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## Fiscal Discipline and Social Spending in IMF-Supported Programs (1)

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### Abstract

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This paper analyzes social spending in the impact of IMF-supported programs on fiscal adjustment and social expenditures. We use a data base on public health and education spending information covering 146 countries over the 1985-2000 period. The paper uses Autoregressive Integrated Moving Average (ARIMA) model techniques as well as a two-stage estimation method to correct for the endogeneity of Fund programs. Contrary to common perceptions, our findings show that social spending does not decline under IMF-supported programs. However, we show that this does not necessarily mean that the most vulnerable groups are protected from the effects of economic adjustment.

*Keywords:* IMF, social spending, fiscal policy.

*JEL Classification:* C33, E62, H51, H52.

### Resumen

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Este artículo analiza el impacto de los programas económicos del Fondo Monetario Internacional sobre el gasto social utilizando una base de datos de gasto público en educación y sanidad que cubre 146 países durante el periodo 1985-2000. El trabajo utiliza un modelo ARIMA y un sistema de estimación en dos etapas para corregir la endogeneidad asociada a los programas del Fondo Monetario. Contrariamente a las percepciones comunes, nuestros resultados muestran que el gasto social no se reduce bajo los programas del

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(1) The views expressed in this Background Paper are those of the author(s) and do not necessarily represent those of the IMF, IMF policy or the IEO. Background Papers report analyses related to the work of the IEO and are published to elicit comments and to further debate.

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FMI. Sin embargo, nuestros resultados no permiten concluir que los grupos mas vulnerables de la poblacion sean protegidos de los programas de ajuste.

*Palabras clave:* gasto social, educacion, sanidad, FMI, impacto programas, politica fiscal.

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## I. Introduction

Critics of the Fund have argued that IMF policy recommendations with their emphasis on fiscal adjustment —through a combination of tax increases and seemingly drastic reductions in public expenditures— have had a devastating effect on the poor. For example, Naiman and Watkins (1999) of the Center for Economic and Policy Research have argued that “there is an urgent need for increased attention to the provision of basic social services. However, IMF adjustment programs restrict access to health services and public education in two key ways: by reducing household incomes, and by reducing public (government) spending”. Similarly, the Bretton Woods project, a well-known critic of Washington-based international financial institutions notes that “in the face of public exhortations to greater spending on social services, low income country governments however find themselves trapped by Fund diktat on budget balances, inflation and interest rates”. Other NGO’s such as Global Exchange have pointed out that “the subordination of social needs to the concerns of financial markets has made it more difficult for national governments to ensure that their people receive food, health care, and education”.

Although there are many statements about the negative impact of the IMF on social spending, there is very limited empirical evidence systematically assessing this question. This paper uses time-series cross-section data to investigate the impact of IMF-supported programs on public sector social spending and shed new light on this issue. Social expenditures are measured with annual data of government spending on health and education compiled by the Fiscal Affairs Department (FAD) of the IMF (2) and verified and checked for accuracy by staff of country desks. The dataset covers 146 countries during the period 1985-2000. The basic statistical framework underlying the analysis relates social spending in a particular country and year to the presence of an IMF program that year and to a set of (control) variables that may also influence the levels of social spending (3). In order to achieve results as robust as possible, we used four different indicators for education and health expenditures (Table 1): as share of GDP, as share of total government expenditures, as an index of

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(2) See Baqir (2002) for a description and coverage.

(3) That is, we will start by estimating an equation of the form:

$$S_{it} = X_{it}\alpha + \beta^*IMF_{it} + \varepsilon_{it} \quad [1]$$

where  $S_{it}$  measures social spending in country  $i$  in period  $t$ ;  $IMF_{it}$  is one or more variables indicating the presence of a Fund arrangement in period  $t$ ;  $X_{it}$  is the set of control variables (e.g. all other factors determining  $S$ ); and  $\varepsilon_{it}$  is an error term. The problems of this model (serial correlation and unit roots, endogeneity of Fund programs, etc.) and the possible mechanisms to deal with them are discussed below.

**TABLE 1**  
SOCIAL EXPENDITURE VARIABLES (INDICATORS) USED IN THE STUDY

Description	Observations	Mean	Standard deviation
<i>Health expenditure variables</i>			
1. Share of GDP . . . . .	1452	2.22	1.51
2. Share of total expenditures . . . . .	1462	7.25	3.82
3. Per capita, at real domestic prices (index, country average, 1985-2000 = 100)	1418	100	29.86
4. Per capita, in US dollars . . . . .	1424	6.06	9.43
<i>Education expenditure variables</i>			
5. Share of GDP . . . . .	1452	4.17	1.98
6. Share of total expenditures . . . . .	1465	14.27	5.22
7. Per capita, at real domestic prices (index, country average, 1985-2000=100).	1413	100	25.28
8. Per capita, in US dollars . . . . .	1419	10.20	14.84

*Source:* IMF, Fiscal Affairs Department.

real expenditures at domestic prices (4), and in as expressed US Dollars per capita (5).

