significance levels for the remaining covariates after adding executive nationalist, executive special interests, first privatization and first SIP variables in Tables 3.3.A and 3.3.B.

First privatization and first SIP dummy variables are included in our specification in Models 4 and 5 in Table 3.3.B. and as can be seen from the results, they are not statistically significant in our model. We include regional dummy variables for countries located in the Middle East and North Africa, Sub-Saharan Africa, Asia excluding the Middle East, and Latin America to our base regression in Model 1 and get the similar results with significant

coefficients on the countries located in the Middle East and North Africa that are more likely to liberalize their equity markets. However, we lose significance on our private credit covariate.

We divide the foreign financial aid into bilateral and multilateral aid categories and look at their effects on stock market liberalization decision in Table 3.3.C and 3.3.D. Prior literature suggests that bilateral aid has a large positive effect on government consumption while multilateral aid does not (Burnside and Dollar (2000))[41]. In the less transparent environments of the emerging market countries, the increase in government consumption, associated with the increase in foreign financial aid, can potentially be used by the governments to compensate the politically-powerful groups, which might be adversely affected by the equity market liberalization reforms. Additionally, the increase in government consumption, financed with the foreign financial aid, might be correlated with the increase in the private consumption of the government officials (i.e., foreign financial aid can be used to "purchase" the support of the government officials for the reforms). Both of these arguments suggest that we should find a stronger relationship between bilateral aid and the likelihood of a stock market liberalization than between multilateral aid and the likelihood of a liberalization. The evidence from model 1 in Table 3.3.C supports this hypothesis. The effect of bilateral aid on the hazard of liberalization is positive and significant with a hazard ratio of 1.0012 at 1 percent level while the effect of multilateral aid on the hazard of liberalization remains significant only at the margin. Therefore, the bilateral aid flows appear to drive the relationship between foreign financial aid and the probability of a stock market liberalization[42].

[41] This can be attributed to the fact that multilateral aid tends to be more project oriented.
[42] In unreported regressions, we split the bilateral aid into aid from the United States, Japan, France, and the United Kingdom. Aid from Japan is consistently positively and significantly related to the probability of a stock market liberalization. US aid is also significant in several specifications, but looses significance after we include the Middle East and North Africa dummy variable.

An important characteristic of foreign financial aid is “aid conditionality”. International financial institutions often condition the release of foreign financial aid on the implementation of structural reforms by the recipient governments. This approach of aid allocation suggests that foreign financial aid should increase after the implementation of the reforms. However, our results indicate that higher level of foreign investment is given to the recipient countries before the implementation of structural reforms. This result is also confirmed by the summary statistics on foreign aid before and after liberalization (see graph 1). This might be interpreted as foreign financial aid “buys” structural reforms not “rewards” them. Furthermore, “aid conditionality” is generally expected to be associated with multilateral aid while our results are primarily driven by bilateral aid.

In Models 2 and 3 in Table 3.3.C, we again test the effect of the government's political orientation on the likelihood of a stock market liberalization decision. With this new specification, after adding executive nationalist and executive special interests binary variables, we end up with similar results as in Table 3.3.B where we used aggregate aid. We find that executive nationalist and executive special interests are both negatively and significantly related to the probability of a stock market liberalization decision.

When we look at the effects of privatization on the likelihood of stock market liberalization, Models 4 and 5 in Table 3.3.D, we do not find any significant relationship between first SIP and first privatization and the likelihood of stock market liberalization. Finally, in Model 6 in Table 3.3.D, we test whether a particular world region is driving our main results. We include the same regional dummies as in Model 6 of Table 3.3.B and find that only the indicator variable for countries located in the Middle East and North Africa is positively related

to the hazard of liberalization[43]. All of our results are robust to including these regional indicators.

3.4.4. Panel Probit Model

Table 3.4 reports the estimates from a panel probit model, which allows us to explicitly account for some of the unobservable country and time effects. To control for these sources of potential endogeneity, we estimate random effects regressions with time fixed effects. The majority of the panel probit results are consistent with the results from the Cox regressions, which attests to the robustness of our results. Model 1 in Table 3.4.A is identical to Model 1 in Table 3.3.A with the exception that the former includes random effects and time fixed effects. The main differences between the results from the Cox regression and the probit model are that the coefficients on GNI per capita and population lose their significance. In model 2 we include the nationalist dummy variable and find that it has a significant negative effect on the probability of stock market liberalization[44].

Model 3 in Table 3.4.B shows that the first SIP (and the first privatization) indicator variable is still not significant[45]. In model 4 of Table 3.4.B, we examine the robustness of the probit results to including regional dummy variables[46]. The majority of the results are qualitatively the same. Finally, in Table 3.4.C and 3.4.D, we re-estimate all the regressions from Table 3.4.A and 3.4.B after splitting the total foreign financial aid into bilateral and multilateral aid. Consistent with the results from the Cox proportional hazard model, we find that the

[43] The hazard ratios for the regional dummies are not reported in the Table for brevity.
[44] We also estimate the regression with the executive special interests variable and obtain almost identical results, but do not report them for brevity.
[45] This significance level is at the margin for 10 percent though.
[46] The reported coefficients are for the regression that includes only the dummy variable for countries of the Middle East and North Africa. We cannot include all the regional dummy variables simultaneously, because the maximization algorithm exhibits convergence problems with too many binary variables. We do, however, estimate the model by including the regional dummies sequentially and obtain qualitatively similar results.

bilateral aid drives the positive relationship between foreign financial aid and the likelihood of a stock market liberalization.

3.4.5. Robustness and Instrumental Variable Approach

In this section we perform a number of tests to confirm the robustness of our main findings[47]. The descriptive statistics in Table 3.1.B show that there are several potential outliers in the data. The maximum value for population, for example, is 1,015.923 million people. This value corresponds to the population of India, which is in the sample of liberalized countries. We drop India from the sample and re-estimate the Cox proportional hazard model. The coefficient on population loses significance, but the remaining results are qualitatively the same. Another source of potential outliers is government consumption, which has extremely high values for Kuwait (76.22 percent). All of our results, including the results on government consumption, are robust to excluding Kuwait from the sample.

One of the most interesting results in the paper is the positive relationship between foreign financial aid and the likelihood of a stock market liberalization. To lessen the effect of outliers, we winsorize the foreign financial aid variable at the five percent level and drop Israel and Egypt from the sample, because they are the largest recipients of aid from the United States, which is also the largest donor of foreign financial aid. The results are robust to both of these alternative specifications. Finally, our findings remain unaffected when we drop the microstates (countries with less than 1 million inhabitants).

Finally, for a potential omitted variable bias problem and measurement error which the covariates might subject to, we run instrumental variable regressions. Alesina and Weder (2002)

[47] We mainly concentrate on the robustness of the Cox proportional hazard model, because it is the most appropriate model for analyzing the stock market liberalization decision. The results from this section are not reported, but are available upon request.

and Alesina and Dollar (2000) state that the amount of aid is highly related to the indicators of historical and political closeness between the donor and recipient countries. Based on their result, we use former colony dummies as an instrument for foreign financial aid. The dummy variable takes the value of 1 for each country if they were colonized by Great Britain, France, Spain and Portugal and 0 otherwise. By using these variables, we try to capture those historical and political ties between donors and recipients. Our results indicate that being a former British colony increases the amount of received aid whereas others reduce it. Both cross sectional probit and panel probit models reveal similar results and the foreign financial aid coefficient is still positive and significant[48].

3.5. Conclusion

In this paper we analyze some of the potential determinants of the government's decision to allow foreign investors to purchase domestic equity securities. We document that both political and economic factors influence the stock market liberalization decision. Specifically, the more industrialized countries, which have higher levels of financial development, provide better legal protection of the minority shareholder rights, and have less interventionist governments are more likely to liberalize their equity markets. Regarding the political factors, nationalist governments and governments that represent special interest groups are less likely to allow foreign investors to purchase domestic equity securities. Furthermore, the governments that receive more foreign financial aid, especially bilateral aid, are more likely to liberalize their equity markets. The exact channels through which foreign financial aid influences the domestic government's decision to liberalize their national stock markets is unclear. However, it is possible that the recipient governments use the foreign financial aid to compensate the politically powerful groups that would otherwise oppose the stock market liberalization decision, or that the

[48] Results are available upon request.

donors use the foreign financial aid to "purchase" the support of the government officials for the liberalization reforms.

The positive effect of foreign financial aid on the likelihood of a stock market liberalization may indicate the presence of an indirect link between foreign financial aid and economic growth. Specifically, foreign financial aid is positively related to the likelihood of a stock market liberalization, which in turn promotes economic growth.

Table 3.1.A Summary Statistics

The table presents summary statistics for the period from 1980 to 2000, and the results from a two-sample mean comparison test for the countries that liberalized and those that did not liberalize their stock markets. The variables Trade openness, Foreign direct investment, Government consumption, Agriculture, Industry, and Private credit are all expressed as fractions of gross domestic product. Market turnover is expressed as a fraction of total market capitalization. GNI per capita is measured in constant US dollars. Population is measured in millions, and All donors financial aid, DAC bilateral financial aid, and Multilateral financial aid are expressed in millions of constant US dollars.

