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ESSAYS ON FOREIGN AID AND GOVERNMENT SPENDING AND TAX EFFORT

BY

LEANORA ALECIA BROWN

A Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree

of

Doctor of Philosophy

in the

Andrew Young School of Policy Studies

of

Georgia State University

GEORGIA STATE UNIVERSITY

2012

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LEANORA ALECIA BROWN

2012

ACCEPTANCE

This dissertation was prepared under the direction of the candidate's Dissertation Committee. It has been approved and accepted by all members of that committee, and it has been accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Economics in the Andrew Young School of Policy Studies of Georgia State University.

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ABSTRACT

ESSAYS ON FOREIGN AID AND GOVERNMENT SPENDING AND TAX EFFORT

By

LEANORA ALECIA BROWN

AUGUST 2012

Committee Chair: Dr. Jorge Martinez-Vazquez

Major Department: Economics

This dissertation comprises two essays that attempt to determine, empirically, the fiscal response of governments' to international assistance. The first essay examines whether an increasingly popular recommendation in international aid policy to switch from tied foreign assistance to untied foreign assistance affects investment in critical development expenditure sectors by developing countries. In the past, most international aid has been in the form of tied assistance as donors believed that tying aid will improve its effectiveness. It has been argued, that if tied aid is well designed and effectively managed then its overall effectiveness can be improved. On the contrary, it is also believed that tied aid acts as an impediment to donor cooperation and the building of partnership with developing countries. In addition, it is also argued that it removes the 'feeling' of ownership and responsibility of projects from partner countries in aid supported development. Two other more popular arguments used to challenge the effectiveness of foreign aid is that it is compromised when tied to the goods and services of the donor countries because almost 30 percent of its value is eliminated and also because it does not allow recipient countries to act on their priorities for public spending.

These problems bring into question whether tied aid is truly the most effective way to help poor countries. A recommendation by the international community is that a switch to untied aid would be necessary. With untied aid, the recipient country is not obligated to buy the goods of the donor country neither is it compelled to pursue the public expenditure priorities of donors. Instead with untied aid they will have greater flexibility over spending decisions and can more easily pursue the priorities of their countries as they see fit. Hence, one could expect that a one dollar increase in untied aid will increase spending in the critical priority sectors by more than a one dollar increase in tied assistance. The question therefore is whether national domestic priorities coincide or not with what the international community has traditionally deemed should be priority. Empirically, we test this prediction using country-by-country data for 57 countries for the period 1973 to 2006. The results suggest that on average untied aid has a greater impact on pro-poor spending than do tied aid. In addition, the results also suggest that fungibility is still an issue even after accounting for the effects of untied aid. However, one could argue that fungibility may not be as bad as it appears since the switch to untied aid improves spending in the sectors that are essential for growth and development.

The second essay explores the hypothesis that the expectations of debt forgiveness can discourage developing countries from attaining fiscal independence through an improvement of their tax effort. On the one hand, the international financial community typically advises poor countries to improve revenue mobilization but, on the other hand, the same international community routinely continues to bail-out poor countries that fail to meet their loan repayment obligations. The act of bailing-out these countries creates an expectation on the part of developing country governments that they

will receive debt forgiveness time and again in the future. Therefore, the expectation of future bail outs creates a moral hazard that leads to endemic lower tax efforts. The key prediction of our simple theoretical model is that in the presence of debt forgiveness, tax ratios will decline and this decline will be stronger the higher the frequency and intensity of the bailouts. Empirically, we test this prediction using country-level data for 66 countries for the period 1989 to 2006. The results strongly suggest that debt forgiveness plays a significant role in the low tax effort observed in developing countries. Our empirical model allows for the endogeneity of tax effort and debt forgiveness. Interestingly we find that more debt forgiveness is actually provided to countries with lower tax effort. The results are robust to various specifications.

INTRODUCTION

An ongoing debate taking place at the international political level, as well as among bilateral and multilateral donors is the need for a drastic increase in the amount of aid reaching developing countries. This need for 'more aid' is justified on the grounds that it will help developing countries, including the least hopeful African ones; achieve some level of targeted growth and development. In this dissertation I highlight the importance of the 'form' of this increased aid as a crucial determinant of how effective it will be in assisting poor countries achieve social and economic progress. The ubiquitous argument among those in the international financing community is that more aid should be disbursed in the form of untied aid as opposed to the more commonly used tied aid or categorical aid. The decision to move towards untied aid is fuelled by the idea that this type of aid allows for greater flexibility in spending decisions since it neither obligates the recipient to buy the products of the donor nor does it require them to spend it according to the priorities of these donor.

While it is recognized that an increased amount of aid is what will be needed to assist these countries, it is also important to recognize that 'more aid' can sometimes have detrimental effects on a country. Increasing amounts of aid means a greater debt burden for the recipient country. This increased debt burden often proves to be too onerous for some, if not all of these countries and as such they may face extreme difficulty trying to keep-up with debt servicing costs. More often than not these countries must be forgiven these debts to help them break from the vicious cycle of poverty in which they find themselves. Needless to say, this situation fosters an expectation, on the part of recipient governments' that debt forgiveness may be received time and again in

the future. This expectation can in turn induce a moral hazard problem whereby indebted poor countries have little or no incentive to increase their own tax effort to repay loans and provide critical social services. Therefore, an overarching issue in this dissertation is that this increased aid disbursement to developing countries could require more and more debt forgiveness which could subsequently give rise to an endemic lower tax effort among these countries.

This dissertation comprises two essays that attempt to address the issues raised above. The essays are inextricably linked by the concepts of 'aid, fungibility and tax effort.' The first essay seeks to determine, empirically, whether the switch from tied to untied aid will increase expenditure in areas most beneficial to the lowest income group within a country. Further to this investigation, I also analyze whether this change in the composition of foreign aid changes the extent or degree of fungibility. From the existing literature, it is gleaned that the effectiveness of tied aid is compromised by either the extent of fungibility or the above average price that must be paid for the products or services of donor countries to which the aid monies are tied.

Therefore, with the recent thrust by the international community to move away from tied aid and towards issuing more untied aid, it now becomes imperative that we take account of the influence of untied aid not only on public expenditures but also on the overall extent of fungibility. Due to data limitation issues, public expenditures are grouped into two broad categories, namely: the 'pro-poor expenditure'[1] category and the

[1] Pro-poor expenditure is a general category of expenditures that include spending in areas such as education, health and housing & community amenities. I aggregated these categories because of data limitation in the individual expenditure categories. This categorization is previously used by Gomanee et al. (2005). They argue that spending in these sectors will likely be more beneficial to individuals in the poorest income group as such they refer to this group as pro-poor spending.

‘other expenditure’[2] category. The analysis is carried out using 57 countries; however, the estimation is done on a country-by-country basis. This approach is implemented for two main reasons. First, the way fungibility is defined in the first essay requires that we compute the beta estimate of untied aid on expenditure categories and subsequently include these estimates in the fungibility measure. Second, this approach is justified on the basis that we are now able to compare fungibility estimates found in this essay with those found in other papers.

Therefore, the key contribution of this essay is to include a measure of untied aid in the empirical analysis to ascertain whether the standard of living of the lowest income group tend to improve as a result of more untied aid. In addition, an interest is also there to see how this potential switch affects the overall extent of fungibility given that recipient governments now have greater leeway and freedom to spend ‘legally’ fungible funds (that is, the untied aid monies) according to their own national priorities and not according to the priorities or ‘special enthusiasms’ of the donors.

The empirical technique utilized in this essay is seemingly unrelated regressions (SUR) which allows for the heterogeneous character of aid to investigate whether recipient governments behave differently depending on whether they receive tied or untied aid. Interestingly, a few of the countries in my sample experience increased expenditures as a result of the inflow of ‘unattached funds’ and the magnitude of these estimates are sometimes larger than the estimates observed for tied aid. Still, there are countries for which a negative impact of untied aid is observed indicating that not only

[2] Other expenditure is another general category of expenditures that include spending in areas such as general public service, public order and safety, recreational, cultural and religious affairs and services and economic affairs and services. I use a similar rationale to aggregate the data in one group called ‘other expenditure’ category.

did the recipient government not spend any of the 'free money' in the sectors apt to benefit the lowest income groups but they even reduce their own spending in these sectors. Finally, I incorporate the country-specific estimates for untied aid in the fungibility measure. There is evidence of smaller fungibility estimates for some of the countries in the sample.

The second essay is an attempt to get a better understanding of whether the type of aid flow –in this case, debt forgiveness – interacts with a developing country tax effort in a perverse way that could result in a compromise of the fiscal landscape in that country. A lot of empirical work has been done that attempts to identify different factors[3] that could possibly explain the endemic lower tax effort witnessed among these countries. While these factors seem to provide some explanation for the low tax effort observed, there are no studies that investigate to what extent the otherwise well-intentioned actions of the international financial community can be an important cause of the low tax effort observed among developing countries.

Therefore, the objective of this second essay is twofold. First, we want to determine whether the expectation of debt forgiveness actually discourage developing countries from attaining fiscal space through an improvement of their tax effort. And second, because of the possibility of reverse causation, I also want to determine whether countries with lower tax ratios are provided with more debt forgiveness. This analysis is done at a macro level using cross country panel data.

The key prediction of our simple theoretical model is that in the presence of debt forgiveness, tax ratios will decline and this decline will be stronger the higher the

[3] Previous studies include other factors such as corruption, governance, tax rates, income inequality, external debt, loans, grants and administrative factors among others as possible explanation for the low tax effort observed.

frequency and intensity of the bailouts. To test this hypothesis, we use a country level dataset of debt forgiveness derived as the accumulated stock of debt forgiven which does not include the amounts for either debt buybacks or debt swaps, which in effect are just debt relief.[4] We argue that the expectations of debt forgiveness could generate a moral hazard situation that could ultimately discourage developing country governments from improving their tax collection efforts, and hence lowering their tax ratios.

Our empirical model allows for the endogeneity of both tax effort and debt forgiveness. Three different methods are used to test the hypotheses in this essay, namely: two-stage-least-squares (2SLS), generalized method of moments (GMM) and quasi-maximum likelihood estimation. It is important to highlight here that while these three methods are testing different specifications of the model, they are all employed to address shortcomings encountered with each individually. Interestingly, all three methods reveal that more debt forgiveness is actually provided to countries with lower tax effort. We theorize that this 'negative' effect of debt forgiveness on tax ratios is possible, especially in light of the fact that a 'one-off' round of debt forgiveness could trigger expectations that more forgiveness will be received time and again in the future. Therefore, not having these loan repayment obligations could mean that government officials in these countries have little or no incentive to improve the current tax system to collect adequate amounts of revenue or increase their current intake. We also hypothesize that the international financing community may be perpetuating this low tax ratio

[4] In the literature, debt relief and debt forgiveness are sometimes used interchangeably. There are other instances where debt relief is defined to include debt forgiveness (which represents a real reduction in the stock of outstanding debt) along with debt buyback, debt for equity swaps or other rescheduling schemes. These latter two, however, do not reduce the overall debt stock but is just a mere deferment of repayment obligations which must ultimately be honored at a later agreed upon date. Alesina and Weder (2002) is one such study that defines ''debt relief'' to include both debt forgiveness and debt rescheduling. Still, there are some studies that treat debt relief as a different variable from debt forgiveness (Neumayer, 2002; Ndikumana, 2004; Bird and Powell, 2010).

situation by continuously providing debt forgiveness to countries with lower tax effort. And as suspected, we find evidence in support of this hypothesis.

ESSAY 1

FUNGIBILITY AND THE IMPACT OF UNTIED DEVELOPMENT ASSISTANCE: EVIDENCE FROM 57 COUNTRIES

"*Rich countries pursue their own fixations and fads….They tie aid so that it can only be used to buy the donor's own products or services – effectively reducing the value of aid by as much as 30 percent*…" Tony Blair's Commission for Africa (2005, p.58)

Introduction

With the 2015 deadline for the achievement of the Millennium Development Goals (MDGs) fast approaching and progress towards achieving these goals being at best uneven, international organizations have recognized the need to scale-up assistance to developing countries by providing additional financing. The provision of this additional assistance caused ODA flows to developing countries to more than double between 1990 and 2005. ODA flows stood at approximately $38 billion (in USD) in 1990 and increased to just over $82 billion (in USD) in 2005, a more that 100 percent increase.[5] The International Conference on Financing for Development in Monterrey in March 2002 was one such initiative responsible for the dramatic increase in international aid, which continued with other initiatives, namely, the UN Millennium Project Report (2005) and the Report for the Commission of Africa (2005).

The Monterrey consensus in particular, sought to revamp the aid agenda since there was ubiquitous agreement that more aid to developing countries was needed to meet the Millennium Development Goals. One of the conditions for increasing aid flows was

[5] See http://stats.oecd.org/

that progress needs to be made on the "aid effectiveness"[6] front. However, after 40 years of development aid, the majority of evidence still indicates a failure of foreign aid to achieve the targeted growth and development outcomes.

For many years, a large percentage of development aid has been tied aid. There are typically two aspects to tied aid: first, the use of funds for specific purposes and second, that the funds are used for goods and services provided by the donor. In recent times the 'idea' of tied aid has not been well received by aid recipients or within the international community. Two often cited problems with tied aid are that it tends to be very fungible[7] anyway when it is earmarked for a specific purpose and that it attracts a hefty mark-up on the price of the goods and services sold to the recipients of this type of aid. It is widely argued that these abovementioned problems may be partially responsible for the inferior results observed in the literature *vis-à-vis* untied aid. Further, it is also the belief that tied aid acts as both an impediment to donor cooperation and the building of partnerships with developing countries. In addition, tied aid is said to have removed the 'feeling' of ownership and responsibility of 'projects' from partner countries in aid supported development as well as to hamper the broader efforts of promoting their integration into the global economy (ODI, 2008).

It is against this background that tied aid has become the less popular and presumably the less effective means of delivering development assistance to recipient

[6] Aid effectiveness is the effectiveness of development aid in achieving economic or human development. According to Quartey (2005), the effectiveness of aid is defined in terms of aid's contribution to poverty alleviation or sustained poverty reduction. Another view of aid effectiveness is that, if it is used as intended then it should contribute to sustained economic growth in the recipient countries. However, Burnside and Dollar (2000), argued that the only way for foreign assistance to contribute to the growth successes of recipient economies is if these economies have a 'good policy' environment to effectively absorb the aid moneys.

[7] Fungibility is the situation in which the aid–recipient government reduces its own resources from the sector which receives aid and channels them to other sectors of the budget. Fungibility arises because the objectives or preferences of the donors differ from those of the recipient.

governments. As a result of this dissatisfaction, the DAC-OECD committee has come to use more untied aid. The problem here is not fungibility per se any longer because untied aid is precisely that, it is legally fungible. Now, beyond the old question of fungibility**,** the issue has become whether the change in the composition of international aid from tied to untied aid has been effective in achieving the targeted growth and development outcomes. In particular, the question has become whether untied aid has been more effective in sustaining or increasing expenditures in the particular critical sectors that are generally thought can lead to growth and development.

The effect of using untied aid as opposed to tied aid in particular development sectors is of chief importance to both policymakers and researchers alike. The interest in this issue stems from the fact that the budgetary impact of untied foreign aid must be understood before any final assessment concerning its effectiveness can be determined. It is postulated that untied aid allows for greater flexibility in spending decisions made by recipient governments which is not the case with tied aid. The DAC Recommendations therefore provide the unique opportunity for such a study to be undertaken since donor countries has already untied over four fifths (82%) of their ODA to LDCs, against a 60 percent benchmark for untying bilateral aid (ODI, 2008). Also, the extent of untying of bilateral aid to LDCs was substantially greater than for non-LDCs (70%). If (untied) multilateral aid is taken into account, then 85 percent of all ODA was untied in 2006.

Needless to say, the effectiveness of untied foreign assistance hinges on how the recipient governments spend this money. Since most of these inflows go to the public sector of recipient countries, any understanding of aid's broader macroeconomic impacts must extend beyond an understanding of the impact of categorical aid on categorical

expenditure. This extension must include an understanding of the effects of using untied aid on specific public expenditures. However, a review of the literature on untied aid shows that there has been little formal investigation of the impact of untying (non-sector specific aid). This can be explained firstly by the fact that before the mid-1990s more than 50 percent of aid was tied and secondly because donor countries failed to report consistently the disbursement of untied aid.[8] Therefore, it is both understandable and appropriate, that a large body of the existing empirical literature focused on the relationship between sectoral aid inflows and spending in those sectors so targeted by aid donors. Also, from this empirical literature one can unambiguously conclude that aid is sometimes not used in the sector for which it was granted (such as health or education), and donors end up financing something completely different than intended (such as military expenditures). In this sense recipients are said to have been '*funging*' foreign aid.

The contribution of this paper to the existing literature is as follows: firstly, I will assess the effectiveness of untied aid versus tied aid in increasing spending in the pro-poor and 'other' expenditure categories of the recipient economies. I will do so by exploring the budgetary response of recipient governments to both tied and untied foreign assistance. The main rationale for taking into account these two different components of aid is that they have different 'strings' attached to them. Indeed, tied aid is earmarked for specific sectors and recipient governments have little flexibility in deciding how these funds must be used. In contrast, untied aid allows for greater flexibility in spending decisions since it neither obligates the recipient to buy the products of the donor nor does it require them to spend it according to the wishes of the donor. To test whether untied aid and tied aid affect differently the behavior of the government, I utilize a seemingly

[8] See (ODI, 2008) - Tied Aid disciplines: LDCs 50% concessionality; others 35% concessionality.

unrelated regression (SUR) model, with separate accounting for the heterogeneous characteristics of aid. Secondly, I contribute to the foreign aid effectiveness and fungibility literature through investigating the impact of untied aid on sector specific categories of expenditure that some years back were the specific focus of tied aid.

The remainder of this essay is organized as follows. In section two I present a review of the literature. A simple theoretical model of fungibility is presented in section three followed by the empirical model and a description of the data in sections four and five respectively. In section six I will present the results and finally section seven concludes the paper with a summary of key findings and policy implications emanating from the results.

Literature Review

The Effects of Untied Aid

The 2001 DAC Recommendation led to extensive untying of ODA. Prior to this period, the larger proportion of aid was either tied to specific development expenditure sectors which donors were willing to finance [Hendra, 1987; Pack and Pack, 1993; Khilji and Zampelli, 1994; Pettersson, 2007; van de Walle and Mu, 2007; and Wagstaff, 2011] or tied to the exports of donor countries [Baffour, 1999; Arvin, Cater and Choudhry, 2000; Svensson, 1999; Quartey 2005]. Thus, much of the earlier literature focused on the consequences of sector-specific aid and/or aid tied to donors' export. The empirical literature on untied aid, in contrast is sparse.

Of the few studies that examine the impact of untied aid on recipient countries, the focus is mainly on the welfare effects of this transfer (e.g Chatterjee and Turnovsky,

2004; Michael and van Marewijk, 1998; Chatterjee et al., 2003; Chatterjee and Turnovsky, 2007). These analyses conclude that under 'plausible conditions', untied aid benefits the recipient and the world economy more than tied aid. Also, the few studies carried out seem to have focused on the impact of untying from the donor's perspective rather than the recipient's perspective.

Michael and van Marewijk (1998) is one of the few studies that examines the issue of untying from both the donor's and the recipient's perspective. They examine the welfare effects of tied aid versus untied aid on the transfer of capital from donor governments to recipient governments. This analysis was done for individual countries as well as for a panel of countries. They find that the individual countries in their sample enjoy higher benefits when aid is untied than when it is tied, providing that the rental rates of capital are the same in both countries. In addition to this, they also find that a transfer of aid tied to intersectorally mobile capital is worse than untied aid. A similar study conducted by Chatterjee et al. (2003) reveals findings that somewhat supports the findings of Michael and van Marewijk (1998). They find that a permanent pure or untied transfer is always welfare improving, while a tied transfer is welfare deteriorating and is particularly harmful if it involves domestic co-financing. A later study by Chatterjee and Turnovsky (2004) examine the impact of untied transfer versus tied transfer on consumption, leisure and debt reduction. They conclude that untied transfer is initially applied primarily to debt reduction, which allows an immediate substantial increase in consumption, increasing the marginal utility of leisure, and thus inducing an immediate sharp reduction in labor supply. Hence it is shown that untied transfers results in a more

uniform increase in consumption and leisure, resulting in an almost constant improvement in welfare.