Our analysis proceeds in three steps. First, we describe the general characteristics of the dataset and compare the mean values of each indicator for periods *with* and *without* a Fund program. We then proceed to compare periods *with* and *without* a Fund program in the same country. This is useful as a reference point for the rest of the analysis, although it has severe limitations as a measure of the actual impact of IMF-supported programs on social spending.

Second, we discuss ways of addressing these limitations and obtaining a better measure of the impact of Fund-supported programs on social spending. Third, we explore the sensitivity of the results to the selection of countries in the sample and to the econometric specification of the model. We conclude with a summary of the main lessons and findings, and also discuss the limitations of our approach and identify possible areas for further research.

(4) In the absence of a sector-specific price index, social expenditures were deflated by the general Consumer Price Index. Expenditures in US Dollars were calculated at the annual average exchange rate, and deflated by the US Wholesale Price Index.

(5) It is not clear a priori that one indicator is better than others. Social expenditures as a percentage of GDP measure the overall macroeconomic importance of social expenditures using the size of the economy as a comparative benchmark. Social expenditures as a share of government spending provide a measure of fiscal priorities within the budget, and is thus a more direct indicator of the degree to which policy-makers wish to commit resources to the social sector. Finally, social expenditures per capita provide a better measure of the amount of direct or indirect resources that citizens receive from the state.

## II. Determinants of Social Expenditures and the Impact of IMF-Supported Programs

### An Evolving Focus

In its first fifty years of operation, the IMF paid limited attention to social spending and social issues such as poverty and the distribution of income. The IMF's role was to promote international monetary cooperation, the balanced growth of international trade, and to ensure a stable system of exchange rates. Although these fundamental institutional objectives are still in place, in the late 1980s and 1990s social policy issues increasingly acquired more importance in the activities of the IMF's (6).

Some recent empirical research by IMF staff suggests that average social spending in IMF-supported programs over the last two decades has increased. For example Gupta *et al.* (2000) show that for 65 of the 107 countries with IMF-supported programs during 1985-97, government spending on education and health care increased, on average, both as a percentage of GDP and in real per capita terms (7).

Over the last two decades there has been a large body of research focusing on the impact of IMF-supported programs (8). Despite this large research output, we know of no studies that have tried to isolate the *impact* of the IMF on social expenditures (9). Though the neglect is understandable in retrospect, since social expenditures per se have not been at the core of the IMF's areas of responsibility, their increased importance in both the IMF's surveillance operations as well as program design now call for greater attention. In the case of PRGF-supported programs, poverty and social sectors issues have become central elements. Hence, we believe that, in providing the first systematic attempt to obtain rigorous and robust estimates of the impact of IMF-supported programs on social expenditures, this study provides a use-

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(6) For example, as the Fiscal Affairs Department of the IMF (see its Pamphlet 52, *The IMF and the Poor*, p.1) notes that "in earlier periods the IMF's policy advice emphasized the management of aggregate demand with the aim of creating conditions for macroeconomic stability. In recent years, the focus and the scope of the IMF's work have broadened, and the structural and social aspects of fiscal policy have become increasingly important, both in programs that the IMF supports in members undertaking reforms (IMF-supported programs) and in its general policy advice."

(7) The authors document how the share in GDP of spending increased by 0.3 percentage points during the program period (about eight years on average), while in per capita terms social spending increased by 2.4 percent a year.

(8) This has included work on the impact of Fund programs on *growth*: Bagci and Perraudin (1997), Barro and Lee (2001), Conway (1994), Dicks-Mireaux and Hutchinson (2001), Mecagni and Schadler (2000), and Przeworski and Vreeland (2000); on *fiscal adjustment*: Bulir and Moon (2003); on *income distribution*: Garuda (2000) and Easterly (2001); on *private capital flows*: Rodrik (1996), Bird and Rowlands (1997, 2001), and Ergin (1999). There has also been considerable work on other key macroeconomic issues such as inflation and the current account.

(9) Our work builds on previous research by Gupta, Clements and Tiongson (1998) from the IMF's Fiscal Affairs Department, who show that since the mid-1980s real per capita spending on education and health has increased on average, with comparable increases for countries that had IMF-supported adjustment programs, but their conclusions are based on a comparison of averages. Our methodology is seeking to go beyond their work by including statistical controls and dealing with the endogeneity of Fund-supported programs.

ful contribution in an area characterized by much controversy but limited empirical analysis.

