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The Effects of Fund-Supported Adjustment
Programs in African Countries, 1973-86

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Abstract

This study applies statistical analysis to estimate the macroeconomic effects of Fund-supported adjustment programs on African countries during the period 1973-86. The results indicate that inflation fell significantly in countries with adjustment programs that were implemented satisfactorily. The effect of adjustment programs on most other aspects of economic performance was statistically insignificant, although there was some indication that programs led to an improved current account balance and, in cases of high implementation, a rise in economic growth.

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<u>Table of Contents</u>	<u>Page</u>
I. Introduction	1
II. Estimation Technique and Data	4
III. Results	5
1. Effect of Fund arrangements: full sample period (1973-86)	5
2. Effect of Fund arrangements: 1980-86	9
3. Effect of World Bank structural adjustment lending	10
IV. Conclusions	12
Text Tables	
1. Africa: Stand-by and EFF Arrangements by Percentage of Authorized Purchases Made, 1973-86	6
2. Estimates of the Effect of Fund Arrangements on Indicators of Macroeconomic Performance during the Initial Program Year and the Initial Year and Following Year, 1973-86	7
3. Estimates of the First Year Effect and Two-Year Impact of Fund Arrangements on Indicators of Macroeconomic Performance, 1980-86	11
4. Estimates of the Two-Year Impact of Fund Arrangements and World Bank Structural Adjustment Lending on Macroeconomic Performance, 1973-86 and 1980-86	13
Statistical Appendix	15
Table I. Africa: Annual Number of Stand-by and EFF Arrangements by Percentage of Purchases Made, 1973-86	15
Table II. Estimates of First Year Program Effects: Entire Sample Period (1973-86)	16
Table III. Estimates of First Year Program Effects: 1980-86	17
Table IV. Estimates of Two-Year Program Effects: Entire Sample Period (1973-86)	18
Table V. Estimates of Two-Year Program Effects: 1980-86	19
Table VI. Africa: Structural Adjustment Loans and Credits Approved by the World Bank, 1973-86: By Program Year	20
References	21

I. Introduction

Since the early 1970s the Fund has devoted an increasing share of its financial resources in supporting economic adjustment programs in African countries. This effort has been particularly pronounced in the period since the second oil shock. Between 1980 and 1986 nearly half the Fund stand-by and extended arrangements approved, amounting to almost SDR 10.8 billion, involved African countries. African countries have also been heavy users of the Fund's Structural Adjustment Facility (SAF) since its inception in 1986.

The Fund's substantial involvement in Africa reflects the severe economic deterioration of African countries, particularly since 1980. Real GDP per capita, which is estimated to have grown by about 1 percent a year during the 1970s, fell by 8 percent between 1980 and 1987. ^{1/} Moreover, the terms of trade for African countries, which approximately doubled between 1970 and 1980, fell by 37 percent between 1980 and 1987, reflecting a 22 percent decline in non-oil commodity prices during these years. Between 1980 and 1987, the ratio of external debt to GDP for African countries rose from 32 percent to 78 percent, while Africa's ratio of debt service payments to exports of goods and services nearly doubled, from 15 to 29 percent. During this same period real imports fell by 29 percent.

Given the extent of Fund involvement in Africa, it is clearly worthwhile examining the macroeconomic consequences of these arrangements. Of particular interest is whether Fund-supported adjustment programs have succeeded in improving the current account and the overall balance of payments, reducing inflation, and increasing medium-term growth, as they were intended. To date, a number of studies have addressed this issue for developing countries (including African countries) generally. ^{2/} Only a few, however, have focused specifically on African countries. Typical of these papers is Helleiner (1986), which provides only a general critique of Fund arrangements in Africa preceding the establishment of the SAF, noting that the large number of interrupted programs, as well as available research on the subject, casts doubt on the efficacy of Fund-type adjustment measures. A recently issued study by the World Bank and UNDP (1989) has focused on the effects of economic reform programs in Sub-Saharan Africa during the 1980s, but does so by comparing macroeconomic indicators across groups of countries with and without strong reform programs, rather than through extensive statistical analysis.

The only detailed study of Fund arrangements with African countries is by Zulu and Nsouli (1985), which reviewed performance under Fund arrangements with African countries approved during 1979-83. As a whole

^{1/} These and other data reported here are for all Fund member countries in Africa, excluding South Africa.

^{2/} See, for example, Donovan (1981, 1982), Killick (1984), Loxley (1984), and Gylfason (1987).

the authors found limited success in achieving macroeconomic targets. For the arrangements surveyed, only about one fifth of the countries achieved the targeted rate of economic growth. 1/ Nearly half achieved their programs' inflation objectives, while roughly a third reached the objectives regarding the current account of the balance of payments. Zulu and Nsouli attributed much of the shortfall in program performance to failures in implementation, since they found a close correlation between attaining program objectives and meeting the fiscal and credit policy targets. 2/ However, the analysis in Zulu and Nsouli (1985) is not sufficient to address the broader question of whether Fund-supported adjustment programs generally tend to improve macroeconomic performance. This issue requires comparing macroeconomic performance in countries with Fund arrangements against performance without a Fund arrangement. The reason is that countries may be affected by having a Fund arrangement even without achieving its targets, if, for example, having an arrangement leads to significant changes in economic policies. For example, the economy may underperform relative to the program's targets, and yet improve its economic performance.

