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The Macroeconomic Treatment of Aid Increases in IMF-Supported Programs

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Abstract

This note was produced as background to the IEO evaluation of the IMF and Aid to Sub-Saharan Africa. It sets out the technical analysis underpinning the evaluation's estimate for spending and absorption ratios and elaborates further on its scope, rationale and limitations. It also presents more detailed results regarding the treatment of aid increases in country programs supported by the IMF's Poverty Reduction and Growth Facility (PRGF) between 1999 and 2005 (including those outside Africa).

These results show that, in cases where international reserves were high and inflation was low, PRGF program design implicitly followed an immediate 'spend and absorb' approach for aid increases. In cases where reserves were low, at least some of the increases in aid were programmed to be used to boost these reserves instead of financing additional net imports. In cases where the authorities faced domestic financing problems (proxied by high inflation), they programmed some aid increases to pay down domestic debt instead of financing additional net expenditures.

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I. INTRODUCTION[1]

In 2005, the IMF Executive Board endorsed a policy paper (IMF 2005) laying out a framework for debate over the macroeconomic treatment of aid inflows. The so-called 'spend and absorb' framework set out in that paper drew attention to the fact that, from a macroeconomic perspective, the usual intention of transferring aid to a recipient country is to finance a widening of the current account deficit (absorption of aid), allowing for a widening of the fiscal deficit (spending of aid). The recent IEO evaluation of *The IMF and Aid to Sub-Saharan Africa* (IEO 2007) used this framework as a basis to quantify the programmed use of aid increases in country programs supported by the IMF's Poverty Reduction and Growth Facility (PRGFs).

This note sets out the technical analysis underpinning the IEO (2007) evaluation's estimate for spending and absorption ratios in Sub-Saharan IMF programs supported by the Poverty Reduction and Growth Facility. In response to use of the IEO's (2007) estimates in public debate, it attempts to inform the discussion by elaborating further on the scope, rationale and limitations of the analysis.

This note also reports the results for a larger sample of observations from all PRGFs— including those outside sub-Saharan Africa—that were designed in the period between the introduction of this facility in 1999 and the IMF Board's endorsement of the spend and absorb framework in 2005. Like IEO (2007), and unlike IMF (2005) and others, the analysis concentrates on the *programmed* treatment of aid increases and not on their *actual* absorption and spending.

II. ANALYTICAL FRAMEWORK

A. Background

The analytical framework of 'absorption and spending of aid increases' suggested by Berg and others (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 aid increases are used to finance a widening of the current account deficit (excluding aid). Additional aid inflows can be used fully (i) to pay for an increase in the current account deficit (excluding aid) (*full*

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absorption), or (ii) to increase the net foreign assets held by the economy (*no absorption*).[2] The 'choice' between these options is an inter-temporal one. 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. Obviously, the choice can also be partial. While actual adjustment mechanisms depend on the country's exchange rate regime, the basic allocation choices can be made independently of the exchange rate regime.[3]

The spending ratio describes the degree to which aid increases are used to finance a widening of the fiscal deficit (excluding aid). For the inter-temporal allocation of additional fiscal resources stemming from aid increases, the government faces two basic alternatives. They can be used fully (i) to pay for an increase in fiscal deficit (excluding aid) (*full spending*), or (ii) to substitute for domestic financing (*no spending*). 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. The choice can again be partial. While the actual adjustment mechanisms can vary depending on the financing vehicles, the basic allocational choices remain as described above.[4]

The anticipated response of the private sector to an increase in aid depends on the difference between the absorption and spending of aid increases. If the fiscal deficit moves in line with the current account deficit, the increased fiscal net demand is balanced by increased net imports. If the fiscal deficit widens less than the current account deficit, resulting lower interest rates or reduced seniorage encourage private investors to crowd *in;* conversely*,* if the fiscal deficit widens more than the current account deficit, the private sector will be crowded *out*. The relationship between these two deficits is derived from the fact that net exports are equal to the sum of private saving and public saving minus private investments.

B. Estimation Methodology

Corresponding to the short time horizon of conditionality in IMF programs, which usually covers twelve months, *yearly* aid absorption and spending ratios in PRGF supported programs were estimated. The estimated ratios describe how much of an expected aid increase was programmed to be absorbed and/or spent in the same year as it

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[2] In developing countries such an increase 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, which could invest the additional foreign currency abroad, in which case it would show up as capital outflows in the balance of payments.

[3] In developing countries whose capital account is in practice closed, the degree of aid absorption can be determined by central bank actions—through exchange rate interventions (if applicable) and through monetary policy influencing inflation.

[4] Whereas the aid absorption actions can be determined by the central bank, the aid spending actions are determined by the fiscal authorities.

occurred. A ratio below 100 percent means that the rest was programmed to be saved for later years.

The data were derived from PRGF program data recorded in an IMF internal database, *Monitoring of Fund Arrangements (MONA).* This contains selected macroeconomic indicators for all program requests and completed program reviews. To estimate absorption and spending, three variables were constructed from the database: the net aid inflow, the non-aid current account deficit, and the non-aid fiscal deficit. Unfortunately, none of these three variables was given directly in the data base. Hence, different methods were used to derive proxies from MONA. See Appendix 1 for a detailed description. To make variables comparable across countries and to avoid problems with the different currencies in which the various entries were reported, all variables were estimated as percentages of gross domestic product (GDP). Changes in flows were constructed as the differences between the program year of a request or review and the year before that.

Estimates of programmed absorption and spending of aid increases in PRGFs were derived by regressing programmed changes in current account and fiscal deficits excluding aid on expected aid increases. See Figure 1 for a scatter plot of the data. Best linear fits from ordinary least squares regressions—as reported in columns (1) and (3) of Table 1—are depicted by dotted lines, in orange for absorption and in green for spending. The estimated ratios of spending (25 percent), crowding-in (35 percent), and reserve accumulation (40 percent) reported on the right-hand side summary graph of Figure 1 are based on the slopes of these estimated lines. To capture the original concept of absorption and spending as ratios, OLS regressions were also run on the data with suppressed constants. The results are reported in columns (2) and (4) of Table 1 and illustrated by the solid lines in Figure 1.