**Box 1. Issues in the Analysis of the Impact of IMF-Supported Programs.**

Goldstein and Montiel (1985) identified four desirable characteristics that any methodology trying to measure the impact of IMF-supported programs should have: (1) It should use information for a country “before-and-after” a Fund-supported program and “with-and without” programs; (2) It should incorporate other domestic and international factors determining outcomes (control variables); (3) It should consider the determinants of domestic policies (policy reaction functions), to evaluate what outcomes would have been observed in the absence of a program; and (4) It should account for selectivity bias (endogeneity of Fund programs) (10). The approach used in this paper meets only three of the criteria, since we do not discuss explicitly a policy counterfactual. However, such a counterfactual is less important for the type of “outcomes” considered here —social expenditures— than for the broad macroeconomic indicators (e.g. growth, inflation, current account) considered by Goldstein and Montiel and others. There is also a dilemma of including domestic policy variables (11) among the controls: if they *are not* included, all their effect would be attributed to the IMF variable. Thus if countries without an IMF-supported program have better policies, on average, than those with programs, the estimated effect of the IMF variable would include the negative effect of bad policies. However, IMF programs affect domestic policies via conditionality and the general policy dialogue between the Fund and country authorities. Hence domestic policies are not exogenous to the presence of a Fund program and using them as controls runs the risk of ignoring a large part of their potential impact. One way of dealing with this is to use a policy reaction function as it provides a way of estimating how policies would differ with and without a Fund-supported program (12). Our paper does not explicitly include domestic policy variables, as an initial analysis of the determinants of social expenditures found no significant association with potential candidates (e.g. different measures of monetary and exchange rate policies). This omission implies that our analysis does not identify the channels through which IMF-supported programs affect social expenditures. In practice, we are simply estimating the “total effect” of IMF arrangements, including any potential effect via changes in other policies which in turn affect social spending. An estimation of the channels (indirect effects) through which IMF-supported programs may affect social spending was beyond the scope of this paper.

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(10) The paper was mostly concerned with methodological issues, but it also included an empirical exercise comparing different ways of measuring the impact of IMF-supported programs. Mohsin Khan (1990) dubbed their approach the “generalized evaluation estimator” (GEE). The name seems to have stuck, although not always referring to a methodology with the four characteristics discussed above. For example, Khan emphasizes Goldstein’s and Montiel’s use of a policy reaction function. By contrast, Barro and Lee (2002) (who did not use this method) focus on the issue of sample selection bias as a defining characteristic of GEE. It is interesting to note that the empirical application in Goldstein and Montiel did not deal with the endogeneity issue — they just made some assumptions thought to be sufficient to eliminate the possibility of any sample selection bias.

(11) E.g. monetary and exchange rate policies.

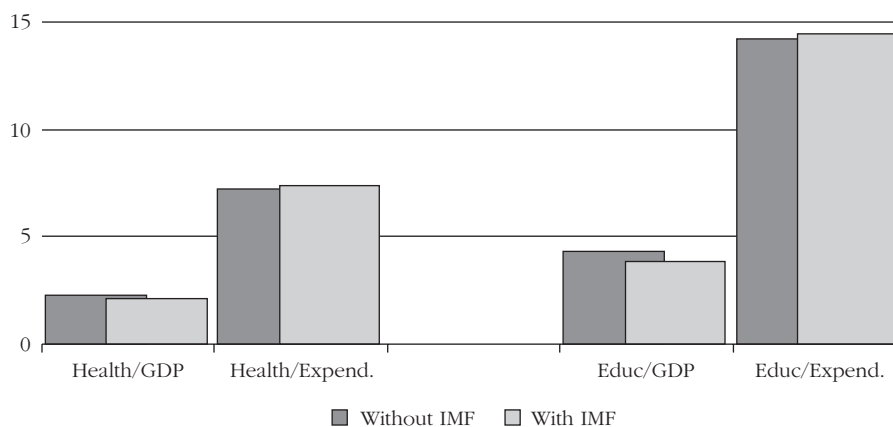
(12) A different, and perhaps more difficult, question is what is the best way to estimate the policy reaction function. The method use by Goldstein and Montiel —estimating it with data for non-program countries— provides some interesting insights but, as the authors themselves recognize, is far from perfect.

## Social Spending and IMF-supported Programs during 1985-2000

There is considerable variation in the amount of resources that developing countries devote to public expenditures on health and education. Table 1 summarizes public spending levels on health and education measured in four possible ways: per capita (in US dollars and in local currency units at constant prices), as a share of total public expenditures, and as a percentage of GDP. Figure 1 compares averages in these indicators for two groups: country/years when there is an IMF program ("with IMF") and the rest ("without IMF") (13), (14). The averages for the two groups are very close -- the "with IMF" group being slightly lower when social spending is measured as share of GDP, and slightly higher when measured as a share of total government expenditures.

This comparison of averages (Figure 1) provides an initial description of levels of social spending with and without IMF-supported programs; however, this information is hardly conclusive. For example, it cannot establish whether the differences depicted in the figure are (statistically) "significant". Do the different levels of spending reflect

**FIGURE 1**  
AVERAGE SOCIAL SPENDING "WITH" AND "WITHOUT" THE IMF  
(IN PERCENT) (1985-2000)



Source: IMF, Fiscal Affairs Department.

(13) Years with only part of a program are allocated to each group in proportion to the length of the period under each of the two conditions. E.g, if country X embarked on an IMF program in September 1, 1990, social spending in 1990 is included in the *with* and *without* groups with weights  $\frac{1}{4}$  and  $\frac{3}{4}$ , respectively. Similarly, in the regression analysis, the IMF variable is defined as the share of the year under a Fund program.