A large number of studies undertaken during the past fifteen years or so have attempted to address this broader question of effectiveness of Fund-supported programs for countries generally. The results of these papers are summarized in Khan (1988). As a whole, the studies have not found a strong relationship between Fund-supported adjustment programs and improved macroeconomic performance. However, Khan notes that most of the studies suffer from important methodological shortcomings. Comparisons of performance in program countries before and after program implementation can be misleading when nonprogram determinants of country performance, such as oil prices, industrial country growth rates, and domestic factors, such as weather conditions or political stability, change significantly over the observation period. Consequently, the effects of these factors may be wrongly attributed to the presence of Fund arrangements, biasing the results.

Comparisons of performance between countries with and without Fund arrangements during the same time period can eliminate some of the biases associated with a changing world environment. However, this type of comparison introduces a new problem--selection bias. Countries that do not enter into Fund arrangements generally will differ systematically from those entering into Fund arrangements. Consequently, simple comparisons of performance between countries with and without Fund arrangements may wrongly attribute to Fund arrangements the effects of different conditions in countries when the arrangements began. Goldstein and Montiel (1986) have shown that the bias can be reduced by adding to the estimation equations variables designed to control for two potential sources of difference between countries with and without Fund arrangements: (a) differences in initial economic conditions (captured by the lagged values of key

1/ Zulu and Nsouli (1985), p. 27.

2/ Zulu and Nsouli (1985), p. 14.

macroeconomic indicators); (b) differences in policy responses to achieve macroeconomic objectives (reflected in variables such as the fiscal deficit and the lagged real effective exchange rate); and (c) differences in external environment (such as foreign interest rates or changes in the terms of trade). These adjustments do not, of course, eliminate all the differences between countries with and without arrangements, but they do control for some of the most important.

Building on the Goldstein-Montiel approach, Khan (1988) compared the macroeconomic performance of countries with and without Fund arrangements during the 1973-86 period to determine whether Fund arrangements had any systematic effect on a country's balance of payments, external current account, domestic inflation rate, and rate of real GDP growth. For his sample, Khan found that countries with arrangements exhibited a stronger current account position and an improvement in the balance of payments, although the latter result was statistically significant only when program effects were observed over a two-year period including the year after initial program implementation. Countries with arrangements tended to have lower inflation rates, although this result was not statistically significant. In addition, these countries tended to experience a decrease in real growth during the program year, although extending the observation period to the year following initial program implementation led to a smaller decline in the growth rate.

The purpose of this paper is to apply Khan's approach to examine the effects of Fund arrangements specifically on African countries. However, the paper goes beyond Khan's analysis in two important respects. First, it explores the effect of program implementation on macroeconomic performance, using as a measure of implementation the percentage of authorized purchases in an arrangement ultimately made. This distinction was not made by Khan, who treated all program countries alike. The approach taken here, to divide the countries based on purchases made, may overstate the degree of implementation, to the extent that program waivers and modifications allow countries that have fallen short of policy expectations to make drawings under an arrangement. Nevertheless, this indicator may provide useful information on policy implementation, since countries implementing very few policies are unlikely to have made the bulk of authorized purchases, while those making the preponderance of authorized purchases are likely to have implemented far more of their adjustment programs than have countries making a much smaller share. ^{1/}

Second, the paper examines the impact on economic performance of World Bank structural adjustment lending. This lending, initiated in 1980, is intended to finance key policy reforms, both in specific sectors or industries and throughout the economy. In recent years it has become increasingly important as a source of financing to countries undertaking

^{1/} On the other hand, some countries may overperform relative to program targets. To the extent this occurs, the use of purchases may actually understate the degree of program implementation.

adjustment programs and represented 25 percent of the Bank's total lending during its (July-June) 1987/88 fiscal year. ^{1/}

II. Estimation Technique and Data

Following Khan, equations were estimated for the percentage change in each of four key macroeconomic indicators: the ratio of the overall balance of payments to GDP, the ratio of the external current account to GDP, the domestic inflation rate (measured by the consumer price index), and real GDP itself. Each equation took the following form:

$$\begin{aligned} \Delta \text{IND} = & a_0 + a_1(\text{BOP/Y})_{-1} + a_2(\text{CA/Y})_{-1} + a_3(\Delta \text{P/P}_{-1})_{-1} \\ & + a_4(\Delta \text{y/y}_{-1})_{-1} + a_5(\Delta \text{DC/DC}_{-1})_{-1} + a_6 \text{REER}_{-1} + a_7(\text{DEF/Y})_{-1} \\ & + a_8(\Delta \text{TOT/TOT}_{-1}) + a_9 \text{LIBOR} + a_{10}(\Delta \text{y}_I/\text{y}_{I-1}) \\ & + a_{11} \text{TREND} + a_{12} \text{CODUM} + a_{13} \text{IMF}_L + a_{14} \text{IMF}_H, \end{aligned} \quad (1)$$

