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Thomas A. Connors

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IMF conditional programs have increasingly come under attack as not being in the best interest of countries that negotiate such programs.[1/] The purpose of this paper is to investigate the effects of IMF programs on some major macroeconomic variables in countries that came under IMF guidance in the post-1972 period. This will shed some light on the question of how IMF programs affect countries. The mechanics of conditional IMF programs are discussed in Section I. Previous studies done in this area are briefly discussed in the first part of Section II. The statistical results of this paper are then presented in the second part of Section II.

I. IMF Stand-Bys and Conditionality

IMF stabilization programs are designed to restore domestic and external balance to a country that is experiencing severe balance-of-payments adjustment problems. A country that wishes to draw on Fund resources must usually negotiate an acceptable program with the Fund.[2/] The program generally calls for increased restraint on monetary and fiscal policies, and sometimes exchange rate depreciation. The overall objective is to cut back domestic demand so that resources can be reallocated toward net exports, without resorting to selective restrictions and subsidies on trade payments.

By successfully negotiating a program with the IMF in connection with a stand-by, a country becomes eligible, subject to certain conditions, to draw specified installments of IMF resources over a period of usually one,

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but occasionally two years.[3] The conditions require that a country adhere to certain quantitative policy performance criteria during the program. The criteria usually include ceilings on domestic credit expansion, on bank lending to the public sector, and on foreign borrowings of specified maturities. A floor is usually established for foreign reserves. This places a limit on the amount of exchange market intervention that can occur. Sometimes, as a pre-condition, some specified devaluation of the currency is required. The macroeconomic criteria are set at levels judged to be consistent with the achievement of the balance-of-payments, income, and price targets of the program. If the performance criteria are not met during the program, the country becomes ineligible to draw further installments until performance becomes consistent with the program. In some cases, the program may be renegotiated, or the Fund may grant a waiver of the performance requirement.

The theoretical basis for IMF programs rests to a large degree on work done by IMF staff on the monetary approach to the balance of payments.[4] In these models, credit expansion plays a large role as a policy variable. It affects nominal income and the balance of payments. Therefore, it is not surprising that control of credit expansion is usually an integral part of IMF stabilization programs.

II. The Effects of IMF Programs

One would expect IMF programs to have measurable effect on major macroeconomic variables. The programs are designed to stabilize economies, which in many instances means following different macroeconomic paths in the future than have been followed in the past.

Previous Research on the Effects of IMF Programs. IMF staff members have written two papers in an attempt to assess the effects of IMF programs. Reichmann and Stillson (1978) and Reichmann (1978) cover countries under stand-bys in the 1963-1972 period and 1973-1975 period, respectively. In both studies, tests were performed to judge whether credit variables behaved differently in individual countries before and after program implementation. As already mentioned, credit variables are carefully monitored under IMF programs and therefore are of particular interest. In addition, there are sufficient observations on credit variables to test whether, on an individual country basis, significant differences occur in growth before and after program implementation.

While credit variables play an important intermediate role in IMF programs, other variables are more interesting from the standpoint of judging the effectiveness of IMF programs. Credit variables are policy variables that are used to affect more fundamental targets such as growth, inflation, and the balance of payments. The authors of the IMF studies were interested in these target variables but did not apply statistical techniques to test how these target variables changed before and after program implementation. In looking at individual countries, the authors did not have enough data points to perform statistical tests. Therefore, Reichmann and Stillson, in analyzing the 1963-1972 period, simply grouped countries according to whether growth slowed, increased, or remained unchanged before and after program implementation. The same was done for inflation. It was also noted whether countries had respected credit ceilings or not. Since

no statistical tests were performed, no statistical significance could be attached to their results.

Reichmann follows a different approach for the 1973-1975 period. The author compares actual outcomes to the ex ante targets for growth, inflation, and the balance of payments. For the 21 programs studied, Reichmann concludes that the growth targets were met, or came close to being met, in most of the cases. In regard to inflation, the targets were exceeded in most of the cases. For the balance of payments, one-third of the countries performed better than expected, one-third performed worse than expected, and one-third performed as expected. However, the Reichmann study still does not test whether achievement or non-achievement of the targets is related to compliance with the Fund-negotiated program. It is not clear whether the achievers or non-achievers were respecting or violating the program criteria. Therefore, the usefulness of following the Fund's program is not made clear.