(14) To make all indicators fit in the same scale, the figure shows the index at constant domestic prices divided by 100; i.e. the average for the 1985-2000 is set to 1.0, instead of 100 as in table 1 and subsequent regressions.

fundamental differences associated with the presence of a Fund-supported program? Or are they just random fluctuations for the particular sample of countries and periods representing each group? In other words, to the extent that other factors that may also affect spending are not controlled for, the observed differences could be spuriously associated with the Fund-supported program (15). What is needed, therefore, is a more explicit statistical analysis, including controls for those variables which may influence social spending and that are simultaneously associated with the presence of an IMF arrangement. Before embarking on this analysis, we present some results from comparing periods with and without Fund program for each particular country, where the need for control variables is somewhat less pressing (16).

Table 2 summarizes the results for the 92-94 countries for which there is enough data to compare periods with and without a Fund-supported program. In the majority of cases there is no statistically significant difference between both periods (17). Among the cases where there is a significant difference, the measures in shares of GDP or of total public expenditures show a majority of countries with higher education and health spending when there is a Fund-supported program, but a majority with lower spending in terms of US Dollars per capita. At constant domestic prices, more countries show higher health expenditures and lower education expenditures with an IMF program.

Table 2 thus indicates that in most countries (about 85 percent) there is no preponderance of evidence to show that social spending levels are systematically higher or lower during periods with Fund-supported programs. And even in the cases where the results are significant, the evidence would be stronger if it were possible to control for other factors which might correlate with periods under an IMF arrangement. As discussed in the next section, this cannot be done properly with the limited number of observations available within each country.

One possible solution to the limitations of the country by country analysis is to combine time series (observations of one unit of analysis at different points in time) with cross section data (observations of a number of units of analysis at the same point in time) (18). This would help us draw some empirical conclusions about what is

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(15) For example, IMF-supported programs are more prevalent in lower income countries (the average income per capita in the "with IMF" group is US\$ 934, about one-third that of the "without IMF" group, US\$ 2,722 which also spend less on health and education in US Dollars per capita, so it is not surprising that average social spending in US Dollars is smaller in the "with IMF" group.

(16) Ideally, it would have been better to start by running individual country regressions (in a fully specified model with all the theoretically relevant variables) for each country in the sample. Unfortunately, the data set covers a limited time period (T=15). Hence, there is a very small number of degrees of freedom for running individual country regressions, which would make it very difficult to obtain robust results. The alternative of running the regressions without controls is, to be sure, also problematic. Yet, it is sufficient for our initial purpose of providing some simple initial results on the basis of intra-country comparisons.

(17) At at least a 90 percent confidence level.

(18) This method of aggregating data has two important advantages. First, it produces a relatively large N. Hence, it overcomes the "degrees of freedom" problem that typically affects individual country regressions. This allows the analyst to test for the effect of a large number of independent variables. Second, it pays attention to both longitudinal and cross-sectional variations, and can therefore produce useful generalizations across both time and space. However, the method also relies on rather stringent assumptions (e.g. parameter heterogeneity) and can potentially suffer the combined pitfalls of cross-sectional analysis (e.g. heteroskedasticity) and time-series analysis (e.g. non-stationarity, serial correlation, etc.).

**TABLE 2**  
SUMMARY OF COUNTRY REGRESSION RESULTS BY SIGNIFICANCE OF  
MEASURES OF SOCIAL SPENDING

	Percent of GDP	Percent of Total Exp.	US\$ per capita	In domestic prices per capita	Average: All measures
<i>Health Expenditure variables</i>					
Countries with (statistically significant) <i>big-her spending</i> when there is a Fund Program. . . . .	8	13	3	10	8.5
Number of countries with no significant difference between years with and without Fund programs. . . . .	78	76	83	75	78
Countries with (statistically significant) <i>lower spending</i> when there is a Fund Program. . . . .	7	4	6	7	6
<i>Education Expenditure variables</i>					
Countries with (statistically significant) <i>big-her spending</i> when there is a Fund Program. . . . .	7	11	1	8	6.75
Number of countries with no significant difference between years with and without Fund programs. . . . .	83	76	86	71	79
Countries with (statistically significant) <i>lower spending</i> when there is a Fund Program. . . . .	5	8	6	14	8.25

likely to happen to social spending for an "average" country with a Fund-supported program.

### III. The Impact of IMF-supported Programs on Social Spending: A Time-Series Cross-Section Analysis

#### Initial Issues

To estimate the impact of the presence of an IMF-supported program on social spending, we need to address three potential sources of bias:

(a) *Missing variables.* It is necessary to include variables that have an independent effect on spending and that may also be associated with the presence of an IMF-supported program. Failure to do so would attribute to the presence of a Fund program, effects that are really the product of these other variables (19). The following

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(19) "Omitted variables" bias is one of the most serious problems in econometrics. Unlike other problems such as heteroskedasticity, multicollinearity or serial correlation (without a lagged endogenous variable), omitting relevant variables leads to biased and inconsistent parameter estimates.



control variables were defined using data from the World Bank's *World Development Indicators* and the IMF's *World Economic Outlook* (see Table A1 in the Appendix for the summary statistics, including means for the "with IMF" and "without IMF" groups) (20):

gdpusdpc	=	GDP per capita in US Dollars
health_priv	=	private expenditures in health as share of GDP (%)
pop95young	=	share of the population aged 0-14 (%)
pop95old	=	share of the population 65 years or older (%)
growth	=	annual rate of real growth (%)
grw_neg	=	annual rate of growth, when it is negative (=0 otherwise)
grw_sd	=	variability (standard deviation) on the rate of growth
ca_y	=	current account deficit, share of GDP (%)
devaluation	=	annual change on the real exchange rate (%)
democracy	=	index of democracy from the Polity IV dataset (21)