	Sample of countries that did not liberalized in the period from 1980 to 200 (34 Countries)				
	N obs.	Mean	Std. dev	Min	Max
GNI per capita	709	2684.344***	2823.506	300	20050
Population (millions)	711	7.580704***	9.595204	0.2491	63.664
Trade openness	714	69.75134*	39.01685	8.959	282.401
Foreign direct investment/GDP	712	1.521114	3.761942	-28.6221	39.8065
Black market premium index	155	-6.98865**	3.989834	-10	0
Government consumption/GDP	712	14.38784	6.414053	2.9	76.2221
Agriculture	693	25.3681***	12.80479	0.1809	61.7747
Industry	693	27.05419***	11.58752	8.9117	74.856
Private credit/GDP	712	21.56844***	15.37219	1.954	112.626
Market turnover	714	0.9203081***	8.126308	0	144.9
Common law	714	0.2647059	0.4414857	0	1
ODA (All donors)	688	326.5598***	317.4156	-9.68	3512.54
ODA (DAC donors)	688	195.7497***	160.5772	-34.12	900.92
ODA (Multilateral)	688	102.7314***	110.7078	-8.13	1718.01
ODA (All donors)/GDP	686	13.97959***	13.87455	-0.1040294	106.4214
ODA (DAC donors)/GDP	686	8.177597***	8.124622	-0.3469335	74.13169
ODA (Multilateral)/GDP	686	5.363422***	6.566521	-0.2817959	60.91359
Nationalist†	714	0.1554622	0.3625987	0	1
Special interest†	714	0.1540616	0.3612609	0	1

Table 3.1.A. Summary Statistics continued

	Sample of countries that liberalized in the period from 1980 to 2000 (36 Countries)				
	N obs.	Mean	Std. dev	Min	Max
GNI per capita	756	4395.886***	3417.369	450	19490
Population (millions)	756	60.18614***	141.3508	0.344	1015.923
Trade openness	755	66.28281*	38.06901	6.32	228.875
Foreign direct investment/GDP	714	1.506639	2.003828	-6.8978	17.4162
Black market premium index	175	-7.71702**	3.222279	-10	0
Government consumption/GDP	749	14.90169	6.743986	2.9755	41.4761
Agriculture	705	15.82556***	10.64099	0.9877	59.7306
Industry	705	34.03968***	9.794824	6.2475	71.5961
Private credit/GDP	739	39.50603***	27.49333	1.542	165.719
Market turnover	756	15.8469***	38.63137	0	475.46
Common law	756	0.4722222	0.4995583	0	1
ODA (All donors)	738	697.1758***	881.7104	-404.62	7289.92
ODA (DAC donors)	738	477.2553***	631.4636	-402.88	5377.96
ODA (Multilateral)	735	175.178***	338.966	-30.89	3163.02
ODA (All donors)/GDP	738	3.740472***	6.008627	-0.514625	62.53314
ODA (DAC donors)/GDP	738	2.248599***	2.999415	-0.5124119	16.61651
ODA (Multilateral)/GDP	735	1.013471***	2.078263	-0.2878835	17.01626
Nationalist†	756	0.1309524	0.3375716	0	1
Special interest†	756	0.1706349	0.3764387	0	1

Table 3.1.B Summary Statistics

The table presents summary statistics for all the countries in our sample for the period from 1980 to 2000. The variables Trade openness, Foreign direct investment, Government consumption, Agriculture, Industry, and Private credit are all expressed as fractions of gross domestic product. Market turnover is expressed as a fraction of total market capitalization. GNI per capita is measured in constant US dollars. Population is measured in millions, and All donors financial aid, DAC bilateral financial aid, and Multilateral financial aid are expressed in millions of constant US dollars.

	All countries in the sample (70 Countries)				
Variable	Observations	Mean	Standard Deviation	Min	Max
GNI per capita	1465	3567.57	3257.326	300	20050
Population (millions)	1467	34.69026	105.0053	0.2491	1015.923
Trade openness	1469	67.96867	38.55849	6.32	282.401
Foreign direct investment/GDP	1426	1.513866	3.011699	-28.6221	39.8065
Black market premium index	330	-7.374907	3.61597	-10	0
Government consumption/GDP	1461	14.65128	6.588025	2.9	76.2221
Agriculture	1398	20.55587	12.69091	0.1809	61.7747
Industry	1398	30.57692	11.2723	6.2475	74.856
Private credit/GDP	1451	30.70413	24.1051	1.542	165.719
Market Turnover	1470	8.596844	29.23633	0	475.46
Common law	1470	0.3714286	0.4833511	0	1
ODA (All donors)	1426	518.3653	696.3957	-404.62	7289.92
ODA (DAC donors)	1426	341.4377	488.3244	-402.88	5377.96
ODA (Multilateral)	1423	140.1511	257.954	-30.89	3163.02
ODA (All donors)/GDP	1424	8.673079	11.72854	-0.514625	106.4214
ODA (DAC donors)/GDP	1424	5.104844	6.724406	-0.5124119	74.13169
ODA (Multilateral)/GDP	1421	3.113447	5.268896	-0.2878835	60.91359
Nationalist[†]	1470	0.142857	0.3500462	0	1
Special interest[†]	1470	0.162585	0.3691122	0	1

Table 3.2. Cross Sectional Probit Model

The dependent variable in the probit model takes the value of one if the country liberalizes its national stock market in the period from 1980 to 2000 and zero otherwise. For the countries that liberalize their stock markets, the explanatory variables are averaged over the five years preceding the liberalization year. For the countries that do not liberalize their equity markets, the explanatory variables are averaged over the five years preceding the liberalization year of their closest geographic neighbor. The tables reports Quasi-Maximum Likelihood adjusted standard errors.

	Coefficient	Partial effect
GNI per capita, log	0.3886 (0.6443)	0.0044
Population	0.0913 (0.0286)***	0.0010
Common law	2.4576 (1.0325)**	0.0352
Trade openness	0.0174 (0.0156)	0.0002
Foreign direct investment	0.6856 (0.3222)**	0.0078
Black market premium index	-0.3810 (0.1332)***	-0.0043
Government consumption	-0.3243 (0.0983)***	-0.0037
Agriculture	-0.1587 (0.0466)***	-0.0018
Private credit	0.0201 (0.0184)	0.0002
Market turnover	0.0284 (0.0171)*	0.0003
All donors foreign aid	0.0056 (0.0015)***	0.00006
Constant	-4.9594 (5.6919)	
Number of observations	60	
Log-likelihood	-10.6	
Robust standard errors in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%	

Table 3.3.A. Cox Regressions

The table presents the results from the duration model estimated using partial maximum likelihood (Cox, 1972). The data for the model estimation is split into seven three year sub periods covering the period from 1980 to 2000. We model the duration between a country's entry in our sample and its official equity market liberalization. The official equity market liberalization indicator variable takes the value of one on and after the three year period of the stock market liberalization, and zero otherwise. The countries that did not liberalize their equity markets in the period from 1980 to 2000 are treated as right-censored. The explanatory variables are lagged three year averages of the data. The table reports hazard ratios and the associated standard errors (in parenthesis below).

	Exp. Sign	Model 1	Model 2	Model 3
GNI per capita	+/-	0.9996	0.9997	0.9997
		(0.0002)**	(0.0001)**	(0.0001)**
Population	+/-	0.9930	0.9921	0.9921
		(0.0013)***	(0.0014)***	(0.0014)***
Common law	+	6.7822	9.1295	9.1295
		(2.5083)***	(3.8056)***	(3.8056)***
Trade openness	+/-	1.0015	0.9959	0.9959
		(0.0086)	(0.0093)	(0.0093)
Foreign direct investment	+	0.9366	0.9376	0.9376
		(0.0878)	(0.0832)	(0.0832)
Black market premium index	-	0.7492	0.7474	0.7474
		(0.0354)***	(0.0303)***	(0.0303)***
Agriculture	-	0.9293	0.9299	0.9299
		(0.0299)**	(0.0271)**	(0.0271)**
Industry	+	1.0922	1.0928	1.0928
		(0.0191)***	(0.0180)***	(0.0180)***
Private credit	+	1.0199	1.0248	1.0248
		(0.0092)**	(0.0082)***	(0.0082)***
Market turnover	+	1.0658	1.0680	1.0680
		(0.0122)***	(0.0121)***	(0.0121)***
Government consumption	-	0.7965	0.8194	0.8194
		(0.0369)***	(0.0400)***	(0.0400)***
All donors	+	1.0010	1.0010	1.0010
		(0.0001)***	(0.0001)***	(0.0001)***
Nationalist	-		0.2724	
			(0.1812)*	
Special interest	-			0.2724
				(0.1812)*
Number of groups/failures		62/30	62/30	62/30
Number of observations		312	312	312
Log-likelihood		-86.80	-85.50	-85.50
Robust standard errors in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%			

Table 3.3.B. Cox Regressions

The table presents the results from the duration model estimated using partial maximum likelihood (Cox, 1972).The data for the model estimation is split into seven three year sub periods covering the period from 1980 to 2000. We model the duration between a country's entry in our sample and its official equity market liberalization. The official equity market liberalization indicator variable takes the value of one on and after the three year period of the stock market liberalization, and zero otherwise. The countries that did not liberalize their equity markets in the period from 1980 to 2000 are treated as right-censored. The explanatory variables are lagged three year averages of the data. The table reports hazard ratios and the associated standard errors (in parenthesis below).