where ΔIND represents the change in a particular indicator (such as the balance of payments to GDP ratio), BOP/Y is the ratio of the overall balance of payments to GDP, CA/Y is the ratio of the external current account balance to GDP, $\Delta \text{P/P}_{-1}$ is the domestic inflation rate, $\Delta \text{y/y}_{-1}$ is the real growth rate of GDP, $\Delta \text{DC/DC}_{-1}$ is the percentage change in domestic credit, REER is the average value of the country's real effective exchange rate during the indicated period, DEF/Y is the ratio of the central government budget deficit to GDP, $\Delta \text{TOT/TOT}_{-1}$ is the percentage change in the country's terms of trade, LIBOR is the London interbank interest rate, $\Delta \text{y}_I/\text{y}_{I-1}$ is the real growth rate of GDP in the industrial countries, TREND is a simple time trend, and CODUM is a vector of country dummy variables. IMF_L is a dummy variable equal to one if the country had a Fund-supported adjustment program during the year in which less than a specified percentage of authorized purchases were made, and zero otherwise, and IMF_H is a dummy equal to one if there was a Fund arrangement in which at least the specified percentage of authorized purchase was made (high-implementation programs) and zero otherwise. The first four of the right-hand variables were included in the equation to control for differences in the initial economic conditions positions of countries with and without Fund arrangements; the next three, for differences in important policy variables; and the following four control for variations in the global economic environment. A country dummy was also added to control other hard-to-specify differences between countries, irrespective of program status.

In estimating the equations, the dependent variables were measured initially over the first year of program implementation, to estimate the short-term consequences of Fund arrangements. A subsequent set of equations was estimated using the values of the four target variables averaged over the first program year and the following calendar year. Looking at

^{1/} See Thomas and Chibber (1989).

the effects of Fund arrangements over this short a time period may understate their positive impact over the longer term, since in some countries an initial rise in inflation and a worsening of the current account balance might be expected en route to longer-term adjustment. Nevertheless, the one- and two-year impacts are of interest in assessing the various consequences of Fund-supported adjustment programs for countries undertaking them.

For those arrangements approved during the first half of a calendar year the first program year was defined as the same as the year in which a Fund arrangement was approved. For those arrangements approved later in a calendar year, the year following approval was used, to take into account possible lags in implementation and program effectiveness. A list of Fund arrangements with African countries approved during the sample period appears in Table 1. To test the effect of program implementation on macroeconomic performance, two different definitions of Fund arrangements were used: arrangements in which at least 75 percent, and arrangements in which less than 75 percent, of the authorized purchases were made. This level was selected to distinguish programs that were largely implemented from programs less fully implemented. 1/

The various equations were estimated using data for 28 of the 30 Fund member countries in Africa having Fund-supported adjustment programs (as defined above) during the years 1973-86. 2/ This data set reflects the experience of 104 of the 108 upper credit tranche Fund arrangements with African countries approved between 1973 and mid-1986. The data set was restricted to countries with Fund arrangements during the period to avoid selection bias that might arise from comparisons in performance with countries that chose not to have Fund arrangements for noneconomic reasons. Broadening the sample to include the eight African countries that did not have Fund arrangements during this period and for which data were available did not, however, lead to noticeably different results.

III. Results

1. Effect of Fund arrangements: full sample period (1973-86)

The results of the regressions for first-year and two-year macroeconomic effects during the entire 1973-86 period are summarized in Table 2, which indicates the point estimates and t-statistics (in

1/ A further breakdown of arrangements to determine the effect of moderate implementation (50-74.9 percent of authorized purchases made) could not be tested because there were only 15 such arrangements during the sample period--too few for meaningful analysis to be undertaken.

2/ Two countries having a total of four Fund arrangements during this period, Equatorial Guinea and Guinea, were eliminated from the sample because reliable data for some of the relevant variables were not available for the entire time period.

Table 1. Africa: Stand-by and EFF Arrangements by Percentage of Authorized Purchases Made, 1973-86

	Under 50 percent					50-74.99 percent	75 percent or more				
Burundi	1976	1986 ¹	...	...	...	...	...	...	...	...	...
C. A. R.	1983	1984 ¹	...	...	...	...	...	...	...	1985 ¹	1981
Congo	1986 ¹	...	...	...	...	1979	...	...	...	...	...
Cote d'Ivoire	1986	...	...	...	...	...	1981	1984 ¹	1985	...	...
Equatorial Guinea	...	...	...	...	...	1985	1980 ¹	...	...	...	...
Ethiopia	...	...	...	...	...	...	1981	...	...	...	...
Gabon	1980	1986 ¹	...	...	...	1978	...	...	...	...	...
The Gambia	1984	...	...	...	...	...	1982	1986 ¹	...	...	...
Ghana	...	...	...	...	...	1979	1983 ¹	1984 ¹	1986 ¹	...	...
Guinea	1982 ¹	...	...	...	...	...	1986	...	...	...	...
Kenya	1975 ¹	1979 ¹	1980 ¹	...	...	1982	1983	1985	...	...	...
Liberia	1973	1974 ¹	1976	1980 ¹	1984 ¹	1982 ¹	1979	1981 ¹	1983 ¹	...	...
Madagascar	1980	1981	...	...	...	...	1982 ¹	1984	1985	1986 ¹	...
Malawi	1979 ¹	...	...	...	...	1983 ¹	1980 ¹	1982 ¹	...	...	...
Mali	...	...	...	...	...	1985 ¹	1982	1983 ¹	...	...	...
Mauritania	1980	...	...	...	...	...	1981	1985	1986	...	...
Mauritius	...	...	...	...	...	1979 ¹	1978	1980 ¹	1981 ¹	1983	1985
Morocco	1980 ¹	1985 ¹	...	...	...	...	1982	1983 ¹	1986 ¹	...	...
Niger	...	...	...	...	...	...	1983 ¹	1984 ¹	1985 ¹	1986 ¹	...
Senegal	1980 ¹	1982 ¹	...	...	...	...	1981 ¹	1983 ¹	1985	1986 ¹	...
Sierra Leone	1981	1984	1986 ¹	...	...	...	1977	1979 ¹	...	...	...
Somalia	...	...	...	...	...	1980	1981 ¹	1982 ¹	1985	...	...
Sudan	1982	1984	...	...	...	...	1973 ¹	1974 ¹	1983	...	...
Tanzania	1975 ¹	1980 ¹	...	...	...	1986 ¹	...	...	...	...	...
Togo	1981	1986	...	...	...	...	1979	1983	1984	1985	...
Tunisia	...	...	...	...	...	...	1986 ¹	...	...	...	...
Uganda	...	...	...	...	...	1983 ¹	1981 ¹	1982 ¹	...	...	...
Zaire	1977	1986	...	...	...	...	1979 ¹	1983 ¹	1985	...	...
Zambia	1976 ¹	1981	1984 ¹	1986	...	1983	1978	...	...	...	...
Zimbabwe	...	...	...	...	...	1983	...	...	...	...	...
Total			41			15			63		