The above control variables are important in accounting for the differences in social spending levels among countries. We discuss briefly the expected impact of some of these variables. First, we follow most empirical studies of the welfare state by including a measure of economic development to control for Wagner's Law, according to which industrialization and modernization lead to an expansion of public activity over private activity. This occurs because in an increasingly complex society, the need for expenditures on regulatory activities grows. In addition, the demand for collective or quasi-collective goods—in particular education and culture—tends to be income elastic (i.e. its demand increases as income grows). As a result, as countries become wealthier, the state has to increase its supply of these goods, which would otherwise be undersupplied by the .market (22) Second, our model also includes three measures of changes in output levels (i.e. the annual rate of real GDP growth, a dummy for years of negative GDP growth, and a measure of output volatility) that are likely to affect the amount of resources that countries can devote to social spending. Finally, we also include a variable that measures "democracy" using a numerical scale. The scale measures the degree to which elections are free and fair and basic civil rights and liberties are respected by the state. Democracy is expected to have a positive impact on social expenditures for two reasons: (a) in a democratic regime political leaders are more dependent on the popular vote and, to the extent that social expenditures can be used to gain the support of important electoral constituencies, politicians are more likely to increase the resources they allocate to the social sector; and (b) democratic

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(20) Two of the control variables (health\_priv and ca\_y) had insignificant coefficients and were excluded from the final regressions.

(21) The index is defined from Gurr's AUTOC and DEMOC scores: democracy = 1 when DEMOC-AUTOC > 4, following Brown and Hunter (1999). See also Kaufman and Segura-Ubiergo (2001).

(22) Another possible analytic framework to study the relationship between economic development and the size of the public sector is Baumol's cost disease. According to Baumol, real wages in the private and public sectors grow at roughly the same speed. However, because the public sector is labor-intensive and mainly service-oriented, productivity in this sector grows at a lower speed than in the private sector. Hence, the relative size of government in the economy grows.

regimes tend to have better developed civil societies that can more effectively press the state for social protection.

These control variables can help explain some of the differences in spending between countries, but there may be residual country differences in spending not captured by them. To account for this possibility, the empirical model was also estimated with *fixed effects*, which allow for a different level of average spending for each country (23).

(ii) *Serial Correlation and Non-stationarity*. Spending on social services tends to change sluggishly and be heavily affected by the level of spending during previous periods. This reflects not only the fact that most programs are often conceived as permanent or at least spanning several years, but also the political economy of budget allocation in which most programs have constituencies who resist change. For these reasons, changes in control variables (and Fund-supported programs) are likely to have an impact which is not instantaneous and may extend beyond one period. Thus, the empirical analysis should include a richer dynamics that distinguishes between short and medium term effects on social expenditures.

The empirical analysis addressed this issue by including the following:

- the value of social spending in the previous year (lagged  $y$ , or **LY**), to account for the dependence of current spending on past allocations.
- the value of all control variables in the previous period (**LX**), as well as the change (difference) between current and previous period values (**DX**). This permits each control variable to have either just a transitory effect on the current period (variable **DX**), or an extended effect over several periods..
- similar specification for the presence of a Fund program (lagged and difference: **LIMF** and **DIMF**), which allows for a richer dynamic on the impact of these programs.

The above variables were then combined in an Autoregressive Moving Average process (ARIMA) which was sufficient to obtain independent and identically distributed residuals (IID). The structural equation of the ARIMA process is given by

$$S_{it} = \gamma \mathbf{L}S_{i,t-1} + \mathbf{L}X_{it}\alpha_0 + \mathbf{D}X_{it}\alpha_1 + \beta_0 \mathbf{L}IMF_{it} + \beta_1 \mathbf{D}IMF_{it} + u_{it} \quad [2]$$

where **L** is the lag operator (i.e.,  $\mathbf{L}Z_t = Z_{t-1}$ , for any variable  $Z$ ), **D** is the first-difference operator ( $\mathbf{D}Z_t = Z_t - Z_{t-1}$ ), and  $u_{it}$  are the new independent and identically distributed residuals (IID), which are not affected by serial correlation. In order to disentangle short and medium term effects, it is useful for analytical purposes to rewrite equation [2] as

$$\mathbf{D}S_{it} = \mathbf{D}X_{it}\alpha_1 + \beta_1 \mathbf{D}IMF_{it} + (1 - \gamma)(\mathbf{L}X_{it}\alpha_2 + \mathbf{L}IMF_{it} + \beta_2 - \mathbf{L}S_{it}) + u_{it} \quad [2a]$$

where  $(1 - \gamma)\alpha_2 = \alpha_1$  and  $(1 - \gamma)\beta_2 = \beta_1$ . In this specification, changes in the dependent explanatory variables (with an impact determined by the coefficients  $\alpha_1$  and  $\beta_1$ ); and gradual adjustment to an "equilibrium" level of spending, determined by the coefficient

(23) The model was thus estimated using a dummy variables for each country.

icients  $\alpha_2$  and  $\beta_2$ ). Transitory changes in the independent variables do not change the long run “equilibrium” level, so that the effect decays geometrically at the rate  $(1 - \gamma)$  after the second period.