The debate over the effectiveness of sector specific aid versus general aid has also given rise to a normative literature based on case studies. For example, Quartey (2005) sees budgetary support as a way to overcome the problems of tied aid. He argues that tying aid to goods and services supplied exclusively by donor country businesses or agencies will not benefit the poor in the recipient country, since such tying is seen as a way of pursuing the commercial self-interests of the donor. He argues that aid can be designed in many ways to pursue the commercial objectives of donors; one pervasive means is the insistence on donor country products. Further, he argues that aid recipients would agree that tied aid is costly; it distorts agreed priorities, burdens governments with ever-increasing recurrent local costs and invites corruption. For example, in the case of Ghana, Baffour (1999) estimated the price differentials between aid imports and non-aid imports at an average cost of US$40 million per year during the 1990-1997 period. Another problem with tied aid, according to Quartey (2005), is that it does not strengthen local capacity because service contracts are usually single-sourced and do not involve local contractors. Svensson (1999) also provides a similar argument against the use of tied aid to ‘advance’ a recipient countries economic and social agenda. Hendra (1987) contrasts Canada’s bilateral development assistance (highly tied) with Scandinavian practices (more untied) and highlights the superiority of the latter.

Other studies that focus on the use of tied aid versus untied aid offer some useful insights on the growth potential of the latter. Miquel-Florensa (2007) evaluates the differential effects of tied and untied aid on growth using a panel of 70 developing

countries for the period 1970-1997. He concludes that aid effectiveness is not significantly different for these two types of aid. However, when he conditioned aid on policies he finds that untied aid has a greater impact on growth than does tied aid.

Another strand of this literature focuses on the effect of untied assistance on donor country exports. Arvin, Cater and Choudhry (2000) examine this relationship using German aid figures to 85 developing countries for the period 1973-1995. They argue that the provision of untied aid, through the generation of goodwill, may result in increased donor exports to the recipient. The results for the full sample suggest that German untied aid has a positive causal impact on its exports to LDCs. This result offers support for their goodwill hypothesis that German untied assistance creates goodwill and promotes exports in a manner analogous to how a firm creates goodwill and generates sales through advertising.

In conclusion, the review of the literature on untied aid broadly shows that there has been little formal investigation on whether untied aid is more effective in increasing spending in particular sectors and in obtaining certain outcomes. Studies differ in scope, coverage and methodology and findings cannot be generalized. Therefore, more empirical study is needed in order to draw some conclusions, especially with respect to the impact of untying of aid on how funds are spent through the government budget.

The Effects of Tied Aid

The group of studies that examine the impact of categorical foreign aid on public expenditures report results that are mixed with respect to targeting. For example, Pack and Pack (1990) in their study of Dominican Republic find that total expenditures

increase by less than the aid amount.[9] This is evidence that categorical foreign aid is indeed fungible. Interestingly however, Pack and Pack (1993) after conducting a similar analysis in Indonesia, find that total expenditures increases by more than the total amount of aid directed at the public expenditure sectors: a different result than in Dominican Republic. Now, a question of interest is what makes aid more fungible in one country than in another country? Pack and Pack argue that evidence of aid fungibility in Dominican Republic is explained by the fiscal picture in that country. The more important is foreign aid as a source of public revenues, the greater the ability of donors to monitor changes in expenditure and therefore the more likely are the recipient's expenditures to reflect donor intentions. In the Dominican Republic, foreign aid, on average over the observed period, was about 1 percent of GDP, while foreign aid represented about 4 percent of Indonesia's Gross Domestic Product.

Cashel-Cordo and Craig (1990) using pooled time-series cross-section data for a sample of 46 countries for the period 1975-1983 also find an ambiguous effect of foreign aid on public expenditures. They find that aid that are provided at rates closer to market rates results in a less than one dollar increase in non-defense non debt public expenditure. Specifically, these loans are referred to as hard loans. On the other hand, loans provided at highly concessional rates seem to have increased expenditures by more than one dollar. These loans are referred to as soft loans. Instead of focusing only on the effects of multilateral foreign aid, Cashel-Cordo et al. (1990) also test whether bilateral loans and

[9] Pack and Pack [1990; 1993] also attempt to account for the sectoral impacts of foreign aid on respective public expenditure sectors. They find that fungibility does not affect some expenditure categories while it affects others. Particularly, they find that the calculated change in development expenditures in health, education and social services is greater than the amount of aid allocated to those sectors in Dominican Republic. Also, in a later study on Indonesia, they find evidence of non-fungibility of foreign aid in Industry, mining and electric power and the transportation and tourism sectors in that country.

grants that are tied to particular expenditure categories have any effect on public expenditure.[10] They find that ODA bilateral loans and bilateral grants from DAC countries have no significant effect on the public sector budget.[11]

Extending the line of research on the impact of foreign aid on government expenditures, Pettersson (2007), van de Walle and Mu (2007), Wagstaff (2009) and Khilji and Zampelli (1994) examine, in particular, the effects of categorical foreign aid on categorical public spending. Using a panel of 57 developing countries from 1973 to 2006, Pettersson (2007) attempts to identify whether sectoral aid is spent in the targeted sector. He finds evidence of substantial diversion of sectoral aid away from the targeted sectors. Likewise, Khilji and Zampelli (1994) study how military and non-military foreign aid from a specific donor institution affect the allocation of spending in those sectors for 8 recipient countries over the period 1972-1987. While the results strongly suggest that both military assistance and non-military assistance are fungible, there is substantially less fungibility of non-military aid than of military aid. The evidence of sectoral aid fungibility is also confirmed in a study by van de Walle and Mu (2007). They use commune- level data to test whether aid donated towards road rehabilitation in Vietnam was actually spent in that sector. They find that less than the targeted amount was spent rehabilitating the road network in that country. Also, Wagstaff (2009) studies the issue of fungibility of sectoral aid in the healthcare sector in Vietnam. He uses commune level data for 1997 and 2003 and show that this type of aid is apparently not

[10] One explanation given for this result is that bilateral aid provided by the DAC countries is seen primarily to be an alternative source of financing for the LDCs and as such has little impact on expenditure.
[11] This result is explained by the idea that the entire grant amount is basically used to replace other sources of public revenue and so is returned by the recipient to the private sector. Cashel-Cordo and Craig (1990) argue that the only difference between bilateral loans and grants is that loans replace other borrowing, while grants replace internal taxes.

fungible between Vietnam's healthcare sectors and others sectors, but is fungible across provinces within the healthcare sector.

A burgeoning literature on the specific effects of tied concessional loans was later developed. Feyzioglu, Swaroop and Zhu (1998) using a panel data set of 38 developing countries and data on net disbursement of concessional loans from both bilateral and multilateral sources, examine the extent of fungibility across sectors in these countries. They find that in their sample of countries, concessional loans are far more stimulative of total government expenditures than do total foreign aid, though they increase by less than one dollar. This result was also confirmed in a sub-sample of 14 of these 38 countries but with a greater impact. They find that total government expenditure increase by more than a dollar increase in net disbursement of concessional loans. [12] Hence, the results based on these samples of countries are mixed: fungible in the sample of the 38 countries and non-fungible for the sample of 14 countries. The impact of concessional loans across expenditure sectors was also studied by Devarajan, Rajkumar and Swaroop (2000). They examine this issue in a sample of 18 sub-saharan African countries for the period 1971 to 1995. They find evidence of non-funbility of concessional loans in some sectors, and argue that the matching requirements in those sectors allows for lower chance of diversion of funds away from them.

From these studies it is observed that foreign aid is fungible in some countries and some sectors but not in others. The review of the literature on tied aid broadly shows that this type of aid has not been very effective in achieving some of its stated goals. There have been problems with fungibility and an overall dissatisfaction with its overall

[12] One likely reason given for concessionary loans being more stimulative of government expenditure is the matching requirement attached to such financing. That is, for every dollar that a government spends on a specified activity, it gets a matching amount in concessionary loans.

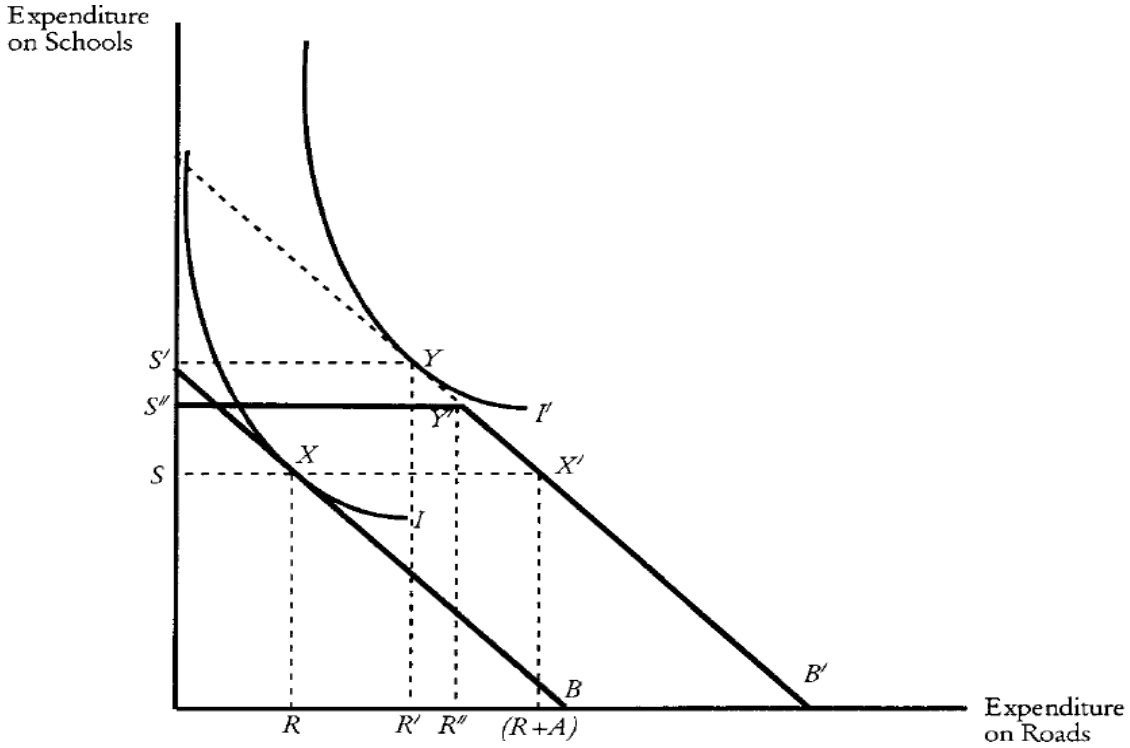
effectiveness. Further, there are other negative effects documented about tied aid such that the international community is now engaged in a policy discourse about how best to help recipient countries. It is widely believed that tied aid acts as both an impediment to donor cooperation and the building of partnerships with developing countries. In addition, it removes the 'feeling' of ownership and responsibility of 'projects' from partner countries in aid supported development and finally, it hampers the broader efforts of promoting their integration into the global economy (ODI, 2008).

A Simple Theoretical Model of Fungibility

The basic assumption by donors that tied aid shifts a recipient government' budget constraint according to the wishes of the donor is simply tenuous. For instance, if tied aid will increase the level of output beyond its current level, the aid recipient can reduce its own resources to the 'newly' subsidized good. This is the process of fungibility (see figure 1). The fundamental nature of the fungibility process has been documented in a number of studies. The illustration in this paper follows closely that of McGillivray et al. (2000). Let B represents the budget line before tied aid is received and let choice X represent the optimum, maximizing government utility subject to the budget constraint. Assume that the donor provides an allocation of A to be spent on roads, and let us also assume that this inflow is large relative to the recipient government's budget. Then this will truncate the budget line: B' becomes horizontal at Y. The recipient will be prevented from obtaining point Y (its optimum), expenditure on roads rises by more than would otherwise be the case (to R'' rather than R') and the extent of fungibility is reduced. In figure 1 the recipient can allocate no more than S'' to schools. It should be noted that at Y' the recipient is better off than without aid, although not at its optimum position, but

not all aid actually goes to roads. If the donor were to restrict spending on schools to S, fungibility could be eliminated and all aid would go to roads. Again, note that the recipient is better off than at X.

Figure 1. A Simple Model of Fungibility[13]



The Empirical Model

The more recent aid fungibility studies build an equation system with public expenditures and public revenues subject to a budget constraint. This framework is used to answer the question whether foreign assistance that is tied to specific expenditure categories is actually spent in those targeted categories. In this essay, we extend that framework to include untied foreign aid in the specification. The rationale for including

[13] See McGillivray et al. (2000)

this type of assistance in the specification is to see whether recipient governments' behavior changes depending on if they receive more foreign aid in the form of untied assistance. That is, with greater flexibility over their spending powers, will recipient governments now spend more money in the sectors that are potentially more beneficial to the lowest income groups in a society? The direction of this effect is expected to be positive signifying that recipient governments are indeed spending the now more flexible funds in the sectors thought to be apt to drive growth and development. While the direction of the coefficient estimate is important, the magnitude of this effect is equally or more significant since one expect to see more being spent out of a dollar of untied aid than out of a dollar of tied aid on public expenditures. The argument is that recipient governments will not be obligated to buy the goods of the donor or to pursue the 'special enthusiasm' of those donors but instead can pursue the national priorities of their respective countries including increased spending on social services and infrastructure. So that is, international donors may have the right priorities but they may get distorted through

Due to data limitation in the individual expenditure categories, we categorize expenditures into two broad categories. These are 'pro-poor expenditures' and 'other expenditures' category[14]. These two development expenditure categories are then

[14] Pro-poor expenditure is a general category of expenditures that include spending in areas such as education, health and housing & community amenities. An aggregation of these categories was done because of data limitation in the individual expenditure sector. This categorization is previously used by Gomanee et al. (2005) and Pettersson (2007). They argue that spending in these sectors will likely be more beneficial to individuals in the poorest income groups in society; as such they refer to it as the pro-poor expenditure category. The 'other expenditure' category is another general category of expenditures that include spending in areas such as general public service, public order and safety, recreational, cultural and religious affairs and services and economic affairs and services. Again, due to the scarcity of data in each of the individual expenditure category an aggregated approach is used for this category. The level of aggregation in this essay is appropriate given that the interest is not about how untied aid affects specific

included in the system of equations to help identify the possible impact of untied aid on expenditures and revenues. Country-by-country estimates of the effect of untied aid on public expenditures and revenues are obtained from this system. The approach of obtaining country by country estimates is necessary to help answer the second question in this essay: does the overall extent of fungibility lessens as a consequence of recipient governments' having greater leeway over their spending powers.

One of the objectives of this essay is to assess whether the switch toward more untied aid has been effective in sustaining or increasing the expenditures in particular aid supported sectors. Therefore we will specify a model that contains a set of equations for expenditures and revenues and subject them to a budget constraint.

The system of linear equations to be estimated takes the form of:

$$\ln PPE_t = \gamma_{0ppe} + \gamma_{1ppe} \ln GDP_t + \gamma_{2ppe} \ln AIDS_t + \gamma_{3ppe} \ln AIDNS_t + \gamma_{4ppe} OAID_t + \varepsilon_{ppe} \tag{2.1}$$

where PPE (pro-poor expenditures) are selected sectors of government expenditures subject to sector-specific assistance. Specifically, these sectors include education, health, housing and water amenities. GDP is gross domestic product per capita, $AIDS_t$ is per capita aid directed at the pro-poor sectors, $AIDNS_t$ is aid that is not tied to any particular sector(s) but is free to be spent in any way desirable by the recipient government. $OAID_t$ is aid directed at all other sectors not including the pro-poor sectors and Ɛ is the error term.

$$\ln OTH_t = \gamma_{0oth} + \gamma_{1oth} \ln GDP_t + \gamma_{2oth} \ln AIDS_t + \gamma_{3oth} \ln AIDNS_t + \gamma_{4oth} OAID_t + \varepsilon_{oth} \tag{2.2}$$

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sectors but instead how effective is untied aid in increasing spending on expenditures thought to be apt for growth and development.

where OTH is aid to all other sectors including public order, energy, agriculture, transportation etc. OTH is also derived on a per capita basis. All the other variables are defined above.

$$\ln NAE_t = \gamma_{0nae} + \gamma_{1nae} \ln GDP_t + \gamma_{2nae} \ln TAIDS_t + \varepsilon_{nae} \tag{2.3}$$

where NAE are sectors that do not receive aid disbursements. GDP is defined above and TAID is the sum of categorical and non-categorical/untied aid, that is

$$\sum_t (AIDS + OAID + AIDNS)$$

The revenue equation is as follows:

$$\ln REV_t = \gamma_{0rev} + \gamma_{1rev} \ln GDP_t + \gamma_{2rev} \ln TAIDS_t + \varepsilon_{rev} \tag{2.4}$$

where REV is non-aid revenue. All other terms are defined above.

The government budget constraint is:

$$PPE_t + OTH_t + NAE_t + DS_t = REV_t + AIDS_t + AIDNS_t + OAID_{j,t} + DEF_t \tag{2.5}$$

where DS is debt service and DEF[15] is the size of the deficit(or surplus).

The government budget constraint above infers that equations (2.1) – (2.4) are interdependent. Therefore, the approach to estimating this system of equations will be to omit one of those equations. The objective of this will be to remove any restriction(s) on the coefficient estimates. Additionally, the budget constraint also implies that the error terms in equations (2.1) – (2.4) are inter-related. This necessitates the use of the Seemingly Unrelated Regressions (SUR) method.

[15] DEF is endogenous, but is the omitted equation since equations (2.1) – (2.4), the budget identity plus the exogenous DS allow its calculation.

Since the main hypothesis being tested is whether untied foreign assistance is more effective at increasing spending in the development expenditure categories, the coefficient of interest is the one on $AIDNS_t$. From equation (2.1), a positive coefficient on $AIDNS_t$ signifies that this very fungible money is being spent in sectors apt for growth and development. Also, as argued by the DAC-OECD, untied aid monies do not have the administrative burdens or the technical incompatibilities of donor and recipient technologies that accompanies tied aid. This further strengthens the argument that untied aid should then be more effective at achieving the targeted goals of growth and development for the least developed and developing economies among us. Also, in equation (2.1), a positive elasticity on $AIDS_t$ $(\gamma_{2de} > 0)$ indicates that an increase in this aid is used in the targeted sector, while a positive coefficient on $OAID_t$ $(\gamma_{4de} > 0)$ suggests a diversion from the targeted category of 'other expenditure' toward the pro-poor expenditure category. To answer the question of whether the change in the composition of foreign assistance from tied to untied aid has brought the priorities of the international community closer to the national priorities of the recipient governments; I will estimate a model of fungibility. The specification for the fungibility model in this essay builds on previous specifications of this model by Pack and Pack [1990; 1993] and Pettersson (2007). Hence, to estimate the overall level of fungibility, a simulation of the effects of an increase in total foreign aid per capita, pro-rated to each categorical aid grouping in proportion to its mean value relative to total per capita aid was done. This simulation will calculate the change in each of the expenditure categories, as well as the non-aid supported expenditure sectors[16] and own revenues, resulting from simultaneous

[16] These sectors are mainly defense, social security and welfare and 'other' expenditures.

changes in each of the categorical aid and the non-categorical aid value. The simulation should be interpreted as showing the effects of changes in aid, on average, given the average historical aid patterns in the panel of countries included in the dataset. The change in each aid supported expenditure category, for example, is captured in:

$$d\,\hat{PPE}_t = \hat{\gamma}_{2ppe}\frac{PPE_t}{AIDS_t}dAIDS_t + \hat{\gamma}_{3ppe}\frac{PPE_t}{AIDNS_t}dAIDNS_t + \hat{\gamma}_{4ppe}\frac{PPE_t}{OAID_t}dOAID_t \tag{2.6}$$

$$d\,\hat{OTH}_t = \hat{\gamma}_{2oth}\frac{OTH_t}{AIDS_t}dAIDS_t + \hat{\gamma}_{3oth}\frac{OTH_t}{AIDNS_t}dAIDNS_t + \hat{\gamma}_{4oth}\frac{OTH_t}{OAID_t}dOAID_t \tag{2.7}$$

Now, if on the one hand, the calculated change in a sector is smaller than the change in sectoral aid to that sector then aid is diverted away from that sector to other sectors. While on the other hand, if the change in sectoral aid applied to that sector is greater than the aid originally destined for that sector, then there is ‘diversion’ towards that sector. This change in the first instance is interpreted as the degree of fungibility. In the second instance, when total aid used in the sector is actually larger, we have a case of ‘crowding in’.