Pooling Observations Across Countries. Statistical tests on growth, inflation, and balance-of-payments variables were not attempted in the Fund studies because of the lack of sufficient observations on an individual country basis.[5/] An alternative is to pool observations for the desired variables across countries that undertook stand-bys. Through the use of pooled data, one can develop a larger sample size and perform statistical tests of significance.

For this present study, four variables have been chosen for testing to determine the effect of the implementation of IMF stand-bys. The variables are: the GDP growth rate, the inflation rate, the current account of the balance of payments, and the ratio of the central government fiscal

deficit to GDP.[6] The fiscal deficit variable has been included because it is common for countries undertaking stand-bys to be running large fiscal deficits, mainly financed by central bank money creation. Programs are generally designed to correct these fiscal imbalances, so it is of interest to know whether the fiscal deficit, in fact is affected by program implementation.

For each variable the observations were pooled into two groups. The first group consists of one annual observation on the variable for each country before the IMF program was begun. The second group consists of one annual observation on the variable for each country after the IMF program was begun.[7] Then the non-parametric rank test was used to test whether there were significant differences in the values of the variables in the before and after group. A non-parametric rank test was used because the normality assumption necessary for the use of the "t" test seemed inappropriate.[8][9]

The rank test involves putting the before and after groups into a single array. Ranks are assigned to the elements of the array. The ranks corresponding to the elements of each group are then summed. Using the appropriate statistical table one can determine the probability that the observations before and after are from the same population (Snedecor and Cochran, 1967).

For the period covered, 1973-1977, there were 31 cases in the sample identified as upper credit tranche programs (sometimes a country undertook more than one program in the period). However, the needed data were not always available for each variable for every country. Therefore, in all cases the number of programs considered is less than 31 because of data problems.

In addition to testing differences between the before and after groups for each of the variables for the pooled samples of countries, differences are also tested for sub-samples of the pool. The sub-samples are divided according to whether or not the countries respected either the overall credit ceiling agreed to with the Fund, or the ceiling placed on credit to the public sector.[10/] The sub-samples are included in an effort to form a judgment on the effects of respecting Fund criteria.

The Effect on Growth. Fund programs are often austerity programs. Therefore, one would expect that countries undertaking the programs to exhibit a slowing of their income growth rate, at least in the short run. As can be seen in Table 1, where the test results for the growth rate are presented, there is no significant difference in the growth rate for the year before and for the year after program implementation for the countries that undertook programs (and for which data were available). There is also no significant difference in growth rates before and after program implementation for any of the sub-samples considered. The test results suggest that IMF programs have neither a negative nor a positive effect on growth.

The Effect on Inflation. IMF programs are generally designed to reduce the inflation rate in countries where inflation has been a problem. In Table 2, it is seen that for all the programs combined, there is no significant difference in inflation rates before and after program implementation. Countries that complied with the overall credit ceiling did not appear to experience a decline in inflation rates. However, those that did not comply with the overall credit ceiling did experience a significant increase in the rate of inflation. There is no significant difference in inflation

Table 1

The Effect of IMF Programs on the Growth Rate

	Number of Programs	Sum of Ranks Before	Sum of Ranks After	Significant at the 95% Level
All Programs	17	288	307	No
Compliers--Overall Credit Ceiling	5	31	31	No
Non-compliers--Overall Credit Ceiling	10	109	101	No
Compliers--Credit Ceiling on Public Sector	3	12	9	No
Non-compliers--Credit Ceiling on Public Sector	8	60	76	No

Table 2

The Effect of IMF Programs on the Inflation Rate

	Number of Programs	Sum of Ranks Before	Sum of Ranks After	Significant at the 95% Level
All Programs	29	841	870	No
Compliers--Overall Credit Ceiling	13	176	175	No
Non-compliers--Overall Credit Ceiling	12	130	170	Yes
Compliers--Credit Ceiling on the Public Sector	10	104	106	No
Non-compliers--Credit Ceiling on the Public Sector	11	121	132	No

rates before and after program implementation for those groups of countries that did, or did not, respect the credit ceiling applied to the public sector.