Source: Staff calculations, based on Fund accounts.

¹/ Superscripts denote arrangements approved during the last half of the indicated year. In these cases the (first) program year has been taken as the following calendar year, with the exception of one arrangement (Cote d'Ivoire, 1984) where a subsequent arrangement was approved during the first half of the next calendar year.

Table 2. Estimates of the Effect of Fund Arrangements on Indicators of Macroeconomic Performance during the Initial Program Year and the Initial Year and Following Year, 1973-86

(Comparisons of Arrangements by Percent of Authorized Purchases Made)

Dependent Variable	First Year		Initial and Following Year	
	Less than 75 Percent	75 Percent or more	Less than 75 Percent	75 Percent or more
$\Delta(\text{BOP}/Y)$	.331 (.465)	-.742 (-1.054)	.457 (.773)	.123 (.211)
$\Delta(\text{CA}/Y)$	.550 (.554)	.864 (.881)	1.184 (1.134)	1.333 (1.533)
$\Delta(\Delta P/P_{-1})$	-.621 (-.261)	-11.430** (-4.869)	-.632 (-.289)	-12.347** (-5.712)
$\Delta(\Delta y/y_{-1})$	-2.597** (-2.779)	.520 (.564)	-.941 (-1.395)	.597 (.897)

** Estimate significant at the 99 percent level.

* Estimate significant at the 95 percent level.

1/ Estimates measured by coefficients on Fund arrangement dummy variables in estimating equations. Values for t-statistics appear in parentheses below the coefficients.

parentheses) for the coefficients of the IMF program dummies for each of the eight basic equations. ^{1/}

The results in Table 2 suggest that for African countries during this period, having a Fund-supported adjustment program was associated with a marginal improvement in the external current account balance, although the results were not statistically significant. The point estimates of the increases rose with greater program implementation and increased further when the effects were measured over a two-year period. For the balance of payments, the results were again statistically insignificant but less consistent with prior expectations. In the initial program year having a less-than-highly implemented Fund program was associated with a small improvement in the balance of payments, while high-implementation programs were associated with a worsening of the balance of payments during the first program year. Over a two-year observation period the effect of a highly-implemented Fund program on the balance of payments became positive but remained smaller than that of the less-highly-implemented programs, for which the estimated impact rose but remained statistically insignificant.

Regarding domestic performance, Table 2 shows that highly-implemented programs were associated with a large and statistically significant reduction in the domestic inflation rate, in the order of 11 percentage points during the initial program year and 12 points over a two-year period. Having a less than highly-implemented program, by contrast, led to a statistically insignificant impact on the inflation rate, with the point estimate being reduced to only about 0.6 for both the initial year and the two-year period. For economic growth, having a less-than-highly implemented program was associated with a statistically significant decline in the real GDP growth rate of about 2.6 percentage points during the initial program year. This figure remained negative over the two-year observation period but decreased to 0.9 percentage points and became statistically insignificant. Highly-implemented programs, by comparison, were associated with a small and statistically insignificant increase in the real growth rate, in the order of 0.5 percentage points during the initial program year and 0.6 percentage points over the two-year period.

Table 2 would suggest that the one clear impact of Fund arrangements on African countries during this period was to reduce inflation, where the underlying adjustment program was fully or largely implemented. There was also some indication that Fund arrangements were associated with improvements in the external current account, a marginal strengthening of the balance of payments (at least over a two-year observation period), and--in the case of highly-implemented programs--a small improvement in real GDP growth. These results are different from Khan's, which showed Fund arrangements to have a positive and highly significant impact on the external current account balance and only a small and statistically

^{1/} Results for the entire set of variables in each equation are reported in Appendix Tables II-V.

insignificant effect in reducing the inflation rate. Khan had also observed a negative relationship between Fund arrangements and real GDP growth, whereas for the African countries the effect was positive for highly-implemented programs and negative otherwise.