Data

A dataset consisting of 57 countries for the period 1973-2006 is used for the estimation. Although I have a panel of 57 countries, the analysis is done on a country-by-country basis with the countries selected for inclusion in the study based solely on the availability of data. I extend Pettersson’s (2007) dataset that already had information on tied aid to include information on untied aid. This dataset was chosen primarily for comparative purposes. Table A1 presents the summary statistics for the variables. A list

of all the countries in the sample is contained in Table A4. Data definition and the source of the data in this essay are listed in table A3.

All the aid data in this study comes from the OECD's Development Assistance Committee's online database and it includes data from both multilateral and bilateral donors. This database consists of two primary databases: the Development Assistance Committee's (DAC) database and the Creditor Reporting System (CRS) online database. It is important to highlight here that the DAC database only reports aggregate aid disbursed to the countries without any reference to the sectors supported by this aid. However, for this analysis, the amount of aid received by each public expenditure sector is needed. Therefore to compensate for this limitation of the DAC database, I had to utilize the CRS database. This database give the sectoral decomposition of total aid making it somewhat possible to use both databases together to derive proxies of the share of aid disbursed to the different expenditure sector.[17] However, one drawback with using the CRS data to compute the sectoral shares of aid is that it only reports the amount of aid committed to the different expenditure category. The problem with using such a figure is that it might overstate the actual amount of aid disbursed to a sector since the amount of aid committed in a particular year may not actually be disbursed in that year. Notwithstanding these limitations, I make the assumptions that the amount of aid that is committed was actually disbursed and that it was disbursed in the year in which it was committed.[18]

[17] Burnside and Dollar (2000); Easterly, Levine and Roodman (2004) and Miquel-Florensa (2007) all use data on disbursement and commitment of aid from the OECD- DAC database. Ouattara (2006) and Mavrotas et al. (2007) use commitments on project aid and financial program aid and then convert these figures into disbursement form by applying their respective share in the commitment to the disbursement. Pack and Pack [1990; 1993]; Feyzioglu et al. (1998); Devarajan et al. (1999) use disbursement of concessionary loans by sector from the World Bank Database.

[18] This is similar to what Pettersson (2007) assumed in his paper.

Also, from the CRS database it can be observed that some aid flows are not susceptible to allocation by sectors and can be reported as non-sector allocable aid. These types of non-sectoral aid are aggregated to form the untied component of aid. In this context, aid that is said to be untied just means it is not tied to any productive investment activity and can be thought of as a pure transfer.[19] Further, untied aid can be devoted to debt reduction, as well as to consumption activities or other non-developmental projects. Examples of untied aid are aid for general purposes, general budget support, actions relating to debt and internal transactions in the donor country.

An important observation of the aid data (both tied and untied) is that it is recorded in current U.S dollars. Similar to Burnside and Dollar (2000) and Pettersson (2007) we convert both tied and untied aid into constant (1998) per capita dollars using population data from the World Development Indicators (WDI) and subsequently deflate the series with the unit-value of imports price index from the International Financial Statistics (IFS). This provides measures of aid that is constant in terms of its purchasing power over a representative bundle of world imports.[20]

For the government expenditure data, we use data on expenditure by function for the consolidated central government accounts from the Government Financial Statistics (GFS) Database from IMF (2009). The expenditure data are reported in national currency and must be converted to US dollars for purposes of comparison. This is done using the 'DEC alternative conversion factor' from the World Bank. To make both the expenditure and the aid data consistent, the resulting expenditure figures are converted to per capita US dollars after which they are deflated using the unit-value of imports price index.

[19] See Chatterjee et al. (2004)
[20] See Burnside et al. (2000) and Pettersson (2007) for further discussion.

Results

First, the results for the impact of the changes in the composition of international aid from tied to untied aid is summarized in figure 2. Specifically, figure 2 illustrates the distribution of the estimates of untied aid on the pro-poor expenditure sectors. The estimates are for 57 countries. The decision to switch to more untied aid came against the background of a plethora of evidence indicating a failure of tied aid to achieve targeted growth and development outcomes due either to problems of fungibility or to the above average prices charged for the products or services of the donor countries to which these monies are tied. So besides the old question of fungibility, we empirically analyze whether the switch to untied aid has been ‘more effective’ in sustaining or increasing expenditures in particular sectors that are thought to be more conducive to growth and development.

Figure 2. The Effect of Untied Aid on PPE Sector, 1973-2006

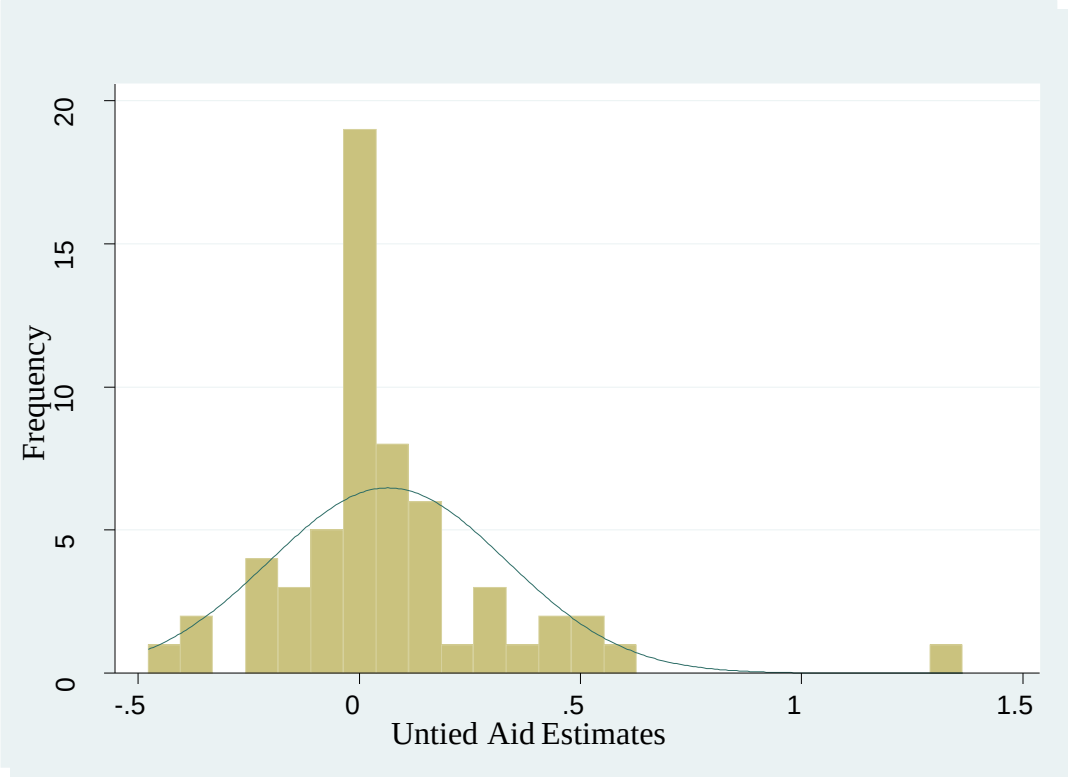
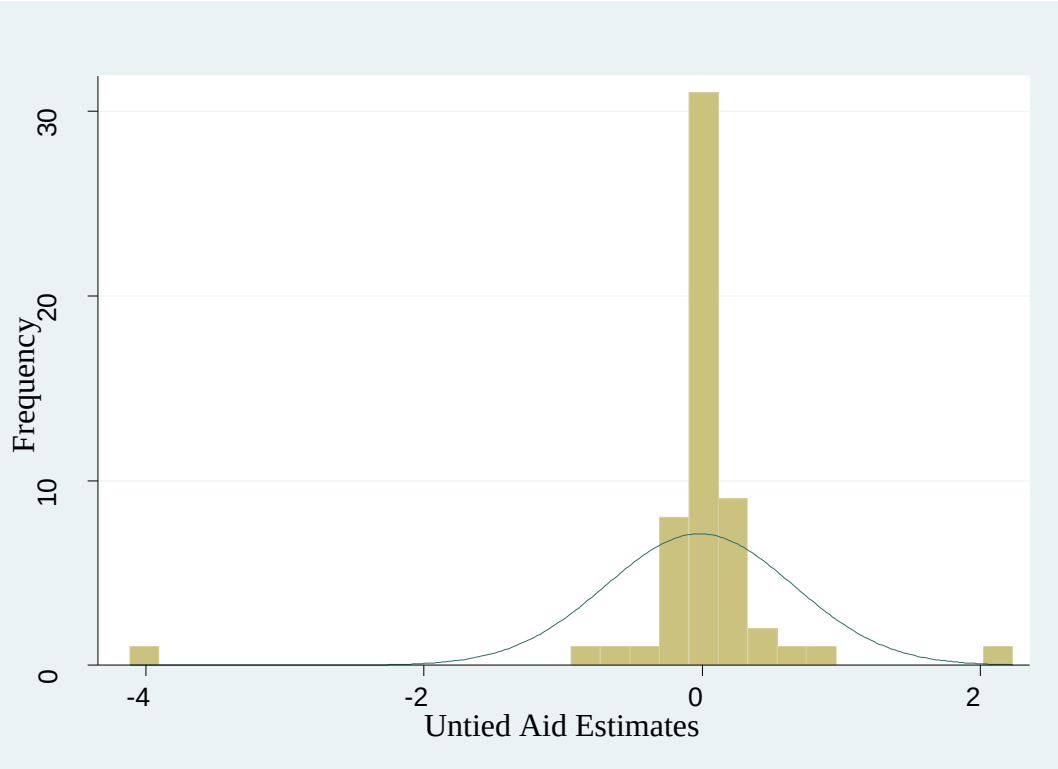


Figure 2 illustrates an approximately normal distribution of estimates, with an average estimate of 0.10 and a standard deviation of 0.27. The mean of this distribution is positive which suggests that a one percent increase in untied aid could possible lead to a 0.1 percent increase in the expenditure category thought to be most likely to benefit the poor in society. The dispersion of these estimates around the mean can be considered slightly wide because of an outlier effect. For instance, in the case of Iran (See table 1), pro-poor expenditures increased by almost 1.4 percent for a one percent increase in untied aid. This estimate could possibly be explained by the increase in government revenues as a result of an increase in total aid; however, the revenue effect for this country is not significantly different from zero. Notwithstanding the outlier effect, 96 percent of these country estimates are within two standard deviations of the mean, which

is in keeping with convention. It is important to emphasize here again that untied aid is really ‘unattached’ aid monies that can be spent according to the national priorities of the recipient government; therefore a positive average influence of untied aid would seem to suggest that these governments are indeed spending in areas that are conducive to the growth and development of their economies.

Figure 3 illustrates the estimates of the impact of untied aid on ‘other expenditure’ category. Again, the distribution of these estimates appears to be approximately normal. However, the mean of this distribution is -0.018 suggesting that there is a more than proportionate reduction in this category of expenditures, on average. This estimate is somewhat surprising; however, the country of Iran (see table 1) has a more than 4 percent reduction in this expenditure category possibly contributing to the overall negative average effect. While Iran experiences a more than proportionate reduction in ‘other expenditures’, Colombia has about a 2.3 percent increase in this category of public expenditures. Additionally, the dispersion of the estimates around the mean is 0.676 which is somewhat greater than in the case of the pro-poor expenditures effects. However, approximately 97 percent of these estimates are still within two standard deviations of the mean.

Figure 3. The Effect of Untied Aid on OTH Sector, 1973-2006



While the mean and the dispersion of the estimates of untied aid on the two main expenditure categories are considered to be important indicators, the breakdown of this average on a country-by-country basis is also informative. For instance, in the case of Argentina, a one percent increase in untied aid increase expenditure in the pro-poor expenditure category by 0.15 percent, while expenditure in the 'other expenditure' category increased by about 0.10 percent. Apart from Argentina, countries such as Guatemala, Liberia, Malawi, Mali and Vanuatu all have positive and statistical significance coefficient estimates for untied aid. In the case Liberia and Mali, a one percent increase in untied aid results in an almost 0.5 percent increase in pro-poor expenditures. Vanuatu and Guatemala also had greater than average increases in pro-poor expenditure as a consequence of the inflow of untied aid with increases of 0.4 and

0.2 percent increase respectively. On the contrary, there are some countries for which untied aid negatively impacted pro-poor expenditures (see table 1). These countries include Bangladesh, Egypt, Mexico, Syria, Tunisia, Uganda and Zimbabwe. While this effect seems quizzical, a possible explanation for such a result could be that the recipient governments also reduce their spending in this sector today in anticipation/expectation of more untied aid in the future.

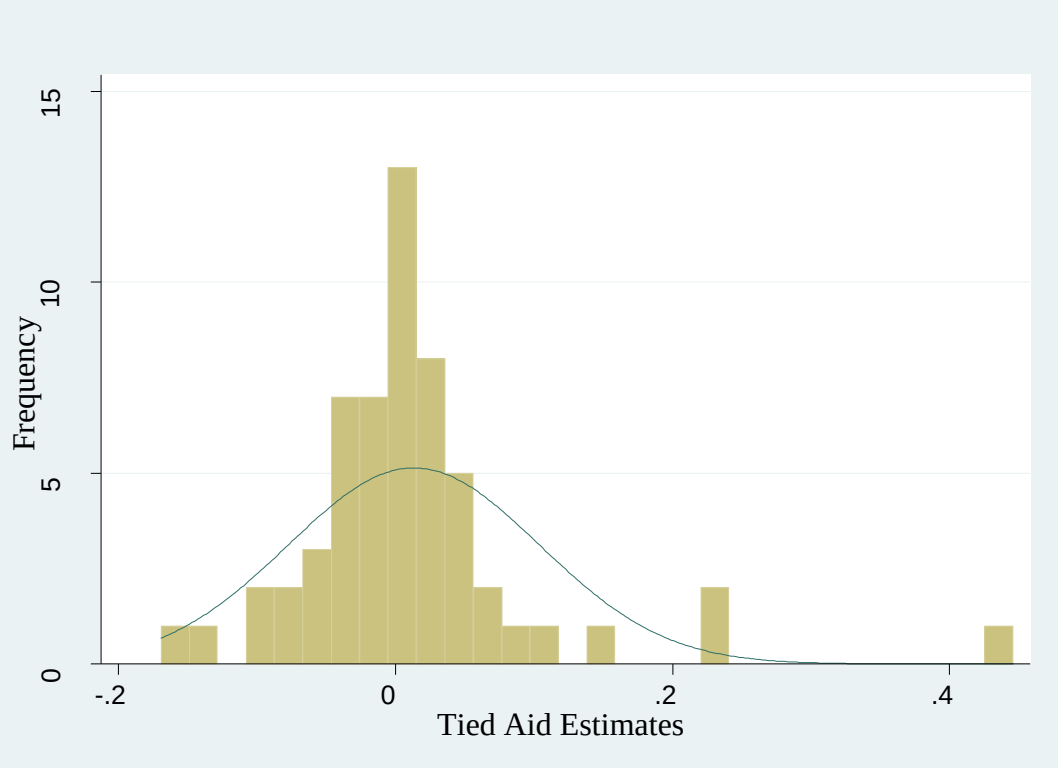
In the case of the 'other expenditure' category, a number of countries realized increases in this expenditure category as a result on the increase in untied aid. These countries include Argentina, Burkina Faso, Burundi, Costa Rica, Guatemala, Indonesia, Nepal, Solomon Islands, Tunisia, Turkey and Yemen. For instance, Burkina Faso and Solomon Islands spends as much as 0.8 percent of the 1 percent increase in untied aid in this category.

In addition to including untied aid in these two broad expenditure categories, the influence of tied aid is also analyzed. The variable *AID* controls for the impact of aid that is directed to pro-poor expenditure category while *OAID* controls for aid that is not directed toward the pro-poor expenditure category but was nevertheless spent in that category. These interpretations will also be extended to the 'other expenditure' category.

Figure 4 presents the distribution of the estimates of aid tied to the pro-poor expenditure category. The mean of this distribution is 0.013 indicating that of the 10 percent increase in aid directed towards this category only 0.1 percent of it is actually spent in that category. This is indicative of extreme diversion of aid targeted at this expenditure category. The dispersion of these estimates is 0.091 which indicates that

there is very little dispersion and approximately 93 percent of these estimates are within 2 standard deviations of the mean.

Figure 4. The Effect of Tied Aid on PPE Sector, 1973-2006



A close look at individual country estimates (see table 1) for the impact of tied aid (*AID*) on the pro-poor expenditure category reveals that while some of the targeted aid is spent in the targeted sector, there is also evidence that some of this targeted aid is spent in other sectors. For instance, Argentina, Bolivia, Cameroon, Egypt, Malawi, Mexico, Nepal, Tanzania and Vanuatu all have evidence of significant diversion of this aid away from the targeted sector. This diversion of aid funds could have some implications for the overall extent of fungibility for all countries in the sample as well as for that country.

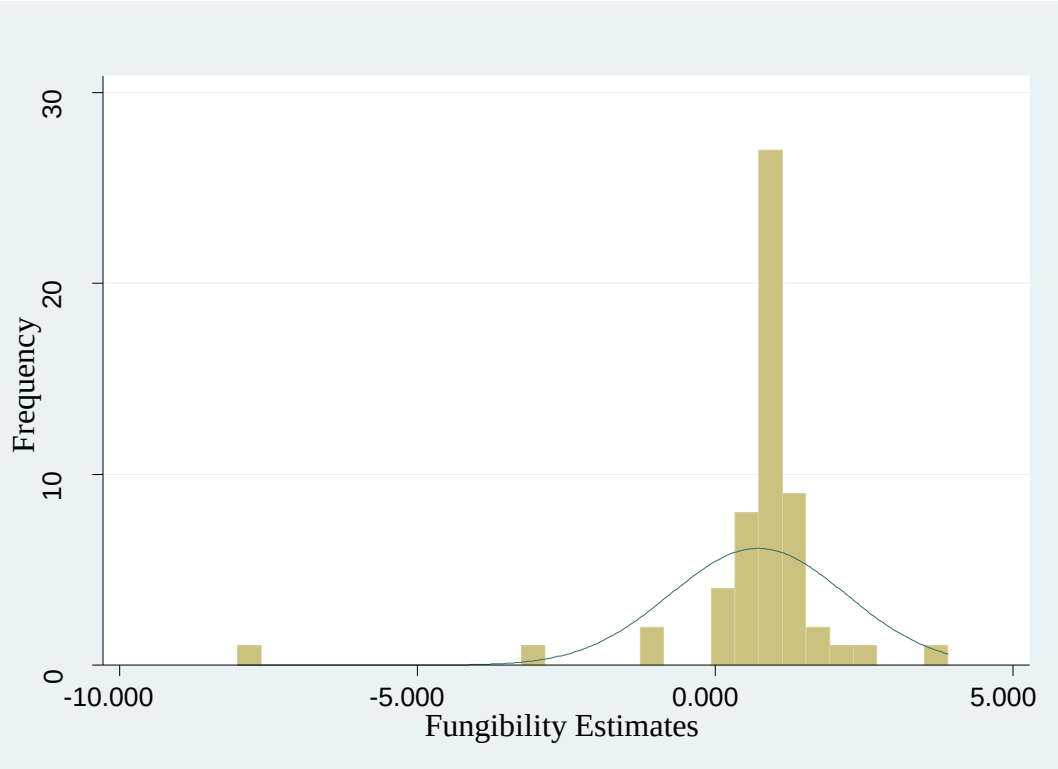
The results for the fungibility estimates are presented in table 2. To calculate the extent of fungibility, however, I accounted for the effects of untied aid on the different expenditure categories. This slightly changes the methodology used in the previous studies by Pack and Pack [1990; 1993] and Pettersson (2007). The extent of fungibility is measured as the difference between pro-rated aid and the combined effect of categorical aid and non-categorical aid on both the 'pro-poor' and 'other' expenditure categories. That is, FUNGIBILITY = 1 – dPPE – dOTH. The main rationale for including untied aid in equations (2.6) and (2.7) is to arrive at a more accurate measure of fungibility that captures the budgetary impact of this type of aid. Fungibility estimates are calculated for the 57 countries over the period 1973 to 2006. The countries included in this analysis are chosen solely on the basis of data availability.