In the regressions, each program request or review was treated as one observation indexed by the subscript i in the following equations underlying the basic regressions. Here T_0 is defined as the calendar year with the greatest overlap with the program year. $\Delta CAD_i^{T_0-T_{-1}}$, $\Delta FD_i^{T_0-T_{-1}}$, and $\Delta AID_i^{T_0-T_{-1}}$ are the differences between T_0 and one year earlier, T_{-1}, for the non-aid current account, the non-aid fiscal deficit, and the aid inflows, respectively. The slopes β_0 and θ_0 are interpreted as the programmed absorption and spending ratios.

$$\Delta CAD_i^{T_0-T_{-1}} = \alpha + \beta_0 \Delta AID_i^{T_0-T_{-1}} + \varepsilon_i$$
$$\Delta FD_i^{T_0-T_{-1}} = \varpi + \theta_0 \Delta AID_i^{T_0-T_{-1}} + \sigma_i$$

Figure 1. Derivation of estimates for spending and absorption of anticipated aid in PRGFs
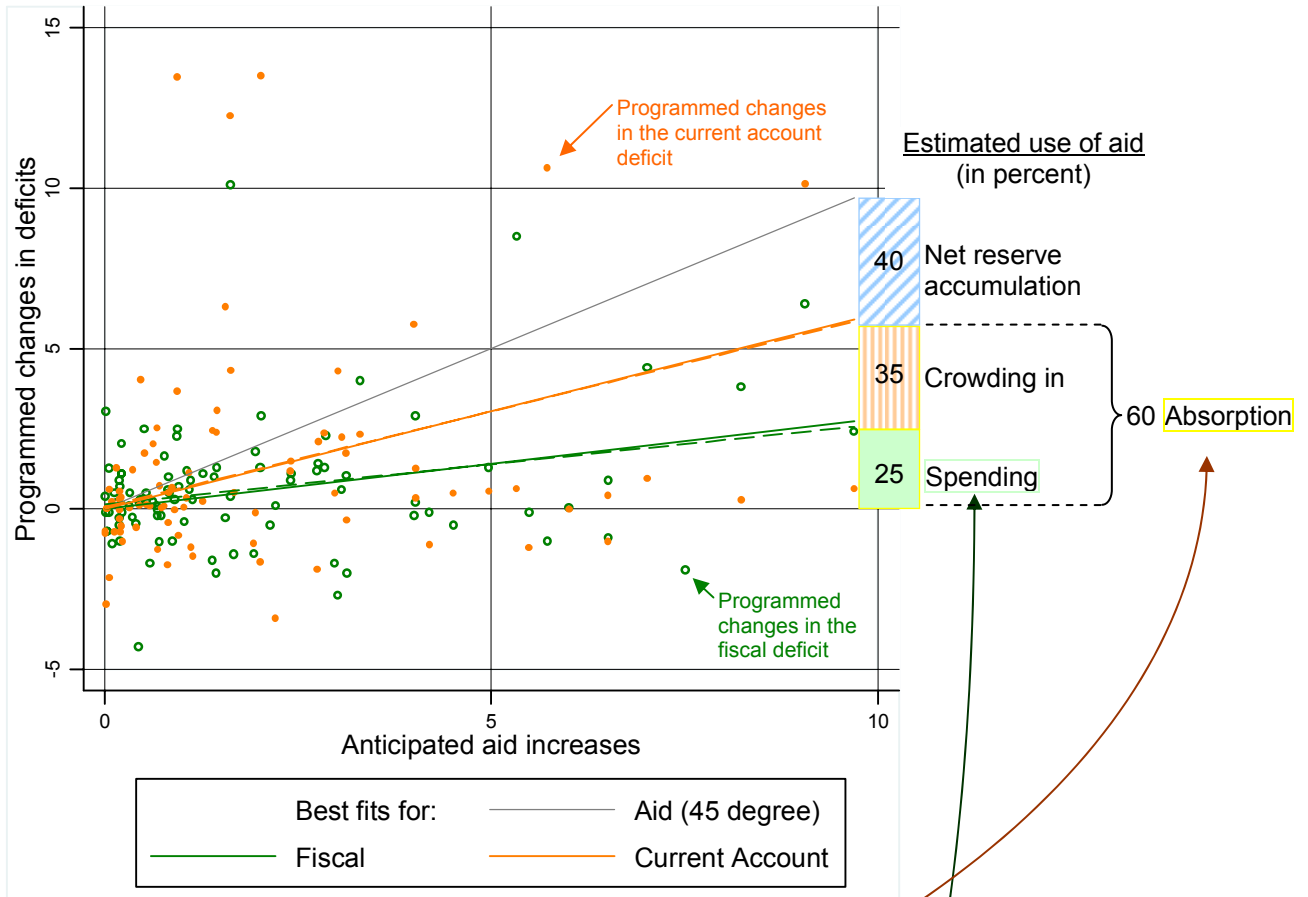
Table 1. Base model: all PRGFs with anticipated aid increases

	Current Account Deficit (ΔCAD)		Fiscal Deficit (ΔFD)	
	(1)	(2)	(3)	(4)
Delta aid	**0.596**	0.611	0.25	0.283
	[2.77]***	[3.85]***	[2.74]***	[4.20]***
Constant	0.066		0.148	
	[0.10]		[0.54]	
Observations	93	93	93	93
Adjusted R-squared	0.08	0.14	0.08	0.16

Note: Absolute value of t statistics in brackets, * significant at 10%; ** significant at 5%; *** significant at 1%,
Filter: 0 < ΔAid[T0–T-1] < 10%, -20% < ΔCAD[T0–T-1] < 30%

The influence of different initial conditions on programmed absorption spending was tested by looking at the coefficients of respective interaction terms. In the following schematic reproduction of the equations underlying these regressions, X_{ij}^{T-1} are the different variables describing these initial conditions at the year before the program year. In most of the reported regressions of the following section, these were measures of international reserves and inflation levels.