	Exp. sign	Model 4	Model 5	Model 6
GNI per capita	+/-	0.9996	0.9997	0.9996
		(0.0002)**	(0.0001)**	(0.0002)***
Population	+/-	0.9922	0.9921	0.9933
		(0.0016)***	(0.0015)***	(0.0014)***
Common law	+	8.8030	9.1954	10.2701
		(3.8553)***	(4.1164)***	(4.8029)***
Trade openness	+/-	0.9960	0.9958	0.9997
		(0.0094)	(0.0093)	(0.0104)
Foreign direct investment	+	0.9354	0.9385	0.9765
		(0.0855)	(0.0840)	(0.0862)
Black market premium index	-	0.7512	0.7471	0.7401
		(0.0322)***	(0.0300)***	(0.0441)***
Government consumption	-	0.8189	0.8188	0.7385
		(0.0410)***	(0.0406)***	(0.0445)***
Agriculture	-	0.9269	0.9297	0.9029
		(0.0307)**	(0.0263)**	(0.0367)**
Industry	+	1.0894	1.0930	1.0895
		(0.0217)***	(0.0187)***	(0.0209)***
Private credit	+	1.0241	1.0249	1.0197
		(0.0084)***	(0.0084)***	(0.0113)*
Market turnover	+	1.0675	1.0682	1.0683
		(0.0125)***	(0.0129)***	(0.0132)***
All donors	+	1.0010	1.0010	1.0008
		(0.0001)***	(0.0001)***	(0.0001)***
Nationalist	-	0.2636	0.2719	
		(0.1719)**	(0.1824)*	
SIP	+	1.2106		
		(0.5851)		
First privatization	+		0.9825	
			(0.3285)	
Number of groups/failures		62/30	62/30	62/30
Number of observations		312	312	312
Log-likelihood		-85.47	-85.50	-84.72
Robust standard errors in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%			

Table 3.3.C. Cox Regressions with Different Types of Foreign Financial Aid

The table presents the results from the duration model estimated using partial maximum likelihood (Cox, 1972).The data for the model estimation is split into seven three year sub periods covering the period from 1980 to 2000. We model the duration between a country's entry in our sample and its official equity market liberalization. The official equity market liberalization indicator variable takes the value of one on and after the three year period of the stock market liberalization, and zero otherwise. The countries that did not liberalize their equity markets in the period from 1980 to 2000 are treated as right-censored. The explanatory variables are lagged three year averages of the data. The table reports hazard ratios and the associated standard errors (in parenthesis below).

	Exp. Sign	Model 1	Model 2	Model 3
GNI per capita	+/-	0.9997	0.9997	0.9997
		(0.0002)**	(0.0001)**	(0.0001)**
Population	+/-	0.9922	0.9914	0.9914
		(0.0014)***	(0.0016)***	(0.0016)***
Common law	+	5.9130	8.1779	8.1779
		(2.3510)***	(3.6066)***	(3.6066)***
Trade openness	+/-	1.0029	0.9974	0.9974
		(0.0087)	(0.0095)	(0.0095)
Foreign direct investment	+	0.9424	0.9414	0.9414
		(0.0868)	(0.0834)	(0.0834)
Black market premium index	-	0.7581	0.7562	0.7562
		(0.0347)***	(0.0304)***	(0.0304)***
Government consumption	-	0.7990	0.8206	0.8206
		(0.0366)***	(0.0399)***	(0.0399)***
Agriculture	-	0.9284	0.9296	0.9296
		(0.0301)**	(0.0268)**	(0.0268)**
Industry	+	1.0952	1.0965	1.0965
		(0.0211)***	(0.0199)***	(0.0199)***
Private credit	+	1.0203	1.0253	1.0253
		(0.0091)**	(0.0081)***	(0.0081)***
Market turnover	+	1.0655	1.0678	1.0678
		(0.0114)***	(0.0119)***	(0.0119)***
DAC bilateral	+	1.0012	1.0012	1.0012
		(0.0002)***	(0.0001)***	(0.0001)***
Multilateral	+	1.0015	1.0014	1.0014
		(0.0008)*	(0.0008)*	(0.0008)*
Nationalist	-		0.2643	
			(0.1772)**	
Spec. interest	-			0.2643
				(0.1772)**
Number of groups/failures		62/30	62/30	62/30
Number of observations		312	312	312
Log-likelihood		-86.80	-85.41	-85.41
Robust standard errors in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%			

Table 3.3.D. Cox Regressions with Different Types of Foreign Financial Aid

The data for the model estimation is split into seven three year sub periods covering the period from 1980 to 2000. We model the duration between a country's entry in our sample and its official equity market liberalization. The official equity market liberalization indicator variable takes the value of one on and after the three year period of the stock market liberalization, and zero otherwise. The countries that did not liberalize their equity markets in the period from 1980 to 2000 are treated as right-censored. The explanatory variables are lagged three year averages of the data. The table reports hazard ratios and the associated standard errors (in parenthesis below).

	Exp. sign	Model 4	Model 5	Model 6
GNI per capita	+/-	0.9997	0.9997	0.9996
		(0.0002)**	(0.0001)**	(0.0002)**
Population	+/-	0.9915	0.9914	0.9923
		(0.0017)***	(0.0016)***	(0.0016)***
Common law	+	7.6992	7.9360	9.7053
		(3.6474)***	(3.7886)***	(4.5904)***
Trade openness	+/-	0.9976	0.9975	1.0008
		(0.0096)	(0.0094)	(0.0107)
Foreign direct investment	+	0.9394	0.9382	0.9810
		(0.0870)	(0.0846)	(0.0874)
Black market premium index	-	0.7609	0.7572	0.7354
		(0.0318)***	(0.0302)***	(0.0441)***
Government consumption	-	0.8200	0.8223	0.7363
		(0.0408)***	(0.0405)***	(0.0437)***
Agriculture	-	0.9252	0.9301	0.9054
		(0.0305)**	(0.0263)**	(0.0373)**
Industry	+	1.0922	1.0962	1.0971
		(0.0226)***	(0.0202)***	(0.0222)***
Private credit	+	1.0242	1.0250	1.0202
		(0.0083)***	(0.0082)***	(0.0114)*
Market turnover	+	1.0673	1.0672	1.0699
		(0.0122)***	(0.0126)***	(0.0133)***
DAC bilateral	+	1.0012	1.0012	1.0009
		(0.0001)***	(0.0001)***	(0.0002)***
Multilateral	+	1.0015	1.0015	1.0014
		(0.0008)*	(0.0008)*	(0.0008)*
Nationalist	-	0.2512	0.2661	
		(0.1661)**	(0.1763)**	
SIP	+	1.3260		
		(0.6249)		
First privatization	+		1.0674	
			(0.3515)	
Robust standard errors in parentheses		* significant at 10%; ** significant at 5%; *** significant at 1%		

Table 3.4.A. Panel Probit Model

The table presents the results from the panel probit model estimated using maximum likelihood. The data for the model estimation is split into seven three year sub periods covering the period from 1980 to 2000. The dependent variable takes the value of one on and after the three year period of the stock market liberalization, and zero otherwise. The explanatory variables are lagged three year averages of the data. All specifications include random effects and time fixed effects. The table reports the coefficients and standard errors (in parenthesis below), and the associated partial effects.

	Model 1	Marginal effects	Model 2	Marginal effects
GNI per capita	-0.0003	-3.11e-08	-0.0003	-2.14e-08
	(0.0002)		(0.0002)*	
Population	-0.0026	-2.72e-07	-0.0030	-1.98e-07
	(0.0027)		(0.0027)	
Common law	2.7275	.0119631	3.1202	.0174804
	(0.8253)***		(0.8858)***	
Trade openness	-0.0220	-2.30e-06	-0.0264	-1.75e-06
	(0.0134)		(0.0140)*	
Foreign direct investment	0.1048	.000011	0.1057	7.02e-06
	(0.1358)		(0.1543)	
Black market premium index	-0.3141	-.0000328	-0.2967	-.0000197
	(0.1060)***		(0.1067)***	
Agriculture	-0.1476	-.0000154	-0.1582	-.0000105
	(0.0510)***		(0.0536)***	
Industry	0.1274	.0000133	0.1178	7.82e-06
	(0.0489)***		(0.0488)**	
Private credit	0.0474	4.95e-06	0.0537	3.57e-06
	(0.0195)**		(0.0205)***	
Market turnover	0.0221	2.31e-06	0.0218	1.45e-06
	(0.0165)		(0.0168)	
Government consumption	-0.2710	-.0000283	-0.2509	-.0000167
	(0.0786)***		(0.0803)***	
All donors	0.0016	1.72e-07	0.0015	9.93e-08
	(0.0006)***		(0.0006)**	
Nationalist			-1.7274	-.0001147
			(0.9902)*	
Constant	-0.4933		0.2547	
	(2.6608)		(2.7591)	
Number of observations	357		357	
Number of groups	63		63	
Log likelihood	-60.9678		-59.3081	
Year dummies	Yes		yes	
Standard errors in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%			

Table 3.4.B. Panel Probit Model

The table presents the results from the panel probit model estimated using maximum likelihood. The data for the model estimation is split into seven three year sub periods covering the period from 1980 to 2000. The dependent variable takes the value of one on and after the three year period of the stock market liberalization, and zero otherwise. The explanatory variables are lagged three year averages of the data. All specifications include random effects and time fixed effects. The table reports the coefficients and standard errors (in parenthesis below), and the associated partial effects.