The distribution of the estimates of fungibility for the 57 countries over the period 1973 to 2006 appears in figure 5. The mean of this distribution is calculated to be 0.72 which suggests that there is a decrease in overall public spending. This result is comparable to previous findings in the literature. Much of the earlier literature also finds evidence of targeted funds not being spent in the targeted category. This evidence is often cited as the primary reason for the switch from tied to untied aid as the international financing community strongly believes that untied aid will be more helpful to recipient governments trying to focus on their national priorities. A closer look at the country-by-country fungibility estimates in table 2 reveals that there are countries with estimates above and below this average. For instance, public expenditures in Argentina increased by almost eight dollars for every dollar of aid received. However, one could conclude that the model did not perform well for this country and therefore this estimate should be

interpreted with caution. It also can be observed that fungibility estimates for some countries fall outside the [0, 1] interval. However, similar to Pettersson (2007) we could censor some of those values that falls outside the interval to either zero or one depending on if they are less than zero or greater than one. According to the literature, fungibility is defined on the [0, 1] interval with 0 defined as non-fungibility; 1 defined as full-fungibility; and any number between [0, 1] defined as partial fungibility. 7 of the 57 countries have estimates that spans the [0, 1] interval (see table 2). This means that the FUNG estimates and the CI[21] interval measures associated with each of these FUNG estimates dictates that 7 countries in the sample have both full fungibility and non-fungibility at the same time. Therefore, one could conclude that the model performed fairly poorly for these 7 countries.

[21] CI is the confidence interval for FUNG using 90 percent for the cumulative t-distribution.

Figure 5. Fungibility Estimates for 57 Countries, 1973-2006



Also, we can compare fungibility estimates for countries in my sample with existing estimates in the literature. Table A2 presents a comparison of these fungibility estimates. Similar to Pettersson and Pack and Pack, we find evidence of fungibility in Dominican Republic and Sri Lanka. This result is explained by the importance of foreign aid in public revenues. The argument made by Pack and Pack is that the smaller this share, the less likely the recipient's expenditure will reflect the donors' intentions.

In sum, the results are mixed. The positive coefficient on untied aid suggests that on average, pro-poor expenditures increase with increases in untied aid. However, there are countries in the sample for which a negative and significant estimate is found suggesting a reduction in the pro-poor expenditure. Interestingly, the average impact of

untied aid on pro-poor expenditure is greater than the average impact of tied aid. This is suggestive of issues of diversion of aid funds away from its target. With the inclusion of untied aid in the fungibility model, we find that on average foreign aid stimulates total expenditure by less than dollar for dollar. This finding runs counter to that of Pettersson who finds that on average, one dollar of foreign aid stimulates more than a dollar increase in total expenditures. Overall, while there is evidence of fungibility, the extent of fungibility varies considerably among the countries in the sample.

Table 1. Regression Estimates of the Effect of Aid on the PPE and OTH Sectors

Country	Obs	Pro-Poor Expenditure			Other Expenditure		
		AID	OAID	AIDNS	AID	OAID	AIDNS
Argentina	23	-0.0484** (0.0234)	-0.0081 (0.0607)	0.1521*** (0.0498)	-0.0155 (0.0235)	0.0992 (0.0681)	0.1030* (0.0535)
Bangladesh	12	0.0888** (0.0321)	-0.3270 (0.2235)	-0.2256* (0.1231)	0.0067 (0.0379)	0.0812 (0.2599)	-0.2983** (0.1450)
Belize	17	0.0033 (0.0116)	-0.0381 (0.0312)	-0.0283 (0.0576)	-0.0083 (0.0144)	-0.0690* (0.0410)	-0.0594 (0.0656)
Bhutan	22	-0.0267 (0.0299)	-0.0820 (0.0585)	0.0131 (0.0113)	-0.0285 (0.0476)	0.0400 (0.0927)	0.0122 (0.0179)
Bolivia	20	-0.1692*** (0.0616)	0.0147 (0.0972)	-0.1907 (0.1506)	0.2040** (0.0802)	0.1540 (0.1379)	0.2492 (0.1897)
Botswana	23	-0.0277 (0.0622)	0.01711 (0.0638)	0.0810 (0.0779)	-0.0009 (0.0380)	0.0553 (0.0389)	0.0380 (0.0441)
Brazil	11	0.0741*** (0.0215)	0.3184*** (0.0714)	0.0139 (0.1815)	-0.0321 (0.0232)	0.1760** (0.0772)	-0.1101 (0.1442)
Burkina Faso	15	-0.0356 (0.0232)	-0.0280 (0.1127)	0.2610 (0.1992)	-0.0119 (0.0267)	-0.3626*** (0.1296)	0.7831*** (0.2343)
Burundi	8	0.0602*** (0.0155)	-0.0289 (0.0236)	0.0720 (0.0542)	0.0477 (0.0464)	0.0677** (0.0306)	0.3402*** (0.1033)
Cameroon	23	-0.0930** (0.0369)	-0.0693 (0.1021)	0.0298 (0.0291)	-0.0342 (0.0370)	0.2781*** (0.1024)	-0.0101 (0.0280)
Chile	19	0.0082 (0.0082)	-0.0042 (0.0072)	0.0571 (0.0361)	0.0104 (0.0204)	0.0263 (0.0180)	0.0695 (0.0601)
China	9	0.2241*** (0.0548)	-0.3284*** (0.0829)	-0.1969 (0.1179)	0.1765** (0.0780)	-0.1521 (0.1181)	-0.2667 (0.1561)
Colombia	9	-0.1030* (0.0532)	-0.0355 (0.1020)	0.1305 (0.4320)	-0.1283* (0.0702)	-0.1411 (0.1346)	2.2322*** (0.5791)
Costa Rica	14	-0.0190 (0.0157)	-0.0166 (0.06670)	0.1000 (0.0774)	0.0366** (0.0173)	-0.0268 (0.0896)	0.1749** (0.0758)
Dominican Republic	12	0.0268 (0.0524)	-0.0470 (0.1330)	-0.0271 (0.05979)	-0.0167 (0.0203)	-0.1692** (0.0631)	-0.0676** (0.0279)
Egypt	21	-0.0817*** (0.0242)	0.1490*** (0.0550)	-0.1794* (0.0935)	-0.0014 (0.0339)	0.2239*** (0.0763)	-0.0686 (0.1307)
El Salvador	29	-0.0044 (0.0307)	0.1130** (0.0542)	-0.0530 (0.1303)	-0.0150 (0.0257)	0.0261 (0.0459)	-0.0188 (0.1593)
Ethiopia	26	0.0294 (0.0177)	0.0949** (0.0362)	-0.0805 (0.1037)	-0.0049 (0.0203)	0.0875** (0.0416)	-0.1086 (0.1225)
Fiji	19	0.0097 (0.0168)	0.0286 (0.0266)	-0.1299 (0.0996)	0.0411 (0.0348)	0.0179 (0.0550)	0.0896 (0.2059)
Ghana	20	0.0379* (0.0211)	0.0635** (0.0267)	0.0881 (0.1121)	0.0013 (0.0303)	-0.0134 (0.0384)	0.0142 (0.1538)
Guatemala	13	0.0506 (0.0836)	-0.0821 (0.1332)	0.2062*** (0.0862)	-0.2427* (0.1284)	0.6002*** (0.1973)	0.3056** (0.1405)
India	27	0.0216 (0.0159)	-0.0045 (0.0343)	0.0100 (0.0145)	0.0237* (0.0126)	-0.0477* (0.0273)	0.0143 (0.0107)
Indonesia	26	-0.0726 (0.0502)	-0.1781 (0.1126)	0.1520 (0.0962)	0.1316** (0.0531)	0.1026 (0.1192)	0.1858* (0.1078)
Iran	12	0.0459*** (0.0029)	0.0225*** (0.0061)	1.3642** (0.4509)	0.0526** (0.0252)	-0.2021*** (0.0509)	-4.1156** (1.3267)
Jordan	32	0.0379*** (0.0133)	0.0705** (0.0276)	-0.0796* (0.0453)	0.0524 (0.0368)	0.0285 (0.0182)	-0.0326 (0.0627)
Kenya	21	0.0218 (0.0160)	0.0502 (0.0338)	-0.0193 (0.0670)	0.0632** (0.0302)	0.2358*** (0.0639)	0.0194 (0.1010)

Note: *** significant at 1%; ** significant at 5%; * significant at 1%. Standard errors are in parenthesis. All variables are in logs; therefore coefficients must be interpreted as elasticities. Time dummies are also included in each equation. The variable of interest, AIDNS (untied aid) is calculated by summing general budget support, actions relating to debt and internal transactions in the donor country and general purpose aid.

Table 1 cont'd. Regression Estimates of the Effect of Aid on the PPE and OTH Sectors

Liberia	11	0.0547** (0.0215)	0.0451 (0.0449)	0.4590*** (0.1022)	0.1325*** (0.0367)	0.0580 (0.0818)	-0.0113 (0.1912)
Madagascar	11	0.0060 (0.0409)	-0.0051 (0.1119)	-0.0003 (0.0208)	0.0364 (0.0391)	0.1085 (0.1068)	-0.0337 (0.0235)
Malawi	13	-0.0421** (0.0188)	0.0389 (0.0403)	0.1848** (0.0892)	-0.0009 (0.0162)	0.1033*** (0.0351)	0.1412 (0.1025)
Maldives	19	0.1158* (0.0599)	0.1214** (0.0550)	0.1315 (0.0952)	0.0227 (0.0672)	0.0055 (0.0653)	0.1264 (0.1166)
Mali	12	-0.0401 (0.0391)	0.1216 (0.1528)	0.4895* (0.2778)	-0.0319 (0.1038)	-0.1801 (0.4026)	-0.0978 (0.7410)
Mauritius	27	-0.0004 (0.0073)	-0.0663* (0.0333)	0.0347 (0.0371)	0.0094 (0.0090)	0.0188 (0.0411)	0.0308 (0.0433)
Mexico	10	-0.0544*** (0.0138)	0.0391*** (0.0087)	-0.3722*** (0.1214)	0.0084 (0.0104)	-0.0475*** (0.0065)	-0.798*** (0.1291)
Mongolia	15	0.0328 (0.0403)	0.6140** (0.2202)	0.0020 (0.0790)	-0.0263 (0.0226)	0.2226* (0.1238)	-0.0166 (0.0444)
Morocco	19	-0.0160 (0.0130)	0.0098 (0.0223)	-0.0115 (0.0079)	0.0125 (0.0248)	-0.0353 (0.0389)	-0.0006 (0.0155)
Myanmar (Burma)	12	-0.0067 (0.0138)	0.0055 (0.0618)	-0.0097 (0.0730)	-0.0067 (0.0187)	-0.0509 (0.0838)	-0.0369 (0.1088)
Nepal	33	-0.0594* (0.0354)	-0.0971 (0.1007)	0.2861 (0.1839)	-0.0033 (0.0308)	-0.1796** (0.0877)	0.3002* (0.1679)
Papua New Guinea	12	-0.0280 (0.0437)	0.0009 (0.0395)	-0.0110 (0.2338)	-0.0021 (0.0395)	-0.0088 (0.0367)	-0.0507 (0.2045)
Paraguay	20	-0.0030 (0.0112)	0.0043 (0.0408)	-0.0619 (0.0531)	-0.0101 (0.01205)	-0.0673 (0.0439)	-0.0512 (0.0532)
Philippines	33	0.0237 (0.0189)	0.0732 (0.0452)	0.0072 (0.0598)	0.0034 (0.0264)	-0.0172 (0.0633)	-0.2026** (0.0940)
Solomon Islands	12	0.0049 (0.0363)	0.0921 (0.0702)	-0.1957 (0.1674)	0.0185 (0.0343)	-0.0586 (0.0662)	0.7425*** (0.1580)
Sri Lanka	24	-0.0096 (0.0162)	-0.0917 (0.0696)	-0.0638 (0.0760)	-0.0204 (0.0220)	0.0545 (0.0948)	0.0057 (0.1151)
St.Vincent & Grenadines	15	0.0016 (0.0056)	0.0190*** (0.0066)	-0.0059 (0.0123)	0.0312*** (0.0053)	0.0577*** (0.0061)	-0.114*** (0.0116)
Swaziland	16	0.0279 (0.0206)	-0.0036 (0.0401)	-0.0342 (0.0618)	-0.078*** (0.0171)	0.2017*** (0.0333)	0.0093 (0.0516)
Syria	8	-0.0061 (0.0039)	-0.1336*** (0.0151)	-0.1299** (0.0500)	0.0108 (0.0099)	-0.0015 (0.03709)	-0.1799 (0.1249)
Tanzania	8	-0.0420*** (0.0136)	-0.0281 (0.0328)	0.1869 (0.1063)	-0.086*** (0.0130)	0.0980*** (0.0314)	-0.0794 (0.1095)
Thailand	30	0.0044 (0.0075)	-0.0293 (0.0364)	-0.02452 (0.0383)	0.0083 (0.0239)	0.0288 (0.1153)	0.0161 (0.1195)
Tonga	11	0.0086 (0.0198)	-0.0910 (0.1697)	-0.3623 (0.2375)	0.0046 (0.0162)	-0.1419 (0.1341)	-0.3066 (0.1949)
Tunisia	27	0.01125 (0.0096)	-0.0434 (0.0319)	-0.0389** (0.0173)	-0.0101 (0.0081)	0.1136*** (0.0274)	0.0388** (0.0148)
Turkey	20	-0.0076 (0.0088)	-0.0059 (0.0204)	-0.0099 (0.0658)	-0.0071 (0.0118)	0.1271*** (0.0273)	0.2598*** (0.0625)
Uganda	8	0.4458*** (0.1364)	-0.5468 (0.3713)	-0.4779*** (0.1285)	0.5742*** (0.1163)	-0.6893* (0.3213)	-0.513*** (0.1096)
Uruguay	22	-0.0100 0.0070	0.0229* (0.0122)	0.0050 (0.0104)	0.0052 (0.0111)	0.0058 (0.0191)	0.0162 (0.0165)
Vanuatu	9	-0.1346*** (0.0214)	-0.0199 (0.0398)	0.3843** (0.1737)	0.0881*** (0.0213)	-0.0548 (0.0399)	-0.611*** (0.1728)
Viet Nam	12	0.1574* (0.0745)	-0.3452*** (0.0776)	0.0640 (0.0358)	0.0842 (0.0922)	-0.3386*** (0.0967)	0.0799 (0.0509)

Note: *** significant at 1%; ** significant at 5%; * significant at 1%. Standard errors are in parenthesis. All variables are in logs; therefore coefficients must be interpreted as elasticities. Time dummies are also included in each equation. The variable of interest, AIDNS (untied aid) is calculated by summing general budget support, actions relating to debt and internal transactions in the donor country and general purpose aid.

Table 1 cont'd. Regression Estimates of the Effect of Aid on the PPE and OTH Sectors

Yemen	7	0.2324*** (0.0352)	0.3094*** (0.0345)	0.0757 (0.0428)	0.0960 (0.0745)	0.4827*** (0.0672)	0.5210*** (0.1001)
Zambia	23	0.0216 (0.0375)	0.0839 (0.0534)	0.1203 (0.1822)	-0.0319 (0.0897)	0.3167** (0.1269)	0.1353 (0.4287)
Zimbabwe	9	0.0084 (0.0478)	0.0324 (0.0464)	-0.1877** (0.0837)	0.1989** (0.0897)	0.1733* (0.0878)	-0.0583 (0.1225)

Note: *** significant at 1%; ** significant at 5%; * significant at 1%. Standard errors are in parenthesis. All variables are in logs; therefore coefficients must be interpreted as elasticities. Time dummies are also included in each equation. The variable of interest, AIDNS (untied aid) is calculated by summing general budget support, actions relating to debt and internal transactions in the donor country and general purpose aid.

Table 2. Fungibility Estimates for the 57 countries over the period, 1973-2006

Country	Byear	Eyear	DPPE	DOTH	FUNG	CI	Span[0,1]
Argentina	1983	2006	1.738	7.542	-7.964	8.471	
Bangladesh	1974	1985	-0.107	-0.205	1.315	0.509	
Belize	1978	1994	-0.081	-0.292	1.361	0.324	
Bhutan	1983	2006	-0.063	-0.012	1.01	0.496	
Bolivia	1987	2006	-0.22	0.32	0.703	0.364	
Botswana	1974	1996	0.064	0.092	0.85	0.335	
Brazil	1981	1991	0.785	0.074	0.134	1.333	Yes
Burkina Faso	1976	1990	0.004	0.012	0.984	0.021	
Burundi	1992	1999	0.005	0.062	0.939	0.025	
Cameroon	1977	1999	-0.194	-0.037	0.707	1.002	Yes
Chile	1988	2006	0.189	0.175	0.596	0.372	
China	1991	1999	-0.003	-0.365	1.094	0.246	
Colombia	1991	1999	0.001	0.789	0.26	0.18	
Costa Rica	1982	1995	0.9	1.13	-1.042	2.84	Yes
Dom. Republic	1981	1992	-0.07	-0.948	2.129	1.127	
Egypt	1977	1997	-0.031	0.179	0.93	0.408	
El Salvador	1978	2006	-0.004	0.006	0.99	0.117	
Ethiopia	1974	1999	0.001	0.001	0.999	0.007	
Fiji	1978	1996	-0.13	0.339	0.823	0.664	
Ghana	1974	1993	0.013	0.001	0.985	0.036	
Guatemala	1982	1994	0.234	1.606	-1.215	1.961	
India	1975	2001	-0.003	0.358	1.063	0.442	
Indonesia	1974	1999	-0.008	0.077	0.941	0.058	
Iran	1994	2006	1.128	-4.077	3.916	2.39	
Jordan	1975	2006	-0.008	0.045	1.004	0.277	
Kenya	1978	1998	0.002	0.018	0.979	0.012	
Liberia	1977	1987	0.318	0.523	0.472	0.723	Yes
Madagascar	1989	1999	0.001	0.014	0.965	0.031	
Malawi	1976	1988	0.016	0.08	0.902	0.069	
Maldives	1988	2006	0.591	0.327	0.074	0.658	
Mali	1977	1988	0.142	-0.127	0.985	0.953	
Mauritius	1980	2006	-0.114	0.118	0.968	0.192	
Mexico	1990	1999	-0.508	-0.766	2.194	0.408	
Mongolia	1993	2006	0.042	0.059	0.895	0.061	
Morocco	1981	1999	-0.061	-0.117	1.187	0.619	
Myanmar (Burma)	1977	1988	0.001	-0.018	1.015	0.04	
Nepal	1974	2006	0.004	0.008	0.99	0.017	
Papua New Guinea	1986	1999	-0.059	-0.186	1.252	1.023	
Paraguay	1974	1993	-0.021	-0.171	1.156	0.311	
Philippines	1974	2006	0.069	-0.192	1.155	0.314	

Table 2 cont'd. Fungibility Estimates for the 57 countries over the period, 1973-2006

Country	Byear	Eyear	DPPE	DOTH	FUNG	CI	Span[0,1]
Solomon Islands	1977	1988	-0.035	0.41	0.613	0.09	
Sri Lanka	1974	1997	-0.006	0.019	1.006	0.037	
St.Vin. & Gren.	1992	2006	0.07	-0.15	1.215	0.186	
Swaziland	1974	1989	-0.018	0.356	0.746	0.326	
Syria	1992	1999	-0.156	-0.494	1.662	0.74	
Tanzania	1974	1981	0.002	-0.009	1.001	0.016	
Thailand	1977	2006	-0.021	0.026	0.99	0.227	
Tonga	1981	1991	-0.255	-0.795	2.05	1.114	
Tunisia	1974	2000	-0.382	0.811	0.415	0.663	Yes
Turkey	1987	2006	-0.047	0.926	0.043	0.412	
Uganda	1979	1986	-0.653	-0.481	2.677	1.375	
Uruguay	1985	2006	-0.026	0.192	0.526	0.629	Yes
Vanuatu	1982	1990	0.132	-0.614	1.473	0.388	
Viet Nam	1995	2006	0.009	-0.122	1.117	0.112	
Yemen	1993	1999	1.039	3.091	-3.085	0.914	
Zambia	1974	1996	0.064	0.414	0.555	0.756	Yes
Zimbabwe	1981	1989	-0.13	0.142	0.788	0.454	

Notes: BYEAR is defined as the first year for which a value is available for a country; EYEAR is the last year for which a value is available for a country; FUNG is the definition for fungibility. This is already defined above and CI is the confidence interval.

