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## The Spending and Absorption of Aid in PRGF Supported Programs

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## **IMF Working Paper**

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### **The Spending and Absorption of Aid in PRGF Supported Programs**

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#### **Abstract**

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This paper studies the spending and absorption of aid in PRGF-supported programs, verifies whether the use aid is programmed to be smoothed over time, and analyzes how considerations about macroeconomic stability influence the programmed use of aid. It finds that PRGF-supported programs allow countries to use most or almost all increases in aid within a few years. The paper finds some evidence that the programmed absorption of aid is higher in countries where reserve coverage is above a certain threshold, whereas programmed spending does not seem to depend on inflation. Finally, it shows that the presence of a PRGF-supported program does not constrain the actual spending and absorption of aid.

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## I. INTRODUCTION

For developing countries, aid provides an opportunity to reduce poverty and enhance growth. Through aid, a country can finance an expansion of infrastructure, the provision of services such as health and education, and other spending aimed at poverty reduction. However, many factors can impair an effective use of aid. For example, if aid is volatile, initiating long term projects that require steady financing could generate financial difficulties in the future. Similarly, when capacity constraints are acute, an increase of expenditures might exceed productive capacity from the economy, to the point where inflation could rise. In addition, in case of severe economic vulnerabilities or instability, poverty reduction and growth may be most effectively achieved if aid is first used to address these vulnerabilities and instabilities, and then to expand spending.

These considerations raise questions on the advice the IMF gives to member countries about the timing and extent of using aid. Further questions are how aid volatility, capacity constraints, or macroeconomic stability shape these recommendations. The IMF has recently clarified the principles for its advice on the use of aid: the IMF supports the full use of aid over time, taking into account the need to safeguard macroeconomic stability and limits on productive spending.<sup>2</sup> This supportive overall approach still leaves the question of what has been the Fund's actual advice to countries receiving aid. This question is particularly relevant in the case of countries with economic programs supported under the IMF's Poverty Reduction and Growth Facility (PRGF), not only because these programs play a catalytic role in unlocking aid, but also because the goal of these programs is to support countries achieve those very objectives to which aid is functional: to reduce poverty and enhance growth.

The objective of this paper is to study the extent to and pace at which PRGF-supported programs allow aid to be used over time. Specifically, the paper studies the extent to which an increase in aid is allowed to be spent through an increase in the fiscal deficit (net of aid) and absorbed through an increase in the current account deficit (net of aid). Also, the paper studies how considerations about macroeconomic stability influence programmed spending and absorption of aid. The paper takes both a short and a long run perspective and studies whether programs allow to spend and absorb aid immediately, or to smooth it over time. Finally, while the paper focuses mainly on the *programmed* spending and absorption, i.e., the plans for spending and absorbing aid yet to be received, it also looks at *actual* spending and absorption of aid.

The paper uses data from IMF program documents to estimate reduced forms models. The dataset was constructed by collecting data from all the staff reports for the request or a review of all PRGF-supported programs approved since the inception of the PRGF in 1999, until end-2007. The dataset allows tracking Fund's projections and economic programming for 378 episodes of program requests or reviews. If the Fund were following a rule of thumb to

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<sup>2</sup> See International Monetary Fund (2007).

recommend how much aid should be spent and absorbed, this dataset would allow to infer this rule.

The paper shows that PRGF-supported programs allow countries to use most or almost all increases in aid within a few years, that is the use of aid is programmed to be smoothed over time. Because there are several valid ways of examining these issues, the study presents a range of estimates, looking at the key questions from different angles. For example, the paper finds that, on average, 70 percent of aid is programmed to be absorbed and more than 80 percent is programmed to be spent over just two years. When aid is expected to decrease, programs do not ask for an immediate downward adjustment in spending, thus supporting expenditure smoothing in managing volatile aid inflows. There is weak evidence of the existence of simple thresholds for inflation or reserves coverage that may affect the programmed use of aid. Analyzing possible thresholds, the strongest result is that programmed spending may drop once inflation exceeds 15 percent. Finally, the paper finds that, on average, programs do not hamper the actual use of aid: spending and absorption are roughly the same in countries with and without a PRGF-supported program.

A seminal paper on the spending and absorption of aid by Berg et al (2007) noted that the textbook response to aid involved full spending and absorption, but also identified circumstances under which it is recommendable that aid is only partially spent and/or absorbed.<sup>3</sup> This study also presented evidence from selected case studies on the actual use of aid in countries with IMF programs. A subsequent study by the IMF's Independent Evaluation Office (IEO) on the empirics of spending and absorption of aid found that programmed spending and absorption in SSA countries with a PRGF-supported program is rather limited.<sup>4</sup> A paper by Aiyar and Ruthbah (2008) found that the actual spending and absorption of aid in SSA countries with and without a PRGF-supported program is lower in the short than in the long run. Our paper complements these earlier studies in three ways. First, it uses a new and comprehensive dataset that includes observations about actual and programmed outcomes. Second, it analyzed the programmed use of aid over a longer time horizon, thus recognizing the idea that aid should be fully used, but smoothed over time. Third, it estimates absorption and spending in a more elaborate way, including controlling for factors other than aid that can affect the programmed response in the fiscal and current account deficits net of aid.

The paper develops as follows. Section II clarifies the concept of aid and describes some facts about aid flows to low-income countries. Section III describes the theoretical framework that should guide recommendations on the spending and absorption of aid. Section IV introduces key elements of the methodological framework that guides the analysis, and Section V

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<sup>3</sup> See International Monetary Fund (2005) and Berg et al (2007).

<sup>4</sup> See Independent Evaluation Office (2007).

presents the estimation results using various approaches and alternative models. Section VI concludes. Details about the dataset, the methodology, and the results are presented in the Appendixes.

## II. BACKGROUND

### Aid

From a macroeconomic perspective, aid is a transfer of resources from donors to a recipient country. Aid can take various forms: it comprises both grants and loans, and both budget support and project financing, and it may or may not be channeled through the government budget in the recipient country.<sup>5</sup> An important recent development in the provision of aid has been the accelerated delivery of debt relief, which have greatly alleviated debt service costs in many recipient countries.<sup>6</sup>

Consistent with the macroeconomic perspective described above, and reflecting the availability of data, this paper takes a pragmatic approach to the measurement of aid and includes all official net transfers and loans under the concept of aid. Basically, net official borrowing is added to official transfers/grants, and interest payments to official creditors are deducted from them. This paper also includes the flow component of so-called exceptional financing—essentially, the part of debt relief that is not used for clearing arrears, and that is thus available to pay for imports or debt service.<sup>7</sup> To summarize, the paper defines aid on a cash basis as the net transfer of financial resources from donors to recipient countries.

While overall average aid flows to PRGF eligible countries in percentage of GDP has remained rather stable in the last 15 years, there has been an increase of aid at the beginning of this century (see left panel of Figure 1). This increase, which was mainly driven by debt relief in the context of the HIPC Initiative and—especially in 2006--MDRI, now seems to have come to a halt. An important feature of aid is its high volatility and unpredictability, which has been documented extensively.<sup>8</sup> On average, a PRGF-eligible country can expect that aid will vary about 5 percentage points of GDP with respect the average aid that it

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<sup>5</sup> This view obviously ignores a host of other positive effects that are intended by giving aid, such as transfer of knowledge (which, in principle, could be captured as imported services) or the influence on the reform process resulting from the program conditionality that may come with aid. However, these other effects cannot be easily measured, and their inclusion in the definition of aid is beyond the scope of this paper.

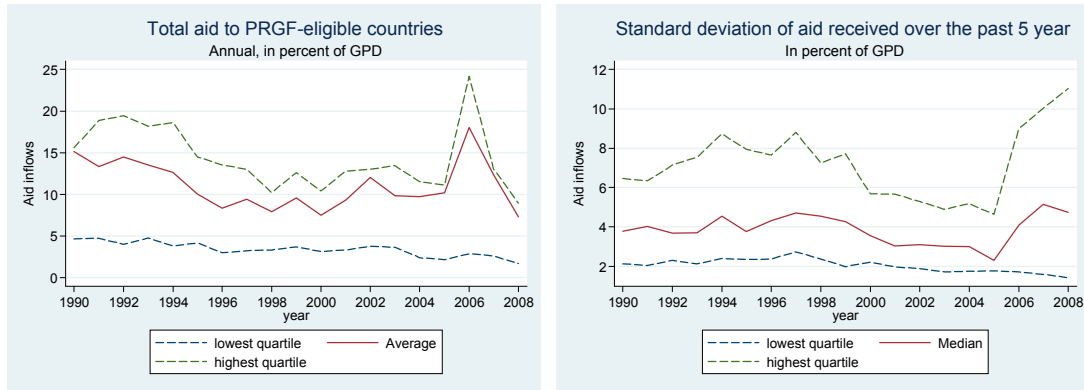
<sup>6</sup> See International Monetary Fund and World Bank (2007).

<sup>7</sup> This concept of aid is closely related, but not identical, to the so called Official Development Assistance (ODA). The OECD defines as ODA those flows which are: (i) provided by official agencies, including state and local governments, or by their executing agencies; and (ii) where each transaction (a) is administered with the promotion of the economic development and welfare of developing countries as its main objective; and (b) is concessional in character and conveys a grant element of at least 25%.

<sup>8</sup> See, for example, Bulir and Hamann (2006).

received in the previous 5 year, and the average deviation is higher than 10 percentage points of GDP for about one in four countries.

**Figure 1: Aid inflows and their variability**



Source: WEO data

## IMF programs

This study focuses on the use of aid as envisaged in economic programs adopted by the authorities and supported by the IMF under a PRGF arrangement. The PRGF is the main vehicle by which the IMF provides concessional financial support to countries' poverty reduction and growth strategies.<sup>9</sup>

A PRGF arrangement typically covers a three-year period and sets macroeconomic objectives for the medium-term. During the arrangement a sequence of updated economic programs is presented to the Board of the IMF: the first when the arrangement is requested, and subsequent ones when performance under the programs is reviewed. Program reviews are conducted, in principle, every half-year. These updated economic programs include both quantitative fiscal and balance of payments projections for the current and next year(s), and a set of program conditions. The fiscal and balance of payment projections are consistent with the effects of the policies that the authorities intend to implement and that the IMF agrees to support. The program conditions help ensure and track progress in implementing these policies, with the aim of maintaining macroeconomic stability, and promoting growth and poverty alleviation. Also, meeting the conditions unlocks the scheduled disbursements by the IMF.

Program projections and conditions implicitly define the programmed use of the expected aid inflows. Programs typically set a floor on the build up of international reserves by the central bank and a ceiling on some measure of the fiscal deficit or of fiscal financing. These floors

<sup>9</sup> Currently, 77 countries are eligible to access resources under the PRGF. During 1999-2007, generally, each year a PRGF arrangement was in place in between 25 and 40 countries.



and ceilings determine how much room there is to use projected aid to finance higher net imports and aid-based fiscal spending.

The actual use of aid may deviate substantially from what was planned under PRGF-supported programs. First, program conditions set one-sided boundaries that leave room for more restrictive actual policies; for example, actual reserve accumulation is often higher than the floor set under the program. Second, conditions do not apply to the broad aggregates that are the focus of this study. This means that even when program conditions are met exactly, the actual fiscal and current account deficits net of aid could be smaller (or larger) than projected, for example, because the capital inflows, which help finance the current account deficit, turn out to be different from what was expected. Finally, programs generally include a mechanism that automatically adjusts program conditions to accommodate greater or smaller than expected aid inflows. Specifically, as it is known that actual aid disbursements often deviate from the amounts foreseen in program projections, most programs allow for higher spending in case of unanticipated aid windfalls—especially in case of higher grants—and they do not require lower spending to offset all of aid shortfalls—generally through higher domestic financing.<sup>10</sup>

### III. CONCEPTUAL FRAMEWORK

The analytical framework of ‘absorption and spending of aid increases’ suggested by Berg et al (2007) distinguishes two dimensions of the macroeconomic impact of aid increases: the current account response is measured by a ratio of aid *absorption*; the fiscal response is measured by a ratio of aid *spending*.

The absorption ratio describes the degree to which an increase in aid is used to finance a widening of the current account deficit (excluding aid). An increase in aid inflows can be used either to pay for an increase in the current account deficit (excluding aid), or to increase the net foreign assets held by the economy.<sup>11</sup> In the first case, the additional aid resources are used immediately to finance a transfer of real resources to the country; in the second case, the additional resources are ‘saved’ to allow for additional transfers of real resources sometime in the future. The choice between these two options is an inter-temporal one and it can be partial.<sup>12</sup>

Similarly, the spending ratio describes the degree to which an increase in aid that is channeled through the government budget is used to finance a widening of the fiscal deficit (excluding aid). For the inter-temporal allocation of additional fiscal resources stemming

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<sup>10</sup> See IMF (2007), section III.D.

<sup>11</sup> In developing countries such an increase in net foreign assets most often takes the form of additions to international reserves held by the monetary authorities. It could, however, also include foreign net assets held by the private sector, in which case it would show up as a financial outflow in the balance of payments.

<sup>12</sup> In developing countries whose capital account is in practice closed, the aid absorption outcome can be entirely determined by the central bank through the sale of the foreign exchange it received when the aid is disbursed.

from an increase in aid, the fiscal authorities face two basic alternatives. The additional aid can be used either to pay for an increase in fiscal deficit (excluding aid), or to substitute for domestic financing. In the first case, the additional fiscal resources provided by donors are used immediately to finance a net fiscal expansion; in the second case, the additional resources are saved to give more room for fiscal expansion sometime in the future.<sup>13</sup>

The choices about the level of spending and/or absorption of aid are intertemporal, and have important effects on the economy and the private sector.