	Model 3	Marginal effects	Model 4	Marginal effects
GNI per capita	-0.0003	-5.86e-08	-0.0003	-2.52e-08
	(0.0002)*		(0.0002)*	
Population	-0.0034	-6.37e-07	-0.0040	-3.25e-07
	(0.0028)		(0.0029)	
Common law	2.7487	.0179758	2.2423	.0041273
	(0.8313)***		(0.9081)**	
Trade openness	-0.0229	-4.30e-06	-0.0229	-1.85e-06
	(0.0133)*		(0.0140)	
Foreign direct investment	0.0557	.0000105	0.1154	9.35e-06
	(0.1528)		(0.1569)	
Black market premium index	-0.2693	-.0000506	-0.2328	-.0000188
	(0.1007)***		(0.1027)**	
Agriculture	-0.1451	-.0000272	-0.1665	-.0000135
	(0.0499)***		(0.0535)***	
Industry	0.1096	.0000206	0.0924	7.48e-06
	(0.0455)**		(0.0463)**	
Private credit	0.0523	9.82e-06	0.0489	3.96e-06
	(0.0195)***		(0.0203)**	
Market turnover	0.0212	3.99e-06	0.0212	1.71e-06
	(0.0167)		(0.0174)	
Government consumption	-0.2417	-.0000454	-0.2129	-.0000172
	(0.0750)***		(0.0785)***	
All donors	0.0014	2.67e-07	0.0011	9.09e-08
	(0.0006)**		(0.0006)**	
Nationalist	-1.7821	-.0003345	-1.6076	-.0001301
	(0.9302)*		(0.9758)*	
SIP	1.1027	.0013968	0.9556	.0004436
	(0.7094)		(0.7317)	
Constant	-0.0808		0.6976	
	(2.5931)		(2.6446)	
Number of observations	357		357	
Number of groups	63		63	
Log likelihood	-58.7350		-57.1322	
Year dummies	yes		yes	
Regional dummies	no		yes	
Standard errors in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%			

Table 3.4.C. Panel Probit Model with Different Types of Foreign Financial Aid

The table presents the results from the panel probit model estimated using maximum likelihood. The data for the model estimation is split into seven three year sub periods covering the period from 1980 to 2000. The dependent variable takes the value of one on and after the three year period of the stock market liberalization, and zero otherwise. The explanatory variables are lagged three year averages of the data. All specifications include random effects and time fixed effects. The table reports the coefficients and standard errors (in parenthesis below), and the associated partial effects.

	Model 1	Marginal effects	Model 2	Marginal effects
GNI per capita	-0.0003	-2.08e-08	-0.0004	-1.18e-08
	(0.0002)*		(0.0002)*	
Population	-0.0017	-1.09e-07	-0.0020	-6.60e-08
	(0.0031)		(0.0031)	
Common law	3.2388	.0207787	3.7321	.0309024
	(0.9008)***		(0.9826)***	
Trade openness	-0.0226	-1.46e-06	-0.0278	-9.23e-07
	(0.0134)*		(0.0141)**	
Foreign direct investment	0.0863	5.55e-06	0.0822	2.73e-06
	(0.1413)		(0.1621)	
Black market premium index	-0.3200	-.0000206	-0.3053	-.0000101
	(0.1055)***		(0.1069)***	
Agriculture	-0.1483	-9.55e-06	-0.1616	-5.36e-06
	(0.0509)***		(0.0538)***	
Industry	0.1187	7.64e-06	0.1080	3.58e-06
	(0.0488)**		(0.0488)**	
Private credit	0.0479	3.08e-06	0.0545	1.81e-06
	(0.0198)**		(0.0208)***	
Market turnover	0.0280	1.80e-06	0.0284	9.41e-07
	(0.0183)		(0.0187)	
Government consumption	-0.2722	-.0000175	-0.2508	-8.31e-06
	(0.0784)***		(0.0803)***	
DAC bilateral	0.0028	1.83e-07	0.0027	8.97e-08
	(0.0010)***		(0.0010)***	
Multilateral	-0.0011	-7.19e-08	-0.0015	-4.89e-08
	(0.0016)		(0.0017)	
Nationalist			-1.8362	-.0000609
			(0.9918)*	
Constant	-0.2492		0.6233	
	(2.7030)		(2.8084)	
Number of observations	357		357	
Number of groups	63		63	
Log likelihood	-59.7464		-57.8808	
Year dummies	Yes		yes	
Standard errors in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%			

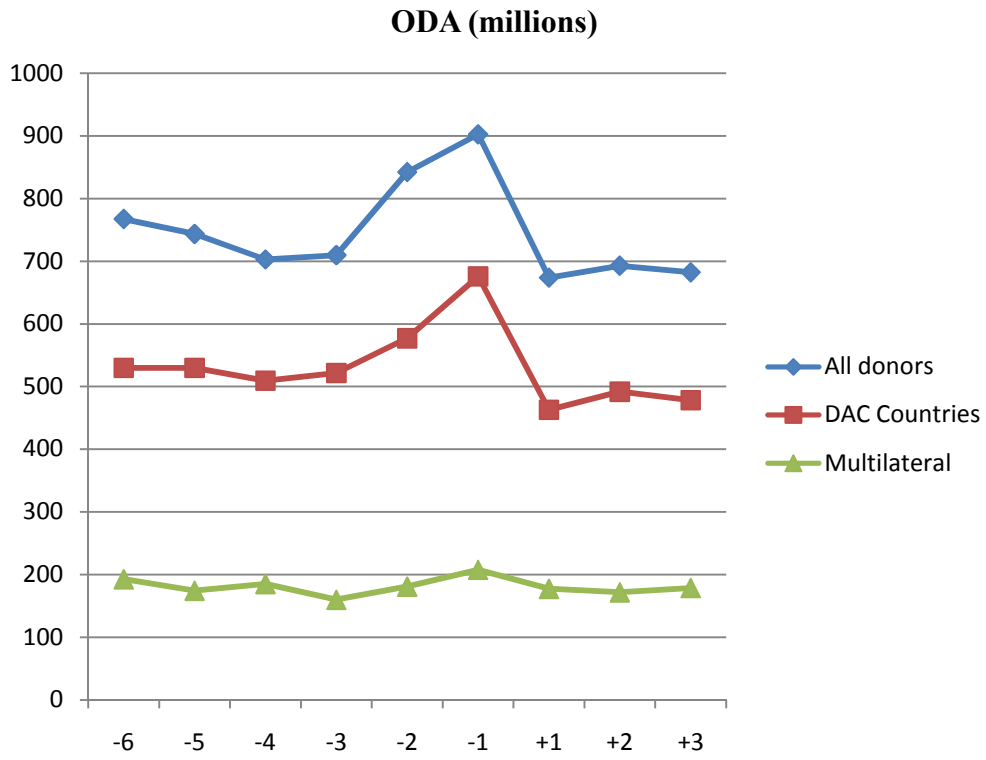
Table 3.4.D. Panel Probit Model with Different Types of Foreign Financial Aid

The table presents the results from the panel probit model estimated using maximum likelihood. The data for the model estimation is split into seven three year sub periods covering the period from 1980 to 2000. The dependent variable takes the value of one on and after the three year period of the stock market liberalization, and zero otherwise. The explanatory variables are lagged three year averages of the data. All specifications include random effects and time fixed effects. The table reports the coefficients and standard errors (in parenthesis below), and the associated partial effects.