Conclusion

The composition of foreign aid has been changing overtime; therefore, any evaluation of its impact on public expenditure and/or tax revenues should take into account not only tied aid but also untied aid. The move to switch from tied to untied aid is precipitated by the less than impressive growth and development outcomes associated with tied aid. Tying aid to the products or services of the donor country eliminates as much as thirty (30) percent of the value of aid because of the greater than average price that must be paid for these products. In addition to this, the problem of fungibility reduces the effectiveness of tied aid because it may be directed at sectors that promote the strategic/special interests of the donors' without catering to the national priorities of the recipient countries. The international financing community strongly advocated for the use of untied aid to help achieve the growth and development outcomes that were not realized with the use of tied foreign aid. They argue that untied aid would be the better financing option since it would allow recipient countries to focus on their national priorities instead of the special enthusiasms of the donor countries. The empirical analysis finds that on average, untied aid did indeed increase pro-poor expenditure by 0.1 percent, and interestingly this increase in public spending is greater than when there is an equal increase in tied aid. The analysis actually reveals that pro-poor expenditures increased by only 0.013 percent for a one percent increases in tied aid. Therefore, one could conclude that untied aid is relatively more effective than tied aid in achieving growth and development targets. The country-by-country analysis also reveals that for some of the countries in the sample, there is a positive and statistically significant effect of untied aid on pro-poor expenditures.

In addition to the question of the changing composition of foreign aid, there is also the question of how does this shift from tied to untied aid affect the overall extent of fungibility of foreign aid. Empirical evidence in previous literature strongly suggests the presence of fungibility of foreign aid and that this fungibility is partially due to the large fraction of foreign aid that is tied to specify projects or expenditures which may not coincide with the immediate needs of the recipient governments. As such these governments find ways to either reduce their own spending in the targeted sector(s) or continue to allocate the same amount to the targeted activity but now spend only a fraction of the dollar amount received from the donors to be spent in the targeted sector.

The evidence in this essay reveals that on average foreign aid is fungible. Similar results are also found in a number of other studies. Even though this study accounts for untied aid in the fungibility equation (no other studies have done this) there is still evidence of fungibility and the overall extent of fungibility seems relatively high. The average estimate is 0.72 suggesting that for every one dollar of total aid received; only $0.28 is spent on public expenditures. However, this result should be interpreted with caution since some of the countries in my sample had very large (or very small) fungibility estimates which could be impacting the average. Despite these concerns, however, it is obvious that fungibility continues to be an issue for tied aid. The effectiveness of foreign aid is generally challenged on the grounds that donors' interest and recipients need do not coincide and the evidence found in this paper seems to be in support of this. Hence, one could conclude that though the switch to untied aid increases expenditures in the sectors thought to be apt for growth and development, fungibility continues to affect the effectiveness of tied even with the accounting for untied aid.

ESSAY 2

INTERNATIONAL DEBT FORGIVENESS AND TAX EFFORT: A PANEL DATA ANALYSIS

Introduction

One of the most important development issues facing the international community for several decades now has been the low levels of public expenditures in infrastructure and social services in developing countries.[22] Low levels of public spending may have been responsible for placing many of these countries in a poverty trap. Breaking out of this trap requires, among others, a combination of international aid in the form of technical assistance with low cost loans and increased sustained tax effort by the developing countries themselves. However, international aid, especially when it is accompanied with debt forgiveness, can interact with domestic tax effort in some perverse ways, which can compromise the sustainability of these fundamental development goals. And even though, there has been considerable interest in the economic literature on the separate topics of tax effort in developing countries,[23] and international assistance and debt forgiveness,[24] the interaction between these two issues has not yet been explored in the literature.

The issue of debt forgiveness has generated much debate in both the academic and policy literatures, and rightly so. For example, under the Heavily Indebted Poor Country (HIPC) Initiative which started in 1996 and the Multilateral Debt Relief Initiative

[22] See World Development Reports [1998/1999; 2000/2001; 2004]
[23] See Teera (2004); Alm, Martinez-Vazquez and Schneider (2004); Bird, Martinez-Vazquez and Torgler (2008)
[24] See Neumayer (2002); Ndikumana (2004); Freytag and Pehnelt (2009)

(MDRI) started in late 2005, assistance amounted to $117 billion in nominal terms over the last decade (see figure B1).[25] In 2007, this represented about one half of the GDP of these countries. In particular, at the June 1999 Cologne summit, the G-7 decided to write off approximately $100 billion of developing countries sovereign debt. The decision to write-off these debts as opposed to providing a temporary solution through debt rescheduling was seen as necessary to improve the supply of resources in these countries and to enhance investments, economic growth and development.[26] The Jubilee 2000 Campaign[27] is another initiative that called for the cancellation of third world debt. This initiative was more extensive than the HIPC initiative in that the amount earmarked for debt forgiveness ranged between $200 and $300 billion and it covered 52 countries (compared with 41 under HIPC). However, with the realization that countries still had huge debt stocks, a 100 percent forgiveness of loans to HIPC graduates was granted at the June 2005 *G-8* summit. These more generous forgiveness terms sought to ease the debt burden of developing countries and encourage physical capital accumulation which would eventually lead to higher incomes and a greater share of national income in government coffers.

However, the chain of events linking debt forgiveness to higher incomes and finally to higher tax revenues is not as straightforward as one may think because there is an inherent moral hazard problem associated with the provision of debt forgiveness. The primary problem is that debt forgiveness has the potential to lower financial discipline because recipient governments may act in future years on the expectation that new

[25] See www.worldbank/org/
[26] See table B1 in Appendix B for a discussion of the different initiatives and terms granted by Paris Club creditors.
[27] Jubilee 2000 campaign was started in the early 1990s in over 40 countries, with the main objective being the cancellation of third world debt by the year 2000.

bailouts will be received. Therefore, the act of providing debt forgiveness today can cause countries to come to expect more debt forgiveness in the future ultimately leading to a 'softening' of their budget constraint. One possible outcome of a *soft* budget constraint is that developing countries may not have an incentive to bolster their own tax effort and therefore make development a sustainable goal.

In this paper we study whether the expectation of debt forgiveness actually acts to soften developing countries' budget constraints by investigating in particular how debt forgiveness, after controlling for other economic and institutional variables, actually affects tax effort.

Tax effort – defined in this paper as the tax ratio or tax revenues as a share of Gross Domestic Product (GDP) - reveals a government preference for taxing or not its existing tax base.[28] In general, tax effort in developing countries is considerably lower than in developed countries.[29] Low tax effort in turn leads developing countries to face difficulties, sometimes extreme, to keep up with their debt service payments and all other budgetary demands.

Beyond investigating the impact of debt forgiveness on tax effort, one must ask whether a reverse causation is actually in place; that is, whether countries with lower tax ratios were provided with more debt forgiveness. This is important from an empirical estimation viewpoint to allow for the endogeneity of tax effort and debt forgiveness, but

[28] See Roy Bahl (1971); Teera (2004); Gupta et al (2003), Alm, Martinez-Vazquez and Schneider (2004); Bird et al (2008). Note that in some of this literature a distinction is made between the tax ratio (tax revenues to GDP) and tax effort defined as the proportion of potential revenues that are actually collected, and where potential revenues are defined as those obtained by multiplying the actual tax bases (or their proxies) by average effective rate for the countries in a particular group category. See, for example, (Bird et al (2008).

[29] The average tax revenues found in many developing countries is around 10-15 percent which is relatively low when compared to say OECD countries with tax collections around 40 percent (see, e.g., Kaldor (1963) and Tanzi and Zee (2000:303)). Countries such as Niger and Guatemala all have below average tax revenues and are struggling to increase this above 11 percent.

also important from a policy viewpoint. Examining this issue will allow us to see if on the one hand the international financial community is saying one thing but in reality practicing something very different. In particular, the Paris club creditors have been urging developing countries (HIPC) to improve their revenue collections above 15 percent of GDP to qualify for assistance under the HIPC initiative, however, those countries that have lower tax efforts are treated preferentially in term of debt forgiveness investigate and differently in general from non-HIPCs in that they received larger debt reductions than any other country group.[30]

One of the underlying reasons given in the literature for the low tax effort observed is the lack of political will to tap into existing 'taxable capacity" with existing tax structures and, in general, to increase taxes. Other factors such as weak administrative capacity, the level of income inequality as measured by the gini coefficient, high levels of corruption, less developed manufacturing sector—traditionally easier to tax—and predominance of agricultural sector—traditionally harder to tax have been identified.[31] However, as was put by Kaldor (1963) many decades ago, even the poorest of countries have sufficient 'capacity' both in economic and administrative terms to tax more than they do.[32] Therefore, it is important to ask what may actually be behind the overall reluctance to tax. The lack of political will explanation is of little use from a policy perspective and it actually may mask other reasons which can be addressed with the right policies. In this paper we explore to what extent the otherwise well-intentioned actions of the international financial community can be an important cause of the low tax

[30] See www.clubdeparis.org/
[31] See, for example, Bird et al. (1971); Gupta (2003); Alm, Martinez-Vazquez and Schneider (2004); Bird et al. (2008); Alonso et al. (2011)
[32] See Kaldor (1963)

effort observed among developing countries. In order to understand how significant debt forgiveness may be in influencing tax effort, it will be necessary to take into consideration the potential endogeneity of debt forgiveness itself. There is a strong indication that our variable of interest is endogenous because among the criteria used by the international financial community to include a country in the list of those deserving forgiveness is low level of revenues generated by a country, which are likely to show up in high deficits, low levels of spending on infrastructure and social services, and so on.

The challenge ahead is to be able to find appropriate instruments for debt forgiveness in our regression analysis to successfully address the endogeneity issue. The literature on debt forgiveness/debt relief does not identify any unique instrument(s) for this variable.[33] Therefore, we start with a 2SLS approach, first estimating an equation of debt forgiveness controlling for factors that may affect the need or merit of a particular country for debt forgiveness, plus the political-strategic relationship between donor countries and the developing country, and the overall governance of the developing country. However, there is a caveat about using this methodology since it does not capture potential dynamism that possibly exists in the relationship we are attempting to study. Therefore, to take into consideration the possibility of dynamism in this relationship, we also use the System Generalized Method of Moments (GMM) estimator. System GMM however, is not without its own limitations. The model we are estimating has a proportional left-hand side variable which system GMM cannot adequately address. Therefore, we also use quasi-maximum likelihood estimation to account for the fractional response variable in our model.

[33] See for example, Neumayer (2002); Ndikumana (2004); Freytag et al. (2009)

The model is estimated using a panel data set of 66 countries over the period 1989-2006. To exploit the panel nature of the data we control for fixed country and year effects in all three estimation methods. The principal finding of the paper is that debt forgiveness actually triggers a decline in tax ratios. In other words, debt forgiveness would seem to act as a substitute for politically costly increased tax revenues.

As in the previous literature we also find that structural factors such as per capita GDP, manufacture value added in GDP, services value added in GDP, and trade openness are strong determinants of tax ratios.

The rest of the paper is organized as follows. Section two presents a review of the literature. Section three presents the theoretical framework. The empirical model and a discussion of the data follow in Sections four and five respectively. Estimation results are discussed in Sections six. The paper concludes in section seven with some policy implications.

Literature Review

Tax revenues are essential for providing public goods and services in a sustainable manner. According to Kaldor (1963), the key indicator of whether a country can transition from a position of aid-dependency to one of economic self-sufficiency depends on if a state learns how to tax, thereby halting the vicious cycle of aid reliance. Aid dependency has long been recognized for its deleterious effects on tax revenues. According to Bauer (1972), foreign aid can create perverse incentives and lead states' to collect less revenues. Further, he argues that large increases in aid flows can create dysfunctional state institutions and as such he expresses much skepticism about the desirability of such aid. Azam et al. (1999) present similar arguments, claiming that if a

country can cut its ‘aid umbilical cord’ and engage in learning-by-doing in the public sector, the overall level of tax revenues may be positively impacted.

The potential effects of aid dependency were not studied in the traditional tax effort literature. This literature considered a limited set of variables as possible determinants of tax effort (Lotz and Morrs, 1967; Bahl 1971; Chelliah 1971; Chelliah et al 1975; Tanzi, 1981). These variables include GDP per capita, the degree of openness of the economy, the non-agricultural share of GDP, and in some cases population growth (Tanzi, 1992; Leuthold, 1991). However, there were some exceptions. In particular, Leuthold (1991) views foreign aid as non-earned source of revenue. And, consequently, a government that receives significant amounts of aid is thought to have less incentive to tax and improve its tax administration.

A number of studies have investigated the impact of foreign aid on tax effort, although none of these studies have investigated the issue of debt forgiveness. However, the evidence provided thus far is inconclusive. Pack and Pack (1990) studied the impact of foreign aid on both expenditures and revenues in Indonesia. This study uses highly disaggregated time series data on expenditure and foreign aid. They found that foreign aid stimulates an approximately equivalent change in expenditures with half the increase being financed by an increase in the revenues raised by Indonesia from its own sources. Therefore, tax effort in Indonesia increases as a result of foreign aid. It is important to note that the studies of foreign aid on tax effort have evolved over the last couple of years. With the availability of data, the more recent studies use both cross-section and times series data to study the impact of foreign aid on tax efforts. Ghura (1998) examines the effect of the conventional tax effort variables and foreign aid in a panel of 39 sub-

Saharan African countries for the period 1985-1996. Foreign aid is significant and negatively correlated with tax shares of GDP. Feyzioglu, Swaroop and Zhu (1998) use a panel of 38 developing countries to study the relationship between foreign aid and public spending in recipient countries. They show that an increase of $1.00 in foreign aid leads to an increase of $0.33 in total government spending with the remainder being used for tax relief. Brautigam (2008) categorized African countries according to their aid dependency ratio – the share of aid in GDP – and found that 71 percent of these countries had tax effort lower than 10 percent. Also, Remmer (2004) using a panel of middle and lower-income countries for the period 1970-1999 provides evidence of depressing effects of aid on domestic revenue mobilization.

While these studies find negative and significant effects of aid on tax effort, there are some studies that find zero-effect. Leuthold (1991) uses a panel of 8 African countries for the period 1973-1981 and she finds a negative effect of aid on tax revenues, however, the estimate was insignificant. Teera and Hudson (2004) use data for 116 developed and developing countries for 1975-1998, also find a zero effect of aid on tax effort. Franco-Rodriguez (2000) provides evidence to suggest that foreign aid appears to induce tax efforts with a positive effect on recurrent revenue. Mavrotas (2002) using time-series data on India and Kenya over the time period 1970-1990 and 1970-1992 respectively provides empirical estimates of the impact of aid on tax efforts in these countries. He finds that the presence of aid does not necessarily increase tax effort in India but that it does in Kenya.

Also more recently, several studies have taken the composition of aid into account when examining its impact on tax effort. Brun et al. (2007) examine the revenue effects of aid, by examining whether different approaches to transferring aid (eg. grants and

loans) could help to limit or offset the potentially negative effects of aid on revenue raising. They found an overall positive effect of aid, both loans and grants, on tax efforts in developing countries. A similar result was found by Otim (2004). In that study Otim finds that in a pooled sample of three South Asian economies, grants are more likely to leak into consumption than loans. Therefore, he suggests that domestic investment stimulation can be achieved via loans extended to developing countries rather than grants, and he also finds that both grants and loans increase tax efforts. Gupta et al. (2003) find a somewhat different set of result for the impact of grants and loans on tax revenues. They use a panel of 107 developing countries over the period 1970-2002 and focus on the revenue response of foreign aid inflows by separating total net aid into grants and loans to test if the impact of grants on domestic revenue is different from that of concessional loans. They report results of possible substitutability of tax revenue with grant monies since grants are generally considered to be free money that need not be repaid. On the other hand, loans come at a price since they must be repaid. Therefore at the very minimum governments must maintain at least the current levels of tax revenue according to Brautigam (2008). Khan and Hoshino (1992) also provide some empirical evidence that grants reduce tax effort while loans increase it. This result was found in a sample of five South and Southeast Asian countries over the period 1955-1976. Odedokun (2003) provides preliminary evidence that grants reduce tax effort in low-income countries, using a simple model of tax revenue as a function of per capita income and (to address potential endogeneity issues) the lagged ratio of grants to total aid in 72 developing countries. Heller (1975) finds that in a cross-section time-series sample of eleven African countries, aid not only increases investment, but simultaneously facilitates a reduction in

the level of domestic taxes. As is expected, the receipt of grant leads to a reduction in taxes for a sub-group of countries in the sample of eleven countries. Interestingly, he also finds that loans have a negative impact on taxes.

There are several country case studies for which the results are also mixed. For example, Gang and Khan (1990) find in a time series study on India, that grants and loans generally go into development projects with no leakages into consumption and ultimately leaves tax effort unchanged. In particular, they find evidence of loans and multilateral aid (most multilateral aid is composed of loans) going completely into investment in development projects.

While the composition of foreign aid is important in explaining the variations in tax ratios, the form of foreign aid is also important. For instance, Cashel-Cordo and Craig (1990) also examine the effects of foreign aid on public sector budgets of developing countries taking into consideration whether aid "strings" are successful at restricting the behavior of government. The idea is that the 'strings' attached to aid vary considerably among the three types of donor agencies.[34] They use pooled time-series cross-section data for a sample of 46 countries for the period 1975-1980. Empirically, the structure of foreign assistance is found to be crucial for determining the ultimate impact on public sector budget. The empirical results show that an additional dollar in LIMF (one type of IMF lending) funds reduces current revenues by $4.44.[35] Thus, LIMF lending significantly reduces the size of the public sector. Also, they test whether bilateral loans

[34] The donor agencies are the multilateral development banks such as the World Bank, the Asian Development Bank, Inter-America Development Bank, the International Monetary Fund (IMF) and the industrial countries comprising the Development Assistance Committee (DAC) such as USAID etc.
[35] The IMF provides loans through a number of different 'facilities' or 'window'. LIMF is a low conditionality loan that is used for mainly budget support in developing countries.

and grants have any effect on public expenditure and revenues.[36] They find ODA bilateral loans and bilateral grants from DAC countries having no significant effect in the public sector budget. However, bilateral grant does result in a $0.93 reduction in taxes. The entire grant amount, they argue, is basically used to replace other sources of public revenue and so is returned by the recipient to the private sector.

Khilji and Zampelli (1994) also examine indirectly the tax revenue effect of foreign aid. Particularly, they examine the impact of U.S military and non-military assistance on the allocation of public and private spending for eight (8) major recipients over the period 1972-1987. The results strongly suggest that U.S military assistance and non-military assistance is used to provide tax relief as private consumption increases by more than public investment.

In summary, even though the impact of foreign aid on tax effort was not considered in the earlier conventional literature on tax effort, a large number of more recent studies have analyzed those effects. Overall, the evidence is mixed. Some studies have found foreign aid to affect negatively tax effort, while other studies have found no significant effects and yet others have found a positive stimulating effect on tax effort. Some of the differences in empirical findings can be attributed to the different country samples and time periods used and also to the different methodologies. But clearly, the impact of foreign aid on tax effort realized by developing countries is far from settled. Another, perhaps more important conclusion from the perspective of this paper, is that none of the previous studies have examined the potential impact of debt forgiveness on - the tax effort of developing countries, which is the main theme of this paper.

[36] One explanation given for this result is that bilateral aid provided by the DAC countries is seen primarily to be an alternative source of financing for the LDCs and as such has little impact on expenditure.

A Simple Theoretical Framework

The Soft Budget Constraint (SBC) refers to the expectation of a bailout by an entity (in this context, an aid-receiving country government), in the event of financial distress. The concept of the SBC was first introduced by Kornai [1980; 2003]. Later, several papers have investigated the potential causes of the SBC.[37] In the context of this paper, the SBC is caused by a lack of commitment on the part of the international financial community to not bailout "profligate" poor country governments *ex post,* creating an expectation that additional bailouts will come in the future. It is important to stress at this point that debt forgiveness/bailout itself –which can be a kind of ad hoc 'additional funding' provided to poor country governments when they would otherwise be unable to service their obligations – does not constitute the SBC, but rather it is the expectation of bailouts in the future that do.[38]

Bailouts as a Sequential Game

The problem of bailout expectations can be analyzed using a sequential game played between the international financial community and an aid receiving government. In this framework, it is assumed that the aid receiving government does not have complete information about the payoffs accruing to the international financial community or donor country. The international financing community may be one of two types –

[37] Schleifer and Vishny (1994) developed the model of "politicians' influencing enterprises' behavior." It is argued that in a bid to maximize their noneconomic objectives, politicians often facilitate enterprises operating inefficiently by increasing the enterprises' employment or output. In a different model, Li et al. (1997) argues that insiders' or managers' control rights are the main cause of the SBC. Here if an insider/manager enjoys significant benefits associated with control, then when faced with a financial loss, a manager will object to liquation proceedings to avoid loss of their control benefit.
[38] See Rodden (2003)

committed or not - and the aid receiving governments must make an assessments about the probability that it is the committed type.