- If the fiscal deficit moves in line with the current account deficit, the increased fiscal net demand is met by increased net imports. In this case the spending and absorption are the same.
- However, when the central bank sells more aid-based foreign exchange than is needed to finance higher government spending, the domestic debt and/or money supply is reduced. As a result, the interest rates and/or inflation decrease, private investors crowd *in*, and the fiscal deficit widens by less than the current account deficit. In this case, absorption is greater than spending.
- Conversely, when the fiscal deficit increases but the aid is kept in the central bank's reserves, the fiscal expansion is, de facto, covered by higher domestic financing. As a result, interest rates and/or inflation increase, the private sector is crowded *out*, and the fiscal deficit widens more than the current account deficit does. In this case, spending is greater than absorption.<sup>14</sup>

The key question is not whether aid is fully spent and absorbed in the short run, but whether aid is fully used over time. As a first round of approximation, aid should be fully spent and fully absorbed, that is, aid should finance a one-to-one widening of the current account deficit net of aid and a corresponding widening of the fiscal deficit net of aid. However, the optimal extent and timing of absorption and spending depends on many other factors, including aid volatility, spending capacity, national priorities about current and future consumption, and macroeconomic vulnerabilities.

When aid is volatile, smoothing the spending and absorption of aid over time is an important element of macroeconomic management.<sup>15</sup> Certain types of expenditure imply a multi year commitment, either because they create financing needs in the future (for example, the

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<sup>13</sup> Whereas the aid absorption outcome can be determined by the central bank, the aid spending outcome is determined by the fiscal authorities.

<sup>14</sup> The relationship between the increase in the fiscal and in the current account deficits reflects the fact that—in equilibrium—net exports are equal to the sum of private saving and public saving, minus private investments.

<sup>15</sup> Adam et al (2007) study the optimal monetary and fiscal policies when aid is volatile. Gupta et al (2008) and Heller et al (2006) study the optimal fiscal policy under scaled-up aid.

opening of a school implies a commitment to pay teachers' salaries also in the future), or because they need to be provided on a regular basis in order to be effective (for example, efforts to eradicate malaria may need to be sustained over many years). In this context, it might be optimal not to spend all of an aid increase at once, but to smooth it over time within a medium term budget framework, and if aid is indeed spent over time, in principle, it should be absorbed over the same time span. In these cases, the observed spending and absorption of aid will be lower in the short run (e.g. a year) than in the long run (e.g. two or three years).<sup>16</sup>

Macroeconomic vulnerabilities can also justify the delayed use of aid increases.<sup>17</sup> When capacity constraints are severe or inflation is high, an increase of expenditures might exhaust productive capacity from the economy and create (or exacerbate) inflationary pressures. Also, the higher the domestic debt is, the higher the associated interest payments are, and the more expensive it is to roll it over. In these cases, a temporary policy of absorbing but not fully spending aid can help reduce the costs associated with inflation or high levels of domestic debt, in order to bring the country to a situation where all aid can be used without endangering stability. Similarly, when reserves are low, a prudent temporary strategy may be to use part of aid increases to build up a reserve buffer that would allow to maintain spending in case of future adverse shocks, including aid shortfalls.

A preliminary study of the way in which inflation and reserves levels shape the programmed use of aid increases was included in the IEO (2007) report. This study focused on the same-year use of aid increases in macroeconomic frameworks underlying PRGF-supported programs in Sub-Saharan Africa between 1999 and 2005. It estimated that programmed absorption was almost full only in countries where initial levels of international reserves were above 2.5 months of imports. At the same time, it estimated that programmed spending was complete only in case of inflation levels below 5 percent. Table 1 summarizes the findings of this study.

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<sup>16</sup> Conversely, in the case of aid decreases, smoothing would mean that fiscal contraction due to aid shortages (the counterpart of spending) and the corresponding current account contraction (the counterpart of absorption) would be less than the decrease in aid.

<sup>17</sup> See IMF (2007) for a more extensive analysis.

**Table 1. IEO estimates on same-year spending and absorption in SSA PRGFs**

		Reserves (in months of imports)	
		below 2.5	above 2.5
Inflation	above 5%	Absorption: 5%; Spending: n.a. /1	Absorption: 100%; Spending: 15%
	below 5%	Absorption: 5%; Spending: n.a. /1	Absorption: 100%; Spending: 79%

/1 The report only looked at the influence of inflation on programs with reserves covering more than 2.5 months.

However, no study so far has considered the extent to which PRGF-supported programs allow aid to be used over time. For instance, the IEO studied spending and absorption over one year only, while Aiyar and Ruthbah (2008) focus only on actual absorption and spending. Our paper fills this gap, and shows that aid is programmed to be used over time rather than immediately as it is received.

#### IV. METHODOLOGY

The objective of our paper is to estimate the programmed spending and absorption of aid over time in PRGF arrangements. The paper studies the extent to which inflation and reserve adequacy affect programmed spending and absorption. The main focus of the paper is not on the actual spending and absorption of aid; rather it is on how much spending and absorption is incorporated in the program design in countries that have a PRGF program in place. Nonetheless, the paper also studies whether PRGF arrangements affect the actual spending and absorption of aid.

##### The basic approach

The paper uses econometric techniques to estimate how much of the programmed changes in the nonaid fiscal balance is explained by the expected increase in aid (spending), and how much of the programmed change in the nonaid current account balance is explained by the expected change in aid (absorption). The observations are derived from PRGF staff reports as described below.<sup>18</sup> All estimates are based on reduced form models and on pooled

<sup>18</sup> Berg et al (2005) derived measures of spending and absorption by comparing average net flows in a pre-aid-surge time period with those in a post-aid-surge period to derive differences, upon which the 'spend and absorb' ratios were calculated. The focus of the paper was on actual aid absorption and spending in selected case studies for countries with significant aid increases.

regressions, as the structure of the data makes panel techniques less reliable (see Appendix III).<sup>19</sup>

The paper adopts the definition of spending and absorption described by Berg et al. (2007) and used by other studies, such as the IEO (2007) and Aiyar and Ruthbah (2008). In line with the IEO (2007), the paper assesses econometrically how spending and absorption, as foreseen in PRGF-supported policy programs, depends on inflation and reserves. In line with Aiyar and Ruthbah (2008), the paper also reports estimates of the actual spending and absorption of aid, and studies whether these are different in those years when a country has a IMF program in place.

However, our paper goes well beyond these previous studies in several important respects:

- First, it is based on a new and comprehensive database for all countries with PRGF arrangements (see below). The IEO study considered only a subset of Sub-Saharan African countries for which it found available data.
- Differently from the IEO (2007), it isolates spending and absorption by controlling for variables, other than aid, that can still explain a change in the programmed fiscal and current account deficits.
- In addition, it estimates the use of aid over time. The IEO study focuses on the use of aid increases within the same year the extra money is received. As discussed above, if smoothing of aid flows plays a role in program design and/or if aid is spent with a time lag, an analysis limited to same-year use of aid may seriously underestimate the eventual response.
- Also, it considers the policy response to both increases and decreases in aid. This is highly relevant in light of the high aid volatility, with large swings in aid in both directions, without a clear trend toward scaling up.
- It presents a more in-depth analysis of possible threshold levels of inflation and reserves that might shape the programmed use of aid.
- Finally, it complements the analysis of the impact of *changes* in aid, by estimating the link between the *level* of the fiscal and current account balances and the *level* of aid.

### **Key variables**

Within our dataset, aid is constructed as the net foreign financing including grants, debt relief, and the flow component of exceptional financing. Exceptional financing accounts for

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<sup>19</sup> Regression results incorporating fixed effects are, nonetheless, shown in the appendix, and are broadly comparable to those for the pooled regressions, especially for the spending equations. This testifies to the robustness of the findings.

the resources that are implicitly made available by debt relief (see Appendix I for a formal definition).<sup>20</sup> For consistency, we calculate aid on this basis separately for the balance of payments and government finances. This allows to distinguish between the total aid received by a country and the part of aid that is channeled through the budget.

The current account deficit net of aid is computed by subtracting the current account components of aid (official transfers net of interest payments) from the current account deficit. Similarly, the fiscal deficit net of aid is obtained by subtracting grants net of interest payments on external debt from the fiscal deficit. Both aid and the fiscal and current account deficits are expressed as a share of GDP.

### **The dataset**

In line with the focus on programmed spending and absorption, the dataset consists of data from the staff reports on the request and review of all PRGF programs that have been approved over 1999–2007. In our dataset, the observational unit is the country. For each country, an observation is made whenever a document was issued. As explained in Section 2, a program document is a record of every instance in which projections were formally agreed upon with the authorities and presented to the Board of the IMF in the context of a program.<sup>21</sup>

By the nature of PRGF-supported programs, the dataset is not a balanced panel. As an example, consider Benin and Nepal. During the period of interest, Benin completed a three-year PRGF arrangement (which started in 2000) and completed the first and second reviews under a second PRGF arrangement. Hence, we collected data about Benin from 10 documents (two requests, six reviews under the first program, and two reviews under the second program). Each of these documents correspond to an observation. On the other hand, Nepal had only one arrangement during 1999–2007, which started in 2003 and the fifth review of which was concluded at end-2007. For Nepal, we therefore collected data from 6 documents (the request, and the five reviews). The total dataset comprises observations from 369 documents, pertaining to 51 countries.

From each document and for each variable, we collected as many years as possible of available data, spanning 1996–2010. This allowed us to collect at most three years of actual data for the oldest (1999) document, and at most three years of projections for the most recent (2007) documents. Differences in the presentation of the data across the documents further aggravate the unbalanced nature of the panel, as observations about the same variable for the same country are available for different time spans across different documents. For example,

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<sup>20</sup> For those cases in which debt relief does not concretely generate new resources (consider the case of a country that has been accumulating arrears on external debt service and that receives relief on future debt service), considering exceptional financing as aid gives an overestimate of aid in some years, but it provides an accurate estimate of the value of aid over time.

<sup>21</sup> In order to control for other variables that are generally not reported in program documents or to check for non-program countries, the dataset was complemented with data from the IMF's WEO database.

in the report for Albania's third review under the 2002-05 PRGF arrangement, detailed fiscal data were available for 2002–2004, whereas for the fourth review these data were available for 1997-2007.

A simple rule was adopted to separate actual data from program projections. While the database uses annual data, program documents are issued throughout the year, setting program conditions for several quarters into the future (in principle, at least a year out). This raises the question of what calendar year is considered to be the first year of program projections. Given that our underlying questions concern how IMF programs have guided and possibly constrained the use of aid, this should be the calendar year most affected by the program. On this basis, and given that budgets are generally formulated before the start of the year, we considered the first year of program projections in a staff report to be the last calendar year of which at least two quarters were covered by program conditionality. For instance, although Benin requested its first PRGF in July 2000, the request included conditionality up to June 2001; therefore, 2001 (and not 2000) was selected to be the first program year.

## V. RESULTS

There is strong evidence suggesting that PRGF-supported programs allow most or almost all aid to be used over time. In presenting this evidence, we will discuss a range of alternative models. The first model is very simple, and comparable to the one used by the IEO (2007). Subsequent models are more elaborate, in order to address various dimensions of the use of aid.

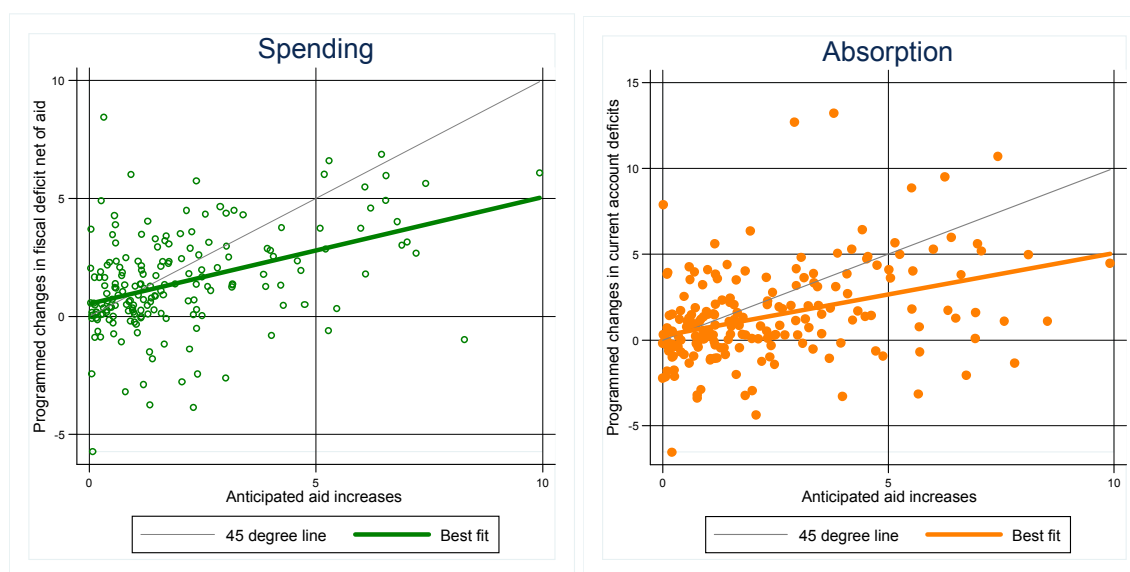
### A. Spending, Absorption, and Smoothing of Aid Increases in PRFG Programs

Focusing on cases where aid is projected to increase, a first snapshot of the data suggests that about half of an aid increase is programmed to be spent and absorbed within the year the aid is received. The left and right panels of Figure 1 show a scatter plot of the programmed increase in the fiscal and current account deficits (net of aid), against the programmed increase of aid.<sup>22</sup> The panels also show the OLS regression line between these variables. The plots point to the presence of a strong and positive relationship between the programmed increase in the deficits net of aid, and the programmed increase in aid. Table 1 shows the estimated coefficients of the corresponding regressions: spending is about 49 percent, and absorption is about 48 percent. These estimates can be compared with those by the IEO, which found that about 27 percent of aid increases is spent in one year, and about 64 percent is absorbed in one year (IEO 2007, page 42).<sup>23</sup>

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<sup>22</sup> For simplicity, from this point on, deficit and deficit net of aid will be used interchangeably in text, tables, and graphs, except when otherwise indicated.