Of the various results, the apparent effectiveness of Fund arrangements in reducing inflation is consistent with prior expectations. Inflation has been a recurring phenomenon in many African countries during the past two decades, and slowing monetary and credit expansion has been a primary objective in most Fund arrangements with African nations. Likewise, it is not surprising that more fully-implemented arrangements have been associated with higher economic growth rates, given the importance in many arrangements with African countries of structural reforms aimed at improving resource allocation. Indeed, greater attention to structural problems may have been the reason why highly-implemented programs did not appear to have a downward impact on economic growth, since the resolution of structural problems may have offset any growth-impeding consequences of the demand restraint policies normally a part of Fund-supported adjustment programs. The statistically weak effect of arrangements on current account performance and the negative relationship observed between arrangements and balance of payments performance during the initial program year are contrary to expectations, however. The last result in particular may indicate that Fund arrangements and the adjustment programs they supported were not strong enough to offset the strongly adverse impact of external economic developments that affected most African countries during much of the 1973-86 period, and particularly during the 1980s. Alternatively, it may suggest that the external sector in African countries improves more slowly than domestic economic performance following implementation of a Fund-supported adjustment program, implying that short-term supply elasticities are fairly small.

2. Effect of Fund arrangements: 1980-86

To examine further the impact of external circumstances on the effects of Fund-supported adjustment programs, each of the equations for the different target variables was reestimated over the period 1980-86. ^{1/} As noted earlier, this period was marked by a sharp rise in African external debt service obligations and a decline in net capital inflows. Real GDP per capita also declined significantly during this period. At the same time, Fund-supported adjustment programs became more comprehensive, paying greater attention to structural economic problems while continuing their emphasis on demand restraint and encouraging increased export production over the longer run. ^{2/}

^{1/} Separate estimates for the period 1973-79 did not yield meaningful results because there were only 23 Fund arrangements with African countries during these years (see Appendix Table I).

^{2/} See, for example, IMF Survey, Vol. 17 (September 1988), "Supplement on the Fund," p. 14.

The figures reported in Table 3 confirm many of the hypotheses suggested above. During the 1980s, it appears that Fund-supported adjustment programs were less successful at improving external sector performance. Although all coefficient estimates were again statistically insignificant, the estimated impact of Fund arrangements on the external current account was negative in the case of less-than-highly implemented adjustment programs and positive only for highly-implemented programs over a two-year observation period. Moreover, this last coefficient was smaller than the corresponding coefficient for the entire 1973-86 period. For the balance of payments, the estimated impact of Fund arrangements was negative though statistically insignificant, regardless of the degree of program implementation. These results support the view that Fund-supported adjustment programs were less successful in responding to the massive external shocks experienced by most African countries during the 1980s.

On the domestic side, highly-implemented adjustment programs were again strongly associated with lower inflation rates, with the point estimates of the coefficients being highly significant and slightly larger than in the case of the larger 1973-86 period. As regards growth, the estimated coefficients were again statistically insignificant. This result is similar to that in World Bank-UNDP (1989) for all Sub-Saharan countries. However, the point estimates of the effects of Fund arrangements were uniformly larger. In the case of highly-implemented programs, the point estimate for the one-year effect, about 1.3 percentage points, was more than twice that of the estimate for the entire 1973-86 period. These results are at least consistent with the hypothesis that Fund arrangements during the 1980s were more successful at promoting growth by focusing more on eliminating structural economic problems. It is surprising, nonetheless, that the point estimate for the growth impact of highly implemented programs declined in moving from a one-year to a two-year observation period.

3. Effect of World Bank structural adjustment lending

Because many African countries also received structural adjustment loans or credits from the World Bank during the 1981-86 portion of this time period, often in tandem with Fund arrangements, an attempt was made to determine whether some of the effects of Fund arrangements might not in fact have resulted from the presence of these Bank activities. Accordingly, the equations for the various macroeconomic indicators were reestimated, adding a dummy variable for the effect of World Bank structural adjustment lending. This dummy was set equal to one for all loans and credits where 75 percent or more of the authorized disbursements were made, a condition that eliminated only 2 of the 25 Bank loans to countries included in the sample, one loan each to Senegal and Sierra Leone. A list of the World Bank structural adjustment loans and credits during this

Table 3. Estimates of the First Year Effect and Two-Year Impact of Fund Arrangements on Indicators of Macroeconomic Performance, 1980-86

(Comparisons of Arrangements by Percent of Authorized Purchases Made)

Dependent Variable	First Year		Two Years	
	Less than 75 Percent	75 Percent or more	Less than 75 Percent	75 Percent or more
$\Delta(\text{BOP}/Y)$	-.141 (-.178)	-.622 (-.853)	-.285 (-.407)	-.139 (-.216)
$\Delta(\text{CA}/Y)$	-.413 (-.41)	-1.215 (1.312)	-.232 (-.257)	.874 (1.051)
$\Delta(\Delta P/P_{-1})$	-.822 (-.237)	-11.885** (-3.728)	-.567 (-.173)	-12.609** (-4.182)
$\Delta(\Delta y/y_{-1})$	-1.118 (-1.021)	1.294 (1.285)	-.817 (-1.047)	.767 (1.068)

** Estimate significant at the 99 percent level.

* Estimate significant at the 95 percent level.