The Effect on the Current Account. Countries that undertake stand-bys are usually experiencing severe balance-of-payments problems. The main purpose of the programs is usually to return a country to a sustainable balance-of-payments position. In most cases "sustainability" requires an improvement in the current account, not just the promotion of greater capital inflows.

In Table 3, the effect of Fund programs on the current account of the balance of payments is presented. For all programs combined, the sum of ranks before and after does indicate that the current account did improve under the programs, but the improvement is not statistically significant at the 95% confidence level. For all sub-samples, there is no significant difference in the current account before and after program implementation. However, the sum of ranks moves in the expected direction: those countries that respected credit ceilings experienced some improvement, on average, in the current account, while those that did not, experienced deterioration.

One possible reason why no statistically significant improvement is observed is that countries undertaking stand-bys often devalue their currency at the beginning of the program period. If there is a J curve effect, the improvement in the current account might not show up in the first year after a program is started. The validity of this proposition should be investigated further.

Table 3

The Effect of IMF Programs on the Current Account

	Number of Programs	Sum of Ranks Before	Sum of Ranks After	Significant at the 95% Level
All Programs	23	514	567	No
Compliers--Overall Credit Ceiling	10	91	119	No
Non-compliers--Overall Credit Ceiling	10	110	100	No
Compliers--Credit Ceiling on the Public Sector	5	21	34	No
Non-compliers--Credit Ceiling on the Public Sector	9	90	81	No

Table 4

The Effect of IMF Programs on the Ratio of Fiscal Deficit to GDP

	Number of Programs	Sum of Ranks Before	Sum of Ranks After	Significant at the 95% Level
All Programs	17	306	289	No
Compliers--Overall Credit Ceiling	9	86	85	No
Non-compliers--Overall Credit Ceiling	6	104	106	No
Compliers--Credit Ceiling on the Public Sector	6	36	42	No
Non-compliers--Credit Ceiling on the Public Sector	5	27	28	No

Effect on the Fiscal Deficit/GDP Ratio. Fund programs implicitly call for a reduction in the fiscal deficit either through the reduction of expenditures or the increase of revenues. (Indeed, performance criteria which place a ceiling on domestic bank credit to the central government on the one hand, and a ceiling on official short- and medium-term foreign borrowing on the other will, jointly, tend to define the upper limit on the fiscal deficit.) Table 4 presents the statistical results. There is no significant difference in the ratio of the fiscal deficit to GDP before and after program implementation for all programs or for the different sub-samples. It appears to have made no difference whether or not the countries respected the credit ceilings.

Conclusions

On the basis of the test results, one might conclude that stand-bys in the 1973-1977 period did not have much effect on the variables that were considered. However, use of the 1973-77 period may create an inherent selection bias for our results: average economic conditions of growth, inflation, and measured current account balances were significantly worse at the end of the period than at the beginning for all groups of countries except the major oil exporters. Thus, a randomly selected two-year episode of a country's economic performance is likely to show deterioration in the fundamental target variables--irrespective of whether the country happened to be operating under a conditional stand-by from the IMF.

A more general problem for our tests of Fund program effectiveness may be the time frame that was used for pre- and post-program performance.

Perhaps one year is not enough time for the programs to show their effects. While most Fund programs are designed to be short-term stabilization programs and their effects should be transmitted to the economy in a short period, the IMF has begun to extend a number of stand-by programs to two years.

Critics of Fund programs may find some comfort in these results to the extent that these results indicate that Fund programs do not work. However, the same results also indicate that Fund programs do not adversely affect growth. A common complaint against austerity programs is that they are anti-growth. This does not appear to be the case in the Fund programs considered--despite the overall tendency of world income growth to slow down over the period of our sample.

The results seem to indicate that Fund programs in the 1973-1977 period were not too successful. This conclusion is in accord with the Fund's own assessment of programs in the 1973-1975 period. Reichmann (1978) concluded that less than one-third of the programs in his sample was successful. However, because the testing procedures used in this study and previous studies are quite crude, these conclusions should be viewed as being very tentative.