<sup>23</sup> The difference with the IEO results stems from our more comprehensive and updated database.

**Figure 1: Scatter plot for spending and absorption****Table 1: OLS coefficient for simple spending and absorption regressions 1/**

	Spending Regression	Absorption Regression
Independent variable:	Increase of fiscal deficit	Increase of CA deficit
Coefficients 1/:		
Aid increase 2/	0.494***	0.478***
Constant	0.309	0.258
Observations 3/	186	176
R-squared	0.209	0.135

Notes:

1/ Rejection of "H0: coefficient = 0": \*\*\* at 0.01 level, \*\* at 0.05 level, \* at 0.1 level.

2/ Derived from BoP or fiscal data, respectively

3/ The sample is restricted to increases in aid, and as described in Tables III.2 and III.3 of Appendix III.

However, the simple regressions of Table 1 do not allow to estimate the spending and absorption over time. First, by looking only at the programmed changes within a year, this regression cannot capture the current effect of aid changes that were not absorbed or spent in previous years. Second, this regression does not estimate spending and absorption accurately because it ignores those factors other than aid that can still systematically affect the programmed change in the fiscal and current account deficits net of aid. For example, concerns about inflation might systematically induce the IMF to recommend, possibly, a fiscal tightening irrespective of the expected change in aid. Incorporating multi-year effects and additional variables allow to estimate the amount of smoothing, and to obtain more precise estimates of spending and absorption. The results of the complete equations for the



programmed use of aid increases are summarized in Table 2 and presented in Appendix III (Tables III.2 and III.3).<sup>24</sup>

**Table 2: Summary of spending and absorption regressions**

Independent variable:	Absorption Regression				Spending Regression		
	Increase in CA deficit				Increase in fiscal deficit		
	1 - Pooled OLS	2 - Pooled OLS	3 - Pooled OLS, 2-year		4 - Pooled OLS	5 - Pooled OLS	6 - Pooled OLS, 2-year
Coefficients 1/:				Coefficients 1/:			
Δ aid 2/	0.561***	0.702***	0.411***	Δ aid 2/	0.578***	0.566*	0.847***
Δ aid lagged 2/	0.127**	0.119*	...	Δ aid lagged 2/	0.258***	0.266***	...
Δ deficit net of aid, lagged 2/	0.109	0.123*	...	Δ deficit net of aid, lagged 2/	-0.209**	-0.207**	...
Δ aid * dummy SSA 2/	...	-0.202	...	Δ aid * dummy SSA 2/	...	0.052	...
Overall CA deficit, lagged	-0.062*	-0.072*	...	Overall fiscal deficit, lagged	-0.234***	-0.247***	...
Δ terms of trade, lagged	0.758	0.686	-0.211	Real GDP growth	0.048	0.071	-0.210
Δ overall fiscal deficit, lagged	0.017	0.019	...	Lagged inflation	-0.013	-0.011	-0.123***
PPP - GDP per capita	0.135*	0.189*	-0.035	Dummy SSA	...	-0.469	...
Lagged coverage	0.208*	0.197*	0.169	Constant	0.824**	1.021**	1.360
Dummy SSA	...	0.903	...				
Constant	-0.933	-1.605**	0.128				
Observations 3/	163	163	126		176	176	130
R-squared	0.259	0.266	0.055		0.346	0.352	0.254

Notes:

1/ Rejection of H0: coefficient=0: \*\*\* at 0.01 level, \*\* at 0.05 level, \* at 0.1 level.

2/ Derived from BoP or fiscal data, respectively

3/ The sample is restricted to increases in aid, and as described in Tables III.2 and III.3 of Appendix III.

To estimate the amount of smoothing, the lagged change in aid is included in the regression. The lagged change in aid allows to estimate how much of the programmed widening of the fiscal (or of the current account deficit) is explained by the use of aid changes that were not spent (or absorbed) in the previous year. A positive coefficient on the lagged change in aid implies that there is smoothing. In this case, the sum of the coefficients on the programmed and lagged change in aid roughly indicate the total amount of an aid increase that is spent (or absorbed) over a two year period (see Appendix II for details).

Including the lagged change in aid provides evidence of smoothing in both absorption and spending. Specifically:

- 69 percent of a programmed increase in aid is absorbed in two years. The coefficient on the expected change in aid indicates that 56 percent of the expected increase in aid is programmed to be absorbed in the first programming year, whereas the coefficient on the lagged increase in aid indicates that 13 percent of the past increase in aid is to be absorbed in the first programming year (Table 2, column 1). Moreover, one cannot reject the hypothesis that the sum of these two coefficients is 70 percent.
- 84 percent of a programmed increase in aid is allowed to be spent in two years; specifically, about 58 percent is programmed to be spent immediately, and about 26 percent in the following year (Table 2, column 4). Even accounting for the feedback effect of the lagged fiscal expansion, spending remains about 70 percent in two years (see below and Appendix II).

<sup>24</sup> See Appendix II for a formal description of the estimated model.

An alternative method for analyzing smoothing in the use of aid is to consider a regression over two-year periods. This regression considers the cumulative increase of the programmed fiscal deficits over a two-year period and the projected increase in aid over the same period.<sup>25</sup> For the case of spending, this regression confirms that the spending of aid over a two-year period is over 80 percent (Table 2, column 6). The importance of medium term budgeting—which means that changes in the fiscal deficit are programmed for a time horizon that is longer than one year—provides an economic ground to this estimates. For absorption, the regression over a two year period points to a lower degree of absorption than the regression with lagged effects (Table 2, column 3). However, this result appears less credible and relevant than the result of the previous absorption equation, as programming absorption two-year into the future has no operational significance. Indeed, differently from fiscal policy, where medium term budgeting makes two-year programming significant, monetary programming has a more short-term horizon.<sup>26</sup>

Controlling for other variables suggests that concerns about fiscal consolidation and reserve adequacy can dampen the programmed spending and absorption of aid (see Box 1). For the spending regression, there is evidence that higher past overall fiscal deficits induce to program a lower increase in the fiscal deficit net of aid; specifically, a difference of one percent of GDP in the lagged overall fiscal deficit seems to imply that the programmed expansion in the fiscal deficit net of aid is about 0.2 percent of GDP lower. Furthermore, the significant coefficient on the lagged change in the fiscal deficit confirms a concern for stabilizing the deficit over time: if the deficit net of aid increased 1 percent of GDP in the past, a reduction of about 0.2 points of GDP is programmed. Surprisingly, inflation does not affect the programmed increase in the fiscal deficit net of aid in the programming year, but it does affect the increase in the deficit over a two-year horizon: one percent higher inflation implies a lower increase in the deficit by 0.1 percent of GDP. Reserves coverage affects the programmed increase in the current account deficit net of aid: a positive difference in reserves equivalent to one month of imports induces an increase in the programmed current account deficit net of aid by about 0.2 percent of GDP.

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<sup>25</sup> Generally, PRGF programs focus on the next year, but their broad objectives are set for a longer time horizon. A two-year horizon might thus be more pertinent than a one-year horizon for fiscal programming (in particular given the importance of medium term budgeting).

<sup>26</sup> Also, the two-year regression has a relatively poor fit, as many factors which are beyond the authorities control and which are difficult to predict greatly affect changes in the current account deficits. Hence, programmed changes in the current account deficit two years into the future are less informative about the absorption of aid than the one-year regressions.

### Box 1: Control variables

For the spending regressions, the following variables are controlled for:

- The lagged change in the deficit net of aid: this captures either the indirect effect of past aid, or concerns about keeping the level of the deficit stable. A positive coefficient implies that there is persistence in the increase in the deficit net of aid. In this case, aid affects next year's deficit not only directly, through the part that is not currently spent, but also indirectly, as the current increase in the deficit will persist over time. A negative coefficient implies that programs aim at keeping the deficit net of aid stable over time, programming a reduction after an expansion.
- The lag of the overall fiscal deficit: this captures concerns about fiscal consolidation. A negative coefficient implies that the reduction in the deficit net of aid is programmed to be larger the greater was the overall fiscal deficit in the past.
- Real GDP growth: this captures the cyclicity of fiscal policy. A negative coefficient implies that higher deficit is programmed when growth slows down.
- The lag of the inflation rate: this captures concerns about the impact of fiscal policy on internal macroeconomic stability. A negative coefficient implies that the higher past inflation is, the larger the programmed reduction in the fiscal deficit.

For the absorption regressions, the following variables are controlled for:

- The lagged change in the current account deficit net of aid (with a similar interpretation as for the fiscal balance in the spending equation).
- The lag of the overall current account deficit (same interpretation as the lag of the overall fiscal deficit in the spending equation).
- The lag change in the terms of trade: this captures concerns about adjusting to past exogenous shock. A negative coefficient implies that past shocks are allowed to be passed to the economy through an increase in the current account deficit net of aid.
- The change in the overall fiscal deficit: this captures either concerns about the effects of fiscal policy on external macroeconomic stability (negative coefficient), or considerations about the demand pressures generated by fiscal policy on the current account (positive coefficient).
- Per capita GDP relative to that of the US: this captures concerns about a country's vulnerability, as countries with a higher per capital income can be expected to be more resilient to shocks. A positive coefficient implies that a larger increase in the account deficit is programmed for countries of higher income.
- The lag of reserve coverage in terms of months of imports: this captures concerns about external stability, in particular reserve adequacy. A positive coefficient implies that a larger increase in the current account deficit is programmed for countries where the reserve position is higher.

All pertinent variables are expressed in percent of GDP.

There is no evidence of differences in spending and absorption for countries of Sub-Saharan Africa. Indeed, the coefficient of the interaction between aid increase and a dummy for SSA countries is not significantly different from zero (Table 2, columns 2 and 5). Finally, although important, country specific effects do not alter the results in the case of spending while they do somewhat in the case of absorption (see Appendix III for details).<sup>27</sup>

### **Treatment of positive and negative changes in aid**

Focusing on positive changes in aid only provides a partial, and possibly misleading, picture of the use of aid. As aid is volatile, with sizable increases and decreases, the treatment of both should be considered. Aid volatility provides a valid rationale for the less than complete spending and absorption of swings in aid in both directions, especially in the short-run, as this allows to stabilize fiscal spending and nonaid current account over time. In particular, less than complete reductions in spending and net imports when aid falls—by tapping the foreign exchange reserves built up in previous years—can provide an important buffer to help safeguard spending priorities. This also raises the question of whether the programmed response to changes in aid is symmetric, that is whether the programmed reduction in the deficit when aid decreases is symmetric to the increase that is programmed when aid is expected to increase. Looking at both directions of changes in aid allows to answer this question.

Our regressions indicate that the aid decreases are treated symmetrically to aid increases in the case of absorption, but asymmetrically in the case of spending. And there is further evidence of smoothing for both spending and absorption (Table 3, and Table III.4 in Appendix III). The treatment of decreases in aid is controlled by interacting the expected change in aid with a dummy that takes value one if the expected change is negative. Specifically:

- The equations for both spending and absorption show similar results as the equations of the previous sections. The eventual absorption ratios (adding up the coefficients for the same-year and the lagged effects) remains about 0.72 and the eventual spending remains about 0.82 (Table 3, columns 1 through 3).
- Spending and absorption coefficients below 1 imply that when aid is expected to change during the program year, program design does *not* ask for an immediate full adjustment of the current account or fiscal deficits, but for a smaller change, thereby smoothing the adjustment over time;
- For absorption, the response to increases and decreases in aid appears to be symmetric, as the coefficient of the interaction term is not significant;

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<sup>27</sup> For the case of absorption, this result is highly sensible to the inclusion of some countries. For instance, excluding Guyana, Lesotho, and Nicaragua, overall absorption in the fixed effects increases to about 0.59.

- For spending, however, the response to increases and decreases in aid is asymmetric over a one-year horizon, but symmetric over a two-year horizon (Table 3, columns 2 and 3). In particular, the negative sign of the interaction term suggests that there is an expansive asymmetry: if aid is expected to fall over the program, the programmed tightening of the fiscal deficit net of aid is smaller than the expansion that is allowed when aid increases.

**Table 3: Treatment of increases and decreases in aid**

Independent variable:	Absorption regression		Spending regression	
	Increase in CA deficit		Increase in fiscal deficit	
	1 - Pooled OLS		2 - Pooled OLS	3 - Pooled OLS, two-year
Coefficients 1/		Coefficients 1/		
Δ aid 2/	0.568***	Δ aid 2/	0.591***	0.824***
Δ aid * dummy aid decrease 2/	-0.203	Δ aid * dummy aid decrease 2/	-0.227*	-0.256
Δ aid lagged 2/	0.163***	Δ aid lagged 2/	0.243***	...
Δ deficit net of aid, lagged 2/	0.033	Δ deficit net of aid, lagged 2/	-0.186***	...
Overall CA deficit, lagged	-0.077***	Overall fiscal deficit, lagged	-0.238***	...
Δ terms of trade, lagged	0.342	Real GDP growth	0.013	-0.118
Δ overall fiscal deficit	0.008	Lagged inflation	-0.025*	-0.094**
PPP - GDP per capita	0.084	Dummy aid decrease 2/	-0.335	-0.109
Lagged coverage	0.135	Constant	1.034***	0.839
Dummy aid decrease 2/	-0.371			
Constant	-0.313			
Observations 3/	260		276	198
R-squared	0.315		0.425	0.325

Notes:

1/ Rejection of H0: coefficient=0: \*\*\* at 0.01 level, \*\* at 0.05 level, \* at 0.1 level.

2/ It refers to BOP definition, for absorption, or fiscal, for spending.

3/ The sample is restricted as described in Table III.4 of Appendix III.