$$\Delta CAD_i^{T_0 - T_{-1}} = \alpha + \beta_0 \Delta AID_i^{T_0 - T_{-1}} + \beta_1 \left(\Delta AID_i^{T_0 - T_{-1}} \times X_{1i}^{T_{-1}} \right) + \beta_2 \left(\Delta AID_i^{T_0 - T_{-1}} \times X_{2i}^{T_{-1}} \right) + \ldots + \varepsilon_i$$

$$\Delta FD_i^{T_0 - T_{-1}} = \varpi + \theta_0 \Delta AID_i^{T_0 - T_{-1}} + \theta_1 \left(\Delta AID_i^{T_0 - T_{-1}} \times \Delta X_{1i}^{T_{-1}} \right) + \theta_1 \left(\Delta AID_2^{T_0 - T_{-1}} \times \Delta X_{1i}^{T_{-1}} \right) + \ldots + \sigma_i$$

C. Scope, Rationale, and Limitations

As in IMF (2005) estimates were derived for programmed absorption and spending of anticipated aid *increases* and not for programmed levels of aid inflows. In estimating the spending ratio, the aid increase is compared to the *change* in the non-aid fiscal deficit. In principle, one could also relate the level of aid inflows to the level of the non-aid fiscal deficit. However, we decided to stick to the original 'spend and absorb' concept and look at first differences instead, in order to mitigate errors potentially stemming from the fact that we had to combine and compare items from the fiscal tables with items from the balance of payment tables, which might cover different concepts and coverage of aid. Another variation would have been to look at differences in aid flows regardless of direction, i.e. the current account and fiscal impact of aid increases *and reductions*. However, as confirmed by the results presented in Table 9, one can expect programs to react asymmetrically to changes in aid flows. The reasons allowing for full spending and absorption of aid increases may also allow for a financing of aid reductions through a run-down of reserves. In such a case the spending and absorption ratio would be high for aid increases and low for aid reductions.

Derived estimates were for *same-year* absorption and spending of aid increases. The estimates describe how much aid was programmed to be absorbed and spent *in the year that it occurs*. This short time frame is used because the analysis attempts to gain insight into program design. Quantitative conditionality in IMF supported programs usually covers a maximum of 12 months. It is these 12 months where program assumptions regarding the use of aid inflows cannot as easily be renegotiated as in the outer years. By definition, aid that is not absorbed or spent is saved for use in later years. Hence, estimated absorption or spending ratios give some indication about the "*speed*", in which aid increases can be used. A low spending ratio means that an aid increase that is anticipated in a particular year is not programmed to be translated into a net fiscal expansion in the same year. This does not rule out the possibility of the aid increase being used over time in later years. In fact, the estimates that are reported in the next section suggest a strategy of aid increases being saved until a certain degree of macroeconomic stability is achieved, at which point any further aid increases can be fully spent.

Absorption and spending ratios were estimated as the slopes of linear ordinary least squares (OLS) regressions. Rather than computing the respective ratios for each observation and then averaging them, we chose this estimation method because, this way, observations with large anticipated aid increases get a larger weight in the computation of the estimates than those with small increases. Plus, estimating the slope of the lines resulting from these linear regressions seems to come closest to the concept of the 'spend and absorb' framework in IMF (2005), which by calculating ratios, implicitly assumes a linear relationship. Like IEO (2007), results are also reported for regressions with suppressed

constants because this is considered to be closer to the original concept of ratios.[5] Constants are never significantly different from zero in the regressions outlined below. Neither does the robustness of any estimated slope or differences between them depend on suppressing the constant. Correspondingly, results are very similar whether the constant is suppressed or not. Since the suppression of the constant in IEO (2007) has raised questions about the robustness, this note— unlike IEO (2007)—presents the summary charts based on results that do not suppress the constant. In practice, suppressing the constant does not make any difference.

The presented regressions are deliberately simple. Obviously, both the current account and the fiscal deficits are influenced by many more factors than the few variables that could be derived from the database.[6] Hence, the underlying model is far from being complete and the all the regressions generate very low R-squared, as expected. Initial attempts to include more control variables or to apply more sophisticated methods to analyze panel data like fixed effects did not produce any significantly different results, partly because observations were scattered across countries and years.

In the analysis macroeconomic stability was proxied by initial levels of inflation and international reserves. These were chosen among those few variables describing macroeconomic stability with sufficient availability for the sample. This choice does not necessarily mean that these variables were the only important drivers for program design. The identified correlations do also not necessarily imply causality. For example, unfortunately, there was no good data on domestic public debt. Hence, we could not test this variable's direct influence on program design, even though unsustainable domestic debt would have been an obvious candidate for causing programs to allocate some additional aid toward a reduction of domestic debt instead of spending it. Since high domestic debt is often associated with high inflation, it is not clear whether high domestic debt or high inflation (or both) lead to the observed reduction in programmed spending.

Unlike IMF (2005), estimates were derived for the *programmed* absorption and spending of aid rather than for actual ratios. Since this analysis is part of an evaluation of the IMF-supported programs, the focus lies on the macroeconomic *design* of the PRGF-supported programs (on which the IMF has a direct influence) rather than on outcomes, which are also influenced by the country authorities' policy implementation and exogenous shocks.

The analysis does not distinguish between the different types of aid delivery. While potentially interesting, the data on program design did not readily allow for an analysis of potentially different treatment of project vs. budget aid in IMF-supported programs. Instead, data on aid was taken from the available information for the balance of payment tables of the program documents. That could mean that, especially in post conflict countries with weak

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[5] The suppression of the constant also helps avoid the underestimation of spending ratios that could arise from measurement errors in the unconstrained model.

[6] However, obvious candidates for additional control variables like changes in the terms of trade or growth turned out to be insignificant and did not influence the results.

macroeconomic data, some aid might not have been fully captured. As mentioned above, the analysis looked at differences in flows to mitigate inconsistencies arising from differences in concepts and coverage of aid.