1/ Estimates measured by coefficients on Fund arrangement dummy variables in estimating equations. Values for t-statistics appear in parentheses below the coefficients.

period appears in Appendix Table VI, and the results of these regressions over a two-year period appear in Table 4. ^{1/}

Introducing the World Bank variables reduced slightly the magnitude of the coefficients for the IMF arrangement dummies, but did not affect their statistical significance (or lack thereof). Thus, the results are not much different from those reported earlier in Tables 2 and 3. The coefficient estimates for the World Bank variables are themselves insignificant, with the exception of the impact on inflation. This was negative and statistically significant at the 95 percent confidence level, though about half the size of estimated coefficient for highly-implemented Fund programs. For the 1980-86 period, the coefficients for the World Bank dummy variables are also statistically insignificant. However, introducing the World Bank dummy reduced the estimated negative impact of Fund arrangements on the balance of payments. It also raised the point estimate of the positive impact of highly-implemented programs on the current account balance, although the coefficient remained statistically insignificant. Adding the World Bank dummy variable made less positive or more negative the estimated impact of Fund arrangements on real GDP growth. In addition, the estimated coefficients for the effect of Bank lending on real growth were larger, though also statistically insignificant, than those for Fund arrangements, which is consistent with the presumed focus of Bank programs on restoring growth.

Over the 1980-86 period, introducing the World Bank variable slightly reduced the estimated coefficients for the effect of Fund programs on domestic inflation. Running the same regressions in the 1981-86 period during which the World Bank loans were actually in operation led to broadly similar results, although the estimated coefficients for the Fund program dummies were generally smaller in absolute value or, in the case of the balance of payments, more negative. These findings suggest that the Bank loans did not have much independent effect on country macro-economic performance, apart perhaps from encouraging an even greater reduction in inflation. This outcome is not surprising given the frequency with which these loans were paired with, or used to increase support to countries undertaking, Fund-supported adjustment programs.

IV. Conclusions

The results of this study suggest that, during the 1973-86 period, Fund arrangements had somewhat different effects on African countries from their apparent impact on developing countries generally. During this time period highly-implemented Fund arrangements with African countries were associated with significantly lower inflation rates, on the order of 11 percentage points in the first program year and 12 points over that year

^{1/} The results of equations for the initial program year were not substantially different, except for a smaller and less significant impact of Bank lending on domestic inflation.

Table 4. Estimates of the Two-Year Impact of Fund Arrangements and World Bank Structural Adjustment Lending on Macroeconomic Performance, 1973-86 and 1980-86 1/

(Comparison of Arrangements by Percent of Authorized Purchased Made)

Dependent Variables	1973-86			1980-86		
	Fund		World Bank	Fund		World Bank
	Less Than 75 Percent	75 Percent or More		Less Than 75 Percent	75 Percent or More	
$\Delta(\text{BOP}/Y)$	.454 (.766)	.119 (.201)	.057 (.065)	-.260 (-.369)	-.107 (-.165)	-.502 (-.554)
$\Delta(\text{CA}/Y)$	1.112 (1.260)	1.207 (1.377)	1.508 (1.155)	-.210 (-.232)	.902 (1.077)	-.432 (-.369)
$\Delta(\Delta P/P_{-1})$	-.321 (-.147)	-11.800** (-5.440)	-6.530* (-2.021)	-.195 (-.060)	-12.130** (-4.035)	-7.483 (-1.785)
$\Delta(\Delta y/y_{-1})$	-.971 (-1.435)	.545 (.811)	.629 (.629)	-.869 (-1.111)	.700 (.971)	1.042 (1.036)

** Estimate significant at the 99 percent level.

* Estimate significant at the 95 percent level.

1/ Estimates measured by coefficients on Fund arrangement and Bank lending dummy variables in estimating equations. Values for t-statistics appear in parentheses below the coefficient

and the following year. There is also some indication that highly-implemented Fund arrangements were associated with a somewhat larger growth rate, particularly during 1980-86, although the results fall short of statistical significance. Fund arrangements with African countries during this period were not particularly associated with improvement in the overall balance of payments, although there were some indications of a positive impact on the external current account. Within the overall time period, there is evidence suggesting that during the 1980s, Fund arrangements were more successful in improving domestic economic performance and less successful at restoring external viability than during the previous decade. There is also evidence suggesting that most of the effects of these arrangements occurred during the initial year of program implementation, although the external and growth effects improved during the second year. This observation may reflect the frequency of successive one-year stand-by arrangements among African countries during this period.

From these results, it is difficult to conclude that Fund-supported adjustment programs had a marked effect on the African countries undertaking them during the 1973-86 period, except perhaps in the area of moderating inflation, where the focus in most arrangements on restraining monetary and credit expansion may have had some effect. To some extent, this result is not surprising, given the generally adverse external developments affecting most African countries during much of this period and the large number of African countries entering into Fund arrangements, particularly during the 1980s. On the other hand, there is some evidence that highly-implemented Fund programs have not reduced economic growth in African countries, particularly during the 1980s. In light of this, and the growing emphasis on structural reform in current Fund arrangements with African countries under the recently-established Structural Adjustment Facility (SAF) and the Enhanced Structural Adjustment Facility (ESAF), future Fund arrangements with African countries may produce more positive macroeconomic outcomes. At the same time, it is important that further assessments of the macroeconomic consequences of Fund arrangements be undertaken, both to improve our understanding of their effects and to refine the techniques available for measuring them.