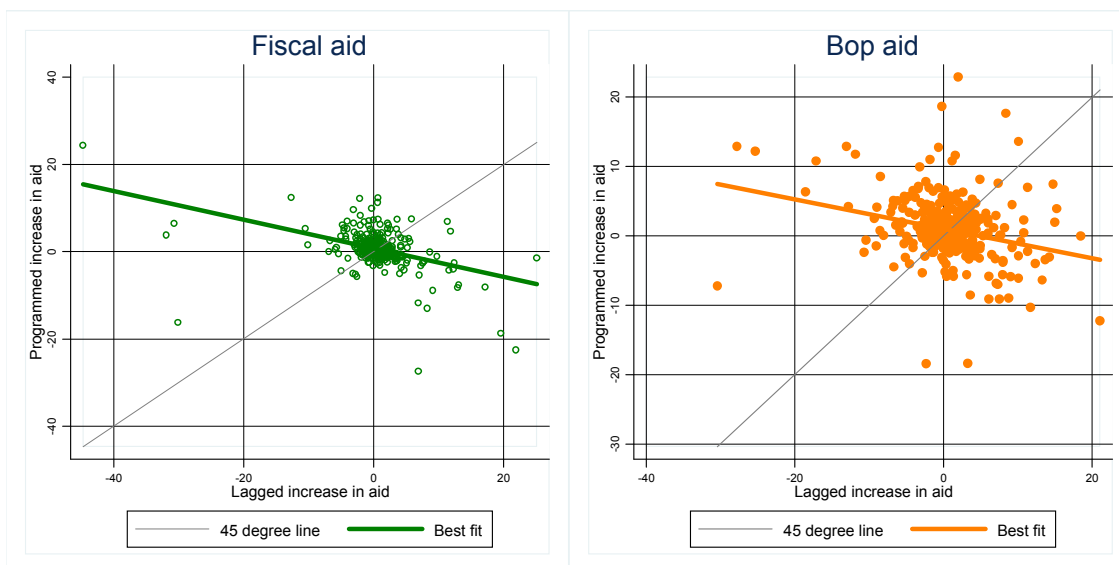
The degree of symmetry in the programmed response to aid changes may reflect the expected aid pattern. A symmetric treatment may make sense, in particular, if aid inflows are expected to remain broadly stable, in terms of GDP, over time. In this case, increases or decreases from one year to the next reflect the annual oscillation of aid inflows around their long run average. By contrast, if aid inflows are expected to follow an increasing trend over time, there would be a case for the programmed spending and absorption of aid increases to be larger than that of aid decreases, thereby limiting the need for fiscal contraction in response to a decline in aid that is expected to be more than offset over time.

## Aid Projections

An analysis of programmed changes in aid shows that aid is projected to follow an upward trend, with a partial reversion of recent changes in the level of aid (as a share of GDP). Our dataset not only allows to study programmed spending and absorption of aid, but it also how aid projections evolve over time. Figure 2 and Table 4 show the relationship between programmed changes in aid and past changes in aid. The positive constant in the regressions corresponds to an estimated upward trend in projected aid that is close to 1 percent of GDP for the program year. The negative coefficient for the lagged (i.e., last year's) change in aid means that aid changes are not considered to be fully permanent. In particular, under a program, if aid increased in the immediate past then (i) the expectations about long run aid

are revised upwards, but not in full; and (ii) aid inflows are expected to fluctuate around the revised long-run average, with the size of the fluctuations decreasing over time.<sup>28</sup> However, note that for balance of payments aid, this relationship is not strong, as evidence by the very low R-squared.

**Figure 2: Programmed vs. lagged aid changes used in spending regressions (left) and in absorption regressions (right)**



**Table 4: Programmed vs. lagged aid changes, in percent of GDP**

	Change in aid used in absorption regressions	Change in aid used in spending regressions
Independent variable:	Aid (from BOP)	Aid (from Fiscal)
Coefficients:		
$\Delta$ aid, lagged 2/	-0.211***	-0.327***
Constant	1.023***	0.789***
Observations	359	339
R-squared	0.07	0.187

Notes:

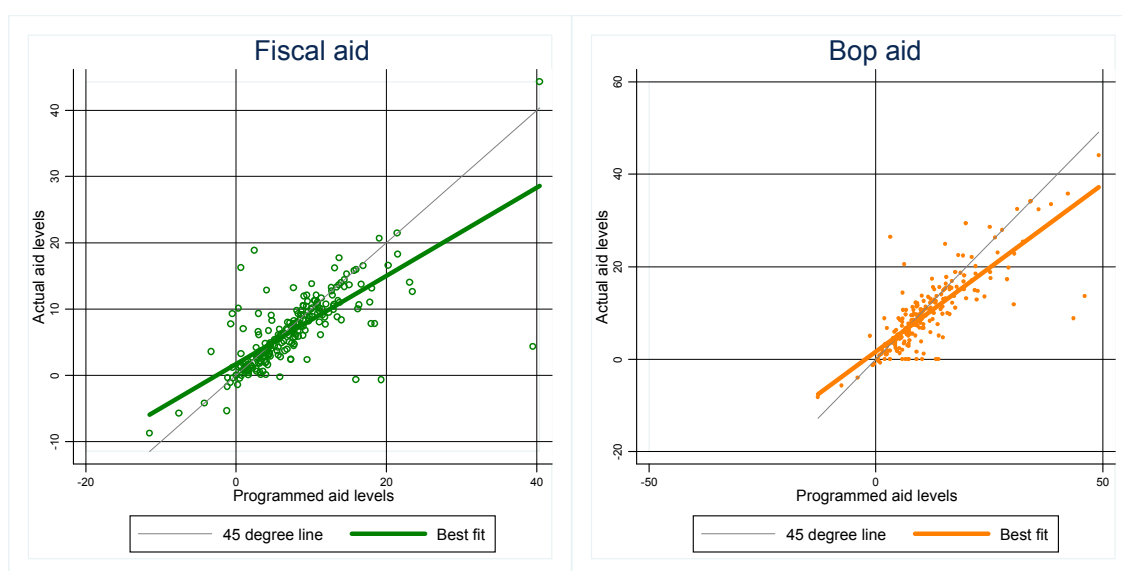
1/ Rejection of  $H_0$ : coefficient=0: \*\*\* at 0.01 level, \*\* at 0.05 level, \* at 0.1 level.

2/ Derived from BoP or fiscal data, respectively

<sup>28</sup> To see this, let us consider the regression for fiscal aid. Assume that aid inflows in the budget were 0 in the past. One year before the program, aid inflows increase to 10 percent of GDP. Applying the regressions results, the aid inflows expected for the first year of the program would then be 7.5 percent of GDP, or a decrease of 2.5 percentage points (that is, the coefficient, of -0.33, times the lagged change in aid, of 10 percentage points, plus the constant 0.8). If this expectation is realized, in the second year of the program aid inflows would be expected to reach 9.1 percent of GDP, an increase of 1.6 percentage points (that is, -0.33 times -2.5, the observed decrease in aid, plus the constant). Iterating, one obtains an harmonic series for aid that oscillates around an increasing trend.

During 1999-2007, aid projections under PRGF programs were, on average, overly optimistic. The programmed BOP and fiscal aid inflows were, on average, 1.4 and 0.7 percent of GDP, respectively, higher than the actual respective inflows. Behind these averages, was a particular pattern: a simple regression of the actual aid received by countries and the programmed aid inflows for the same calendar year suggests that IMF programs have a tendency to be overly pessimistic when they project low levels of aid, but they tend to be overly optimistic when they project large aid inflows.<sup>29</sup> This holds true for both fiscal and BOP data. This pattern can be seen in both the below graphs and in the table of regressions results (Figure 3 and Table 5).

**Figure 3: Actual and programmed aid inflows in the same year**



**Table 5: Actual and programmed aid inflows in the same year, in percent of GDP**

Independent variable:	Actual BOP aid received	Actual fiscal aid received
Coefficients:		
Programmed aid inflow 2/	0.731***	0.705***
Constant	1.591***	1.464***
Observations	237	235
R-squared	0.693	0.598

Notes:

1/ Rejection of H0: coefficient=0: \*\*\* at 0.01 level, \*\* at 0.05 level, \* at 0.1 level.

2/ Derived from BoP or fiscal data, respectively

<sup>29</sup> To see this, consider the estimated coefficients of actual BOP aid received. When the programmed aid inflow is zero, the actual aid received is, on average, 1.6 percent of GDP (that is, the estimated constant). When the programmed aid inflow is 20 percent of GDP, the actual aid received is, on average, 16.2 percent.

## Thresholds in Programming the Use of Aid

An important question is whether there are thresholds for inflation and reserves that trigger a reduction or an increase of the programmed spending and absorption ratios. The regressions of the previous sections analyzed whether concerns about internal and external stability affect the programmed increase in the fiscal and current account deficits independently on the expected increase in aid. The question then arises of whether there exists an inflation level above which programmed spending is systematically reduced, and whether there exists a level of reserves coverage above which programmed absorption is systematically increased.<sup>30</sup> As discussed above, the IEO report found evidence that simple thresholds of this kind have indeed guided IMF programs. IMF staff, however, have argued that program designed is based on a country-specific analysis that involves a wider range of considerations.<sup>31</sup>

A careful analysis provides little evidence of simple threshold effects on the programmed spending and absorption of aid. The existence of such thresholds were estimated by including in the spending and absorption regression an interaction term between the increase in aid and a dummy variable that takes value of one if inflation (coverage) is above the threshold, and zero it is below. A grid search was then conducted to find the threshold that maximizes the R-squared of the regression, within a specified interval. Figure 4 shows the R-squared of the spending and absorption regressions as a function of the thresholds for inflation and coverage. The graph shows that these relationships are not concave, there are many local maxima, and there is little variability of the R-squared across different local maxima. All these factors suggest that, controlling for other control variables, it is hard to find evidence for the existence of such thresholds.

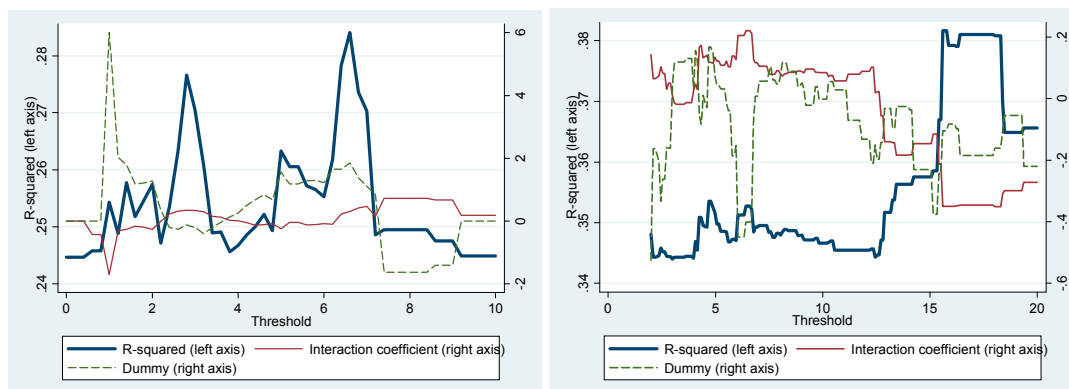
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<sup>30</sup> To see the difference, consider a country that has never received and is not expected to receive any aid. Everything else equal, an increase in the current account will be programmed if reserve coverage improved the year before the program, and a decrease will be programmed if reserve coverage worsened. Consider instead a country where reserve coverage has been constant in the past, and where aid is expected to increase. Everything else equal, the increase in the current account deficit due to the expected increase in aid might depend on the level of coverage.

<sup>31</sup> See the IMF Staff Response to IEO (2007).



**Figure 4: R-squared of the absorption (left) and spending (right) regressions as a function of the thresholds on coverage and inflation**



There appears to be weak evidence of a threshold for coverage of 2.9 months of imports. The grid search suggests that the threshold that maximizes the R-squared is 6.6 months of imports. However, in the regression associated to this threshold the coefficient of the interaction term is not significantly different from zero (see column 6 of Table III.3 in Appendix III). However, the left panel of Figure 4 shows that the second-highest R-squared corresponds to a threshold of 2.9 months of imports. The regression associated to this threshold produces a coefficient on the interaction term that is positive (0.36) and different from zero (Table 5, column 1) although it is significant at the 10 percent level only. This coefficient would mean that if reserve coverage is below 2.9 months of imports, two year absorption is 46 percent (the sum of the coefficient on aid and lagged aid), whereas absorption increases to 81 percent if coverage is above 2.9 months of imports.

For spending, there is stronger evidence that spending drops if inflation is above 15 percent. The grid indicates that the highest R-squared corresponds to a threshold of 15.7 and, in the regression associated to this threshold, the coefficient of the interaction term is significantly different from zero (Table 6, column 2; see also Table III.2 in Appendix III): if inflation is below 15.7 percent, spending would be about 87 percent, whereas it drops to 53 if inflation is above 15.7 percent.

These results indicate that while program design is not based on simple rules, certain levels of vulnerability indicators raise heightened concern, that can lead to a more cautious stance of the programmed macroeconomic policies.

**Table 6: Thresholds for inflation and coverage**

Independent variable:	Absorption regression			Spending regression
	Increase of CA deficit			Increase of fiscal deficit
	1 - Pooled OLS			2 - Pooled OLS
Coefficients 1/:		Coefficients 1/:		
Δ aid 2/	0.340**	Δ aid 2/		0.647***
Δ aid lagged 2/	0.118*	Δ aid lagged 2/		0.228***
Δ CA deficit net of aid, lagged	0.112	Δ fiscal deficit net of aid, lagged		-0.197**
Overall CA deficit, lagged	-0.063*	Overall fiscal deficit, lagged		-0.225***
Δ terms of trade, lagged	0.066	Real GDP growth		0.059
Δ overall fiscal deficit	0.020	Δ aid * lagged inflation > 15.7		-0.349***
PPP - GDP per capita	0.143**	Dummy lagged inflation > 15.7		-0.104
Δ aid * lagged coverage > 2.9	0.355*	Constant		0.650**
Dummy lagged coverage > 2.9	-0.121			
Constant	-0.134			
Observations 3/	163			176
R-squared	0.277			0.382

Notes:

1/ Rejection of H0: coefficient=0: \*\*\* at 0.01 level, \*\* at 0.05 level, \* at 0.1 level.