	Model 3	Marginal effects	Model 4	Marginal effects
GNI per capita	-0.0003	-3.12e-08	-0.0003	-1.54e-08
	(0.0002)**		(0.0002)*	
Population	-0.0025	-2.29e-07	-0.0028	-1.24e-07
	(0.0031)		(0.0032)	
Common law	3.3071	.0280659	2.8880	.0092764
	(0.9249)***		(1.0013)***	
Trade openness	-0.0242	-2.20e-06	-0.0253	-1.14e-06
	(0.0134)*		(0.0146)*	
Foreign direct investment	0.0370	3.35e-06	0.1068	4.81e-06
	(0.1569)		(0.1647)	
Black market premium index	-0.2769	-.0000251	-0.2426	-.0000109
	(0.1014)***		(0.1034)**	
Agriculture	-0.1494	-.0000135	-0.1726	-7.78e-06
	(0.0503)***		(0.0542)***	
Industry	0.1012	9.18e-06	0.0808	3.64e-06
	(0.0457)**		(0.0466)*	
Private credit	0.0531	4.82e-06	0.0517	2.33e-06
	(0.0200)***		(0.0211)**	
Market turnover	0.0265	2.40e-06	0.0281	1.26e-06
	(0.0182)		(0.0192)	
Government consumption	-0.2425	-.000022	-0.2181	-9.83e-06
	(0.0754)***		(0.0798)***	
DAC bilateral	0.0025	2.29e-07	0.0021	9.60e-08
	(0.0009)***		(0.0009)**	
Multilateral	-0.0012	-1.13e-07	-0.0018	-8.00e-08
	(0.0016)		(0.0016)	
Nationalist	-1.8674	-.0001693	-1.7375	-.0000783
	(0.9322)**		(0.9829)*	
SIP	1.0733	.0006983	0.8892	.0002155
	(0.7272)		(0.7470)	
Constant	0.3155		1.2134	
	(2.6500)		(2.7228)	
Observations	357		357	
Number of ifscode	63		63	
Log likelihood	-57.4701		-55.8386	
Year dummies	yes		yes	
Regional dummies	no		yes	
Standard errors in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%			

Figure 3.1. Aid Trend Before and After Liberalization

Aid is shown on the vertical axis. The years before and after financial liberalization is graphed on the horizontal axis. As it can be seen, aid increases before financial liberalization and decreases sharply afterwards.



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APPENDIX A

Table A1. List of Recipient Countries Included in Our Panel Data

Argentina, Bahrain, Barbados, Belarus, Belize, Bolivia, Brazil, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, Chile, Colombia, Congo - Rep., Costa Rica, Cote d'Ivoire, Croatia, Cyprus, Dominican Republic, Egypt, El Salvador, Estonia, Ethiopia, Guatemala, Honduras, Hungary, India, Indonesia, Iran, Jamaica, Kazakhstan, Kuwait, Latvia, Lesotho, Malaysia, Mali, Malta, Mauritania, Mauritius, Mexico, Mongolia, Morocco, Nepal, Nicaragua, Niger, Pakistan, Panama, Paraguay, Peru, Romania, Russia, Rwanda, Senegal, Singapore, Slovenia, Sri Lanka, Syria, Tajikistan, Thailand, Togo, Trinidad & Tobago, Tunisia, Turkey, Uruguay, Venezuela.

Table A2. List of Donor countries included in the IV regression

Australia, Austria, Belgium, Canada, Denmark, Finland, Japan, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

Table A3. CRS/Aid Activities (these activities include all commitments)

DAC name	Definition
XII.TOTAL	
I.SOCIAL INFRASTRUCTURE & SERVICES	I.Total
I.1 Education, Total	Includes general teaching and instruction at all levels; as well as construction specifically to improve or adapt educational establishments. Training in a particular field, such as agriculture, is reported against the sector concerned.
I.1.a) Education, Level Unspecified	Includes education sector policy and research, as well as buildings and teacher training when level of education unspecified.
I.1.b) Basic Education	Includes primary, basic life skills for youth and adults and early childhood education.
I.1.c) Secondary Education	Includes vocational training.
I.1.d) Post-Secondary Education	Includes higher education and advanced technical and managerial training.
I.2 Health, Total	Covers assistance to hospitals, clinics, other medical and dental services, public health administration and medical insurance programmes.
I.2.a) Health, General	Includes health policy, medical education and research, laboratories, hospitals and specialised clinics, ambulances, dental services, mental health, rehabilitation, non-infectious disease control, drug and substance abuse control (excluding narcotics traf
I.2.b) Basic Health	Basic health care provision, training of basic health personnel and development of basic health infrastructure; nutrition, infectious disease control, public health campaigns.
I.3 Population Programmes	Covers all activities in the field of reproductive health, family planning and research into population problems.
I.4 Water Supply & Sanitation	Covers assistance given for water supply and use, sanitation and water resources development (including rivers).

I.5 Government & Civil Society	Includes assistance to strengthen the administrative apparatus and government planning, and activities promoting good governance and strengthening civil society.
I.5.a) Government and civil society - general	
I.5.b) Conflict, Peace and Security	
I.6 Other Social Infrastructure & Services	Covers assistance to employment, housing, other social services and cultural development. Includes also research when sector cannot be identified.
II.ECONOMIC INFRASTRUCTURE	II.Total
II.1Transport & Storage	Covers road, rail, water and air transport and storage, whether or not related to transportation.
II.2Communications	Includes all communications (post and telecommunications, radio, television, print media).
II.3 Energy	Covers both the production and distribution of energy. Assistance towards the peaceful use of nuclear energy is reportable as ODA. This includes the construction and decommissioning of nuclear power reactors for civilian power supply, the development or
II.4 Banking & Financial Services	Covers assistance to finance and banking in both formal and informal sectors.
II.5 Business & Other Services	Includes business development and activities aimed at improving the business climate; privatisation.
III.PRODUCTION SECTORS	III.Total
III.1 Agriculture - Forestry - Fishing, Total	Including agricultural sector policy, agricultural development and inputs, crops and livestock production, agricultural credit, co-operatives and research.
III.1.a) Agriculture	Including agricultural sector policy, agricultural development and inputs, crops and livestock production, agricultural credit, co-operatives and research.
III.1.b) Forestry	Includes forestry policy, planning and programmes, fuelwood and charcoal projects, forestry education, research and development.
III.1.c) Fishing	Includes fisheries policy, planning and programmes as well as fisheries research and education.

III.2 Industry - Mining - Construction, Total	Covers assistance to manufacturing industries of all kinds, technological research and development, extractive industries, and construction when sector cannot be identified.
III.2.a) Industry	Industrial policy, small business and craft development; all types of manufacturing, including agro-processing, chemicals and fertilisers, gas liquefaction and petroleum refining, fuel wood production, textiles and leather.
III.2.b) Mining	Includes mining and minerals policy and programmes, geology, and extraction of metals, minerals and fuels.
III.2.c) Construction	Construction sector policy and planning; excluding construction activities within specific sectors (e.g., hospital or school construction).
III.3 Trade Policy and Regulations	Covers trade and export promotion; hotels and other tourist facilities.
III.4 Tourism	Tourism policy and administrative management.
IV. MULTISECTOR	IV.Total
IV.1 General Environment Protection	Covers activities concerned with conservation, protection or amelioration of the physical environment without sector allocation.
IV.2 Women In Development	Covers activities concerned with advancement of women in development without sector allocation.
IV.3 Other Multisector	Covers urban and rural development projects and other multisector activities
V.TOTAL SECTOR ALLOCABLE (I+II+III+IV)	Sum of amounts on lines 100, 200, 300 and 400.
VI. COMMODITY AID / GENERAL PROG. ASS.	This main heading includes contributions for general development purposes without sector allocation, with or without restrictions on the specific use of the funds (and irrespective of any control by the donor of the use of counterpart funds). Funds suppl
VI.1 General Budget Support	Non-sector allocable programme assistance whose provision is explicitly linked to agreed policy packages, in particular those implementing recommendations made by the World Bank and the IMF.

VI.2 Developmental Food Aid/Food Security Assistance	Supplies and transport of food, cash for food, and intermediate products (fertilisers, seeds etc.) provided as part of a food aid programme.
VI.3 Other Commodity Assistance	Includes import, budget and balance-of-payments support.
VII. ACTION RELATING TO DEBT	This main heading groups all actions relating to debt (forgiveness, swaps, buy-backs, rescheduling, refinancing).
VIII. EMERGENCY ASSISTANCE AND RECONSTRUCTION	This main heading groups emergency and distress relief in cash or in kind, emergency food aid, humanitarian aid including aid to refugees, and assistance for disaster preparedness.
VIII.1 Emergency Food Aid	Food aid for population groups affected by emergency situations.
VIII.2 Other Emergency and Distress Relief	All emergency, distress relief and humanitarian aid except food aid.
VIII.3 Reconstruction relief	
IX. ADMINISTRATIVE COSTS OF DONORS	Administrative costs as defined in paragraphs 1.26 to 1.30.
X. SUPPORT TO NGO'S	This main heading refers to official funds paid over to national and international non-governmental organisations for use at the latters' discretion. Official funds made available to NGO's for use on behalf of the official sector, in connection with purp
XI. UNALLOCATED/UNSPECIFIED	Amounts should be reported under this heading only for forms of aid which cannot be assigned to another part of the table, and also, in the case of project or sector assistance, to record contributions for which sectoral destination remains to be specifie

Table A4. Government Financial Statistics (IMF)