(iii) *Endogeneity of Fund programs.* Countries only engage the Fund and agree to its monitoring when they have an urgent need to access the resources that it provides. Thus, years with a Fund-supported program are not “normal” years. The special factors leading to the presence of a program could also, in principle, have an independent impact on social expenditures. For example, a country could seek a Fund program as result of an external crisis (e.g. a large increase in the price of imports or a fall in export prices), and such a crisis is likely to require a reduction in government expenditures with or without the Fund (24).

To address this issue, the following instruments were used to “predict” the presence of a program:

- Current account deficit as fraction of GDP in the previous year (as proxy of external crisis).
- Growth in the previous year (proxy of unsustainable expansion?).
- Income per capita (IMF-supported programs less likely on high income countries).
- Presence of a Fund program in the previous year.
- Government balance as share of GDP in the previous year.
- Democracy index (as in the control variables).

## Results

Table 3 presents regression results for the eight definitions of social spending, four for education and four for health. All eight indicators of health and education expenditures show positive coefficients for the contemporaneous and lagged values of the IMF variable; only three of the 16 coefficients are not significantly different from zero at least at a 90 percent confidence level (i.e. \*, \*\*, \*\*\* represent the 90, 95, and 99 percent confidence intervals), and 5 are significant at 99 percent level. It is interesting that this seems to reflect a specific effort to protect these types of expenditures, as *total* public expenditures are not significantly different with a without the IMF (see Table A3 in appendix).

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(24) In the absence of any rigorous way of defining counterfactuals (i.e. deciding what would have been the level of government social expenditures under a given set of conditions *with* and *without* a Fund program), the standard way to improve the estimation of the coefficients of endogenous variables is to estimate these variable together with the original equation. As the main interest is in the spending equations, though, we do not need a full estimation of the likelihood of an IMF program: it is enough to estimate the regression using instrumental variables. It is also not critical to include all the determinants of the IMF variable, provided that the set of instrumental variables at least includes all the factors which potentially affect both, the presence of a program and the level of social spending, since these are the factors that biased the estimate of the IMF variable.

**TABLE 3**  
ARIMA MODEL WITH CONTROL VARIABLES AND ENDOGENOUS FUND PROGRAMS

	Health			Education			
	%of GDP	%Tot. Exp	US\$ pc	%of GDP	%Tot. Exp	US\$ pc	DP pc
L.Depend. Var. . . . .	0.577***	0.548***	0.748***	0.604***	0.559***	0.662***	0.743***
L.IMF(predicted). . . . .	0.179***	0.492*	0.390*	0.251**	0.681*	0.168	4.157
D.IMF(predicted). . . . .	0.206***	0.636**	0.395**	0.228***	0.748**	0.333	6.027**
L.gdpusdpc. . . . .	-0.030*	-0.027	0.014	0.021	0.070	0.517	1.406
D.gdpusdpc. . . . .	-0.080***	-0.093	1.101***	-0.034	0.125	2.144***	0.178
L.devaluation. . . . .	0.002*	0.012***	0.010***	-0.001	0.001	0.011***	0.007
D.devaluation. . . . .	0.001	0.008***	0.005***	-0.001	0.000	0.005**	-0.025
L.year. . . . .	0.011***	0.068***	-0.002	0.012*	0.104***	-0.012	0.686***
L.democracy. . . . .	0.061	0.342	0.221*	0.142	0.620*	0.114	4.969
D.democracy. . . . .	0.009	0.308	0.072	0.035	0.428	0.056	2.852
L.pop95young. . . . .	-0.031**	-0.015	-0.190	0.023	0.211***	-0.190	1.593***
L.pop95old. . . . .	-0.129*	-0.120	-1.980***	-0.116	-0.119	-3.745***	3.560
L.growth. . . . .	0.013*	0.028	0.073**	-0.010	-0.047	0.050	0.779***
D.growth. . . . .	0.005	0.019	0.033	-0.021***	-0.035	0.025	0.320
L.grw_neg. . . . .	-0.049***	-0.060	-0.078*	-0.024	0.022	-0.045	-0.399
D.grw_neg. . . . .	-0.035**	-0.025	0.000	0.004	0.036	0.060	0.236
L.grw_sd. . . . .	0.047***	0.000	0.386***	0.050**	-0.118	0.955***	-0.831*
Number of obs. . . . .	992	1,001	992	989	1,001	989	989
R-squared. . . . .	0.931	0.894	0.985	0.918	0.881	0.987	0.626
Root MSE. . . . .	0.408	1.375	1.209	0.597	1.952	1.761	15.591