2/ Derived from BoP or fiscal data, respectively

3/ The sample is restricted to increases in aid, and as described in Tables III.2 and III.3 of Appendix III.

**Actual spending and absorption of aid increases**

The analysis so far raises the question of how actual spending and absorption compare with the programmed spending and absorption. Table 7 summarizes the results of the regressions that explain actual fiscal and current account balances for the countries in our dataset for the entire period 1996-2007, that is even for years when these countries did not have a program (see also Tables III.5 and III.6 in Appendix III). This analysis suggests that actual spending of same-year aid is full, and that there is no smoothing of aid (Table 7, column 4). By contrast, estimated actual absorption of the aid received in the first programming year is lower than programmed absorption, 32 percent; and, there is no evidence of smoothing (Table 7, column 1). These results are in stark contrast with Aiyar and Ruthbah (2008), which finds that actual spending is 56 percent in the short run and above 100 percent in the long run, whereas absorption is 50 in the short run and 83 percent in the long run. The overall result is, however, consistent with the case studies presented in Berg et al (2007), which suggested that, in many cases, aid is spent but not absorbed.

The presence of a program does not appear to affect actual spending and actual absorption. The regressions include an interaction term between aid and a dummy that is equal to one in those years when a country had a program. The coefficient on the interaction term is not different from zero, implying that neither actual spending nor actual absorption are significantly affected by the presence of a PRGF-supported program (Table 7, columns 2 and

5).<sup>32</sup> For absorption these result are obviously consistent with standard program design, which sets a floor on the accumulation of reserves, allowing the monetary authorities to raise reserves further, and thereby limit actual absorption to be less than programmed. For spending, it suggests that the program limits do not impose a binding constraint on the expansion of the broader non-aid fiscal deficit. Of course, these program limits could nonetheless guide the way the program is financed, for example, to help ensure debt sustainability, and avoid risks of crowding out or monetary financing.

Aid surprises—defined as increases in aid that were not anticipated during the programming period—seem to be absorbed and spent to the same extent as the aid that has been foreseen under the program (Table 7, columns 3 and 6).

**Table 7: Actual spending and absorption of aid increases**

	Absorption regression				Spending regression		
Independent variable:	Increase of CA deficit				Increase of fiscal deficit		
	1 - Pooled OLS	2 - Pooled OLS	3 - Pooled OLS		3 - Pooled OLS	4 - Pooled OLS	5 - Pooled OLS
Coefficients 1/:				Coefficients 1/:			
Δ aid 2/	0.332*	0.594	...	Δ aid	0.819***	0.809*	...
Δ aid * dummy for program 2/	...	-0.423	...	Δ aid * dummy for program	...	-0.008	...
Unexpected aid 2/	...	...	0.085	Unexpected aid	...	...	0.758**
Expected aid 2/	...	...	0.244	Expected aid	...	...	0.737**
Δ aid lagged 2/	-0.059	-0.063	0.108	Δ aid lagged	0.332	0.333	0.477
Δ CA deficit net of aid, lagged	0.022	0.027	0.054	Δ fiscal deficit net of aid, lagged	-0.401	-0.402	-0.675**
Overall CA deficit, lagged	-0.093	-0.097	-0.108	Overall fiscal deficit, lagged	-0.211	-0.214	0.023
Δ terms of trade, lagged	0.428	0.105	0.041	Lagged inflation	-0.022	-0.024	-0.030
Δ overall fiscal deficit	0.069**	0.068**	0.064*	Real GDP growth	0.003	-0.007	0.007
PPP - GDP per capita	0.002	0.002	0.002	Dummy for program	...	0.366	...
Lagged coverage	0.059	0.070	0.150	Constant	0.722	0.572	0.304
Dummy for program	...	0.942	...				
Constant	0.088	-0.552	-0.142				
Observations 3/	132	132	88		165	165	107
R-squared	0.118	0.129	0.145		0.328	0.329	0.371

Notes:

1/ Rejection of H0: coefficient=0: \*\*\* at 0.01 level, \*\* at 0.05 level, \* at 0.1 level.

2/ Derived from BoP or fiscal data, respectively

3/ The sample is restricted to increases in aid, and as described in Tables III.5 and III.6 of Appendix III.

## B. Alternative Model in Levels

As a robustness check, the spending and absorption of aid inflows is also estimated, in level terms (as a percent of GDP), in rather than in terms of changes,. When using the level of aid inflows instead of changes, the regression coefficients measure the fraction of the aid inflow that is programmed to be absorbed and spent over time.

The estimated spending is about 76 percent of same-year programmed aid. Accounting for the fact that an increase in the deficit is persistent over time (using formula (3) of Appendix II), long run spending is estimated to be 73 percent.<sup>33</sup> Also, there is weak evidence that there

<sup>32</sup> These results may, however, be affected by sample selection bias, as the countries in the regressions all had a PRGF-supported program during some part of 1999-2007. Countries that did not have a PRGF arrangement during 1999-2007 are not included in the data set.

<sup>33</sup> This is the sum of the coefficients on aid and lagged aid (0.40) divided by one minus the coefficient on the lagged deficit net of aid (0.55).

is a threshold for inflation of 3 percent: long run spending would be full if inflation is below 3 percent, and 66 percent if inflation is above 3 percent (Table 8, and Table III.6 in Appendix III). Consistent with the findings in the previous sub-section, actual spending is higher than programmed spending, but there is no evidence that spending is smoothed over time.

Estimated absorption is about 50 percent of the same-year programmed aid, but it is full over the long run (Table 8, and Table III.7 in Appendix III). There is no evidence for the existence of a threshold for reserves coverage that may affect programmed absorption, and actual absorption is lower than programmed absorption.

**Table 8: Spending and absorption of aid inflows**

Independent variable:	Fiscal deficit net of aid			Current account deficit net of aid	
	1 - Pooled OLS	2 - Pooled OLS	3 - Pooled OLS, actual	4 - Pooled OLS	5 - Pooled OLS, actual
Coefficients 1/ 2/:					
Aid	0.768***	0.914***	0.894***	0.501***	0.349***
Lagged aid	-0.366***	-0.364***	0.043	-0.237**	-0.114
Fiscal deficit net of aid, lagged	0.450***	0.442***	0.018	0.749***	0.743***
Inflation, lagged	-0.078***	-0.069**	0.001	-1.373**	-1.073
Real GDP growth	0.038	0.066	0.081	-0.011	0.090**
Aid * inflation > 3	...	-0.183**	...	0.034	-0.001
Dummy inflation > 3	...	1.060*	...	0.245	0.081
Constant	0.828**	-0.108	-0.736	0.016*	0.017**
				4.88	4.555
Observations 3/	327	327	434	297	409
R-squared	0.715	0.720	0.589	0.891	0.805

Notes:

1/ Standard errors in parentheses

2/ Rejection of "H0: coefficient = 0": \*\*\* at 0.01 level, \*\* at 0.05 level, \* at 0.1 level.

3/ The sample is restricted as described in Tables III.7 and III.8 of Appendix III.

## VI. CONCLUSIONS

Overall, this paper provides compelling evidence that PRGF-supported policy programs have accommodated the spending and absorption of most or almost all available aid or aid increases by low-income recipient countries, while smoothing the use of aid over time. While no single number can do justice to the many complexities and caveats involved, most estimates of the eventual spending and absorption ratios range between 0.6 and 0.9. For example, the paper finds that, on average, 70 percent of aid increases is programmed to be absorbed and more than 80 percent is programmed to be spent over just two years.

The evidence of smoothing of the programmed use of aid over time is important. This finding is confirmed by the significance of lagged aid in the regressions, which testifies to the gradual use of aid over time. Expenditure smoothing is also implied by the finding that fiscal spending and the nonaid current account adjust only partially to both increases and decreases in aid, thereby stabilizing the use of aid over time in the face of high aid volatility. Expenditure smoothing is beneficial as large swings in expenditures can undermine spending effectiveness.

Finally, the paper finds very weak evidence of any simple inflation or reserves coverage thresholds. This points to a much more complex array of influences on program design

reacting to specific country circumstances. Also, the paper finds that actual spending and absorption do not depend on whether a country has a PRGF-supported program.

## Appendix I: The Dataset

The dataset is available on the IMF's website or upon request from the authors. It includes data from all program documents (request and review) of all PRGF supported programs in existence between 2000 and end-2007, including some programs that were initiated in 1999 under the ESAF and then converted to a PRGF-supported program. Because of lack of data, we excluded the PRGF program approved for Afghanistan in 2007 and the one approved for Cote d'Ivoire in 2007. As a result, the dataset is based on data from 369 program documents pertaining to 51 countries (Table I.4).

From each document and for each variable, we collect as many years of data as possible for the period 1996 – 2010. This allows to collect at most three years of actual data for the oldest (1999) document, and at most three years of projections for the most recent (2007) documents (Table I.2). We complement our dataset with variables from the WEO on the terms of trade, and the PPP-adjusted real per capita GDP. Finally, for each document we collect the country to which the document pertains, the month and year when the document was discussed, the first year of programming under the document, and whether the document relates to a request or a review, and which review.

We collected the following data:

Variable	Table in SR where variable is found	Scale	Sign	Meaning of variable name
CA	BOP	nominal	(+/-)	current account balance, including transfers
INTEX	BOP	nominal	(+)	interest payments on external public debt
CURTRAN	BOP	nominal	(+/-)	official current transfers, net
CAPTRAN	BOP	nominal	(+/-)	official capital transfers, net
DIEX	BOP	nominal	(+)	gross disbursements / gross borrowing, originating public sector external debt
AMEX	BOP	nominal	(+)	amortization on external public sector debt
ARREARSEX	BOP	nominal	(+/-)	change in the stock of external arrears (BOP)
NIR	BOP	nominal	(+)	stock of net international reserves
IMF	BOP	nominal	(+/-)	change in the net position towards the IMF
GIR	SEI/BOP	nominal	(+)	stock of gross international reserves (nominal)
COVERAGE	BOP	number	(+)	gross international reserves in months of imports (staff report definition)
DEBTTEX	BOP/DSA	nominal	(+)	stock of external debt outstanding
DEBTD	BOP/DSA/FISCAL	nominal	(+)	stock of domestic debt outstanding
FINEXCP	BOP	nominal	(+)	exceptional financing
FINGAPEX	BOP	nominal	(+)	financing gap (BOP)
NCUS	SEI/BOP	nominal	(+)	exchange rate, national currency per 1 US\$/SDR/EUR/...
GDPUS	SEI/BOP	nominal	(+)	nominal GDP including natural resources, in US dollars/SDR/EUR/...
GDPNC	SEI/BOP	nominal	(+)	nominal GDP including natural resources, in local currency
FI	FISCAL	nominal	(+/-)	fiscal balance, including grants and natural resources
REV	FISCAL	nominal	(+)	government revenues, including grants and natural resources
GRANTS	FISCAL	nominal	(+)	grants in budget
EXPTOT	FISCAL	nominal	(+)	total fiscal expenditures, including interests and net lending
EXPCUR	FISCAL	nominal	(+)	current expenditures, including interests
INTEXFI	FISCAL	nominal	(+)	external interest payments (FISCAL)
INTDOMFI	FISCAL	nominal	(+)	domestic interest payments (FISCAL)
EXFINFI	FISCAL	nominal	(+)	external financing net (FISCAL) (if applicable: excluding any resource accounts)
FINGAPFI	FISCAL	nominal	(+)	financing gap (FISCAL)
ARREARSFI	FISCAL	nominal	(+/-)	change in the stock of external arrears (FISCAL)
INF	SEI	percentage points	(+/-)	inflation, average (in percent) - in percentage points (that is, 1 means 1 percent)
M2	MON	nominal	(+)	stock of M2
GDPDEF	SEI	percentage points	(+/-)	GDP deflator excluding oil, average, in percent

### Derivation of main variables

The proxy variable for net aid inflows is derived from balance of payments data by adding changes in liabilities to official creditors (disbursements—amortization) to official current

transfers and capital transfers, deducting external interest payments and—where applicable—adding the programmed financing gap and increases in external arrears, rescheduling and other balance of payments or fiscal support. Table I.1 provides a detailed description of the derivation of the aid inflows from the actual variables in the database.

**Table I.1. Derivation of proxies for net aid as a share of GDP (Aid)**

Conceptual	BoP	Fiscal
(Received Grants	( CURTRAN	GRANTS
+ Net borrowing	+ CAPTRAN	
	+ DIEX	+ EXFINFI
	– AMEX	
	+ IMF	
+ Other inflows	+ ARRERSEX	+ARREARSFI
	+ FINEXCP	+ FINGAPFI
	+ FINGAPEX	
– Interest payments)	– INTEx )	– INTExFI
/ GDP	/ GDP	/ GDP

The current account deficit excluding aid is derived by excluding official current transfers and interest payments from the current account balance. **Table I.2** provides a detailed description of the derivation of the current account deficit excluding aid from the actual variables in the database.

**Table I.2. Derivation of proxies for current account deficit excluding aid as a share of GDP (CAD)**

Conceptual	Variables
( Current account deficit	(– CA
+ Current transfers	+ CURTRAN
– Interest payments)	– INTEx)
/ GDP	/ GDP

The fiscal deficit excluding aid is derived from the difference between expenditures excluding interest payments and revenue excluding grants. **Table I.3** provides a detailed description of the derivation of the fiscal deficit excluding aid from the actual variables in the database.