III. RESULTS

A. Absorption of aid increases

Aid absorption appears to have been significantly influenced by initial levels of international reserves. PRGF design programmed about 60 percent of the anticipated aid increases to be absorbed (Table 1). However, as can be seen in Table 2, this estimate significantly depends on initial levels of international reserves. Column (1) of that table repeats the respective column of Table 1. The regressions underlying columns (2) and (3), which assume a linear relationship between aid absorption behavior and a country's international reserve levels, show that the estimated programmed absorption depends significantly on initial reserve levels but not on initial inflation levels. The regressions underlying columns (4) and (5) use a dummy variable that divides the sample into cases with lower and higher international reserve levels, i.e. below and above 2.5 months of imports,[7] in the year before the program. Again, programmed absorption appears to be influenced by the level of reserves but not by inflation levels. In column (6) the constant has been suppressed for comparison with the results for programs in sub-Saharan African countries only, presented in IEO (2007).

Table 2. Absorption: programmed current account deficit (ΔCAD) in PRGFs with anticipated aid increases

	All observations						High reserves 1/	
	(1) ΔCAD	(2) ΔCAD	(3) ΔCAD	(4) ΔCAD	(5) ΔCAD	(6) ΔCAD	(7) ΔCAD	(8) ΔCAD
Delta aid	**0.596** **[2.77]***	0.164 [0.30]	-0.027 [0.08]	0.136 [0.47]	0.04 [0.14]	0.048 [0.20]	**1.032** **[2.30]**	**0.868** **[3.12]***
Interaction terms								
Reserve levels		**0.168** **[1.79]***	**0.184** **[2.11]**					
Inflation levels		-0.007 [0.46]					-0.01 [0.46]	
Reserve threshold 1/				**0.795** **[2.47]**	**0.917** **[2.91]***	**0.917** **[2.93]***		
Inflation threshold 1/				0.889 [1.59]				1.011 [1.52]
Constant	0.066 [0.10]	-0.089 [0.13]	-0.002 [0.00]	-0.514 [0.73]	0.039 [0.06]		0.293 [0.35]	-0.329 [0.36]
Observations	93	93	93	93	93	93	64	64
Adjusted R-squared	0.07	0.09	0.1	0.15	0.14	0.2	0.11	0.14

Note: Absolute value of t statistics in brackets, * significant at 10%; ** significant at 5%; *** significant at 1%,
Filter: 0 < ΔAid[T0–T-1] < 10%, -20% < ΔCAD[T0–T-1] < 30%
1/ Reserve threshold = 2.5 months of imports, inflation threshold = 5 %

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[7] This threshold was identified by running regressions on all reserve level thresholds in 0.5 increments and selecting the threshold that produced the lowest p-value for the respective dummy.

All the regressions underlying columns (2) to (6) of Table 2 show that in the cases with low reserve levels, increases in aid were not associated with significant increases in the current account deficit. This points to a programming strategy of saving, rather than immediately absorbing, aid increases in the year that they occurred. In contrast, in cases where international reserves were above the 2.5 months threshold, increases in aid seem to have significantly influenced current account deficits. For completeness, columns (7) and (8) confirm that even in the subset of observations with reserve levels above the threshold, lower inflation was not associated with higher programmed absorption. To further explore the significance of the estimated programmed absorption ratios, Table 3 reports the confidence intervals around the estimates stemming from the regressions with and without suppression of the constants.

Table 3. Estimating programmed aid absorption in PRGFs with anticipated aid increases

	All observations		Low reserves 1/		High reserves 1/	
	(1)	(2)	(3)	(4)	(5)	(6)
	ΔCAD	ΔCAD	ΔCAD	ΔCAD	ΔCAD	ΔCAD
Estimated coefficient	0.596***	0.611***	0.263	0.048	0.874***	0.966***
95% confidence interval						
min	0.168	0.296	-0.273	-0.318	0.313	0.538
max	1.023	0.926	0.800	0.415	1.435	1.393
Estimated constant	0.066		-0.981		0.404	
Observations	93	93	29	29	64	64
Adjusted R-squared	0.068	0.129	0.001	-0.033	0.121	0.232
Interpretation	Significantly different from 'no absorption'		No		**Yes**	
	Significantly different from 'full absorption'		**Yes**		No	

Note: * significant at 10%; ** significant at 5%; *** significant at 1%,
Filter: 0 < ΔAid[T0–T-1] < 10%, -20% < ΔCAD[T0–T-1] < 30%,
1/ Reserve threshold = 2.5 months of imports

Figure 2 illustrates the results reported in Table 3. According to these estimates, in cases where initial international reserve levels were below the threshold of 2.5 months of imports, PRGF-supported programs programmed most of the increase in aid to be used to boost those reserves. Column (3) shows that the estimated absorption of 26 percent of the incremental aid is not significantly different from zero but is significantly different from 100 percent. It also illustrates the rather wide confidence interval around this and the other reported central tendencies. In cases where international reserves were above the 2.5 month threshold, on the other hand, the representative PRGF programmed almost full absorption of the additional aid. Column (5) shows that the estimated 87 percent absorption is not significantly different from 100 percent but significantly different from zero. Column (5) of the earlier Table 2 shows there is a significant difference between the programmed 26 percent absorption of aid in the low reserve cases and the 87 percent absorption in the high reserve cases.