Government Finance	Source
Revenue Classification	
80. OVERALL DEFICIT/SURPLUS	IMF, GDF
81. TOTAL REVENUE & GRANTS	IMF, GDF.
81A. TAXES ON INCOME, PROFITS, & CAPITAL GAINS	IMF, GDF.
81B. SOCIAL SECURITY CONTRIBUTIONS	IMF, GDF.
81C. TAXES ON PAYROLL OR WORK FORCE	IMF, GDF.
81D. TAXES ON PROPERTY	IMF, GDF.
81E. DOMESTIC TAXES ON GOODS & SERVICES	IMF, GDF.
81F. TAXES ON INTL TRADE & TRANSACTIONS	IMF, GDF.
81G. OTHER TAXES	IMF, GDF.
81Y. TOTAL REVENUE	IMF, GDF.
81YA. TAX REVENUE	IMF, GDF.
81YB. NONTAX REVENUE	IMF, GDF.
81YC. CAPITAL REVENUE	IMF, GDF.
81YD. CURRENT REVENUE	IMF, GDF.
81Z. GRANTS	IMF, GDF.
Expenditure Classification	
82. TOTAL EXPENDITURE	IMF, GDF.
82A. GENERAL PUBLIC SERVICES	IMF, GDF.
82AC. PUBLIC ORDER & SAFETY (B3)	IMF, GDF.
82B. DEFENSE (B2)	IMF, GDF.
82C. EDUCATION (B4)	IMF, GDF.
82D. HEALTH (B5)	IMF, GDF.
82E. SOCIAL SECURITY & WELFARE (B6)	IMF, GDF.
82F. HOUSING & COMMUNITY AMENITIES (B7)	IMF, GDF.
82G. RECREATIONAL, CULTURAL, & RELIG AFFAIRS (B8)	IMF, GDF.
82H. ECONOMIC AFFAIRS & SERVICES (B9 TO B13)	IMF, GDF.
82HB. AGRI, FORESTRY, FISHING, & HUNTING (B10)	IMF, GDF.
82HC. MINING & MINERAL RESOURCES, MANUF, & CONSTRUCTION (B11)	IMF, GDF.
82HD. FUEL & ENERGY (B9)	IMF, GDF.
82HI. TRANSPORTATION & COMMUNICATION (B12)	IMF, GDF.
82HL. OTH ECONOMIC AFFAIRS & SERVICES (B13)	IMF, GDF.
82K. OTH EXPENDITURES (B14)	IMF, GDF.
82N. CURR EXPENDITURE ON GOODS & SERVICES (C1)	IMF, GDF.
82NA. WAGES & SALARIES; EMPLOYER CONTRIBUTIONS (C1.1 + C1.2)	IMF, GDF.

82NP. OTH PURCHASES OF GOODS & SERVICES (C1.3)	IMF, GDF.
82NX. EMPLOYER CONTRIBUTIONS (C1.2)	IMF, GDF.
82PA. INTEREST PAYMENTS (C2)	IMF, GDF.
82PJ. SUBSIDIES & OTH CURR TRANSFERS (C3)	IMF, GDF.
82PK. SUBSIDIES (C3.1)	IMF, GDF.
82PM. TRANSFERS TO OTH LEVELS OF NATL GOVT (C3.2)	IMF, GDF.
82PP. TRANSFERS ABROAD (C3.5)	IMF, GDF.
82PT. TRANSFERS TO NONPROFIT INSTS & HHLDS (C3.3 4 + C3.4)	IMF, GDF.
82R. CURRENT EXPENDITURE (C.III)	IMF, GDF.
82V. CAPITAL EXPENDITURE (C.IV)	IMF, GDF.
82VA. ACQUISITION OF FIXED ASSETS (C4)	IMF, GDF.
82Z. EXPEND & LENDING MINUS REPAYMENTS (C.I; OR C.II + C.V)	

Table A5. Summary Statistics

Variable	Mean	Std. Dev.	Min	Max	Obs
Total expenditure (excluding defense)	22.96231	9.929409	.0275524	56.08927	N = 1019
Investment expenditure	5.684408	4.034981	.0033656	25.72717	N = 1048
Non-investment expenditure	3.887969	3.568834	1.43e-06	23.37628	N = 988
Social infrastructure expenditure	13.81117	7.381383	.021869	55.66596	N = 1058
Aid DAC	4.963536	6.418934	-.5458025	48.14704	N = 1727
Aid CRS	3.922629	5.361861	4.30e-06	41.02941	N = 1618
Investment aid (CRS)	1.729454	2.525373	2.12e-06	22.93244	N = 1525
Non-investment aid (CRS)	1.481203	2.522273	9.31e-10	22.22922	N = 1566
Social infrastructure aid (CRS)	.9368216	1.608255	0	17.5981	N = 1484

APPENDIX B

All data on ODA are collected by the OECD/DAC Secretariat from its 22 members, then checked and aggregated by the OECD/DAC Secretariat. The DAC Secretariat collects two sets of data:

i. DAC statistics provide comprehensive data on the volume, origin and types of aid and resource flows to over 180 aid recipients. The data cover official development assistance (ODA), other official flows (OOF) and private funding (foreign direct investment, bank and non-bank flows) from members of the Development Assistance Committee (DAC), multilateral organisations and other donors. See www.oecd.org/dac/stats/dac/guide for details.

ii. The objective of the CRS Aid Activity database is to provide a set of readily available basic data that enables analysis on where aid goes, what purposes it serves and what policies it aims to implement, on a comparable basis for all DAC members. Most commonly Aid Activity data are used to analyse the sectoral and geographical breakdown of aid for selected years and donors or groups of donors. But the database also permits to consider specific policy issues (e.g. tying status of aid) and monitor donors' compliance with various international recommendations in the field of development co-operation. See www.oecd.org/dac/stats/crs/guide for details.

Net Official development assistance (ODA) comprises grants or loans to developing countries and territories on the OECD/DAC list of aid recipients that are undertaken by the official sector with promotion of economic development and welfare as the main objective and at concessional financial terms. This definition is from Milliennium Development Goals Indicators webpage.

APPENDIX C

SOLUTION FOR THE THEORETICAL MODEL

Representative household's utility function:

$$U = \int_0^{\infty} \frac{1}{\gamma} (C G_C^{\theta})^{\gamma} e^{-\beta t} dt \qquad -\infty < \gamma < 1 \qquad \theta(1-\theta\gamma) > 0 \qquad (1)$$

Production function:

$$Y = G_I^{\eta} K^{1-\eta}, \ 0 < \eta < 1 \qquad (2)$$

The accumulation of private capital:

$$\dot{K} = (1-\tau)Y - C - T \qquad (3)$$

The government's budget constraints:

$$G_C + G_I = \tau Y + F + T \qquad (4)$$

$$G_I = G_I^d + \phi F = \left(g_I^d + \phi\varepsilon\right)Y \qquad (5a)$$

$$G_C = G_C^d + (1-\phi)F = \left[g_c^d + (1-\phi)\varepsilon\right]Y \qquad (5b)$$

where $\varepsilon = \frac{F}{Y}$

$$G_I^d = g_I^d Y \quad \text{and} \quad G_C^d = g_c^d Y$$

From government's budget constraint, we can derive τY as following:

$$G_C + G_I = \tau Y + F + T$$

$$\Rightarrow \quad \tau Y = G_C + G_I - F - T$$

Now, we can re-write the private budget constraint:

$$\dot{K} = (1-\tau)Y - C - T = Y - \tau Y - C - T$$

and substitute for τY into $\dot{K}$

$$\dot{K} = Y - \left[G_C + G_I - F - T\right] - C - T$$

$$\Rightarrow \quad \dot{K} = Y - C - G_I - G_C + F \tag{6}$$

which gives us the resource constraint for the whole economy.

2.1. Scenario 1: Foreign Aid is not Fungible

The Hamiltonian function in this non-fungible aid scenario yields a balanced budget closed economy growth rate and the consumption-capital ratio in equilibrium as follows:

$$H = \frac{1}{\gamma}(CG_C^{\theta})^{\gamma} e^{-\beta t} + \lambda e^{-\beta t}\left[(1-\tau)Y - C - T - \dot{K}\right]$$

Substitute for $G_I = \left(g_I^d + \phi\varepsilon\right)Y$ into $Y = G_I^{\eta} K^{1-\eta}$ yields

$$Y = \left[(g_I^d + \phi\varepsilon)Y\right]^{\eta} K^{1-\eta} = (g_I^d + \phi\varepsilon)^{\eta} Y^{\eta} K^{1-\eta} \tag{7}$$

So, after the rearrangement, we can write the production function as $Y = (g_I^d + \phi\varepsilon)^{\frac{\eta}{1-\eta}} K$ and substitute into the Hamiltonian function:

$$H = \frac{1}{\gamma}(CG_C^{\theta})^{\gamma} e^{-\beta t} + \lambda e^{-\beta t}\left[(1-\tau)(g_I^d + \phi\varepsilon)^{\frac{\eta}{1-\eta}} K - C - T - \dot{K}\right] \tag{H.1}$$