**Table I.3. Derivation of proxies for fiscal deficit excluding aid as a share of GDP (FD)**

Conceptual	Variables
(Fiscal deficit	(–FI
+ Grants	+ GRANTS
– Interest payments)	– INTExFI)
/ GDP	/ GDP

Table I.4: List of countries and documents

Country	Date Approved	1st Review Completed	2nd Review Completed	3rd Review Completed	4th Review Completed	5th Review Completed	6th Review Completed
Albania	6/21/2002	2/26/2003	7/14/2003	1/23/2004	7/14/2004	2/28/2005	8/1/2005
Albania	2/1/2006	7/24/2006	2/2/2007	7/9/2007	...	...	...
Armenia	5/21/2001	9/25/2002	9/25/2002	4/2/2003	11/24/2003	5/3/2004	12/1/2004
Armenia	5/25/2005	11/14/2005	5/17/2006	11/22/2006	5/16/2007	11/26/2007	...
Azerbaijan	7/6/2001	2/20/2002	5/14/2003	12/19/2003	12/22/2004	6/24/2005	...
Bangladesh	6/20/2003	1/9/2004	7/28/2004	6/29/2005	2/3/2006	10/27/2006	...
Benin	7/17/2000	1/8/2001	11/5/2001	7/15/2002	3/24/2003	9/10/2003	3/29/2004
Benin	8/5/2005	11/27/2006	6/11/2007	...	...	...	...
Burkina Faso	9/10/1999	7/10/2000	1/10/2001	7/2/2001	12/7/2001	4/9/2002	11/13/2002
Burkina Faso	6/11/2003	3/19/2004	2/2/2005	2/2/2005	9/7/2005	3/13/2006	9/8/2006
Burkina Faso	4/23/2007	...	...	...	...	...	...
Burundi	1/23/2004	1/19/2005	7/27/2005	7/14/2006	7/14/2006	3/9/2007	...
Cambodia	10/22/1999	9/15/2000	1/26/2001	7/18/2001	2/6/2002	7/22/2002	2/20/2003
Cameroon	12/21/2000	7/16/2001	1/30/2002	9/18/2002	12/17/2003	...	...
Cameroon	10/24/2005	4/28/2006	12/22/2006	6/18/2007	12/19/2007	...	...
Cape Verde	4/10/2002	12/16/2002	6/25/2003	12/19/2003	8/27/2004	1/31/2005	5/25/2005
Central African Republic	12/22/2006	9/28/2007	...	...	...	...	...
Chad	1/7/2000	7/25/2000	5/16/2001	1/16/2002	10/18/2002	7/21/2003	...
Chad	2/16/2005	...	...	...	...	...	...
Congo, Democratic Republic of	6/12/2002	3/24/2003	7/23/2003	3/3/2004	7/12/2004	8/29/2005	...
Congo, Republic of	12/6/2004	8/1/2005	7/14/2006	...	...	...	...
Djibouti	10/18/1999	7/24/2000	11/30/2001	12/20/2002	...	...	...
Dominica	12/29/2003	3/24/2004	8/4/2004	3/7/2005	3/7/2005	10/14/2005	7/26/2006
Ethiopia	3/22/2001	8/2/2001	3/18/2002	9/23/2002	8/27/2003	2/27/2004	9/13/2004
Gambia, The	7/18/2002	...	...	...	...	...	...
Gambia, The	2/21/2007	8/29/2007	12/19/2007	...	...	...	...
Georgia	1/12/2001	10/26/2001	7/23/2002	...	...	...	...
Georgia	6/4/2004	12/20/2004	7/20/2005	3/31/2006	9/29/2006	2/28/2007	8/20/2007
Ghana	5/3/1999	11/19/1999	8/25/2000	6/28/2001	2/22/2002	...	...
Ghana	5/9/2003	12/17/2003	7/13/2004	6/20/2005	6/12/2006	6/12/2006	10/27/2006
Grenada	4/17/2006	...	...	...	...	...	...
Guinea	5/2/2001	7/26/2002	...	...	...	...	...
Guinea	12/21/2007	...	...	...	...	...	...
Guinea-Bissau	12/15/2000	...	...	...	...	...	...
Guyana	9/20/2002	9/5/2003	7/26/2004	1/24/2005	9/9/2005	1/30/2006	9/6/2006
Haiti	11/20/2006	7/23/2007	...	...	...	...	...
Honduras	3/26/1999	12/8/1999	6/7/2000	10/5/2001	...	...	...
Honduras	2/27/2004	9/24/2004	3/28/2005	12/16/2005	...	...	...
Kenya	8/7/2000	...	...	...	...	...	...
Kenya	11/21/2003	12/20/2004	4/11/2007	11/16/2007	...	...	...
Kyrgyz Republic	12/6/2001	7/1/2002	2/28/2003	7/16/2003	1/14/2004	6/30/2004	2/23/2005
Kyrgyz Republic	3/15/2005	10/24/2005	5/12/2006	11/3/2006	5/18/2007	11/16/2007	...
Lao, P.D.R.	4/25/2001	2/25/2002	8/30/2002	9/12/2003	...	...	...
Lesotho	3/9/2001	7/20/2001	3/18/2002	9/20/2002	6/16/2003	1/21/2004	9/10/2004
Madagascar	3/1/2001	12/5/2001	12/23/2002	6/30/2003	3/17/2004	10/21/2004	2/18/2005
Madagascar	7/21/2006	12/20/2006	...	...	...	...	...
Malawi	12/21/2000	10/23/2003	...	...	...	...	...
Malawi	8/5/2005	2/24/2006	8/30/2006	3/14/2007	12/17/2007	12/17/2007	...
Mali	8/6/1999	9/8/2000	7/25/2001	12/17/2001	7/26/2002	3/7/2003	7/23/2003
Mali	6/23/2004	3/7/2005	12/19/2005	12/19/2005	7/14/2006	2/14/2007	10/31/2007



Table I.4: List of countries and documents (continued)

Country	Date Approved	1st Review Completed	2nd Review Completed	3rd Review Completed	4th Review Completed	5th Review Completed	6th Review Completed
Mauritania	7/21/1999	6/19/2000	2/8/2001	5/9/2001	11/21/2001	6/20/2002	12/4/2002
Mauritania	7/18/2003	...	...	...	...	...	...
Mauritania	12/18/2006	4/23/2007	11/21/2007	...	...	...	...
Moldova	12/21/2000	7/10/2002	...	...	...	...	...
Moldova	5/5/2006	12/15/2006	7/13/2007	...	...	...	...
Mongolia	9/28/2001	9/12/2003	9/12/2003	...	...	...	...
Mozambique	6/28/1999	3/27/2000	12/18/2000	9/26/2001	6/17/2002	6/20/2003	...
Mozambique	7/6/2004	2/11/2005	6/22/2005	12/19/2005	6/19/2006	12/18/2006	6/18/2007
Nepal	11/19/2003	10/20/2004	11/10/2006	11/10/2006	6/13/2007	11/9/2007	...
Nicaragua	12/13/2002	6/18/2003	6/18/2003	10/20/2003	1/23/2004	9/8/2004	9/8/2004
Nicaragua	10/5/2007	...	...	...	...	...	...
Niger	12/22/2000	8/3/2001	2/8/2002	8/26/2002	4/18/2003	11/24/2003	6/28/2004
Niger	1/31/2005	11/14/2005	6/19/2006	12/20/2006	6/8/2007	11/21/2007	...
Pakistan	12/6/2001	3/26/2002	7/3/2002	11/1/2002	2/28/2003	6/18/2003	10/27/2003
Rwanda	8/12/2002	6/13/2003	6/9/2004	6/9/2004	4/11/2005	8/26/2005	6/5/2006
Rwanda	6/12/2006	1/29/2007	6/25/2007	...	...	...	...
Sao Tomé & Príncipe	4/28/2000	12/19/2000	...	...	...	...	...
Sao Tomé & Príncipe	8/1/2005	3/6/2006	8/2/2006	1/17/2007	6/25/2007	12/21/2007	...
Senegal	4/28/2003	2/13/2004	3/8/2005	1/9/2006	1/9/2006	...	...
Sierra Leone	9/26/2001	3/11/2002	9/18/2002	4/21/2003	2/23/2004	11/12/2004	6/1/2005
Sierra Leone	5/10/2006	12/15/2006	...	...	...	...	...
Sri Lanka	4/18/2003	...	...	...	...	...	...
Tajikistan	12/11/2002	7/18/2003	1/16/2004	7/21/2004	3/18/2005	7/18/2005	2/7/2006
Tanzania	4/4/2000	8/1/2000	3/14/2001	9/24/2001	4/15/2002	11/18/2002	7/28/2003
Tanzania	8/16/2003	2/25/2004	8/6/2004	2/23/2005	7/29/2005	4/7/2006	2/16/2007
Uganda	9/13/2002	6/25/2003	12/17/2003	7/30/2004	2/23/2005	7/8/2005	1/23/2006
Vietnam	4/13/2001	11/21/2001	7/3/2002	...	...	...	...
Zambia	3/25/1999	8/11/2000	4/16/2001	11/7/2001	5/29/2002	11/27/2002	...
Zambia	6/14/2004	12/16/2004	4/8/2005	1/11/2006	7/12/2006	6/8/2007	6/8/2007
<b>Not in dataset</b>							
Afghanistan	6/26/2006	3/7/2007	7/9/2007	...	...	...	...
Cote d'Ivoire	3/29/2002	...	...	...	...	...	...

Total number of documents in dataset: 378

Total number of countries in dataset: 51

## Appendix II: The Model

### The model for aid changes

Formally, let  $Y_t^e$  be the programmed level of the endogenous variable for year  $t$  and for document  $i$  (that is, the current account deficit net of aid, or the fiscal deficit net of aid, in percent of GDP).<sup>34</sup> Let  $Y_t$  be the actual level of such variable at year  $t$  and for document  $i$ , and let  $X_t^e$  and  $X_t$  be the expected and actual level of aid at year  $t$  respectively. Finally, let  $Z_t$  be a vector of explanatory variables, and  $\omega_t$  a zero-mean independent and identically distributed error term. OLS and fixed effects of the following model allow to estimate spending and absorption of aid over time:

$$Y_t^e - Y_{t-1} = \gamma_0 + \gamma_1(X_t^e - X_{t-1}) + \gamma_2(X_{t-1} - X_{t-2}) + \gamma_3 Z_{t-1} + \delta(Y_{t-1} - Y_{t-2}) + \omega_t \quad (1)$$

Specifically,  $\gamma_1$  represents spending (or absorption) of aid in the first programming year,  $\gamma_2$  represents spending (or absorption) of aid in the second programming year.

### Alternative model in level

Using the notation in the previous subsection, the model in levels becomes:

$$Y_t^e = \beta_0 + \beta_1 X_t^e + \beta_2 X_{t-1} + \beta_3 Z_{t-1} + \theta Y_{t-1} + u_t \quad (2)$$

where  $u_t$  is a zero-mean independent and identically distributed errors terms. This model allows for a clear identification of the short and long-run effect of aid.

In the short run, equation (2) implies that  $\frac{\partial Y_t^e}{\partial X_t} = \beta_1$ . In the next programming year

$\frac{\partial Y_{t+1}^e}{\partial X_t} = \beta_2 + \theta \frac{\partial Y_t^e}{\partial X_t} = \beta_2 + \theta \beta_1$ , whereas in the following year  $\frac{\partial Y_{t+2}^e}{\partial X_t} = \theta \beta_2 + \theta^2 \beta_1$ , and, in

general,  $\frac{\partial Y_{t+j}^e}{\partial X_t} = \theta^{j-1}(\beta_2 + \theta \beta_1)$ . In the long-run, the cumulative effect of an increase in  $X_t^e$

(that is,  $\frac{\partial Y_t^e}{\partial X_t^e} + \frac{\partial Y_{t+1}^e}{\partial X_t^e} + \frac{\partial Y_{t+2}^e}{\partial X_t^e} + \dots$ ) is given by

$$\frac{\beta_1 + \beta_2}{1 - \theta}. \quad (3)$$

---

<sup>34</sup> To simplify notation, the sub-index  $i$  is dropped.

If  $\beta_1 + \beta_2 = 1 - \theta$  (which is a testable hypothesis) there is full spending/absorption of aid over the long-run.

The model allows to an error-correction formulation, which allows to describe the adjustment of the endogenous variable towards its equilibrium relationship. To see this, we can subtract  $Y_{t-1}$  from both sides of (3), add and subtract  $\beta_1 X_{t-1}$  and  $\beta_3 Z_{t-1}$  on the right-hand side, and obtain

$$Y_t - Y_{t-1} = \beta_0 + \beta_1(X_t - X_{t-1}) + (\beta_1 + \beta_2)X_{t-1} + \beta_3(Z_t - Z_{t-1}) + \beta_3 Z_{t-1} - (1 - \theta)Y_{t-1} + \varepsilon_t$$

which reduces to

$$\Delta Y_t = \beta_1 \Delta X_t + \beta_3 \Delta Z_t - (1 - \theta) \left[ Y_{t-1} - \frac{\beta_0}{1 - \theta} - \frac{\beta_1 + \beta_2}{1 - \theta} X_{t-1} - \frac{\beta_3}{1 - \theta} Z_{t-1} \right] + \varepsilon_t$$

The expression within square brackets is the deviation of the actual from equilibrium.<sup>35</sup>

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<sup>35</sup> To see this, let us assume that all variables in equation (3) are at their constant long-run level,  $Y_t = Y$ ,  $X_t = X$ , and  $Z_t = Z$ , so that the error term is zero. Collecting terms and dividing by  $(1 - \theta)$  we obtain:

$$Y = \frac{\beta_0}{1 - \theta} + \frac{\beta_1 + \beta_2}{1 - \theta} X + \frac{\beta_3}{1 - \theta} Z$$