In the first stage of the game the international financial community must decide whether or not to provide loans. In addition, at this stage of the game it is assumed that the international financial community will also make an announcement that it is its policy to *never* allow bailouts. Officials in the aid receiving government will try to assess the credibility of this commitment, making its move at the second stage of the game in light of these assessments. At this stage, those government officials can either spend and borrow within their means, or over-borrow and attempt to shift the costs onto others. If officials in the aid receiving government borrow within reasonable limits to finance its necessities, then the game ends. However, if the officials engage in over-borrowing they may expect that the international financing community will eventually take over its obligation through providing bailouts. The donor country then makes the third move, and it must decide either to provide bailout or refuse. If the costs to the international financing community of not providing additional funds/bailouts exceed those of providing them, the donor government reveals itself to be non-committed. If the government officials in the borrowing country have strong beliefs that the international financing community is not committed at the first stage of the game to a no-bailout policy, it has incentives to raise too little tax revenue. One consequence of raising too little taxes is that debt servicing costs will eventually become burdensome as these countries will find it increasingly difficult to keep up with servicing charges. The eventual built up of unpaid debt servicing charges will mean countries will require bailouts to keep afloat. Once a bailout is provided government officials will believe, and rightly so, that additional

bailouts will be provided again in the future. Contrastingly, if the government officials believe that the donor government will be committed to a no-bailout policy when making its fiscal decisions at the first stage, it will spend within its means by raising domestic taxes.

How are Expectations Formed?

Spillover effects or externalities can be an important element in the formation of expectations about bailouts. Commitment problems come about because of the spillovers associated with not bailing out defaulting governments. However, while some may argue that the size of a defaulting institution/country is important in the decision making process of donor institutions when deciding to choose the bailout option *ex post*, others are not so convinced by the 'too large to fail' argument (Wildasin, 1999). More generally, spillovers also exist from the donor side. When a donor institution may be viewed as having implicitly guaranteed the liabilities of the borrowing country (see, for example, Bai and Wang 1999), and where the donor's own reputation would be hurt by failing on those guarantees.

There are other possible causes for the commitment problem besides the spillover effects argument. One other cause has to do with the role of a donor government in enforcing property rights against a defaulting developing country government. If the institutions in the donor country are weak, then when the donor country officials are approached by creditors to enforce their property rights in the recipient country, the donor government may be facing the prospect of failing in its obligations and thus prefer to help the creditors through a bailout of the recipient government.

In summary, the lack of credible commitment, whatever its causes, can lead developing countries (and local governments) to form expectations about future bailouts possibilities.

Theoretical Predictions

The simple theoretical framework above is sufficient to yield *a priori* expectations for the signs of the three variables that capture the existence of a soft budget constraint in the tax effort equation: (i) debt forgiveness per unit of GDP, as an annual flow; (ii) the accumulated share of debt forgiveness to GDP; and (iii) the debt forgiveness signal measured by the number of times a country has received debt forgiveness in the past.

Debt forgiveness per unit of GDP is a measure of the importance of this variable as a source of income for a country on an annual basis. We would expect that the higher the share of debt forgiveness in GDP the less incentive governments will have to improve tax collection effort in terms of enforcement of tax rates, and therefore we would likely see a reduction in tax ratios. A similar argument applies with respect to the accumulated share of debt forgiveness to GDP. The accumulated stock of past debt forgiveness is likely to create a memory in the minds of developing country officials to the extent that they come to expect that their debts will be forgiven today and in the future. These officials may then be motivated to acquire additional debt; however, the long run consequence of this is that they accumulate debts to point where it becomes unsustainable. Hence, *a priori* we would also expect in this case to see a decline in tax effort as the accumulated share of GDP rises. Finally, the debt forgiveness signal gives an indication of the number of times a country receives debt forgiveness in the past. A

higher frequency of debt forgiveness rounds could be interpreted as a positive signal that more forgiveness/bail-outs will be received in the future. Here again, *a priori* we would expect a negative relation between the tax ratio and the frequency of bail-out.

Empirical Model

The more recent empirical literature provides guidance concerning the factors affecting tax effort, and we follow this literature to build a base specification. To ensure that any inferences about the relationship between debt forgiveness and tax effort are robust, we attempt to account for the range of all known factors that can help explain the tax performance of developing countries. Since we are particularly interested in assessing the impact of a soft budget constraint on tax effort, the tax effort model is augmented to include the three variables relating to the existence of this budget constraint discussed above: namely, debt forgiveness per unit of GDP; accumulated debt forgiveness as a share of GDP and the debt forgiveness signal.

Hence, for the estimation of the model we propose the following linear unobserved effects specification:[39]

$$TE_{it} = \theta_t + \beta_1 TE_{it-1} + \beta_2 DEBTFOR_{it} + \beta_3 POP_{it} + \beta_4 XM_{it} + \beta_5 SERV_{it} + \beta_6 MANU_{it} + \beta_7 LOANS_{it} + \beta_8 GRANTS_{it} + \beta_9 \log(Y_{it}) + \eta_i + \mu_{it} \quad (1)$$

[39] We use a two-stage least squares (2SLS) technique to estimate a similar linear model specified below:
$TE_{it} = \theta_t + \beta_1 DEBTFOR_{it} + \beta_2 POP_{it} + \beta_3 XM_{it} + \beta_4 SERV_{it} + \beta_5 MANU_{it} + \beta_6 LOANS_{it} + \beta_7 GRANTS_{it} + \beta_8 \log(Y_{it}) + \eta_i + \mu_{it}$
Due to the lack of a unique instrument for $DEBTFOR$ we estimate a 'first stage equation' by regressing $DEBTFOR$ on a number of exogenous determinants including some variables not in the tax effort equation for identification purposes:
$DEBTFOR_{it} = \alpha_0 + \alpha_1 PGDP_{it} + \alpha_2 EXTDEBT_{it} + \alpha_3 DEBTSER_{it} + \alpha_4 ODA_{it} + \alpha_5 ARMS + \alpha_6 FREE_{it} + \lambda_i + \nu_{it}$
$PGDP_{it}$ is log of per capita income, $EXTDEBT_{it}$ is the share of total external debt in GDP, $DEBTSER_{it}$ is debt service to export, $LOANS_{it}$ is official development assistance (ODA) as a share of GDP, $ARMS_{it}$ is arms imports as a share of GDP and $FREE_{it}$ is political rights and civil liberties.

where i indexes the countries in the sample and t the time period. *DEBTFOR* is the variable that summarizes the existence of the soft budget constraint and is measured in the three different ways mentioned above. *TE* denotes the country's level of tax effort measured as tax revenues as a share of gross domestic product (GDP) and TE_{it-1} is its lagged value, η_i stands for country fixed effects, θ_t are time dummies, Y is GDP per capita (measured in constant US$), POP the rate of population growth, XM the share of exports plus imports in gross domestic product (GDP). To represent the non-agricultural sector, we include both services and manufacture value added as a share of GDP. Instead of including official development assistance (ODA) as a total, we disaggregate this amount into its loans and grants component to help address any possible endogeneity that may arise. μ_{it} denotes the error term.

We proceed by using the system GMM estimator suggested by Blundell and Bond (1998), and which was first proposed by Holtz-Eakin et al. (1988). Apart from the endogeneity of our variable of interest, that may be correlated with the error term there are some other econometrics issues that needs addressing. The lagged dependent variable is also endogenous because it is correlated with the country-specific fixed effects, potentially biasing the estimates. Other econometrics issues encountered include the potential correlation between the country fixed effects and other explanatory variables in the model, in addition to the relatively short time dimension (T=18) and a relatively larger country dimension (N=66) of the dataset. To address the endogeneity problem, one would usually use instrumental variables estimation (two stage least square). However, finding good instruments can be challenging. System GMM allows us to address the problem of endogeneity by way of specifying two (2) equations: one in difference and the

other in levels. The set of equations in levels uses lagged first-differences as instruments, while the set of equations in first-differences uses lagged levels as instruments. Therefore, the first-difference of equation (1) is not correlated with the errors from that equation, thus making the endogenous variables pre-determined and uncorrelated with the 'new' error term in equation (1). Further, the issue of the correlation between the fixed effects and other explanatory variables in the model is also solved by this estimation strategy since the first difference transformation ultimately gets rid of the country fixed effects. Also, the system GMM estimator was also designed to address the problem/issue of relatively small T - large N panels.[40]

To address the issue of the fractional dependent variable, we re-specify equation (1) and employ the technique of quasi-maximum likelihood estimation to estimate the model below:

$$E(TE \mid X_{it}) = \phi(\psi_{at} + X_{it}\beta_a + \bar{X}_{it}\,\xi_a) \tag{2}$$

where X_{it} = [$DEBTFOR_{it}$, POP_{it}, XM_{it}, $SERV_{it}$, $MANU_{it}$, $LOANS_{it}$, $GRANTS_{it}$, Y_{it}]. The individual variables in X_{it} are as defined above. ψ_{at} allows for a different intercept in each year. To that end, it allows the average tax ratio to change over time. $\bar{X}_i$ is the time averages for each of the explanatory variables in the regression. Note that we are only able to identify the scaled coefficients (indexed by a). However, this is precisely what we want since this is the only way the average partial effects are identified.

The main reason for specifying a fractional probit model is that the left-hand side variable in our model is a proportion and thus is bounded between zero and one. Standard

[40] In large -T panels, a shock to a country's unobserved heterogeneity will decline overtime. Similarly, the correlation of the lagged dependent variable with the error term is insignificant (Roodman, 2009). In these cases, using the Blundell and Bond (1998) estimator would not be necessary.

linear models may not provide an accurate picture of the effects of debt forgiveness on the tax ratio throughout the entire distribution of debt forgiveness. Hence, if the tax ratio depends on debt forgiveness, the relationship must be bounded – otherwise the tax ratio is eventually predicted to be greater than one. This therefore necessitates the use of quasi-maximum likelihood estimation methods.

The estimation of a separate equation for debt forgiveness is important in its own right. From a policy viewpoint it will help identify what country characteristics international donors consider in order to determine how much debt forgiveness different developing countries deserve. Estimating a separate equation for debt forgiveness will also enable us to test for the reverse causality from tax effort to debt forgiveness. We therefore specify a debt forgiveness equation as:

$$DEBTFOR_{it} = \varphi_t + \alpha_1 DEBTFOR_{it-1} + \alpha_2 TE_{it} + \alpha_3 EXTDEBT_{it} + \alpha_4 DEBTSER_{it} + \alpha_5 ODA_{it} + \alpha_6 ARMS_{it} + \alpha_7 FREE_{it} + \alpha_8 GDP_{it} + \lambda_i + \nu_{it} \quad (3)$$

All the variables in equation (3) are as defined above. Again, because of potential endogeneity of our variable of interest *TE*,[41] in addition to the presence of a lagged dependent variable, we proceed with system GMM estimation of equation (3).

Now, besides our key explanatory variables, the other explanatory variables employed in the basic model follow those in the conventional tax effort literature. The level of development of a country is proxied with per capita GDP. It is argued that a

[41] Potential endogeneity of our key right hand side variable, the tax effort (TE) calls for the use of the two-stage least squares (2SLS) technique. The model to be estimated will be:

$$DEBTFOR_{it} = \varphi_t + \alpha_1 TE_{it} + \alpha_2 EXTDEBT_{it} + \alpha_3 DEBTSER_{it} + \alpha_4 ODA_{it} + \alpha_5 ARMS_{it} + \alpha_6 FREE_{it} + \alpha_7 GDP_{it} + \lambda_i + \nu_{it}$$

However, we must first specify a 'first stage equation' since there is no unique instrument(s) for the tax effort. In this stage we regress the *tax ratio* on a range of known determinants of tax efforts including some variables not in the debt forgiveness equation for identification purposes:

$$TE_{it} = \theta_t + \beta_1 POP_{it} + \beta_2 XM_{it} + \beta_3 SERV_{it} + \beta_4 MANU_{it} + \beta_5 LOANS_{it} + \beta_6 GRANTS_{it} + \beta_7 \log(Y_{it}) + \eta_i + \mu_{it}$$

All the variables in this equation are as defined above.

higher level of development goes together with a higher capacity to collect taxes, as well as a higher relative demand for income elastic public goods and services (Chelliah, 1971; Bahl, 1971). Generally, we would expect a positive relation between the level of per capita income and the level of tax effort. Demographic characteristics also play a role in determining tax effort. The rate of population growth could have a negative relation to tax efforts if the population grows at a rate faster than the tax system is able to accommodate this change by failing to capture new taxpayers.

A frequently used measure for the availability of 'tax handles' in a country is the ratio of exports plus imports to GDP, and it is expected to positively influence the level of tax effort. Trade-related taxes are easier to collect, relative to say income taxes or other domestic taxes since the goods involved enter or leave the country at specified locations. Therefore, we expect a positive relation between the tax ratio and the degree of openness of an economy.

The sectoral composition of national income may also affect the ability to tax and collect taxes. The larger the relative importance of the agriculture sector in GDP, the lower the need to spend on governmental activities and services, since many public sector activities and services are city-based (Tanzi, 1992). According to Bird et al. (2008), a government may decide for political reasons to exempt from taxes a large share of agricultural activities. Agriculture is also well-known to be a hard-to-tax sector. Therefore a higher non-agriculture share in GDP should thus produce a higher tax ratio.

Foreign aid - consisting of loans and grants – can also impact the level of tax effort in an economy. It has been argued in the international aid literature that grants are free resources that substitute for domestic revenues, while the burden of future loan

repayments induces policymakers to mobilize taxes or, at least, to protect current levels of revenue protection (Brautigam, 2008). Therefore, we would expect grants to have a negative effect on the tax ratio while loans should have a positive effect.

One of the hallmarks of a successful tax reform, according to Bird et al. (2008) is the improvement in the quality and quantity of public services offered, which subsequently will increase overall well-being. However for such an outcome to be made possible, the political or societal institutions in a country play a vital role. Those authors argue that the fiscal reality in many developing countries does not changed significantly despite wholesale tax reform effort being undertaken. Tax revenue performance is still below expectations. They then posit that if the taxpayers' perception of the political landscape is one that does not take their interests or preferences into consideration, then tax reform effort will be unsuccessful – if success is measured in terms of tax revenue performance. If taxpayers perceive that their interests are poorly represented in political institutions and governments are more wasteful than helpful they are less inclined to vote for higher levels of taxation and comply with their tax obligations. Also, if corruption is rampant and citizens have little trust in authority then they will have a low incentive to cooperate. On the other hand, if their interests are properly represented they will have more incentive to contribute and the supply of public goods will increase to their benefit. Societal institutions, captured by corruption, voice and accountability, are used here as possible indicators of the extent to which citizens feel they have a meaningful 'voice' in influencing the state.

Data

A panel dataset covering 66 developing countries for the period 1989-2006 is used in the estimation. The starting year for our sample is determined by the availability of data for our variable of interest, debt forgiveness. Table 3 presents the summary statistics of all the variables used in the regressions. The main variable of interest is the accumulated stock of debt forgiven as a percentage of constant prices GDP. The definition of the variable as an accumulated stock is deemed more relevant toward the formation of bailout expectations than other alternative definitions, such as the current flows of debt forgiveness or even the frequency of bailouts. Debt forgiveness, as defined in the Global Development Finance (GDF) Manual of 2008 is the amount of the debt stock, principal, and/or interest that will not be paid from the beginning of the observation period to the particular year being observed.[42] This figure does not include the amounts for either debt buybacks or debt swaps since they do not reflect a reduction/change in the debt stock.

[42] It is quite likely that bailout expectations will be also affected by the amount of forgiven debt prior to the beginning of the observation period. However, I do not have reliable data on debt forgiveness prior to 1989.

Table 3. Descriptive Statistics, 1989-2006

Variable	Obs.	Mean	Std. Dev.	Min	Max
Tax revenue share of GDP	732	0.158	0.066	0.012	0.448
Debt forgiveness share of GDP	1589	0.011	0.052	0	0.942
Accumulated debt Forgiveness/GDP	1589	0.081	0.18	0	1.727
Debt Forgiveness Signal	1703	3.42	3.669	0	16
Per Capita GDP	1794	2065.76	2338.43	81.01	16787.55
Population Growth	1901	1.606	1.428	-7.855	11.181
(Exports + Imports)/GDP	1781	0.799	0.44	0.107	3.507
Services Value Added/GDP	1758	0.296	0.107	0.078	0.721
Manufacture Value Added/GDP	1759	0.501	0.118	0.165	0.818
Loans share of GDP	1554	0.062	0.087	0.00003	0.832
Grants share of GDP	1399	0.0377	0.133	-0.0011	1.94
Total External Debt/GDP	1641	0.765	0.652	0.002	5.193
Foreign Direct Investment/GDP	1736	2.82	4.102	-19.244	46.488
Free	1800	5.975	3.544	0	12
External Debt/ Export	1643	0.037	0.061	0.00003	0.688
Debt Service/Export	1467	0.163	0.131	0.0002	1.523
Arms Imports share of GDP	1639	0.003	0.017	0	0.507

We measure the dependent variable – Tax Effort – as the share of tax revenues in Gross Domestic Product (GDP). Data for this variable come from the World Development Indicators (WDI) for 2009. The data on loans and grants are taken from the Organization for Economic Co-operation and Development's (OECD.Stat) database. The data for the other control variables including GDP per capita, population growth, exports, imports, the share of agriculture in GDP, the share of manufacture in GDP and the share of services in GDP come from the WDI database. The data for the governance variables are taken from the Freedom House (2008) and the Polity IV (2009) databases. The Freedom House database reports scores on both political rights and civil liberties. These scores range on a scale from one-to-seven, with one representing the highest degree of freedom and seven the lowest. However, to facilitate easy interpretation of the

coefficients on these variables we added the reported scores for both political rights and civil liberties and then subtract the sum from 14. This means that higher values represent improved freedom.[43] The Polity IV database reports a composite measure of governance based on if a country is democratic or autocratic. This score ranges from -10 to +10 ten with +10 representing a strong democracy.

Results

The table showing the results for the tax effort model using fixed effects instrumental variables (2SLS) estimation is shown in Appendix B, table B5. As a first step we include all three proxies of the soft budget constraint in the same specification. These results are presented in column (1). As accumulated debt forgiveness increases by one percentage point, tax revenues decline by 0.28 percentage point. This result is indicative of the level of substitutability between aid monies, or more precisely forgiven debts and tax effort in our group of developing countries. Further, this result may also suggest that government officials are using aid monies to relieve the taxable population of some of its tax burden to lengthen their own political careers. The openness indicator is positive and statistically significant as expected. This is evidence to support the hypothesis that imports and exports are indeed easier to tax since they take place at specified locations. The level of growth in the population, according to theory is also supposed to affect tax revenues negatively. The result in column (1) confirms this relationship. The inclusion of annual debt forgiveness, accumulated debt forgiveness and debt forgiveness signal in specifications (2), (3) and (4) respectively, presents a somewhat discouraging picture. While both annual debt forgiveness and accumulated

[43] See Bird, Martinez-Vazquez and Torgler (2004; 2008) and Ndikumana (2004).

debt forgiveness are negatively related to tax effort they fail to achieve statistically significance. However, per capita GDP is positive and statistically significant suggesting that as income increases so does the capacity to tax. In addition, the openness indicator is also statistically significant as expected. The two-stage least squares (2SLS) methodology may, however produce bias results if there is potential dynamism in the relationship we are studying. Therefore we will proceed to estimate a dynamic model (system GMM) to account for any dynamism that may exist.

The results of the dynamic model are displayed in table 4. These results are encouraging not only because the directions of many of these estimates are in line with economic theory but also because more of these variables achieve significance which was not achieved with the fixed effects instrumental variables estimator. The inclusion of all three proxies of 'softness' in specification (1) reveals that only the debt forgiveness signal achieves significance at the 95 percent level. The two other proxies are not significant; however the direction of each of their coefficient estimates follow hypotheses. When we include each of the proxies separately accumulated debt forgiveness (column 3) is now significant, though weakly. Debt forgiveness signal (column 4) continues to be strongly significant with an improvement in significance when it is included as the only proxy of softness.

Interestingly, loan as a fraction of GDP is now positive and statistically significant across all specifications. This finding gives credence to the hypothesis by Gupta et al. (2007) that the burden of repayment of these loans propels these countries to sustain or even increase their tax collections. While statistical significance is important, economic significance is also of equal or greater importance. In terms of the loans

variable, for every one percentage point increase in loans received tax collections increased on average by at least 0.22 percentage points. Population is the other control that gains significance in two of the four regressions (see table 4) and encouragingly this significance is achieved in the expected direction. Overall, the magnitude of the coefficient estimates obtained with GMM is smaller relative to those obtained with fixed effects instrumental variables.