Table I. Africa: Annual Number of Stand-by and EFF Arrangements by Percentage of Purchases Made, 1973-86

	Under 50 percent	50-74.99 percent	75 percent or more
1973	1	--	1
1974	1	--	1
1975	2	--	--
1976	2	--	--
1977	2	--	1
1978	--	1	2
1979	2	3	4
1980	8	1	3
1981	4	--	9
1982	3	2	7
1983	1	4	11
1984	6	--	5
1985	1	3	10
1986	<u>8</u>	<u>1</u>	<u>9</u>
Totals	41	15	63

Source: Staff calculations and estimates.

Table II. Estimates of First-Year Program Effects: Entire Sample Period (1973-86) 1/

Dependent Variable	(BOP/Y) ₋₁	(CA/Y) ₋₁	(ΔP/P ₋₁) ₋₁	(Δy/y ₋₁) ₋₁	(ΔDC/DC ₋₁) ₋₁	REER ₋₁	(DEF/Y) ₋₁	(ΔTOT/TOT ₋₁)	LIBOR	Δy _I /y _{I-1}	TREND	Fund Program Dummy 2/ Below 75 75+		R ²
Δ(BOP/Y)	-.767** (-11.45)	.032 (.79)	-.004 (-.26)	-.037 (-.95)	.201 (1.91)	-.001 (-.69)	.071 (1.51)	.038** (4.14)	-.015 (-.18)	.193 (1.59)	-.337** (-4.66)	.331 (.46)	-.742 (-1.05)	.389
Δ(CA/Y)	-.296** (-3.16)	-.496** (-8.79)	.017 (.79)	-.154** (-2.82)	.005 (.34)	-.001 (-.29)	.010 (.15)	.754** (5.86)	-.069 (-.56)	.270 (1.59)	-.184 (-1.83)	.550 (.55)	.864 (.88)	.395
Δ(ΔP/P ₋₁)	.031 (.22)	.121 (.89)	-.634** (-12.00)	-.275* (-2.10)	.037 (1.05)	-.018** (-3.29)	-.176 (-1.13)	.036 (1.17)	.048 (.16)	.124 (.31)	.549* (2.27)	-.621 (-.26)	-11.430** (-4.87)	.385
Δ(Y/Y ₋₁)	.162 (1.84)	-.061 (-1.14)	.014 (.69)	-.934** (-18.15)	-.003 (-.18)	.000 (.22)	.078 (1.28)	.045** (3.74)	.026 (.22)	.165 (1.04)	-.036 (-.38)	-2.597** (-2.78)	.520 (.56)	.526

1/ t-values in parentheses below coefficients

2/ Dummy variables equal 1 where there are arrangements in which less than 75 percent, or at least 75 percent, of the authorized purchases were made, respectively.

** Estimates significant at the .99 level.

* Estimates significant at the .95 level.

Table III. Estimates of First Year Program Effects: 1980-86 1/

Dependent Variable	(BOP/Y) ₋₁	(CA/Y) ₋₁	(ΔP/P) ₋₁	(Δy/y) ₋₁	(ΔDC/DC) ₋₁	REER ₋₁	(DEF/Y) ₋₁	(ΔTOT/TOT) ₋₁	LIBOR	Δy _I /y _{I-1}	TREND	Fund Program Dummy 2/ Below 75 75+		R ²
Δ(BOP/Y)	-.767** (-7.95)	.027 (.38)	-.020 (-.91)	-.027 (-.46)	.024 (1.19)	-.003 (-.21)	.083 (.82)	.087** (4.61)	-.035 (-.22)	.143 (.68)	-.442* (-2.33)	-.141 (-.18)	-.622 (-.86)	.468
Δ(CA/Y)	-.399** (-3.26)	-.601** (-6.80)	-.010 (-.36)	-.153* (-2.06)	-.038 (-1.53)	-.005 (-.30)	.158 (1.22)	.073** (3.05)	-.154 (-.76)	-.179 (-.67)	.063 (.26)	-.413 (-.41)	.121 (1.31)	.453
Δ(ΔP/P) ₋₁	-.212 (-.50)	.206 (.68)	-.840** (-8.87)	-.519** (-2.03)	.011 (.12)	.049 (.84)	-.452 (-1.02)	-.068 (-.83)	-.658 (-.94)	-.527 (-.57)	-.231 (-.28)	-.822 (-.24)	-11.885** (-3.73)	.474
Δ(Y/Y) ₋₁	.262 (1.97)	-.206* (-2.14)	.016 (.54)	-.957** (-11.84)	-.001 (-.03)	-.012 (-.64)	.119 (.85)	.384 (1.48)	.215 (.97)	.447 (1.53)	.305 (1.17)	-1.118 (-1.02)	1.294 (1.28)	.551

1/ t-values in parentheses below coefficients.

2/ Dummy variables equal 1 where there are arrangements in which less than 75 percent, or at least 75 percent, of the authorized purchases were made, respectively.

** Estimates significant at the .99 level.

* Estimates significant at the .95 level.