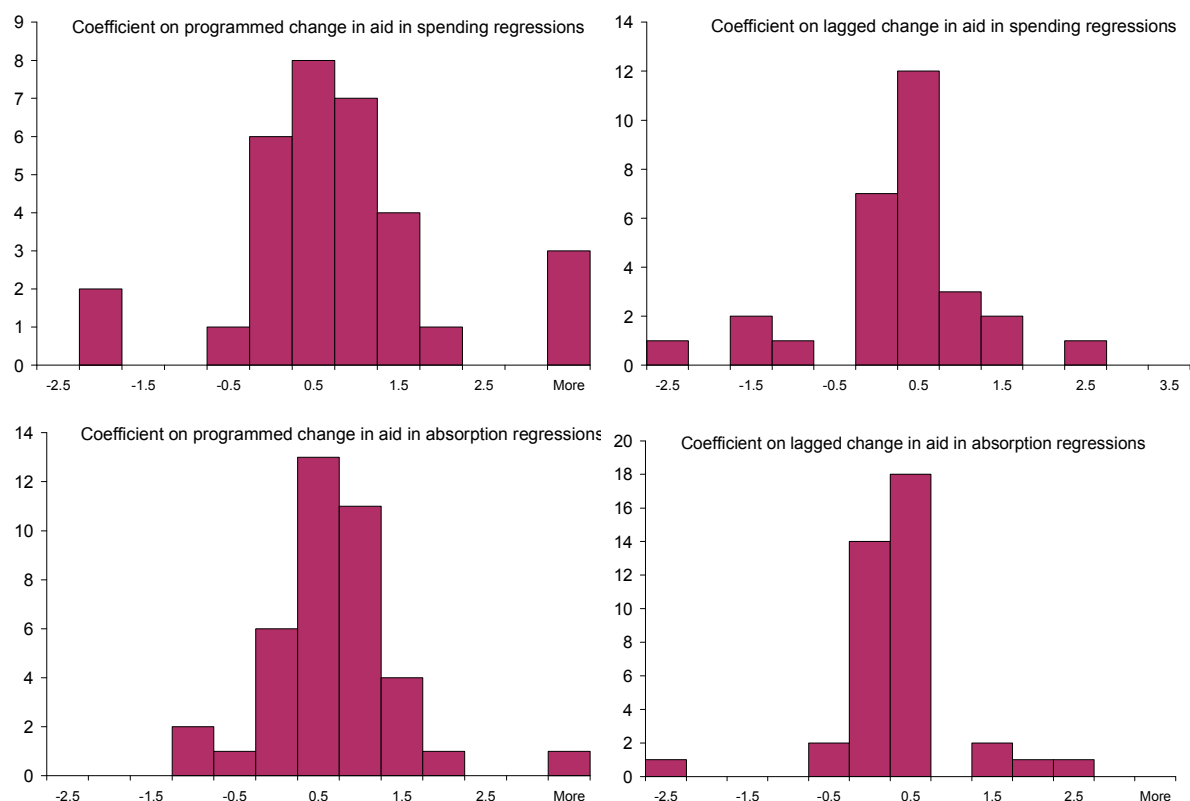
where we can recognize the long-run multiplier  $\frac{\beta_1 + \beta_2}{1 - \theta}$ .

### Appendix III: Estimation Results

STATA was used for conducting the analysis, which is based on pooled estimations. A preliminary analysis of the data indicates a high degree of heterogeneity in the spending and absorption relationships. As a first step, the programmed change in the current account and fiscal deficits are regressed for each country separately against the programmed and lagged change in aid. Figure III.1 shows the distribution of the estimated coefficients across countries and Table III.1 shows the average and standard deviations of these coefficients. The standard deviation of the absorption coefficients is about 0.8 and the standard deviation of the spending coefficients is about 4.

The high degree of heterogeneity in the data makes it preferable to pool the data and use simple OLS.<sup>36</sup> Panel regressions with homogenous coefficients are likely unreliable, and the structure of the dataset (unbalanced) does not make it feasible to run panel regressions that allow for heterogeneous coefficients (for instance, the Swamy estimator). In any case, the tables report also estimates using fixed effects.

**Figure III.1 Histograms of regressions coefficients across countries**



<sup>36</sup> See Robertson and Symons (1992), Baltagi and Griffin (1997), and Baltagi et al. (2003)

**Table III.1 Average of coefficients of country regressions**

	Simple average	Standard deviation	Weighted average (Stein rule)
<b>Absorption regressions</b>			
Programmed change in aid	0.442	-0.018	0.444
Lagged change in aid	-0.018	1.212	-0.160
<b>Spending regressions</b>			
Programmed change in aid	1.289	4.344	1.280
Lagged change in aid	-1.189	13.852	-1.180

For some regressions there is evidence of heteroskedastic errors. Hence, robust variance was estimated for all pooled regressions. In fixed effects estimations, standard STATA commands do not allow to run the F-test that the fixed effects are equal to zero. Hence, for fixed effects, the robust option was not used. As our main interest is on programmed spending and absorption, the Ramsey specification test was also performed for only the pooled regressions of programmed spending and absorption. A test that fixed effects are equal to zero was conducted on all fixed effects regressions. The nature of the data does not allow to test serial correlation in a simple way: only in few countries there are enough sequenced observations. Finally, a test on the sum of the coefficient on the increase in aid and the lagged increased in aid, and a test on the long run effect of a change in aid (as defined in Appendix II) were conducted on most regressions.

Several factors help explain the size of the samples in the various estimations. First, in order to obtain the lagged change in aid, data are needed for the two years preceding the programming year. In many cases, these data are not available, accounting for a loss of about 10 observations in the absorption regressions, and 30 in the spending regressions. Second, the equations for the use of aid increases exclude observations in which aid was programmed to decline. The programmed change in aid is negative for about 130 observations in both types of regressions. Third, in the spending and absorption regressions of Tables III.2 through III.6, outliers were identified, and excluded, if the programmed change in the overall deficit and aid exceeded their respective averages by two standard deviations (for the spending regressions, the same principle was applied to other fiscal variables to identify outliers); as a result, about 30 outliers were dropped for the absorption regression, and 38 for the spending regressions. A footnote to each table indicates which observations were kept. Differences in the actual vis-à-vis programmed variables, and the fact that programmed variables are observed twice a year, on average, while actual variables are observed only once a year explain the difference in the number of observations between the regressions on programmed and actual spending and absorption.

Table III.2: Regression results for the spending of aid increases

Independent variable:	Increase in fiscal deficit							
	1 - Pooled OLS	2 - Pooled OLS	3 - Pooled OLS 1/	4 - Fixed effects	5 - Pooled OLS 1/	6 - Pooled OLS 1/	7 - Pooled OLS, two-year 1/	8 - Fixed effects, two-year
Coefficients: 2/								
$\Delta$ aid	0.494*** (0.071)	0.512*** (0.071)	0.578*** (0.075)	0.550*** (0.079)	0.647*** (0.082)	0.566* (0.294)	0.847*** (0.153)	0.639*** (0.156)
$\Delta$ aid lagged	...	0.154** (0.067)	0.258*** (0.070)	0.250*** (0.070)	0.228*** (0.067)	0.266*** (0.071)	...	...
$\Delta$ fiscal deficit net of aid, lagged	...	...	-0.209** (0.091)	-0.152** (0.062)	-0.197** (0.093)	-0.207** (0.090)	...	...
Overall fiscal deficit, lagged	...	...	-0.234*** (0.069)	-0.346*** (0.063)	-0.225*** (0.070)	-0.247*** (0.069)	...	...
Real GDP growth	...	...	0.048 (0.047)	0.510* (0.275)	0.059 (0.047)	0.071 (0.056)	-0.210 (0.159)	0.982 (0.720)
Lagged inflation	...	...	-0.013 (0.016)	-0.015 (0.032)	...	-0.0108 (0.041)	-0.123*** (0.041)	-0.033 (0.099)
$\Delta$ aid * dummy SSA	...	...	...	...	...	0.0518 (0.298)	...	...
$\Delta$ aid * lagged inflation > 15.7	...	...	...	...	-0.349*** (0.129)	...	...	...
Dummy SSA	...	...	...	...	...	-0.469 (0.453)	...	...
Dummy lagged inflation > 15.7	...	...	...	...	-0.104 (0.403)	...	...	...
Constant	0.309 (0.200)	0.28 (0.198)	0.824** (0.318)	-0.467 (1.039)	0.650** (0.305)	1.021** (0.445)	1.360 (0.910)	-3.433 (2.977)
Observations 3/	186	186	176	176	176	176	130	130
Number of groups	...	...	...	47	...	...	...	37
R-squared	0.209	0.231	0.346	0.394	0.382	0.352	0.254	0.174
Test $\Delta$ aid+ $\Delta$ aid lagged = 0.85	...	3.284	0.016	0.174	0.0507	0.003	...	...
Prob of rejecting	...	0.072	0.899	0.677	0.822	0.953	...	...
Test long run abs. = 0.70	...	...	0.012	0.003	0.123	0.002	...	...
Prob of rejecting	...	...	0.915	0.954	0.726	0.965	...	...
Ramsey test for omitted var	...	...	0.417	...	0.041	0.248	4.678	...
Prob rej omitted var	...	...	0.741	...	0.989	0.862	0.004	...
F test that fixed effects =0	...	...	...	2.447	...	...	...	2.112
Prob of rejecting	...	...	...	0.000	...	...	...	0.002

Notes:

1/ Robust standard errors are estimated.

2/ Rejection of  $H_0$ : coefficient = 0: \*\*\* at 0.01 level, \*\* at 0.05 level, \* at 0.1 level. Standard errors in parenthesis.3/ In regressions 1 through 6, the sample is restricted to observations where  $0 < \Delta$ aid < 10;  $\Delta$ aid, lagged > -10;  $-10 < \Delta$ fiscal deficit net of aid, lagged < 10;and the overall fiscal deficit, lagged < 20. In regressions 7 and 8, the sample is restricted to observations where  $0 < \Delta$ aid < 10; and  $-20 < \Delta$ fiscal deficit net of aid, lagged < 20.

Table III.3: Regression results for the absorption of aid increases

Independent variable:	Increase in CA deficit								
	1 - Pooled OLS	2 - Pooled OLS	3 - Pooled OLS 1/	4 - Fixed effects	5 - Pooled OLS 1/	6 - Pooled OLS 1/	7 - Pooled OLS 1/	8 - Pooled OLS, two-year	9 - Fixed effects, two-year
Coefficients: 2/									
$\Delta$ aid	0.478*** (0.092)	0.500*** (0.089)	0.561*** (0.108)	0.414*** (0.102)	0.702*** (0.208)	0.545*** (0.109)	0.340** (0.139)	0.411*** (0.154)	0.455*** (0.171)
$\Delta$ aid lagged	...	0.165*** (0.044)	0.127** (0.061)	0.079 (0.060)	0.119* (0.061)	0.119** (0.060)	0.118* (0.060)	...	...
$\Delta$ CA deficit net of aid, lagged	...	...	0.109 (0.069)	0.003 (0.066)	0.123* (0.072)	0.114* (0.067)	0.112 (0.069)	...	...
Overall CA deficit, lagged	...	...	-0.062* (0.037)	-0.172*** (0.048)	-0.072* (0.039)	-0.054 (0.036)	-0.063* (0.035)	...	...
$\Delta$ terms of trade, lagged	...	...	0.758 (1.153)	-0.909 (1.603)	0.686 (1.154)	0.967 (1.150)	0.066 (1.118)	-0.211 (3.108)	-1.214 (3.757)
$\Delta$ overall fiscal deficit	...	...	0.017 (0.017)	-0.011 (0.019)	0.019 (0.018)	0.017 (0.016)	0.020 (0.014)	...	...
PPP - GDP per capita	...	...	0.135* (0.073)	0.881* (0.525)	0.189** (0.078)	0.135* (0.072)	0.143** (0.072)	-0.035 (0.178)	1.798** (0.835)
Lagged coverage	...	...	0.208* (0.113)	0.039 (0.183)	0.197* (0.115)	...	...	0.169 (0.294)	0.118 (0.456)
$\Delta$ aid * dummy SSA	...	...	...	...	-0.202 (0.241)	...	...	...	...
$\Delta$ aid * lagged coverage > 2.9	...	...	...	...	...	...	0.355* (0.200)	...	...
$\Delta$ aid * lagged coverage > 6.6	...	...	...	...	...	0.314 (0.354)	...	...	...
Dummy SSA	...	...	...	...	0.903 -0.601	...	...	...	...
Dummy lagged coverage > 2.9	...	...	...	...	...	...	-0.121 (0.555)	...	...
Dummy lagged coverage > 6.6	...	...	...	...	...	1.853* (1.070)	...	...	...
Constant	0.258 (0.304)	0.164 (0.296)	-0.933 (0.700)	-2.120 (2.278)	-1.605** (0.771)	-0.348 (0.502)	-0.134 (0.625)	0.128 (1.790)	-7.138* (3.847)
Observations 3/	176	175	163	163	163	163	163	126	126
Number of groups	...	...	...	40	...	...	...	...	36
R-squared	0.135	0.199	0.259	0.253	0.266	0.284	0.277	0.055	0.122
Test $\Delta$ aid+ $\Delta$ aid lagged = 0.7	...	0.118	0.007	2.487	...	0.071	2.472	...	...
<i>Prob of rejecting</i>	...	0.731	0.933	0.118	...	0.791	0.118	...	...
Test long run abs. = 0.76	...	...	0.008	4.490	...	0.006	2.321	...	...
<i>Prob of rejecting</i>	...	...	0.929	0.036	...	0.937	0.130	...	...
Ramsey test for omitted var	...	...	55.890	...	107.600	53.300	69.040	0.368	...
<i>Prob rej omitted var</i>	...	...	0.108	...	0.000	0.159	0.038	0.776	...
F test that fixed effects = 0	...	...	...	2.593	...	...	...	...	2.555
<i>Prob of rejecting</i>	...	...	...	0.000	...	...	...	...	0.000

Notes:

1/ Robust standard errors are estimated.

2/ Rejection of "H0: coefficient = 0": \*\*\* at 0.01 level, \*\* at 0.05 level, \* at 0.1 level. Standard errors in parenthesis.

3/ In regressions 1 through 7, the sample is restricted to observations where  $0 < \Delta$ aid < 10; and  $-10 < \Delta$ current account deficit net of aid, lagged < 10.In regressions 8 and 9, the sample is restricted to observations where  $0 < \Delta$ aid < 10; and  $-20 < \Delta$ current account deficit net of aid < 20.