Table 2. GMM Regression Results to Address Endogeneity, 1989-2006

Model Estimation Method	Linear GMM Coefficient (1)	Linear GMM Coefficient (2)	Linear GMM Coefficient (3)	Linear GMM Coefficient (4)
(A) SOFT BUDGET CONSTRAINT				
Annual Debt Forgiveness	-0.0061 (0.0327)	-0.0111 (0.0364)		
Accumulated Debt Forgiveness	-0.0158 (0.0138)		-0.0306 (0.0181)*	
Debt Forgiveness Signal	-0.0023 (0.0011)**			-0.0028 (0.0010)***
B) DEVELOPMENT				
Per Capita GDP	0.0026 (0.0059)	0.0007 (0.0068)	-0.0004 (0.0074)	0.0046 (0.0056)
Population Growth	-0.0020 (0.0025)	-0.0067 (0.0028)**	-0.0062 (0.0029)**	-0.0016 (0.0024)
C) OPENNESS				
(Exports + Imports)	0.0036 (0.0065)	0.0143 (0.0087)	0.0138 (0.0092)	0.0009 (0.0067)
D) ECONOMIC STRUCTURE				
Services Value Added	0.0514 (0.0495)	0.0508 (0.0581)	0.0674 (0.0634)	0.0448 (0.0474)
Manufacture Value Added	0.0551 (0.0626)	0.0430 (0.0720)	0.0680 (0.0790)	0.0416 (0.0597)
E) FOREIGN AID				
Loans	0.2700 (0.0950)***	0.2184 (0.0988)**	0.3041 (0.1165)***	0.2828 (0.0917)***
Grants	-0.0659 (0.2611)	-0.1057 (0.3126)	-0.1235 (0.3263)	-0.0741 (0.2639)
F) OTHER VARIABLES				
Lagged Tax Ratio	0.7877 (0.1080)***	0.6947 (0.1641)***	0.6710 (0.1689)***	0.8267 (0.1058)***
Constant	-0.0193 (0.0180)	-0.0001 (0.0185)	-0.0065 (0.0200)	-0.0270 (0.0182)
Sargan (p-value)	0.110	0.270	0.524	0.401
AR(2) (p-value)	0.735	0.523	0.423	0.825
Observations	370	370	370	372

Notes: All specifications contain year dummies. *** indicates significance at 1% level, ** significance at 5% level, and * significance at 10% level. Dependent variable is the tax ratios - tax revenues divided by GDP. The standard errors for the systems GMM model are robust to arbitrary serial correlation.

Quasi-maximum likelihood estimation was also utilized in this essay. This was done with the objective of accounting for the fractional left-hand side variable that neither the 2SLS technique nor the GMM technique can handle. The results are reported in table 5. We compute average partial effects (APEs) to make them comparable to the estimates obtained in the linear model. Encouragingly, these results tell a similar story. When all three proxies are included in specification (1) (table 5) only the debt forgiveness signal achieves significance. However, unlike in the linear models the annual debt forgiveness flow (column 2) now becomes significant at a 95 percent level. This coefficient estimate may be interpreted to mean that a one percentage point increase in the annual amount received in debt forgiveness can possibly lead to as much as a 0.45 percentage point decline in tax revenues. A similar story can be told about accumulated debt forgiveness (column 3) and the debt forgiveness signal (column 4). Both of these coefficient estimates are negative and strongly statistically significant. In addition to all of the proxies being in line with economic theory, per capita GDP is now positive and statistically significant across all specifications in table 5. For example, in specification (1**,** table 5) this coefficient estimate can be interpreted to mean that a 10 percent increase in per capita GDP (which captures the level of development within a country) will likely lead to a 0.4 percentage point increase in the tax ratios of countries. The result obtained for services value added as a share of GDP is unexpected. This variable is included in the model to capture the ease with which a government can tax such sector; as such we expect to find a positive coefficient. However, this estimate turns out to be negative and statistically significant across all specifications.

Table 3. Fractional Probit Regression Results, 1989-2006

Model Estimation Method	Fractional Probit QMLE Coefficient (1)	APEs (1)	Fractional Probit QMLE Coefficient (2)	APEs (2)
(A) SOFT BUDGET CONSTRAINT				
Annual Debt Forgiveness	-0.3780	-0.0321	-6.3075	-0.4541
	(4.3258)	(0.3677)	(3.0217)**	(0.2176)**
Accumulated Debt Forgiveness	-0.5662	-0.0481		
	(0.9847)	(0.0837)		
Debt Forgiveness Signal	-0.0412	-0.0035		
	(0.0150)***	(0.0013)***		
(B) DEVELOPMENT				
Per Capita GDP	0.4984	0.0424	0.2415	0.0174
	(0.1568)***	(0.0133)***	(0.1466)*	(0.0106)*
Population Growth	-0.0232	-0.0020	-0.0116	-0.0008
	(0.0451)	(0.0038)	(0.0562)	(0.0040)
(C) OPENNESS				
(Exports + Imports)	-0.0973	-0.0083	-0.0673	-0.0048
	(0.1441)	(0.0122)	(0.2168)	(0.0156)
(D) ECONOMIC STRUCTURE				
Services Value Added	-1.5783	-0.1342	-1.9226	-0.1384
	(0.6821)**	(0.0580)**	(0.7408)***	(0.0533)***
Manufacture Value Added	-0.7591	-0.0645	-0.8927	-0.0643
	(0.6337)	(0.5390)	(0.6548)	(0.0471)
(E) FOREIGN AID				
Loans	-1.3006	-0.1106	0.0344	0.0025
	(1.3359)	(0.1136)	(1.3353)	(0.0961)
Grants	3.5929	0.3054	3.2315	0.2327
	(5.5540)	(0.4721)	(5.0921)	(0.3666)
Constant	-1.5588	-0.1325	1.4597	0.1051
	(0.2236)***	(0.0190)***	(0.2218)***	(0.0160)***
Scale factor	.085		.072	
Observations	272	272	272	272

Notes: All models contain year dummies. For the fractional probit model, standard errors are obtained by bootstrapping using bootstrap replications. *** indicates significance at 1% level, ** indicates significance at 5% level, * indicates significance at 10% level. Dependent variable is the tax ratios - tax revenues divided by GDP.

Table 5 cont'd: Fractional Probit Regression Results, 1989 - 2006

Model Estimation Method	Fractional Probit QMLE Coefficient (3)	APEs (3)	Fractional Probit QMLE Coefficient (4)	APEs (4)
(A) SOFT BUDGET CONSTRAINT				
Accumulated Debt Forgiveness	-1.9201 (0.4887)***	-0.1152 (0.0293)***		
Debt Forgiveness Signal			-0.0501 (0.0126)***	-0.0036 (0.0009)***
(B) DEVELOPMENT				
Per Capita GDP	0.3403 (0.1538)**	0.0204 (0.0092)**	0.5197 (0.1365)***	0.0359 (0.0094)***
Population Growth	-0.0227 (0.0483)	-0.0014 (0.0029)	-0.0213 (0.0541)	-0.0015 (0.0037)
(C) OPENNESS				
(Exports + Imports)	-0.0985 (0.2477)	-0.0059 (0.0149)	-0.1064 (0.1625)	-0.0073 (0.0112)
(D) ECONOMIC STRUCTURE				
Services Value Added	-1.7516 (0.7119)**	-0.1051 (0.0427)**	-1.5186 (0.6578)**	-0.1048 (0.0454)**
Manufacture Value Added	-0.9511 (0.7721)	-0.0571 (0.0463)	-0.6750 (0.5801)	-0.0466 (0.0400)
(E) FOREIGN AID				
Loans	-1.0741 (1.0952)	-0.0644 (0.0657)	-1.1821 (1.3211)	-0.0816 (0.0912)
Grants	2.9268 (4.8328)	0.1756 (0.2899)	3.7673 (4.8393)	0.2599 (0.3339)
Constant	-1.3592 (0.2023)***	-0.0816 (0.0121)***	-1.6748 (0.1518)***	-0.1156 (0.0105)
Scale factor	0.060		0.069	
Observations	272	272	272	272

Notes: All models contain year dummies. For the fractional probit model, standard errors are obtained by bootstrapping using bootstrap replications. *** indicates significance at 1% level, ** indicates significance at 5% level, * indicates significance at 10% level. Dependent variable is the tax ratios - tax revenues divided by GDP.

In summary, the proxies for the soft budget constraint do seem to have a robust impact on the tax ratios for the countries in our sample once we take into account other factors such as openness, per capita GDP, loans, grants and population growth. These results give credence to the hypothesis that the amount of tax collected depends on the frequency and intensity of bailouts.

Another interesting question that arises is whether countries with lower tax ratios were provided with more debt forgiveness. This is part of the endogeneity of the tax ratio and debt forgiveness story but also, as argued in the previous section, an important policy question on its own. In an attempt to answer this question, we estimated equation (3)

using three different measures of the left-hand side variable. These are the annual debt forgiveness flow per unit of GDP, accumulated debt forgiveness and debt forgiveness signal. The results for the fixed effects instrumental variables approach are reported in table 6. Table 7 contains the results from the systems GMM estimation strategy. The results in table 6 are mixed. The tax ratio is not significantly different from zero in any of these specifications. The non-significance of the tax ratio could be a consequence of the poor first stage statistics. Per capita GDP is negative across all specifications as expected but significant in only the specification with accumulated debt forgiveness flow as the dependent variable. Total external debts per unit of GDP and debt service as a share of export are negative and statistically significant in some of the specifications. These findings runs counter to expectation. However, arms imports share of GDP is positive but weakly significant. Again, due to the weakness of the first stage statistics from the fixed effects instrumental variables estimation we went ahead and employ the systems GMM estimation strategy

Table 4. 2SLS Regression Results allowing the Tax ratio to be Endogenous, 1989 -2006

Model Estimation Method Dependent Variable	Linear 2SLS Coefficient Annual Flow (1)	Linear 2SLS Coefficient Accumulated Flow (2)	Linear 2SLS Coefficient Signal (3)
(A) TAX EFFORT			
Tax Revenues to GDP	-1.5727 (1.9988)	1.0046 (2.1785)	19.9786 (37.0577)
(B) NEEDS			
Per Capita GDP	-0.0119 (0.0996)	-0.3280 (0.1662)*	-0.6466 (2.6692)
Total External Debt to GDP	0.0445 (0.0619)	-0.2794 (0.1184)**	-2.4810 (1.2755)*
Debt Service to Export	-0.0134 (0.0069)*	-0.0207 (0.0179)	0.0688 (0.1144)
(C) POLITICAL INTEREST			
Arms Imports	-0.1709 (0.6116)	1.5683 (0.8175)*	20.9699 (12.4992)
(D) GOVERNANCE			
Political Rights and Civil Liberties	0.0027 (0.0038)	0.0123 (0.0072)*	-0.1896 (0.1383)
(E) OTHER CONTROLS			
Official Development Assistance	0.7879 (0.4672)	0.0693 (0.2457)	3.7873 (6.2187)
Hansen *J* (p-value)	0.409	0.399	0.576
Observations	424	424	425

Notes: All specifications contain year dummies. *** indicates significance at 1% level, ** significance at 5% level, and * significance at 10% level. The standard errors for the fixed effects instrumental variables model are robust to arbitrary serial correlation.

The findings from the systems GMM estimations are reported in Table 7. These results are more optimistic. Our variable of interest, the tax ratio, is negative and statistically significant in two of the three specifications. On average, for every one percentage point less of tax revenues collected a country receives as much as 2.5 percentage point increase in debt forgiveness. This finding provides support to the hypothesis that the international financing community, with its well-intentioned action to lessen the debt burden of these countries could actually be perpetuating a cycle of poverty. In this sense, these countries will find it increasingly difficult to provide the necessary social services and infrastructure needed for the achievement of the targeted goals of growth and development. Overall, the controls perform reasonably well. Per capita GDP which indicates the level of development of a country and therefore its need

for debt forgiveness is negative and strongly significant in two of our specifications. Total external debts per unit of GDP and debt service to export are two other controls that are indicative of the need of a country for debt forgiveness. Specification 3 (table 7) shows that these coefficients are in line with our theory: that is, as the external debts of these countries increases to levels beyond what is sustainable so too will debt servicing costs. Therefore debt forgiveness will be necessary to help remove the stronghold that such debts places on the growth and development of these countries. Specification 1 (table 7) shows a negative effect of total external debts per unit of GDP on annual debt forgiveness but this impact is at best weakly significant. Institutional quality/governance has a positive impact on both accumulated debt forgiveness and debt forgiveness signal. This suggests that donors have a preference for economies that has better institutional quality or that are better governed. Finally, official development assistance as a share of GDP has the expected sign suggesting that the more ODA a country accumulates, the more debt forgiveness it will eventual need to prevent a situation of debt overhang.

Table 5. GMM Regression Results allowing the Tax ratio to be Endogenous, 1989 -2006

Model Estimation Method Dependent Variable	Linear GMM Coefficient Annual Flow (1)	Linear GMM Coefficient Accumulated Flow (2)	Linear GMM Coefficient Signal (3)
(A) TAX EFFORT			
Tax Revenues to GDP	-2.4717	-1.7655	-1.2108
	(1.0622)**	(0.3979)***	(2.0351)
(B) NEEDS			
Per Capita GDP	0.0202	-0.0858	-0.3114
	(0.0487)	(0.0209)***	(0.1485)**
Total External Debt to GDP	-0.0606	-0.0218	0.2351
	(0.0316)*	(0.0141)	(0.1003)**
Debt Service to Export	-0.0005	0.0010	0.0060
	(0.0010)	(0.0005)	(0.0028)**
(C) POLITICAL INTEREST			
Arms Imports	0.2752	0.1028	-0.6728
	(2.1381)	(1.4088)	(8.3502)
(D) GOVERNANCE			
Political Rights and Civil Liberties	-0.0042	0.0091	0.0571
	(0.0068)	(0.0028)***	(0.0199)***
(E) OTHER CONTROLS			
Official Development Assistance	2.2282	0.5775	-3.5422
	(1.1758)	(0.3385)*	(2.9522)
(F) LAGGED DEPENDENT VARIABLE			
Annual Debt Forgiveness	-0.1914		
	(0.6070)		
Accumulated Debt Forgiveness		0.8521	
		(0.0379)***	
Debt Forgiveness Signal			1.0777
			(0.0197)***
Constant	0.2622	0.8427	1.6578
	(0.2404)	(0.1505)***	(0.8254)**
AR(2) p-value	0.315	0.121	0.511
Sarjan p-value	0.344	0.374	0.209
Observations	403	403	404

Notes: All specifications contain year dummies. *** indicates significance at 1% level, ** significance at the 5% level, and * significance at 10% level. Dependent variable is the tax ratios - tax revenues divided by GDP. The standard errors for the systems GMM model are robust to arbitrary serial correlation.

Conclusion

The main conclusion of this paper is that the international financial community may be doing more harm than good by relieving developing countries of their loan repayment obligations. The results show that prolonged debt forgiveness is likely to create a disincentive to poor countries seeking to improve their tax effort. Further, the test to see whether reverse causality is actually present confirms our suspicion. This result shows that as countries reduce their tax intake they are given more and more debt forgiveness to make up for the shortfall in tax revenues. Therefore one can safely conclude that while the international financing community is encouraging these countries to increase their tax intake, they unintentionally created the problem of low tax revenues by providing more debt forgiveness to these countries. These results may be comforting to the detractors of this mode of assistance provided to developing countries who often argue that it might lead them to engage in over-borrowing with the expectation that their creditors will forgive them time and again. Thus perpetuating a cycle of aid dependence, which in and of itself can lead to chronic macroeconomic imbalances due to the volatility of this mode of financing. Also, some would argue that debt forgiveness initiatives are an insufficient remedy to the economic problems facing poor countries and these results in some ways confirm their conjecture. The evidence shows a consistently lower level of tax revenue collection across the different specification which will ultimately mean lowered or sub-standard public service provision and lower growth possibilities.

These results have a particular strong policy implication for both developed countries and developing countries. In the case of developed countries, they could include restrictive covenants in debt forgiveness contracts that compel developing countries to

sustain or even to increase their current tax collections effort. In addition, the international financial community could tie access to debt forgiveness monies to the creditworthiness of developing countries. The idea is, if developing countries continue to use debt forgiveness monies as a substitute for raising their own tax revenues, then the pool of funds available for debt forgiveness will eventually dry-up. So if it is tied to some measure of creditworthiness then that could induce developing countries to raise their tax efforts. Failure on the part of developing countries to increase tax efforts could result in them losing access to future loans.

The most important contribution of this paper has been to extend the conventional model of tax effort, showing that debt forgiveness can significantly contribute to impede the development of sustainable fiscal systems in the developing world, and that the damage is increased with the amount and frequency of debt forgiveness. Of course, in order to fully understand the tax performance of any one country one needs to pay close attention to the fact that debt forgiveness decisions are made on a case-by-case basis and are tailored to each debtor country's individual situation. However, the estimated average effects found in this paper should bring significant caution with the implementation of this type of policy by the international community.

CONCLUSION

This dissertation examines empirically the fiscal response of government to foreign aid. The first essay examines specifically whether the switch from tied aid to untied aid affect spending in critical public expenditure sectors; namely, health, education, housing and community amenities. Further to this question, we revisit the old question of fungibility of foreign aid to analyze the overall extent of fungibility in light of the switch to untied foreign aid, the now more popular mode of transferring assistance to developing countries. The question therefore is whether national domestic priorities coincide or not with what the international community has traditionally deemed should be priority.

To test these predictions we use country-by-country data for 57 countries for the 1973-2006 period. As expected, average spending in the pro-poor expenditure sector (PPE) increased with increases in untied foreign assistance. We also find that, on average, more is spent out of a dollar of untied foreign aid s in the PPE sector than is the case with tied foreign aid. In addition, the results also suggest that fungibility is still an issue even after accounting for the effects of untied aid. However, one could argue that fungibility may not be as bad as it appears since the switch to untied aid improves spending in the sectors that are essential for growth and development.

The second essay examines whether tax effort is affected by the frequency and intensity of debt forgiveness. In an attempt to answer this question, a second question arose, that is, are countries with lower tax ratios provided with more debt forgiveness? This latter question is important empirically, but from a policy perspective it is also important to investigate whether the well-intentioned action of the international financial

community is perpetuating a cycle of low tax revenues among the countries in our sample. The key prediction of our theoretical framework is that the frequency and intensity of debt forgiveness will negatively affect tax effort since the recipients of 'bailout' will no longer have the burden of repayment, ceteris paribus. To test these hypotheses, we use a country-level dataset of debt forgiveness over the 1989-2006 period.

Our empirical analysis reveals that the frequency and intensity of bailouts have a significantly negative impact on tax effort. We theorize that the 'negative' effect of debt forgiveness is possible, especially if there is a lack of commitment on the part of the international financial community to not bailout "profligate" poor country governments *ex post*, as this will create an expectation that additional bailouts will come in the future. The evidence provides some support for our hypothesis as we show that the frequency and intensity of bailouts produces a negative effect on tax effort.

The complex interplay of foreign aid, government spending and tax effort is important for policymakers to understand as they attempt to achieve the targeted growth and development outcomes associated with the millennium development agenda. A worthwhile extension of these essays would be to account for the impact of foreign direct investment which could prevent sustainable increases in tax revenues and thus perpetuate low levels of spending on well-needed social services and infrastructure.