Table IV. Estimates of Two-Year Program Effects: Entire Sample Period (1973-86) 1/

Dependent Variable	(BOP/Y) ₋₁	(CA/Y) ₋₁	(ΔP/P ₋₁) ₋₁	(Δy/y ₋₁) ₋₁	(ADC/DC ₋₁) ₋₁	REER ₋₁	(DEF/Y) ₋₁	(ΔTOT/TOT ₋₁)	LIBOR	Δy _I /y _{I-1}	TREND	Fund Program Dummy 2/		R ²
												Below 75	75+	
Δ(BOP/Y)	-.693** (-12.47)	-.020 (- .60)	-.008 (- .58)	-.026 (- .78)	.017 (1.95)	-.001 (- .82)	.059 (1.52)	.030** (3.91)	-.104 (-1.42)	-.020 (- .19)	-.313** (-5.22)	.457 (.77)	.123 (.21)	.471
Δ(CA/Y)	-.212* (-2.56)	-.622** (-12.42)	.020 (1.04)	-.130** (-2.69)	.003 (.26)	-.000 (- .14)	.003 (.05)	.048** (4.19)	-.108 (- .99)	-.013 (- .09)	-.151 (-1.70)	1.184 (1.34)	1.333 (1.53)	.499
Δ(ΔP/P ₋₁)	.366 (.18)	.103 (.83)	-.688** (-14.14)	-.236 (-1.96)	.027 (.85)	-.019** (-3.78)	-.204 (-1.42)	.027 (.96)	-.135 (- .50)	.039 (.11)	.658** (2.97)	-.632 (- .29)	-12.347** (-5.71)	.484
Δ(Y/Y ₋₁)	.120 (1.89)	-.020 (- .53)	.021 (1.40)	-1.007** (-27.11)	-.013 (-1.27)	-.001 (- .85)	.105* (2.38)	.037** (4.25)	-.061 (- .73)	.082 (.71)	-.093 (-1.36)	-.941 (-1.39)	.597 (.90)	.707

1/ t-values in parentheses below coefficients.

2/ Dummy variables equal 1 where there are arrangements in which less than 75 percent, or at least 75 percent, of the authorized purchases were made, respectively.

** Estimates significant at the .99 level.

* Estimates significant at the .95 level.

Table V. Estimates of Two-Year Program Effects: 1980-86 1/

Dependent Variable	(BOP/Y) ₋₁	(CA/Y) ₋₁	(ΔP/P ₋₁) ₋₁	(Δy/y ₋₁) ₋₁	(ΔDC/DC ₋₁) ₋₁	REER ₋₁	(DEF/Y) ₋₁	(ΔTOT/TOT ₋₁)	LIBOR	Δy _I /y _{I-1}	TREND	Fund Program Dummy 2/		R ²
												Below 75	75+	
Δ(BOP/Y)	-.631** (-7.39)	.034 (.55)	-.021 (-1.12)	.057 (1.10)	.013 (.74)	-.004 (-.34)	-.017 (-19)	.070** (4.21)	-.055 (-.39)	-.061 (-.33)	-.303 (-1.81)	-.285 (-.41)	-.139 (-.22)	.532
Δ(CA/Y)	-.306** (-2.70)	-.743** (-9.37)	-.014 (-.57)	-.149* (-2.23)	-.013 (-.59)	-.004 (-.25)	.204 (1.76)	.055* (2.54)	-.094 (-.52)	-.362 (-1.49)	.250 (1.16)	-.232 (-.26)	.874 (1.05)	.585
Δ(ΔP/P ₋₁)	-.090 (-.23)	.225 (.78)	-.792** (-8.85)	-.454 (-1.88)	.035 (.43)	-.057 (-1.04)	-.482 (-1.15)	-.059 (-.76)	.296 (-.45)	-.383 (-.44)	.630 (.80)	-.567 (-.17)	-12.609** (-4.18)	.549
Δ(Y/Y ₋₁)	.213* (2.24)	-.165 (-2.40)	.004 (.20)	-1.088** (-18.89)	.002 (.08)	-.000 (-.01)	.226* (2.25)	.048* (2.60)	-.050 (-.32)	.502* (2.40)	-.120 (-.64)	-.817 (-1.05)	.767 (1.07)	.750

1/ t-values in parentheses below coefficients.

2/ Dummy variables equal 1 where there are arrangements in which less than 75 percent, or at least 75 percent, of the authorized purchases were made, respectively.

** Estimates significant at the .99 level.

* Estimates significant at the .95 level.

Table VI. Africa: Structural Adjustment Loans and Credits
Approved by the World Bank, 1973-86: by Program Year

1981 Senegal¹

1982 Cote d'Ivoire, Uganda

1983 Ghana, Togo, Zimbabwe

1984 Cote d'Ivoire, Ghana, Mali, Nigeria, Sierra Leone²,
Uganda

1985 Ghana, Guinea Bissau³, Togo

1986 Burundi, Cote d'Ivoire, Equatorial Guinea³, Ghana,
Guinea³, Kenya, Madagascar, Malawi, Mauritania,
Niger, Senegal, Somalia, Zaire, Zambia

Source: Data provided by the World Bank.

1/ Loan in which only 67 percent of the authorized disbursements were made.

2/ Loan in which only 33 percent of the authorized disbursements were made.

3/ Country deleted from the observation set because of missing data for the real effective exchange rate.

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