Table III.4: Regression results for the treatment of increases and decreases in aid

Independent variable:	Absorption regression		Spending regression			
	Increase in CA deficit		Increase in fiscal deficit			
	1 - Pooled OLS	2 - Fixed effects	2 - Pooled OLS	3 - Fixed effects	3 - Pooled OLS, two-year 1/	4 - Fixed effects, two-year
	1/		1/			
Coefficients: 2/						
$\Delta$ aid 3/	0.568*** (0.105)	0.438*** (0.091)	0.591*** (0.075)	0.594*** (0.074)	0.824*** (0.147)	0.609*** (0.145)
$\Delta$ aid * dummy aid decrease 3/	-0.203 (0.207)	-0.028 (0.166)	-0.227* (0.120)	-0.174 (0.146)	-0.256 (0.284)	0.084 (0.279)
$\Delta$ aid lagged 3/	0.163*** (0.049)	0.128*** (0.040)	0.243*** (0.048)	0.259*** (0.046)	...	...
$\Delta$ deficit net of aid, lagged 3/	0.033 (0.060)	-0.049 (0.048)	-0.186*** (0.066)	-0.191*** (0.048)	...	...
Overall CA deficit, lagged	-0.077*** (0.024)	-0.203*** (0.036)	...	...	...	...
$\Delta$ terms of trade, lagged	0.342 (0.932)	-0.632 (1.202)	...	...	...	...
$\Delta$ overall fiscal deficit	0.008 (0.009)	-0.006 (0.009)	...	...	...	...
PPP - GDP per capita	0.084 (0.056)	0.486 (0.351)	...	...	...	...
Lagged coverage	0.135 (0.085)	-0.006 (0.143)	...	...	...	...
Overall fiscal deficit, lagged	...	...	-0.238*** (0.051)	-0.312*** (0.054)	...	...
Real GDP growth	...	...	0.013 (0.038)	0.446** (0.216)	-0.118 (0.129)	0.900* (0.525)
Lagged inflation	...	...	-0.025* (0.013)	-0.026 (0.027)	-0.094** (0.043)	-0.033 (0.075)
Dummy aid decrease 3/	-0.371 (0.402)	-0.402 (0.449)	-0.335 (0.270)	-0.165 (0.285)	-0.109 (1.002)	0.957 (0.905)
Constant	-0.313 (0.556)	-0.048 (1.664)	1.034*** (0.273)	-0.322 (0.787)	0.839 (0.804)	-3.269 (2.083)
Observations	260	260	276	276	198	198
Number of groups	...	44	...	48	...	43
R-squared	0.315	0.432	0.425	0.446	0.325	0.260
Ramsey test for omitted var	1.191	...	0.994	...	5.488	...
Prob rej omitted var	0.314	...	0.396	...	0.001	...
F test that fixed effects =0	...	3.462	...	1.983	...	2.838
Prob of rejecting	...	0.000	...	0.001	...	0.000

Notes:

1/ Robust standard errors are estimated.

2/ Rejection of "H0: coefficient = 0": \*\*\* at 0.01 level, \*\* at 0.05 level, \* at 0.1 level. Standard errors in parenthesis.

3/ In regressions 1 and 2, the sample is restricted to observations where  $-10 < \Delta \text{aid} < 10$ ,  $-10 < \Delta \text{current account deficit net of aid} < 10$ .In regressions 3 and 4, the sample is restricted to observations where  $-10 < \Delta \text{aid} < 10$ ;  $\Delta \text{aid, lagged} > -20$ ; and  $-10 < \Delta \text{fiscal deficit net of aid} < 10$ .In regressions 5 and 6, the sample is restricted to observations where  $-10 < \Delta \text{aid} < 10$ ;  $\Delta \text{aid} > -20$ ; and  $-10 < \Delta \text{fiscal deficit net of aid} < 10$ .



Table III.5: Regression results for the actual absorption of aid increases

Independent variable:	Increase in CA deficit						
	1 - Pooled OLS	2 - Pooled OLS	3 - Pooled OLS	4 - Pooled OLS	5 - Pooled OLS 1/	6 - Pooled OLS 1/	7 - Pooled OLS 1/
Coefficients 2/:							
$\Delta$ aid	0.308** (0.136)	0.324** (0.138)	0.496*** (0.185)	...	0.332* (0.196)	0.594 (0.401)	...
$\Delta$ aid * dummy for program	...	...	-0.304 (0.204)	...	...	-0.423 (0.44)	...
Unexpected aid	...	...	...	0.109 (0.224)	...	...	0.085 (0.211)
Expected aid	...	...	...	0.156 (0.204)	...	...	0.244 (0.225)
$\Delta$ aid lagged	...	...	...	...	-0.059 (0.077)	-0.063 (0.077)	0.108 (0.099)
$\Delta$ CA deficit net of aid, lagged	...	...	...	...	0.022 (0.115)	0.027 (0.116)	0.054 (0.131)
Overall CA deficit, lagged	...	...	...	...	-0.093 (0.071)	-0.097 (0.070)	-0.108 (0.085)
$\Delta$ terms of trade, lagged	...	...	...	...	0.428 (2.489)	0.105 (2.441)	0.041 (2.670)
$\Delta$ overall fiscal deficit	...	...	...	...	0.069** (0.032)	0.068** (0.031)	0.064* (0.036)
PPP - GDP per capita	...	...	...	...	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)
Lagged coverage	...	...	...	...	0.059 (0.139)	0.070 (0.138)	0.150 (0.218)
Dummy for program	...	-0.460 (0.686)	...	...	...	0.942 (1.006)	...
Constant	0.401 (0.464)	0.632 (0.578)	0.436 (0.463)	0.624 (0.729)	0.088 (1.048)	-0.552 (1.169)	-0.142 (1.522)
Observations 3/	177	177	177	103	132	132	88
R-squared	0.028	0.031	0.041	0.007	0.118	0.129	0.145
Test Daid+Daid lagged = 0.70	...	...	...	...	3.722	0.149	0.337
Prob of rejecting	...	...	...	...	0.056	0.700	0.563
Test long run abs. = 0.76	...	...	...	...	...	0.229	0.400
Prob of rejecting	...	...	...	...	...	0.633	0.529

Notes:

1/ Robust standard errors are estimated.

2/ Rejection of "H0: coefficient = 0": \*\*\* at 0.01 level, \*\* at 0.05 level, \* at 0.1 level. Standard errors in parenthesis.

3/ In all regressions, the sample is restricted to observations where  $0 < \Delta \text{aid} < 10$ .

**Table III.6: Regression results for the actual spending of aid increases**

Independent variable:	Increase in fiscal deficit						
	1 - Pooled OLS	2 - Pooled OLS	3 - Pooled OLS	4 - Pooled OLS	5 - Pooled OLS	6 - Pooled OLS	7 - Pooled OLS
Coefficients 1/ 2/:							
$\Delta$ aid	0.710*** (0.174)	0.714*** (0.177)	0.751*** (0.285)	...	0.819*** (0.269)	0.809* (0.460)	...
$\Delta$ aid * dummy for program	...	...	-0.051 (0.282)	...	...	-0.008 (0.538)	...
Unexpected aid	...	...	...	0.776*** (0.234)	...	...	0.758** (0.303)
Expected aid	...	...	...	0.585** (0.239)	...	...	0.737** (0.303)
$\Delta$ aid lagged	...	...	...	...	0.332 (0.337)	0.333 (0.350)	0.477 (0.354)
$\Delta$ fiscal deficit net of aid, lagged	...	...	...	...	-0.401 (0.253)	-0.402 (0.269)	-0.675** (0.313)
Overall fiscal deficit, lagged	...	...	...	...	-0.211 (0.191)	-0.214 (0.194)	0.023 (0.213)
Lagged inflation	...	...	...	...	-0.022 (0.053)	-0.024 (0.055)	-0.030 (0.061)
Real GDP growth	...	...	...	...	0.003 (0.087)	-0.007 (0.099)	0.007 (0.131)
Dummy for program	...	-0.091 (0.691)	...	...	...	0.366 (0.694)	...
Constant	0.057 (0.473)	0.104 (0.590)	0.045 (0.478)	0.306 (0.713)	0.722 (0.671)	0.572 (0.816)	0.304 (0.865)
Observations 3/	199	199	199	118	165	165	107
R-squared	0.078	0.078	0.078	0.100	0.328	0.329	0.371
Test $\Delta$ aid+ $\Delta$ aid lagged = 1	...	...	...	...	0.179	0.139	2.062
Prob of rejecting	...	...	...	...	0.673	0.710	0.154
Test long run abs. = 1	...	...	...	...	...	0.339	0.218
Prob of rejecting	...	...	...	...	...	0.561	0.642

Notes:

1/ Standard errors in parentheses

2/ Rejection of "H0: coefficient = 0": \*\*\* at 0.01 level, \*\* at 0.05 level, \* at 0.1 level.

3/ In all regressions, the sample is restricted to observations where  $0 < \Delta$ aid  $< 10$ .

**Table III.7: Regression results for spending using the level of aid inflows**

Independent variable:	Fiscal deficit net of aid						
	1 - Pooled OLS	2 - Pooled OLS	3 - Pooled OLS 1/	4 - Fixed effects	5 - Pooled OLS	6 - Pooled OLS, actual	7 - Fixed effects, actual
Coefficients: 2/							
Aid	0.787*** (0.035)	0.747*** (0.146)	0.768*** (0.142)	0.580*** (0.059)	0.914*** (0.077)	0.894*** (0.063)	0.954*** (0.076)
Lagged aid	...	0.050 (0.154)	-0.366** (0.158)	-0.194*** (0.061)	-0.364*** (0.059)	0.043 (0.070)	0.144* (0.081)
Fiscal deficit net of aid, lagged	...	...	0.450*** (0.109)	0.327*** (0.044)	0.442*** (0.041)	0.018 (0.048)	-0.066 (0.051)
Inflation, lagged	...	...	-0.078*** (0.025)	-0.008 (0.040)	-0.069** (0.031)	0.001 (0.022)	-0.009 (0.030)
Real GDP growth	...	...	0.038 (0.055)	0.561* (0.324)	0.066 (0.056)	0.081 (0.084)	-0.438 (0.405)
Aid * inflation > 3	...	...	...	...	-0.183** (0.076)	...	...
Dummy inflation > 3	...	...	...	...	1.060* (0.643)	...	...
Constant	0.37 (0.318)	0.332 (0.450)	0.828** (0.408)	-0.622 (1.155)	-0.108 (0.556)	-0.736 (0.460)	0.511 (1.499)
Observations 3/	348	348	327	327	327	434	434
Number of groups	...	...	...	50	...	...	51
R-squared	0.588	0.589	0.715	0.405	0.720	0.589	0.337
F test that fixed effects =0	...	...	...	2.949	...	...	0.769
Prob of rejecting	...	...	...	0.000	...	...	0.872
Test aid+aid lagged = 0.7	...	1.636	5.108	29.03	3.772	15.36	16.15
Prob of rejecting	...	0.202	0.025	0.000	0.053	0.000	0.000
Test long run abs. = 0.7	...	...	0.056	2.594	5.921	38.59	17.44
Prob of rejecting	...	...	0.813	0.108	0.016	0.000	0.000

Notes:

1/ Robust standard errors are estimated.

2/ Rejection of "H0: coefficient = 0": \*\*\* at 0.01 level, \*\* at 0.05 level, \* at 0.1 level. Standard errors in parenthesis.

3/ In all regressions, the sample is restricted to observations where -20 &lt; fiscal deficit &lt; 30; and -5 &lt; aid inflows &lt; 30.

**Table III.8: Regression results for absorption using the level of aid inflows**

Independent variable:	Current account deficit net of aid					
	1 - Pooled OLS	2 - Pooled OLS	3 - Pooled OLS 1/	4 - Fixed effects	5 - Pooled OLS, actual	6 - Fixed effects, actual
Coefficients: 2/						
Aid	0.919*** (0.040)	0.720*** (0.082)	0.501*** (0.086)	0.476*** (0.053)	0.349*** (0.064)	0.204*** (0.049)
Lagged aid	...	0.241*** (0.087)	-0.237** (0.095)	-0.126** (0.060)	-0.114 (0.081)	-0.100** (0.048)
CA deficit net of aid, lagged	...	...	0.749*** (0.058)	0.490*** (0.057)	0.743*** (0.071)	0.371*** (0.050)
Terms of trade, lagged	...	...	-1.373** (0.592)	-3.535*** (1.303)	-1.073 (0.728)	-2.278* (1.312)
Overall fiscal deficit	...	...	-0.011 (0.023)	-0.0165 (0.020)	0.090** (0.042)	0.066** (0.026)
PPP - GDP per capita	...	...	0.0338 (0.070)	-0.250 (0.524)	-0.001 (0.001)	-0.009* (0.005)
Lagged coverage	...	...	0.245 (0.155)	-0.22 (0.195)	0.081 (0.115)	-0.223 (0.187)
Openess	...	...	0.0158* (0.009)	-0.0246 (0.024)	0.017** (0.008)	0.072*** (0.021)
Constant	2.880*** (0.563)	2.633*** (0.565)	4.88 (3.086)	23.37*** (6.668)	4.555 (3.452)	16.62** (6.840)
Observations	365	365	297	297	409	409
Number of groups	...	...	...	45	...	45
R-squared	0.598	0.606	0.891	0.554	0.805	0.260
F test that fixed effects =0	...	...	...	2.634	...	2.669
Prob of rejecting	...	...	...	0.000	...	0.000
Test aid+aid lagged = 1	...	0.876	159.7	160.5	78.64	244.9
Prob of rejecting	...	0.35	0.000	0.000	0.000	0.000
Test long run abs. = 1	...	...	0.242	11.74	0.263	90.280
Prob of rejecting	...	...	0.623	0.001	0.608	0.000

Notes:

1/ Robust standard errors are estimated.

2/ Rejection of "H0: coefficient = 0": \*\*\* at 0.01 level, \*\* at 0.05 level, \* at 0.1 level. Standard errors in parenthesis.

3/ In all regressions, the sample is restricted to observations where current account deficit &lt; 70.

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