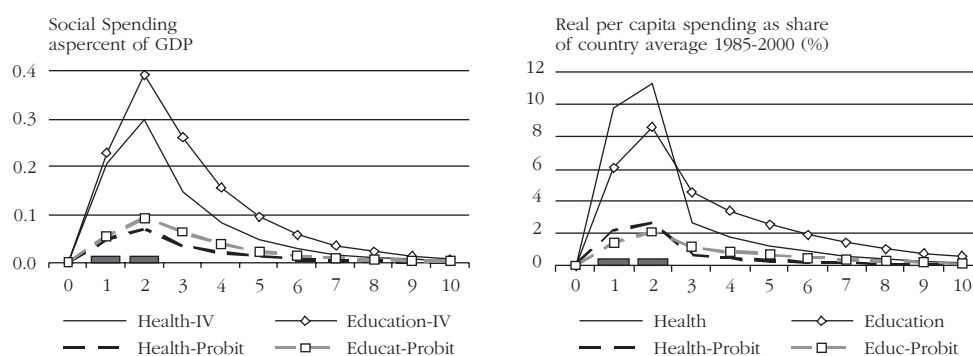
Note: See the text for variable definitions. An initial L indicates a lagged value and D the first difference. IMF(predict) is the estimated value of the IMF variable with the following instruments: lagged values of IMF, growth, CA/GDP, Government Balance/GDP, Democracy index and GDP per capita in US Dollars. The actual estimated equation is:  

$$\text{IMF(predicted)} = 0.148 + 0.696 \text{ IMF}(-1) - 0.003 \text{ growth}(-1) + 0.001 \text{ ca}_y(-1) + 0.001 \text{ cgbal}(-1) - 0.043 \text{ democracy} - 0.011 \text{ gdpusdpc}; N=1916$$

$$(41.94^{***}) \quad (-2.58^{***}) \quad (-0.69) \quad (0.60) \quad (-3.26^{***}) \quad (-4.85^{***}) \quad R^2 = 0.522$$

Figure 2 uses the regression coefficients from Table 3 to simulate the impact of a two-year IMF-supported program on health and education spending as share of GDP and at constant domestic prices. To prevent an excessive sense of precision, it also shows the results from one of the alternative estimates discussed in next section (Probit model) (25). The graphs shows the estimated change in education and health expenditures with respect to what they would have been in the absence of the two-year Fund program. Both types of social spending start to increase the first year of the program and have a larger increase in the second year; there is still a residual effect on the third year (i.e. after the end of the program), which declines geometrically at about 40 percent a year from then on.

**FIGURE 2**  
DYNAMIC EFFECT OF A TWO-YEARS FUND PROGRAM



The results of Table 3 stand in contrast with the ambiguous results for the group means in Figure 1 and the country time series reported in Table 2. Thus, it is particularly important to explore their robustness with respect to the estimation methodology and the country sample. This is the task of the next section.

### Robustness of the Results

Table 4 summarizes the results of sensitivity analysis (26). Specifically, we consider the following alternatives:

- *Estimation methodology:*

1. No correction for serial correlation or endogeneity of Fund programs.

(25) A probit model differs from the Instrumental Variables (IV) estimate used in Table 3 in explicitly constraining the predicted IMF variable to values between zero and one.

(26) See details in Table A1 in the appendix.

2. Correction for Serial Correlation but not for endogenous Fund programs.
  3. Alternative correction for endogenous programs, to take into account that the proportion of the year under a program must be between zero and one (Probit model).
- *Sub samples of countries:*
    - S1. *Excluding non-users and moderate users:* includes countries with at least one year but no more than six years of Fund programs.
    - S2. *Excluding non-users and chronic users:* includes countries with at least one year but no more than ten years of Fund programs.
    - S3. *Only repeat users:* includes countries with five or more years of IMF programs.

By comparing alternative estimation techniques, i.e. different rows of Table 4, we see that the first two rows do not produce any strong conclusion about the impact of Fund programs on spending: either the coefficients are not significant or the number of positive coefficients are roughly on balance with the negative ones. There are, however, interesting differences in the four sub samples results shown in the first row, comparing spending with and without the Fund for each country separately. Among countries with five or more years of programs there is a much larger proportion of countries in which social spending are higher in years with programs. A more detailed analysis would be needed to evaluate hypothesis of why this is the case (27). But these "repeat users" do have significant influence in the results.

The three lower rows of the table shows that the estimation technique does not have much effect on the qualitative results about the impact of Fund programs (the magnitude of the impact does change, as already illustrated in Figure 2).

#### IV. Conclusions

This paper has argued that the popular view of the IMF leading to dramatic declines of social spending is not borne out by the available empirical evidence. In fact, the presence of an IMF-supported program tends to either maintain or increase social spending in health and education, measured as either a share of GDP, total expenditures or in real per capita terms. The effect is relatively small and short-lived and particularly significant for countries which are continuing (but not necessarily chronic) clients of the IMF. We found no significant difference between concessional and non-concessional programs. However, our analysis did not include indicators of actual health or educational outcomes. Hence, we presented no evidence of whether the programs affect the efficiency of delivery of those services or their targeting.

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(27) E.g. it could be that those countries which are frequent clients are more prone to crisis, which could have a negative impact on social spending. Or the IMF's, and perhaps associated World Bank', programs might have a larger leverage on the composition of spending on these countries more dependent on their help and advise.