Figure 2. Central estimates for absorption of aid increases in PRGFs
(as a percentage of aid increase)
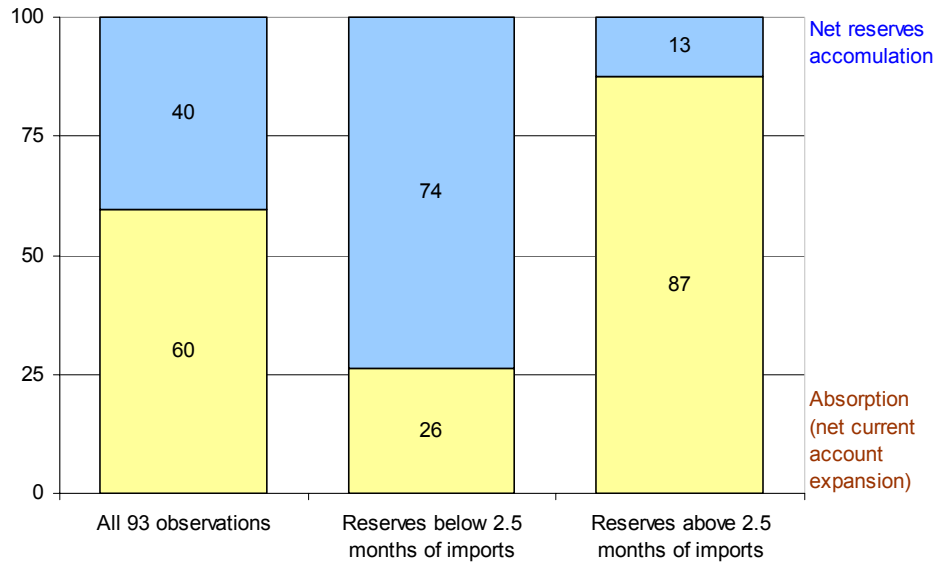
B. **Spending of aid increases**

The programmed spending of anticipated aid increases differed significantly between countries with low and high inflation. In Table 4, Column (1) repeats the respective column of Table 1. Columns (2) and (3), which assume a linear relationship between spending behavior and a country's initial inflation level, show that estimated programmed spending depends significantly on initial inflation levels but not on initial reserve levels. This finding is confirmed by the regressions underlying Columns (4) and (5); these use a dummy variable that captures the influence of dividing the sample into cases of lower and higher inflation—those with inflation equal to or below 5 percent and those with higher inflation[8]— in the year before the program. Columns (6) to (10) repeat the regressions of columns (3) and (5) for the sub samples of observations with low and high initial reserve levels. The results indicate that in cases where reserve levels were low, inflation rates did not significantly influence programmed spending, but in cases where reserves were high, initial inflation rates did play a role. In column (10) the constant has been suppressed.

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[8] Five percent was identified by the data as the threshold that generates the highest significance level for the difference between programs with low and high initial inflation. Inflation at T-1 is interpreted as a proxy to identify whether there might have been potential domestic financing problems at the time the program was designed. Obviously, a better choice would have been direct indications of domestic debt. Unfortunately, there domestic debt data were not generally available.

Table 4. Spending: programmed changes in the fiscal deficit (ΔFD) in PRGFs with anticipated aid increases

	All observations					Low reserves		High reserves		
	(1) ΔFD	(2) ΔFD	(3) ΔFD	(4) ΔFD	(5) ΔFD	(6) ΔFD	(7) ΔFD	(8) ΔFD	(9) ΔFD	(10) ΔFD
Delta aid	**0.25** [2.74]***	**0.463** [1.96]*	**0.538** [3.65]***	**0.239** [1.91]*	**0.262** [2.92]***	**0.586** [2.14]**	**0.345** [2.28]**	**0.546** [3.07]***	**0.229** [2.01]**	**0.236** [2.48]**
Interaction terms										
Reserve levels		0.017 [0.41]								
Inflation levels		**-0.014** [2.12]**	**-0.015** [2.45]**			-0.01 [1.03]		**-0.02** [2.28]**		
Reserve threshold				0.037 [0.27]						
Inflation threshold				**0.484** [1.97]*	**0.499** [2.10]**		-0.042 [0.06]		**0.501** [1.84]*	**0.517** [2.24]**
Constant	0.148 [0.54]	-0.038 [0.14]	-0.046 [0.16]	-0.157 [0.50]	-0.165 [0.54]	-0.744 [1.46]	-0.568 [1.04]	0.184 [0.55]	0.042 [0.11]	
Observations	93	93	93	93	93	29	29	64	64	64
Adjusted R-squared	0.07	0.11	0.11	0.09	0.1	0.14	0.11	0.11	0.08	0.21

Note: Absolute value of t statistics in brackets, * significant at 10%; ** significant at 5%; *** significant at 1%,
Filter: 0 < ΔAid[T0–T-1] < 10%, -20% < ΔCAD[T0–T-1] < 30%
Reserve threshold = 2.5 months of imports, inflation threshold = 5%

Among the cases where reserves were high, increases in aid were associated with significantly greater increases in the fiscal deficit where inflation was low (Table 4 columns (8) to (10)). For cases where there was a domestic financing problem, proxied by the high inflation identifier, the results point to a programming strategy of saving a significant part of the aid (through domestic debt reduction) rather than immediately spending it. Analogous to Table 3, Table 5 reports the results of regressions both with and without suppressed constants. The reported confidence intervals help to identify whether the estimated programmed spending ratios differ significantly from the extreme cases of *no* programmed spending and *full* programmed spending.

Table 5. Estimating programmed spending of aid increases in PRGFs with anticipated aid increases

	All observations		Low reserves		High reserves			
					High inflation		Low inflation	
	(1) ΔFD	(2) ΔFD	(3) ΔFD	(4) ΔFD	(5) ΔFD	(6) ΔFD	(7) ΔFD	(8) ΔFD
Estimated coefficient	0.25***	0.283***	0.346**	0.219**	0.255	0.236	0.673**	0.752***
95 percent confidence interval								
Min	0.069	0.149	0.048	0.014	-0.078	0.009	0.050	0.364
Max	0.431	0.417	0.645	0.423	0.588	0.462	1.297	1.140
Constant	0.148		-0.583		-0.122		0.147	
Observations	93	93	29	29	22	22	42	42
Adjusted R-squared	0.066	0.152	0.143	0.116	0.069	0.143	0.084	0.255
Interpretation Significantly different from 'no spending'	Yes		Yes		No		Yes	
Significantly different from 'full spending'	Yes		Yes		Yes		No	

Note: Absolute value of t statistics in brackets, * significant at 10%; ** significant at 5%; *** significant at 1%,
Filter: 0 < ΔAid[T0–T-1] < 10%, -20% < ΔCAD[T0–T-1] < 30%.
Reserve threshold = 2.5 months of imports, inflation threshold = 5%.