Footnotes

1/ For example see Chernow (1979) and Witteveen (1978).

2/ The Fund offers some types of financing to members without the requirement of a stabilization program--for example, compensatory financing of export shortfalls. However, this paper deals only with lending under stand-bys in the upper credit tranches (i.e., drawings beyond 25 per cent of a member's Fund quota). Extended Fund Facility programs are also conditional but have not been included in the sample because of lack of data.

3/ Extended Fund Facility programs are medium-term stabilization programs that run for three years.

4/ For example, see Polak (1957). The original model has been extended in several areas. See International Monetary Fund (1977).

5/ In the study covering the 1963-1972 period, Reichmann and Stillson do test whether net foreign assets of the banking system have changed for individual countries, through the use of quarterly data before and after program implementation. Therefore, they do test one balance-of-payments variable. There are no balance-of-payments test performed for the 1973-1975 period.

6/ The current account defined to include goods, services, and private transfers.

7/ The annual observation does not, in general, correspond to the calendar year observations since programs can begin at any time during the year. But in most cases only calendar year data are available. A weighting system was devised in an attempt to circumvent the problem. The weighting method can be best illustrated by an example. Suppose a program was begun in QIII 1975. The observation on the variable before program implementation is computed as 1/2 of the 1974 observation plus 1/2 of the 1975 observation. The observation after is computed as 1/4 of the 1975 observation plus 3/4 of the 1976 observation. The quarter in which the program is implemented receives no weight. This method does not give the exact data point that is desired, but it is not clear what alternative would be more desirable.

8/ The rank test was used on the credit variables in the Fund studies, but apparently for different reasons.

9/ The parametric "t" test was also performed on these data. The results were much the same as those obtained through the use of the rank test.

10/ It should be stressed that a careful evaluation was made in judging whether Fund program criteria were respected. Nevertheless, it was the judgment of the author, and not the IMF, and is therefore subject to error.

Appendix

Countries in the Sample

The following countries (and program year) are included in the combined samples for growth, inflation, the current account, and the fiscal deficit to GDP ratio.

Growth: Bangladesh (1975), Bolivia (1973), Burma (1974), Chile (1974), Chile (1975), Finland (1975), Indonesia (1973), Italy (1974), Israel (1975), Jamaica (1973), Korea (1975), Pakistan (1973), Pakistan (1974), Sri Lanka (1974), Sudan (1973), Sudan (1974), and Tanzania (1975).

Inflation: Argentina (1976), Bangladesh (1975), Bolivia (1973), Burma (1974), Chile (1974), Chile (1975), Egypt (1977), Finland (1975), Haiti (1975), Haiti (1976), Indonesia (1973), Israel (1976), Israel (1975), Italy (1974), Italy (1977), Jamaica (1973), Korea (1975), Pakistan (1973), Pakistan (1974), Pakistan (1977), Philippines (1973), South Africa (1976), Sri Lanka (1974), Sudan (1973), Sudan (1974), Tanzania (1975), United Kingdom (1977), Zaire (1977), and Zambia (1976).

Current Account: Argentina (1976), Bangladesh (1975), Bolivia (1973), Burma (1974), Chile (1974), Chile (1975), Finland (1975), Haiti (1975), Indonesia (1973), Israel (1975), Italy (1924), Jamaica (1973), Korea (1975), Pakistan (1973), Pakistan (1974), Philippines (1973), Romania (1975), South Africa (1976), Sri Lanka (1974), Sudan (1973), Sudan (1974), Tanzania (1975), and the United Kingdom (1977).

Fiscal Deficit/GDP: Bangladesh (1975), Bolivia (1973), Chile (1974), Finland (1975), Haiti (1975), Indonesia (1973), Italy (1974), Jamaica (1973), Korea (1975), Pakistan (1973), Pakistan (1974), Philippines (1973), South Africa (1976), Sri Lanka (1974), Sudan (1973), United Kingdom (1977), and Zambia (1976).

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