First order individual representative household equilibrium conditions with respect to maximum principle and transversality condition are

$$\frac{\partial H}{\partial C} = 0 \quad \Rightarrow \quad C^{\gamma-1} G_C^{\theta\,\gamma} = \lambda \tag{H.1a}$$

$$\frac{\partial H}{\partial K} = \frac{\partial}{\partial t}\left(\frac{\partial H}{\partial \dot{K}}\right) \quad \Rightarrow \quad (1-\tau)(g_I^d + \phi\varepsilon)^{\frac{\eta}{1-\eta}} = \beta - \frac{\dot{\lambda}}{\lambda} \tag{H.1b}$$

$$\dot{K} = (1-\tau)G_I^{\eta}K^{1-\eta} - C - T \qquad \text{(H.1c)}$$

$$\lim_{t\to\infty} \lambda K e^{-\beta t} = 0 \qquad \text{(H.1d)}$$

Take (H1.a) and substitute for G_C

$C^{\gamma-1}G_C^{\theta\gamma} = \lambda$ where $G_C = \left[g_c^d + (1-\phi)\varepsilon\right]Y$ and $Y = (g_I^d + \phi\varepsilon)^{\frac{\eta}{1-\eta}}K$

$\Rightarrow \quad G_C = \left[g_c^d + (1-\phi)\varepsilon\right](g_I^d + \phi\varepsilon)^{\frac{\eta}{1-\eta}}K$

and

$$C^{\gamma-1}G_C^{\theta\gamma} = C^{\gamma-1}\left\{\left[g_c^d + (1-\phi)\varepsilon\right](g_I^d + \phi\varepsilon)^{\frac{\eta}{1-\eta}}K\right\}^{\theta\gamma}$$

$$= C^{\gamma-1}\left\{\left[g_c^d + (1-\phi)\varepsilon\right](g_I^d + \phi\varepsilon)^{\frac{\eta}{1-\eta}}\right\}^{\theta\gamma} K^{\theta\gamma}$$

Let $[X] = \left[g_c^d + (1-\phi)\varepsilon\right](g_I^d + \phi\varepsilon)^{\frac{\eta}{1-\eta}}$

So let's re-write (H1.a) as follows:

$$C^{\gamma-1}[X]^{\theta\gamma}K^{\theta\gamma} = \lambda$$

and differentiate with respect to time and get

$$(\gamma-1)C^{\gamma-2}\dot{C}[X]^{\theta\gamma}K^{\theta\gamma} + C^{\gamma-1}[X]^{\theta\gamma}\theta\gamma K^{\theta\gamma-1}\dot{K} = \dot{\lambda}$$

now divide both sides by λ :

$$\frac{(\gamma-1)C^{\gamma-2}\dot{C}[X]^{\theta\gamma}K^{\theta\gamma} + C^{\gamma-1}[X]^{\theta\gamma}\theta\gamma K^{\theta\gamma-1}\dot{K}}{C^{\gamma-1}[X]^{\theta\gamma}K^{\theta\gamma}} = \frac{\dot{\lambda}}{\lambda}$$

which yields:

$$(\gamma-1)\frac{\dot{C}}{C}+\theta\gamma\frac{\dot{K}}{K}=\frac{\dot{\lambda}}{\lambda}$$

In a closed economy, we must have a "balanced growth" equilibrium:

$$\frac{\dot{C}}{C}=\frac{\dot{K}}{K}=\frac{\dot{Y}}{Y}$$

$$\Rightarrow \quad [(\gamma-1)+\theta\gamma]\frac{\dot{K}}{K}=\frac{\dot{\lambda}}{\lambda} \quad \text{where} \quad \frac{\dot{\lambda}}{\lambda}=\beta-(1-\tau)(g_I^d+\phi\varepsilon)^{\frac{\eta}{1-\eta}} \quad \text{from (H1.b)}$$

this gives us economy's balanced growth rate:

$$\Psi=\frac{\dot{K}}{K}=\frac{(1-\tau)(g_I^d+\phi\varepsilon)^{\frac{\eta}{1-\eta}}-\beta}{1-\gamma(\theta+1)} \qquad (8)$$

Now take the private budget constraint:

$\dot{K}=Y-C-G_I-G_C+F$ and substitute for G_I and G_C

$$\dot{K}=Y-C-\left\{\left[g_I^d+\phi\varepsilon\right]Y+\left[g_c^d+(1-\phi)\varepsilon\right]Y\right\}+F \qquad \text{where} \qquad \varepsilon=\frac{F}{Y}$$

$$\dot{K}=Y-C-g_I^dY-\phi F-g_c^dY-F+\phi F+F$$
$$\Rightarrow \quad \dot{K}=Y-C-\left(g_I^d+g_c^d\right)Y=\left[1-g_I^d-g_c^d\right]Y-C$$

Let's divide each side by K as follows:

$$\frac{\dot{K}}{K}=\left[1-g_I^d-g_c^d\right]\frac{Y}{K}-\frac{C}{K}$$

Substitute for Y and $\frac{\dot{K}}{K}$

$$\frac{(1-\tau)(g_I^d+\phi\varepsilon)^{\frac{\eta}{1-\eta}}-\beta}{1-\gamma(\theta+1)}=\left(1-g_I^d-g_c^d\right)(g_I^d+\phi\varepsilon)^{\frac{\eta}{1-\eta}}-\frac{C}{K}$$

$$\Rightarrow \quad \frac{C}{K} = \frac{[1-\gamma(\theta+1)]\left(1-g_I^d-g_c^d\right)(g_I^d+\phi\varepsilon)^{\frac{\eta}{1-\eta}} - (1-\tau)(g_I^d+\phi\varepsilon)^{\frac{\eta}{1-\eta}} + \beta}{1-\gamma(\theta+1)}$$

which gives us the following consumption-capital ratio.

$$\frac{C}{K} = \mu = \frac{\left\{[1-\gamma(\theta+1)]\left(1-g_I^d-g_c^d\right)-(1-\tau)\right\}(g_I^d+\phi\varepsilon)^{\frac{\eta}{1-\eta}} + \beta}{1-\gamma(\theta+1)} \qquad (9)$$

The equilibrium growth rate and consumption-capital ratio's response to foreign aid shocks, ε, in the long run can be observed as follows[49]:

$$\frac{\partial\psi}{\partial\varepsilon} = \frac{\phi\eta(1-\tau)(g_I^d+\phi\varepsilon)^{\frac{2\eta-1}{1-\eta}}}{(1-\eta)[1-\gamma(1+\theta)]} > 0$$

$$\frac{\partial\mu}{\partial\varepsilon} = \frac{\phi\eta[\{1-\gamma(1+\theta)\}(1-g_I^d-g_c^d)-(1-\tau)](g_I^d+\phi\varepsilon)^{\frac{2\eta-1}{1-\eta}}}{(1-\eta)[1-\gamma(1+\theta)]} > 0$$

2.2. Scenario 2: Foreign Aid is Fungible

Hamiltonian function formed by the constraints in the fungible aid scenario is :

$$H = \frac{1}{\gamma}C^{\gamma}G_c^{\theta\,\gamma}e^{-\beta t} + \lambda_1 e^{-\beta t}\left[(1-\tau)G_I^{\eta}K^{1-\eta} - C - T - \dot{K}\right] + \lambda_2 e^{-\beta t}\left[G_c - \left(g_c^d + (1-\phi)\varepsilon\right)Y\right]$$

$$+ \lambda_3 e^{-\beta t}\left[G_I - (g_I^d + \phi\varepsilon)Y\right] + \lambda_4 e^{-\beta t}\left[\tau Y + F + T - G_c - G_I\right] \qquad (H.2)$$

First order equilibrium conditions with respect to maximum principle are:

$$\frac{\partial H}{\partial C} = 0 \quad \Rightarrow \quad C^{\gamma-1}G_c^{\theta\,\gamma} = \lambda_1 \qquad (H.2a)$$

[49] These results hold under the mild restrictions that $\gamma < 0$ and $[1-\gamma(1+\theta)] > (1-\tau)$

$$\frac{\partial H}{\partial G_I} = 0 \quad \Rightarrow \quad \eta\lambda_1(1-\tau)G_I^{\eta-1}K^{1-\eta} + \lambda_3 + \lambda_4 = 0 \qquad \text{(H.2b)}$$

$$\frac{\partial H}{\partial G_C} = 0 \quad \Rightarrow \quad \theta\, C^{\gamma} G_c^{\theta\ \gamma-1} + \lambda_2 - \lambda_4 = 0 \qquad \text{(H.2c)}$$

$$\frac{\partial H}{\partial \tau} = 0 \quad \Rightarrow \quad -\lambda_1 G_I^{\eta} K^{1-\eta} + \lambda_4 Y = 0 \qquad \text{(H.2d)}$$

$$\frac{\partial H}{\partial g_c^d} = 0 \quad \Rightarrow \quad -\lambda_2 = 0 \qquad \text{(H.2e)}$$

$$\frac{\partial H}{\partial g_I^d} = 0 \quad \Rightarrow \quad -\lambda_3 = 0 \qquad \text{(H.2f)}$$

From first order conditions we get the followings:

$\lambda_2 = \lambda_3 = 0$
$\lambda_1 = \lambda_4$

Take H2.b and substitute for G_I

$$\eta\lambda_1(1-\tau)\left[(g_I^d + \phi\varepsilon)(g_I^d + \phi\varepsilon)^{\frac{\eta}{1-\eta}} K\right]^{\eta-1} K^{1-\eta} - \lambda_1 = 0$$

$$\eta(1-\tau)\,(g_I^d + \phi\varepsilon)^{1-\gamma}(g_I^d + \phi\varepsilon)^{\frac{\eta(\eta-1)}{1-\eta}} K^{\eta-1} K^{1-\eta} = 1$$

$$\eta(1-\tau)\,(g_I^d + \phi\varepsilon)^{-1} = 1$$

$$\eta(1-\tau) = (g_I^d + \phi\varepsilon)$$

$$g_I^d = \eta(1-\tau) - \phi\varepsilon \qquad \text{(10)}$$

Substitute for G_C into H2.a

$$C^{\gamma-1}\left\{\left[g_c^d + (1-\phi)\varepsilon\right](g_I^d + \phi\varepsilon)\right]^{\frac{\eta}{1-\eta}} K\Big\}^{\theta\gamma} = \lambda_1$$

From H2.c we also know $\lambda_1 = \theta\, C^{\gamma} G_C^{\theta\ \gamma-1}$. Substitute for G_C into H2.c

$$\theta C^{\gamma}\left\{\left[g_c^d+(1-\phi)\varepsilon\right]g_I^d+\phi\varepsilon)\right]^{\frac{\eta}{1-\eta}}K\right\}^{\theta\gamma-1}=\lambda_1$$

Let $[Z]=\left[g_c^d+(1-\phi)\varepsilon\right]g_I^d+\phi\varepsilon)\right]^{\frac{\eta}{1-\eta}}$

$$C^{\gamma-1}[Z]^{\theta\gamma}K^{\theta\gamma}=\theta C^{\gamma}[Z]^{\theta\gamma-1}K^{\theta\gamma-1}$$

Divide both sides with $C^{\gamma-1}[Z]^{\theta\gamma}K^{\theta\gamma}$ and get

$$C^{-1}=\theta[Z]^{-1}K^{-1}$$
$$C=\theta^{-1}[Z]K$$
$$\frac{C}{K}=\theta^{-1}[Z]$$

Since the individual representative household's decision for consumption-capital ratio is exogenous for the government, to solve this equation, $\frac{C}{K}$ will be incorporated into equation $\frac{C}{K}=\theta^{-1}[Z]$ as in (9). After solving $\frac{C}{K}=\theta^{-1}[Z]$, the optimal values of g_c^d and g_I^d are given by the following equations:

$$\hat{g}_I^d=(1-\tau)\eta-\phi\varepsilon$$
$$\hat{g}_c^d=\frac{\left(\gamma\phi-\theta\phi-\gamma\theta-\phi+1+2\gamma\theta\phi-\gamma+\gamma\theta^2\phi\right)\varepsilon}{(\theta+1)(-1+\gamma\theta+\gamma)}$$

$$+\frac{-\gamma\theta\eta-\gamma\theta^2\eta-\theta\eta\tau+\gamma\theta-\left[-\eta(-1-\tau)\right]^{\left(\frac{\eta}{-1+\eta}\right)}\theta\beta+\gamma\theta\eta\tau+\gamma\theta^2+\theta\eta-\theta\tau+\gamma\theta^2\eta\tau}{(\theta+1)(-1+\gamma\theta+\gamma)}$$

$$=\frac{(\theta\phi+\phi-1)\varepsilon}{\theta+1}+\frac{\theta\left[\gamma(\theta+1)-\beta\{\eta(1-\tau)\}^{\frac{\eta}{\eta-1}}-\tau\right]}{(\theta+1)\left[\gamma(\theta+1)-1\right]}$$

$$\hat{g}_c^d = \frac{1}{\theta+1}\left\{\frac{\theta\left[\gamma(\theta+1)-\beta\{\eta(1-\tau)\}^{\frac{\eta}{\eta-1}}-\tau\right]}{\gamma(\theta+1)-1}+\left[\phi(\theta+1)-1\right]\varepsilon\right\} \qquad (11)$$

The respond for the aid shocks:

$$\frac{\partial \hat{g}_I^d}{\partial \varepsilon} = -\phi < 0$$

$$\frac{\partial \hat{g}_c^d}{\partial \varepsilon} = \phi - \frac{1}{\theta+1}$$

The total government expenditure (including both domestic revenue and foreign aid) responds to the foreign aid shocks:

$$\overline{g} = \hat{g}_I^d + \hat{g}_c^d + \varepsilon \text{ and } \frac{\partial \overline{g}}{\partial \varepsilon} = -\phi + \phi - \frac{1}{\theta+1} + 1 = \frac{\theta}{\theta+1} < 1 \qquad (12)$$

Now that $\hat{g}_c^d$ and $\hat{g}_I^d$ are known in the case of foreign aid fungibility, we can substitute for g_I^d into equation (8) and get the growth rate of the economy,

$$\widetilde{\psi} = \frac{(1-\tau)[(1-\tau)\eta]^{\frac{\eta}{1-\eta}} - \beta}{1-\gamma(1+\theta)} \qquad (13)$$

It is very straightforward from the equation that aid does not appear in the equilibrium growth rate which implies that it has no effect in the long run economic growth i.e. $\frac{\partial \widetilde{\psi}}{\partial \varepsilon} = 0$.

APPENDIX D

Timing of the stock market liberalizations and the privatizations for the subsample of liberalized countries

The table presents the official equity market liberalization dates for all the countries that liberalize their stock markets in the period from 1980 to 2000 as well as dates for the first privatization of a state owned enterprise (SOE), and the first Share Issue Privatization (SIP). The last column presents the country's legal origin.

Country	Official lib.	First SOE priv.	First SIP	Legal origin
Argentina	1989	1990	1991	French
Bangladesh	1991	1994		English
Botswana	1990			English
Brazil	1991	1988	1995	French
Chile	1992	1988	1998	French
Colombia	1991	1991	1998	French
Cote d'Ivoire	1995	1995	1998	French
Ecuador	1994	1993	1995	French
Egypt, Arab Rep.	1992	1993	1993	French
Ghana	1993	1994	1994	English
India	1992	1991	1993	English
Indonesia	1989	1994	1991	French
Israel	1993	1986	1987	English
Jamaica	1991	1986		English
Jordan	1995	1995	2002	French
Kenya	1995	1986	1986	English
Korea, Rep.	1992	1989	1989	German
Malaysia	1988	1985	1985	English
Malta	1992	1998		English
Mauritius	1994	2000		French
Mexico	1989	1988	1991	French
Morocco	1988	1993	1993	French
Nigeria	1995	1989	1989	English
Oman	1999	1992	2004	French
Pakistan	1991	1990	1992	English
Peru	1992	1991	1994	French
Philippines	1991	1989	1991	French
Saudi Arabia	1999	1994	2002	English
South Africa	1996	1988	1988	English
Sri Lanka	1991	1989	1991	English
Thailand	1987	1988	1989	English
Trinidad and Tobago	1997	1993		English
Tunisia	1995	1995	1995	French
Turkey	1989	1988	1993	French
Venezuela, RB	1990	1990	1996	French
Zimbabwe	1993	1994	1997	English

APPENDIX E

Timing of the privatizations for the subsample of non-liberalized countries

The table presents the official equity market liberalization dates for the closest neighbors of the countries that did not liberalize their stock markets in the period from 1980 to 2000 as well as dates for the first privatization of a state owned enterprise (SOE), and the first Share Issue Privatization (SIP). The last column presents the country's legal origin.

Country	Neighbor's Off. lib	First SOE priv.	First SIP	Legal origin
Algeria	1988	1998		French
Barbados	1997	1992		English
Benin	1995	1994		French
Burkina Faso	1993	1994		French
Cameroon	1995	1996		French
Central African Republic	1995			French
Chad	1995	1999		French
Congo, Rep.	1995	1996		French
Costa Rica	1991	1994		French
Dominican Republic	1991	1999		French
El Salvador	1989	1998		French
Fiji	1987	1990		English
Gabon	1995	1998	1998	French
Guatemala	1989	1997		French
Guyana	1990	1991		English
Haiti	1991	1992		French
Honduras	1989	1994	1999	French
Iran, Islamic Rep.	1999	1995		French
Kuwait	1999	1994	1995	French
Lesotho	1996	1999		English
Madagascar	1996	1999		French
Malawi	1993	1996		English
Mali	1995	1996		French
Nepal	1992	1992		English
Nicaragua	1991	1994		French
Paraguay	1989	1994		French
Rwanda	1995	1997		French
Senegal	1995	1997	1997	French
Sierra Leone	1995	1997		English
Swaziland	1996			English
Syrian Arab Republic	1995			French
Togo	1993	1997		French
Uruguay	1989	1990	1993	French
Zambia	1993	1993	1995	English