Figure 3 illustrates the results of the regressions reported in Table 5. In those cases where initial international reserve levels were below the threshold of 2.5 months of imports, programmed spending was estimated as 35 percent of the additional aid. If we combine this result with the estimated absorption of only 26 percent in the same set of observations, this

suggests a crowding out of the private sector equivalent to 9 percent of the value of the additional aid. However, as can be seen by comparing columns (3) of Table 3 and Table 5, this estimate of programmed crowding out is not a robust finding. Since the absorption of aid increases does not appear to be influenced by inflation, absorption of 87 percent was presumed for both of the last two columns of Figure 3, depicting the high reserves cases. Where inflation was above the threshold of 5 percent, the representative PRGF programmed the bulk of additional aid to reduce domestic debt. As shown in column (5), the estimated 25 percent is not significantly different from zero but significantly different from 100 percent. Where inflation was below the 5 percent threshold, on the other hand, most of the aid increase was programmed to be spent immediately. Column (7) of Table 5 shows that the estimated 67 percent spending is not significantly different from 100 percent but significantly different from zero. Column (9) of Table 4 shows the difference between the low and the high inflation case to be significant.

Figure 3. Central estimates for spending and absorption of aid increases in PRGFs (as a percentage of aid increase)

/1 Not Significant

C. Differences between ESAF and PRGF

The results presented in Table 6 and Table 7 show that patterns of programmed spending and absorption have changed over time. The tables report differences in programmed absorption and spending, between the PRGF era (1999-2005) and the last six years of the era of the Enhanced Structural Adjustment Facility (ESAF) (1993-1998).[9]

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[9] The database starts in 1993.

Table 6. Comparing programmed absorption of aid increases across time

	All observations		Low reserves 1/	High reserves 1/
	(1) ΔCAD	(2) ΔCAD	(3) ΔCAD	(4) ΔCAD
Delta aid	-0.456 [1.37]	-0.32 [1.07]	**0.795** **[2.32]****	-0.163 [0.54]
Interaction terms Reserve levels	**0.153** **[2.34]****			
Reserve threshold 1/		**0.531** **[2.26]****		
PRGF dummy 2/	**0.503** **[2.04]****	**0.56** **[2.25]****	**-0.582** **[1.81]***	**1.024** **[3.23]*****
Constant	0.142 [0.31]	0.199 [0.44]	-0.75 [1.20]	0.46 [0.82]
Observations	143	143	44	99
Adjusted R-squared	0.09	0.09	0.07	0.14

Note: Absolute value of t statistics in brackets, * significant at 10%; ** significant at 5%; *** significant at 1%,
Filter: 0 < ΔAid[T0–T-1] < 10%, -20% < ΔCAD[T0–T-1] < 30%
1/ Reserve threshold = 2.5 months of imports
2/ Reviews of ESAFs taking place for 1999 or later were counted as PRGFs

Table 7. Comparing programmed spending of aid increases across time in programs with initial international reserves levels above 2.5 months of imports

	All observations		High inflation 1/	Low inflation 1/
	(1) ΔFD	(2) ΔFD	(3) ΔFD	(4) ΔFD
Delta aid	**0.324** **[1.72]***	**-0.327** **[2.06]****	-0.339 [1.47]	0.237 [0.98]
Interaction terms Inflation levels	**-0.024** **[4.60]*****			
Inflation threshold 1/		**0.551** **[2.76]*****		
PRGF dummy 2/	**0.322** **[2.05]****	**0.577** **[3.50]*****	**0.582** **[2.59]****	**0.585** **[1.93]***
Constant	-0.03 [0.11]	-0.089 [0.28]	-0.044 [0.08]	-0.129 [0.32]
Observations	98	98	42	56
Adjusted R-squared	0.24	0.14	0.12	0.09

Note: Absolute value of t statistics in brackets, * significant at 10%; ** significant at 5%; *** significant at 1%,
Filter: 0 < ΔAid[T0–T-1] < 10%, -20% < ΔCAD[T0–T-1] < 30%
1/ Inflation threshold = 5%
2/ Reviews of ESAFs for 1999 or later were counted as PRGFs

PRGFs tended towards more absorption of aid increases than did ESAFs (Columns (1) and (2) of Table 6). This difference was driven by a more accommodating stance in the cases with high initial reserve levels (Column (4) of Table 6); meanwhile, PRGFs in cases with low initial reserve levels took a more restrictive stance towards immediate absorption (Column (3) of Table 6). The spending of aid increases also seems to have become more accommodative over time (Columns (1) and (2) of Table 7), in a shift that seems to have been independent of countries' initial inflation levels (Columns (3) and (4) of Table 7).

D. Programmed responses to anticipated aid reductions

What about the treatment of anticipated aid *reductions*? Analogous to the use of aid increases, reductions in aid can be translated into immediate current account adjustments and fiscal adjustments or they can be (partly) smoothed by depleting international reserves and/or by increasing domestic financing.

The programmed fiscal responses to anticipated aid reductions appear to have depended on initial reserve levels (Table 8). Interestingly, unlike the programmed use of aid increases, they do not appear to have depended on inflation levels. If we interpret inflation as an indicator of a country's ability to borrow domestically, this finding suggests that when facing a reduction in aid, IMF programs envisaged smoothing of fiscal expenditure by drawing down international reserves but not by borrowing domestically. We obtained no significant results for the programmed reaction of the current account to anticipated aid reductions.