APPENDIX A

Table A1: Descriptive Statistics, 1973-2006

Country	Obs.	PPE	OTH	AID	OAID	AIDNS	GNIPC
Argentina	23	80.863	178.126	0.721	2.195	0.049	4874.73
Bangladesh	12	2.777	10.172	0.788	6.784	0.042	169.19
Belize	17	138.679	244.703	29.386	64.260	154.908	1510.77
Bhutan	22	36.708	121.564	14.910	44.656	32.81	415.52
Bolivia	20	45.046	58.871	14.210	37.889	2.703	761.07
Botswana	23	206.367	235.556	31.839	51.161	156.30	1344.15
Brazil	11	64.618	139.925	0.186	0.966	0.289	2070.63
Burkina Faso	15	6.621	9.607	4.033	16.561	39.197	215.005
Burma	12	6.706	14.941	0.751	6.629	2.799	196.644
Burundi	8	7.174	15.862	7.701	10.504	18.269	138.207
Cameroon	23	30.871	71.641	3.869	13.439	8.620	747.098
Chile	19	242.621	173.598	2.026	3.777	5.286	3273.20
China	9	1.081	14.158	0.344	1.545	0.020	518.740
Colombia	9	99.393	81.765	0.977	2.658	5.443	1774.17
Costa Rica	14	200.902	111.592	5.343	16.443	0.576	1613.36
Dom. Republic	12	48.167	73.254	3.403	8.615	0.834	904.233
Egypt	21	52.225	66.203	7.094	20.255	0.546	674.199
El Salvador	29	39.884	60.878	9.104	22.199	37.730	1186.25
Ethiopia	26	5.344	10.750	1.850	5.395	9.650	117.418
Fiji	19	161.895	232.959	15.873	32.321	93.256	1822.03
Ghana	20	18.376	24.201	2.932	12.485	18.169	401.063
Guatemala	13	26.594	47.770	4.516	5.528	0.771	1067.62
India	27	4.458	12.560	0.390	1.433	0.187	308.854
Indonesia	26	19.504	61.595	0.947	4.126	2.462	580.980
Iran	12	112.146	133.853	1.404	0.971	2.183	1491.99
Jordan	32	116.891	217.793	48.086	116.227	8.120	1412.81
Kenya	21	27.837	36.098	6.285	14.534	30.027	339.133
Liberia	11	37.076	91.314	6.418	17.673	22.902	571.535
Madagascar	11	7.544	16.461	6.242	11.672	13.456	219.260
Malawi	13	9.911	30.044	4.774	12.56	10.990	182.222
Maldives	19	184.618	241.209	43.811	54.750	61.942	1018.38
Mali	12	8.006	13.491	6.808	22.253	0.637	213.002
Mauritius	27	161.154	191.487	8.090	24.455	86.933	2259.23
Mexico	10	176.582	128.479	0.569	1.456	1.583	3388.35
Mongolia	15	10.990	27.277	8.409	62.592	20.509	369.186
Morocco	19	60.796	102.233	4.830	13.076	0.031	902.414
Nepal	33	6.185	16.386	3.054	10.329	13.757	181.788
Papua New Guinea	12	71.643	108.310	13.967	28.013	1.987	805.773
Paraguay	20	26.082	45.722	4.480	12.698	9.190	1183.81
Philippines	33	27.208	57.451	1.432	6.464	0.902	775.963
Solomon Islands	12	54.873	99.141	19.795	82.638	237.597	531.276

Table A1 cont'd: Descriptive Statistics, 1973-2006

Country	Obs.	PPE	OTH	AID	OAID	AIDNS	GNIPC
Sri Lanka	24	21.092	45.125	4.112	17.076	20.029	432.48
St. Vin. & Gren.	15	235.757	399.463	27.414	33.703	137.881	2304.97
Syria	8	29.079	92.822	4.537	13.931	1.224	955.29
Tanzania	8	17.487	49.142	4.482	17.594	48.818	276.66
Thailand	30	76.662	99.363	1.210	8.034	2.799	1363.51
Tonga	11	84.347	264.485	17.351	132.465	3.879	827.821
Tunisia	27	138.943	206.480	4.790	18.836	1.169	1410.06
Turkey	20	113.259	222.429	1.301	2.209	1.471	2178.18
Uganda	8	5.466	11.101	1.140	5.976	0.080	223.786
Uruguay	22	166.432	207.582	4.418	5.226	3.474	3940.14
Vanuatu	9	96.619	201.282	17.718	132.484	445.688	978.390
Viet Nam	12	12.727	11.817	2.651	10.826	0.260	341.329
Yemen	7	23.830	40.277	7.194	6.361	0.067	294.074
Zambia	23	36.702	93.996	9.106	30.078	11.497	503.476
Zimbabwe	9	70.387	86.213	7.484	10.137	8.270	675.608

Table A2: Fungibility Estimates from earlier case studies

Authors	Country (Period)	Fungibility (0/1)
Pack and Pack (1990)	Indonesia (1966-1986)	-0.411 (=0)
Pack and Pack (1993)	Dominican Republic (1968-1986)	1.049 (=1)
Ekman and Metell (1993)	Kenya (1971-1991)	-0.038 (=0)
Pack and Pack (1998)	Sri Lanka (1960-1986)	0.802 (0.802)
Pettersson (2007)	Indonesia (1974-1999)	-0.45
Pettersson (2007)	Dominican Republic (1981-1992)	3.12
Pettersson (2007)	Kenya (1978-1998)	0.35
Pettersson (2007)	Sri Lanka (1974-1997)	1.05
My estimates	Indonesia (1974-1999)	0.941
My estimates	Dominican Republic (1981-1992)	2.129
My estimates	Kenya (1978-1998)	0.979
My estimates	Sri Lanka (1974-1997)	1.006

Table A3: Data Definition and Sources

Variable	Definition	Source
Pro-poor Expenditures sectors (PPE)	Education + Health + Housing & Amenities expenditures divided by total population	GFS and Author's Calculation
Other Expenditures sectors (OTH)	General Public Services + Public Order and Safety+ Recreational, Cultural and Religious Affairs Services expenditures divided by total population	GFS and Author's Calculation
Non-Aid Supported expenditure sectors (NAE)	Defense + Social Security and Welfare + Miscellaneous expenditure	GFS and Author's Calculation
Population	Total Population	WDI(2008)
Aid to Pro-poor expenditure sector (AID)	This variable measures the share of sectoral aid allocated to the pro-poor expenditure sector.	Pettersson (2007) and CRS/DAC database
Aid to Other Expenditure sector (OAID)	This variable measures the share of sectoral aid allocated to the 'other' expenditure sector.	Pettersson (2007) and CRS/DAC database
Untied Aid (AIDNS)	This variable measures the amount of aid not allocated to any of the development sector.	CRS/DAC database
Emergency Aid	This is included as a dummy variable for the years a country experienced a disaster	Pettersson (2007) and CRS/DAC database
Gross National Income	The total output of a country divided by population.	GFS
Revenue	Total own source revenues plus any aid (tied and untied) received.	GFS

Table A4: Sample of Countries

Argentina	Kenya	Vanuatu
Bangladesh	Liberia	Viet Nam
Belize	Madagascar	Yemen
Bhutan	Malawi	Zambia
Bolivia	Maldives	Zimbabwe
Botswana	Mali	
Brazil	Mauritius	
Burkina Faso	Mexico	
Burma	Mongolia	
Burundi	Morocco	
Cameroon	Nepal	
Chile	Papua New Guinea	
China	Paraguay	
Colombia	Philippines	
Costa Rica	Solomon Islands	
Dominican Republic	Sri Lanka	
Egypt	St Vincent & Grenadines	
El Salvador	Swaziland	
Ethiopia	Syria	
Fiji	Tanzania	
Ghana	Thailand	
Guatemala	Tonga	
India	Tunisia	
Indonesia	Turkey	
Iran	Uganda	
Jordan	Uruguay	

Table A5: Estimates for the Effect of Aid on both Tax Revenues and the Non-Aid Supported Sectors

		Non-Aid Expenditure Sectors		Tax Revenues	
Country	Obs.	TAID Coefficient	TAID Std. Error	TAID Coefficient	TAID Std. Error
Argentina	23	0.1320	(0.1029)	0.0927	(0.0808)
Bangladesh	12	0.4323*	(0.2481)	0.3666**	(0.1445)
Belize	17	-0.0754	(0.1190)	0.0089	(0.0313)
Bhutan	22	-0.2625	(0.1620)	0.0252	(0.0846)
Bolivia	20	0.0351	(0.1416)	-0.1015*	(0.0533)
Botswana	23	0.2216	(0.2162)	-0.0933	(0.1320)
Brazil	11	0.0565	(0.4050)	-0.2181	(0.2995)
Burkina Faso	15	0.1011	(0.3125)	0.0418	(0.2317)
Burundi	8	0.1863	(0.3555)	0.0583	(0.1161)
Cameroon	23	0.0055	(0.0733)	0.0411	(0.0396)
Chile	19	0.0067	(0.0445)	0.0607	(0.0482)
China	9	-0.3499	(0.3801)	-0.3421	(0.3337)
Colombia	9	-0.5097**	(0.2225)	0.1902	(0.2134)
Costa Rica	14	-0.0433	(0.1487)	-0.0486	(0.0556)
Dom. Republic	12	-0.0674	(0.1758)	-0.1934	(0.1285)
Egypt	21	-0.5481**	(0.2159)	-0.1218	(0.0856)
El Salvador	29	-0.0719	(0.1808)	-0.0460	(0.2083)
Ethiopia	26	-0.0734	(0.1574)	-0.1218	(0.1403)
Fiji	19	0.0541	(0.0989)	0.1122*	(0.0591)
Ghana	20	-0.1563	(0.1716)	0.2366	(0.2123)
Guatemala	13	0.1697	(0.1638)	0.1351	(0.0923)
India	27	0.0116	(0.0122)	0.0021	(0.0099)
Indonesia	26	0.1002	(0.1545)	0.1261**	(0.0501)
Iran	12	0.3216	(0.7012)	1.0168	(1.3186)
Jordan	32	0.1100*	(0.0599)	-0.0779	(0.0537)
Kenya	21	0.0498	(0.2158)	0.0239	(0.0952)
Liberia	11	0.0562	(0.3055)	0.1733**	(0.0811)
Madagascar	11	0.0925	(0.0721)	0.0200	(0.0522)
Malawi	13	0.1557	(0.2722)	0.0441	(0.0982)
Maldives	19	0.3049	(0.1949)	0.1162**	(0.0547)
Mali	12	0.3096	(0.3549)	0.2750*	(0.1482)
Mauritius	27	0.0936**	(0.0427)	-0.0602	(0.0622)
Mexico	10	-0.4659*	(0.2379)	-0.3451***	(0.0528)
Mongolia	15	-0.3087**	(0.1079)	-0.1292	(0.1200)
Morocco	19	0.0500	(0.0496)	-0.0173	(0.0342)
Myanmar (Burma)	12	0.0644	(0.0675)	-0.0135	(0.0699)
Nepal	33	0.1582	(0.1302)	0.0884	(0.0787)
Papua New Guinea	12	-0.0229	(0.1261)	0.0003	(0.0466)

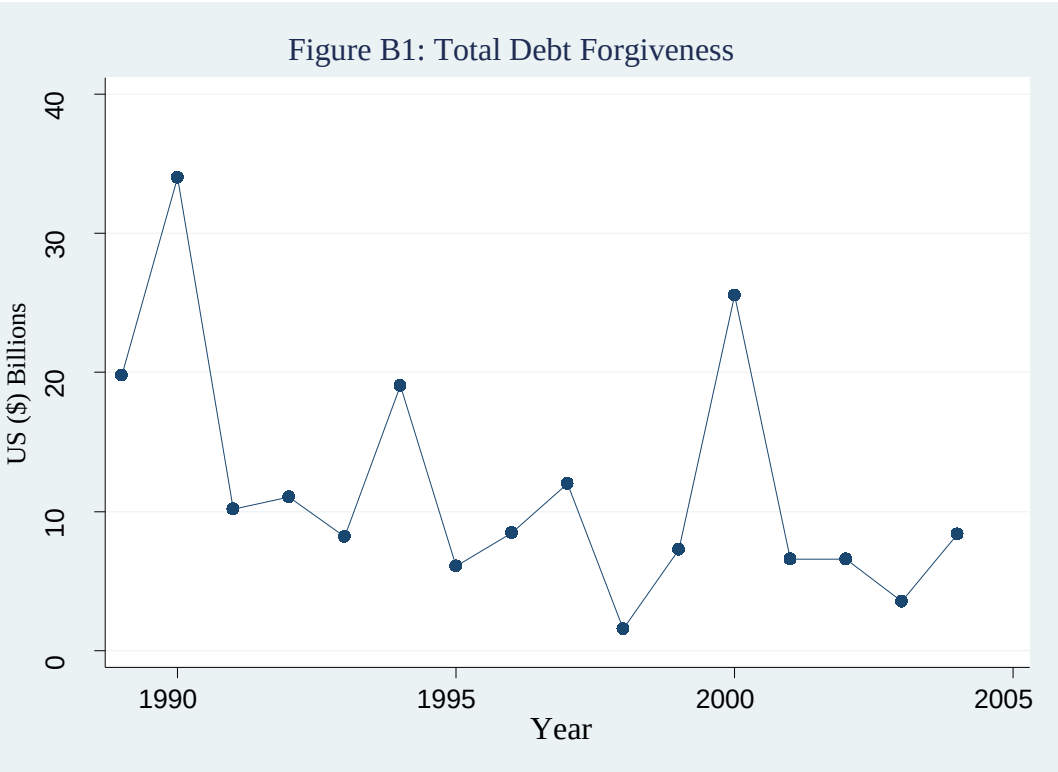
Note: *** significant at 1%; ** significant at 5%; * significant at 1%. Standard errors are in parenthesis. All variables are in logs; therefore coefficients must be interpreted as elasticities. Time dummies are also included in each equation. The variable of interest, AIDNS (untied aid) is calculated by accumulated general budget support, actions relating to debt and internal transactions in the donor country and general purpose aid.

Table A5: Estimates for the Effect of Aid on both Tax Revenues and the Non-Aid Supported Sectors

Country	Obs.	Non- Aid Supported Sectors		Tax Revenues	
		TAID Coefficient	TAID Std. Error	TAID Coefficient	TAID Std. Error
Paraguay	20	0.0361	(0.0588)	0.0302	(0.0506)
Philippines	33	0.0310	(0.1117)	-0.0549	(0.0554)
Solomon Islands	12	-0.5416	(0.9867)	-0.2670**	(0.1096)
Sri Lanka	24	-0.0425	(0.1933)	-0.0651	(0.0877)
St. Vin. & Gren.	15	-0.0869	(0.0826)	0.0029	(0.0171)
Swaziland	16	-0.0689	(0.1681)	0.0083	(0.0642)
Syria	8	-0.2014	(0.1187)	-0.2381*	(0.1258)
Tanzania	8	-0.0912	(0.3648)	0.1618	(0.1838)
Thailand	30	0.0681	(0.0456)	-0.0479	(0.0416)
Tonga	11	0.0572	(0.1512)	-0.1988***	(0.0429)
Tunisia	27	-0.0579	(0.0713)	0.0176	(0.0334)
Turkey	20	0.0178	(0.1063)	-0.0507	(0.0344)
Uganda	8	0.0909	(0.7904)	-0.4821	(1.0415)
Uruguay	22	0.0383	(0.0266)	0.0417	(0.0356)
Vanuatu	9	0.1027	(0.4202)	-0.0409	(0.0755)
Viet Nam	12	-0.0993	(0.0630)	0.0299	(0.0481)
Yemen	7	0.2906*	(0.1268)	1.1260***	(0.2847)
Zambia	23	-1.2326***	(0.3524)	-0.0726	(0.0709)
Zimbabwe	9	-0.1471	(0.1884)	-0.1664*	(0.0824)

Note: *** significant at 1%; ** significant at 5%; * significant at 1%. Standard errors are in parenthesis. All variables are in logs; therefore coefficients must be interpreted as elasticities. Time dummies are also included in each equation. The variable of interest, AIDNS (untied aid) is calculated by accumulated general budget support, actions relating to debt and internal transactions in the donor country and general purpose aid.

APPENDIX B



Source: Global Development Finance

Table B1 : Data Definition and Sources

Variable	Definition	Source
Tax Effort	Tax Revenue as a share of GDP	Author's Calculation
Per Capita Income	Gross Domestic Product divided by population	WDI (2008)
Population Growth	Annual Percentage change in population	WDI(2008)
(Exports + Imports)/GDP	This variable measures the degree of openness of an economy	Author's Calculation
Manufacture Value Added		WDI(2008)
Services Value Added		
Governance	This governance variable ranges from +10 (strongly democratic) to -10(strongly autocratic)	Polity IV Database
Political Rights	This variable is an indicator of the institutions in a country. It enables people to participate freely in the political process, also having the right to vote, and to compete for public office, and to elect representatives who have a decisive impact on public policies are accountable to the electorate. This index ranges from 1 (good governance) to 7(poor governance).	Freedom House Database (2008)
Civil Liberties	This variable is another indicator of governance in a country. This allows for the freedom	Freedom House Database (2008)
Share of Loans in GDP	ODA	OECD Online Database
Share of Grants in GDP		OECD Online Database
Debt Forgiveness/GDP	Debt forgiveness is the sum of the GDF categories 'debt forgiveness or reduction' which measures the nominal amount of principal forgiven (including principal and interest arrears forgiven) and interest forgiven which measures the nominal amount of interest forgiven.	Author's Calculation
Accumulated Debt Forgiveness/GDP		Author's Calculation
Debt Forgiveness Signal		Author's Calculation

Table B2: Paris Club Initiatives:

The Paris club is only one of the many international organizations that provide financial assistance to developing countries, be it through loans, grants or debt relief (including debt forgiveness). The high indebtedness of these countries prompts these institutions to re-examine the methods they were used to help developing countries

reduce their debts to sustainable levels. The terms of the Classic Initiative involved rescheduling of credits at appropriate market rates. However, having recognized that developing countries were still unable to improve their financial situation, a different and urgent approach was needed. The Toronto terms were implemented by Paris Club Members. In October 1988, Paris club creditors agreed to introduce for the first time a partial cancellation of the debt of the poorest and most heavily indebted countries. It is important to mention that different initiatives to provide debt relief were implemented after the implementation of the Classic term initiative but before the Toronto terms initiative. However, all these other initiatives only sought to provide relief mainly through rescheduling of principal and interest payments.

Table B3: Data Issues:

The analysis in the paper starts at 1989 since it was not until the Toronto terms initiative was signed in October 1988 that debt forgiveness (a change in the debt stock) was provided in more significant amounts.

Table B4: Sample of Countries

Albania	Gabon	Russia
Argentina	Gambia	Rwanda
Armenia	Georgia	Seychelles
Bangladesh	Honduras	Slovak Republic
Belarus	Hungary	South Africa
Bolivia	India	Sri Lanka
Bosnia and Herzegovina	Indonesia	Swaziland
Brazil	Iran	Syria
Bulgaria	Kazakhstan	Thailand
Burkina Faso	Latvia	Tunisia
Burundi	Lesotho	Turkey
Cambodia	Lithuania	Ukraine
Cameroon	Malaysia	Uruguay
Chad	Mauritius	Venezuela
Chile	Mexico	Zambia
Colombia	Moldova	Zimbabwe
Congo, Dem. Rep.	Mongolia	
Congo, Rep	Morocco	
Costa Rica	Nicaragua	
Cote d'Ivoire	Pakistan	
Croatia	Panama	
Dominican Republic	Paraguay	
Egypt	Peru	
El Salvador	Poland	
Ethiopia	Romania	

Table B5: 2SLS Regression Results to Address Endogeneity, 1989-2006

Model Estimation Method	Linear 2SLS Coefficient (1)	Linear 2SLS Coefficient (2)	Linear 2SLS Coefficient (3)	Linear 2SLS Coefficient (4)
A) SOFT BUDGET CONSTRAINT				
Annual Debt Forgiveness	0.2708	-0.3760		
	(0.8196)	(0.4566)		
Accumulated Debt Forgiveness	-0.2805		-0.2540	
	(0.1344)**		(0.1561)	
Debt Forgiveness Signal	0.0017			0.0001
	(0.0032)			(0.0021)
B) DEVELOPMENT				
Per Capita GDP	0.0034	0.0478	0.0017	0.0446
	(0.0410)	(0.0199)**	(0.0411)	(0.0193)**
Population Growth	-0.0108	0.0024	-0.0087	0.0011
	(0.0063)*	(0.0035)	(0.0079)	(0.0030)
C) OPENNESS				
(Exports + Imports)	0.0915	0.0283	0.0899	0.0196
	(0.0489)*	(0.0209)	(0.0508)*	(0.0144)
D) ECONOMIC STRUCTURE				
Services Value Added	-0.2299	-0.2302	-0.3246	-0.0833
	(0.4342)	(0.1920)	(0.2182)	(0.0756)
Manufacture Value Added	0.0375	-0.1188	-0.0576	0.0162
	(0.3496)	(0.1688)	(0.1422)	(0.0656)
E) FOREIGN AID				
Loans	-0.8665	0.0874	-0.8213	0.0985
	(0.5764)	(0.1781)	(0.6459)	(0.1278)
Grants	2.1214	1.0803	2.2647	0.5791
	(2.4814)	(1.2320)	(2.0784)	(0.7796)
Hansen (p-value)	0.7246	0.0152	0.9228	0.0095
Observations	407	407	407	408

Notes: All specifications contain year dummies. *** indicates significance at the 1% level, ** significance at the 5% level, and * significance at 10% level. Dependent variable is the tax ratios - tax revenues divided by GDP. The standard errors for the fixed effects model are robust to arbitrary serial correlation.

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