Table 8. Influence of initial conditions on the programmed reactions to anticipated aid reductions

	(1) ΔCAD	(2) ΔCAD	(3) ΔCAD	(4) ΔFD	(5) ΔFD	(6) ΔFD	(7) ΔFD
Delta aid	**0.385** **[4.91]***	**0.466** **[3.60]***	**0.351** **[3.68]***	**0.496** **[4.91]***	**1.046** **[6.90]***	**0.543** **[4.42]***	**0.837** **[7.94]***
Interaction terms							
Reserve levels		-0.021 [0.78]			**-0.144** **[4.57]***		
Inflation levels			0.004 [0.66]			-0.005 [0.59]	
Reserve threshold 1/							**-0.751** **[5.79]***
Constant	-0.161 [0.68]	-0.182 [0.76]	-0.158 [0.65]	-0.139 [0.45]	-0.279 [1.00]	-0.108 [0.34]	**-0.5** **[1.84]***
Observations	100	100	98	100	100	98	100
Adjusted R-squared	0.19	0.19	0.18	0.19	0.33	0.19	0.39

Note: Absolute value of t statistics in brackets, * significant at 10%; ** significant at 5%; *** significant at 1%,
Filter: -10% < ΔAid[T0–T-1] < 0%, -30% < ΔCAD[T0–T-1] < 20%
1/ Reserve threshold = 2.5 months of imports

The regressions reported in Table 9 look for the significance of the asymmetries regarding the programmed reaction to changes in expected aid inflows between cases of aid increases and aid decreases.

Table 9. Asymmetries in the programmed reactions to changes in net aid flows

| | Low reserves 1/ | | High reserves 1/ | | | |
| | | | High inflation 1/ | | Low inflation 1/ | |
	(1) ΔCAD	(2) ΔFD	(3) ΔCAD	(4) ΔFD	(5) ΔCAD	(7) ΔFD
All delta aid	**0.313**	**0.839**	**0.527**	0.077	0.207	**0.22**
	[2.00]*	**[6.41]*****	**[1.81]***	[0.43]	[0.74]	**[1.69]***
Interaction term with aid increase dummy 2/	-0.135	**-0.514**	0.259	0.227	**1.759**	**0.624**
	[0.48]	**[2.19]****	[0.61]	[0.88]	**[2.80]*****	**[2.13]****
Constant	-0.592	-0.485	0.175	-0.421	-0.489	-0.169
	[1.13]	[1.11]	[0.22]	[0.86]	[0.92]	[0.69]
Observations	51	51	47	47	93	93
Adjusted R-squared	0.1	0.55	0.33	0.1	0.19	0.21

Note: Absolute value of t statistics in brackets, * significant at 10%; ** significant at 5%; *** significant at 1%,
Filter: -10% < ΔAid[T0–T-1] < 10%, -30% < ΔCAD[T0–T-1] < -30%
1/ Reserve threshold = 2.5 months of imports, inflation threshold 5%
2/ This coefficient can be interpreted as the programmed reactions' asymmetry between increases and reductions.

The reported results follow intuition:

- **In cases where reserves were low**, PRGF-supported programs envisaged no spending of aid increases but a fiscal contraction in the case of aid reductions. Thus there is a "conservative" asymmetry (Column (2)). As before, we found no significant results for the programmed reaction of the current account (Column (1)).

- **In cases where reserves were high but so too was inflation**, no significant asymmetry is visible for neither the programmed fiscal nor the programmed current account stance (Columns (3) and (4)). This symmetric fiscal stance might reflect the influence of inflation where aid increased, and of reserve levels where aid decreased: high inflation may have led to low spending of increases while high reserves allowed for reserve-financing of aid reductions.

- **Where reserves were high and inflation low**, program design seems to have been guided by a significant "expansive" asymmetry. Aid increases could be fully absorbed and spent while aid reductions could be financed through a drawdown of reserves (Columns (5) and (6)).

E. Aid forecasts in PRGFs

Aid projections in programs themselves may influence spending and absorption. For example, even if all *anticipated* aid increases are programmed to be fully absorbed and spent (as estimated above in the cases with high reserves and low inflation), realized programmed absorption and spending ratios would be lower if the aid increases had been systematically under-estimated and if the country's fiscal and reserve adjusters discourage the full use of

unanticipated aid windfalls.[10] To see whether aid inflows were significantly over- or under-projected, we compared aid projections in program requests and reviews in the program year and thereafter with the actual or updated aid levels that were reported in later reviews of the same program.

There was no systematic over- or underestimation of aid in the program years (see Figure 4 and Table 10, Columns (1), (2)). Interestingly, however, there seems to have been a systematic underestimation of aid inflows in the outer years, namely T+2 and T+3 (Columns (3), (4)). This result holds even if we correct for errors in the projection of GDP growth, which affect the denominator of our variable (Columns (5) to (8)). The slopes shown in Figure 4 suggest that one reason for this medium-term underestimation could be the fact that medium-term aid flows to PRGF countries proved more stable than were forecast in PRGF-supported programs.

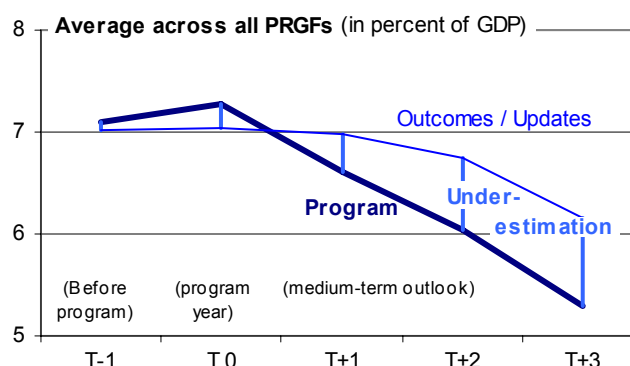Figure 4. Comparing programmed and actual aid levels in PRGFs

Table 10. Estimated forecast errors of aid as a percentage of GDP, and t-statistics, in PRGF-supported programs

Forecast error at	Without correcting for growth projection errors				After correcting for growth projection errors			
	(1) T0	(2) T1	(3) T2	(4) T3	(5) T0	(6) T1	(7) T2	(8) T3
Constant	-0.224 [0.439]	0.364 [0.210]	**0.717** **[0.029]****	**0.876** **[0.014]****	-0.245 [0.402]	0.319 [0.254]	**0.656** **[0.039]****	**0.854** **[0.021]****
Observations	53	50	43	32	53	50	42	31

Note: Absolute value of t statistics in brackets, * significant at 10%; ** significant at 5%; *** significant at 1%,
Filter: Error in reported actuals (T-3 to T-1) < 1%, Absolute net aid per GDP > 0%, Maximum forecast error 10%

IV. CONCLUSIONS

Though the 'spend and absorb' approach was not propounded as such before 2005, it appears to have influenced decisions on the use of aid in PRGF program design in cases with high international reserve levels and low inflation. In cases where international

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[10] This has been the case in the majority of the sample's PRGF supported programs.

reserves were low, some of the aid increases were programmed to be used to boost these reserves instead of immediately financing additional net imports. In cases of domestic financing problems (proxied by higher inflation in this paper), some of the aid increases were programmed to pay down domestic debt instead of immediately financing additional net expenditures.

These deviations from a 'spend and absorb' design can be interpreted as following an intent to accomplish or preserve macroeconomic stability.[11] The analysis presented in this note provides no evidence on the important question of the efficacy of the stance of macro policies underlying such PRGF program design.[12] It merely tries to inform the debate by pointing to some observable differences in IMF program design. To better understand the drivers and assumptions underlying program design, useful follow-up work to this paper might include the discussion of specific country cases, as well as more advanced econometric work, including a better data set with more variables, including domestic debt stocks.

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[11] A recent IMF Board discussion has now established a policy where any deviation from full absorption and spending in IMF-supported programs should be explicitly explained in program documents. See IMF (2007).

[12] This is the subject of an ongoing academic debate. For a recent review of the literature on inflation targets see, for example, Selassie and others (2007), page 6.

APPENDIX: DATA

The data were derived from PRGF program data recorded in an IMF internal database, *Monitoring of Fund Arrangements (MONA).* This database has a break in series in 2001. All IMF-supported programs starting before the break in 2001 plus the 2002 PRGF for the Democratic Republic of the Congo, are captured in MONA I. MONA II, which has a different set of macroeconomic variables closer to those used in the public World Economic Outlook data base, captures all other Fund programs. Hence, for each of the three variables, a different approach had to be used in MONA I and MONA II.

MONA data are organized by calendar years. In this analysis, the program year (t0) was defined as that calendar year with the greatest overlap with the actual program year as stated in the program request or subsequent reviews. For example, if the actual program year with conditionality that was agreed upon in some review lasted from November 2003 to October 2004, 2004 was defined as the program year for that review.

MONA does not receive the same level of scrutiny as published databases of the IMF. At the time when the data was compiled it had a number of errors and inconsistencies. For the analysis underlying this paper the most obvious—such as mixed-up currency denominations—were corrected manually before the generation of the proxies for the various variables. Others, such as discrepancies between reported actuals and obviously erroneous zeros, led us to omit the observations in question. To the extent possible, omitted variables were reconstructed from other observations.

Table 11. Derivation of proxies for net aid as a percentage of GDP (Aid)

Conceptual	MONA I	MONA II
(Received Grants	(Official transfers, net + Other BOP support	(Official current transfers, net + Capital account balance 1/
+ Net borrowing	+ Official borrowing from multilateral and bilateral lenders (excl. Fund) – Scheduled Principal Payments (excl. Fund) + Rescheduling contracted before program + Projected New Rescheduling	+ [Changes in] Liabilities to official creditors – [of which:] Credit and loans from IMF (excludes reserve position in the Fund)
+ Other/unidentified inflows	+ Increases in External Payments Arrears + Programmed Financing Gap	+ Arrears, net change (in the financial account) (+increase) + Programmed financing gap
– Interest payments)	– scheduled net interest Payments) / GDP	– Interest payments) / GDP
/ GDP		

1/ In MONA II, the label of the variable 'capital account balance' is slightly confusing. It consists almost entirely of the net balance of capital transfers (i.e. project support) and debt relief grants and is hence included as an important element of aid inflows. Other elements often referred to as part of the capital account, such as foreign direct and portfolio investments, are *not* included in this variable.

The proxy variable for net aid inflows was derived from balance of payments data by adding changes in liabilities to official creditors (disbursements minus 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, projected new rescheduling, and 'other balance of payments support.' Where, as is often the case, the latter two variables were not available from the database, their values were assumed to be either zero or captured by other variables (Table 11).

The current account deficit excluding aid (CAD) was derived by excluding official current transfers and interest payments from the current account balance (Table 12). Of all variables, these have had the best data availability in MONA.

Table 12. Derivation of proxies for current account deficit excluding aid per GDP (CAD)

Conceptual	MONA I	MONA II

(Current account deficit
+ Current transfers
– Interest payments)
  / GDP
	(– Current account,
	    excluding official transfers
	– Net interest payments)
	  / GDP
		(– Balance on current account
		+ Official current transfers (net)
		– Interest payments)
		  / GDP

The fiscal deficit excluding aid (FD) was derived as the difference between expenditures, excluding interest payments, and revenues, excluding grants (Table 13). One challenge in constructing this variable was the very poor data on grants. Where no data on grants were reported, the balance of payments entry for official current transfers and capital transfers (as captured by the reported capital account balance) was used as a proxy.

Table 13. Derivation of proxies for fiscal deficit excluding aid as a percentage of GDP (FD)

Conceptual	MONA I	MONA II

(Fiscal deficit
 	
+ Grants
– Interest payments)
  / GDP
	– Fiscal balance including grants
	    (percent of GDP)
	
	+ Grants (percent of GDP)
	– Interest payments
	    (percent of GDP)
		(Total expenditures and net
		    lending
		– Total revenues and grants
		+ Grants 1/
		– Interest payments)
		
		  / GDP

1/ If unavailable, grants were proxied derived from the BoP entries (Official current transfers, net) + (Capital account balance).