**TABLE 4**  
SUMMARY OF ROBUSTNESS ANALYSIS

	<b>S0: Complete Sample (N = 146 countries)</b>	<b>Sub samples according to total time under Fund programs during 1985-2000</b>		
		<b>S1: One to Five years (N=53)</b>	<b>S2: One to Ten years (N=88)</b>	<b>S3: Five or more years(N=64)</b>
R1. Countries Regressions	For most countries there is no significant difference between periods <i>with</i> and <i>without</i> Fund prog. On measures in domestic currency (share of GDP or total exp and constant prices) more countries with positive than negative effects.	Small number of countries with significant results (3-4);	Similar results to S0, but with smaller number of insignificant countries)	Significant difference between years with and w/o programs in half of countries; among them, half have higher education spending when there is a Fund program, and two-thirds have higher health spending when there is a program.
R2. No correction for serial correlation or endogeneity of Fund programs	No significant difference <i>with</i> and <i>without</i> a Fund program, except for Health/Expend (+) and Education per capita in US Dollars (-). High level of serial correlation in the residuals.	No significant difference. High level of serial correlation in the residuals.	No significant difference except for Educ pc in US\$ (-). High level of serial correlation in the residuals.	No significant difference with and without a Fund program, except for Health/Expend (+) and Education pc in US Dollars (-). High level of serial correlation in the residuals.
R3. No correction for endogeneity of Fund progr.	Health: significant positive impact in all definitions. Education: significant positive impact for GDP and Domestic prices measures.	Health: no significant effects. Education: positive effect as share of GDP; others are not significant.	Health: significantly positive impact for all definitions. Education: no significant effects.	Health: significant positive impact in all definitions. Education: significant positive impact in all definitions.
R4. <i>Base Case</i> . ARIMA model & instrumental var. (Table 3)	All 16 coefficients for contemporaneous and lagged effects positive and all but 4 significant.	No significant coefficient.	All 16 coefficients for contemporaneous and lagged effects positive and all but 6 significant.	All 16 coefficients for contemporaneous and lagged effects positive and all but 2 significant; smaller in magnitude than in the Base Case
R5. Probit model for Fund programs	All 16 coefficients for contemporaneous and lagged effects positive and all but 3 significant; smaller in magnitude than in the Base Case	No significant coefficient.	All 16 coefficients for contemporaneous and lagged effects positive and all but 6 significant; smaller in magnitude than in the Base Case	All 16 coefficients for contemporaneous and lagged effects positive and all but 2 significant; smaller in magnitude than in the Base Case

Our paper suggests three areas for further research. First, ours is the first attempt we know of to measure the impact of an IMF-supported program on social expenditure using an econometric model. Measuring the impact of the IMF is a very difficult task given the existence of a number of well-known statistical problems (e.g. endogeneity of Fund programs, parameter heterogeneity, serial correlation and unit roots, panel heteroskedasticity, etc.). Although we have been careful to test for the robustness of our results in a number of ways, given the number of potential methodological pitfalls that may affect the study of the impact of IMF-supported programs, the evidence we present can only be taken as tentative. Researchers that have attempted to measure the impact of the IMF on key macroeconomic variables (e.g. growth, the current account, inflation) often get contradictory results that are sensitive to the methodological choices they make. Hence, our evidence only leads to tentative conclusions. Much more analytical and empirical work is needed to evaluate more precisely the impact of IMF-supported programs on social spending.

Second, the main limitation of our study is that it does not allow us to draw any conclusions about the impact of IMF-supported programs on the poor. As noted, social expenditures in developing countries vary enormously in terms of their equity, efficiency and sustainability. One obvious task for further research would be to try to unbundle the direct and indirect impact of IMF-supported programs on the poor using social expenditures as an intervening variable. For example, even if IMF-supported programs managed to maintain constant (or increase slightly) social expenditures during times of budgetary retrenchment, this might not be particularly helpful to protect the poor if expenditures on wages and salaries "crowd out" expenditures on goods and services that more directly benefit the poor. On the other hand, even if social expenditure levels declined, this might not lead to worse poverty indicators if the efficiency or targeting of expenditures increased.

Finally, like all statistical studies, our analysis can point to associations among variables but cannot establish with precision what are the causal mechanisms at work. Hence, another useful way to expand our research would be to draw evidence from in-depth case studies where the transmission mechanisms between the presence of an IMF-supported program, social expenditures and poverty outcomes can be more effectively and convincingly established.

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## Appendix

**TABLE A1**  
SUMMARY STATISTICS FOR THE CONTROL VARIABLES FOR SOCIAL SPENDING

Variable	Description	Number of obs.	Mean	Std. Dev.	Group means	
					With IMF	Without IMF a/
<b>ca_y</b>	current account deficit, share of GDP (%) . . . . .	2233	-4.610	11.937	-4.620	-4.583
<b>democracy</b>	index of democracy xxx . . . . .	2336	0.519	0.500	0.562	0.409***
<b>deval</b>	annual change on the real exchange rate (%) . . . . .	2235	4.274	35.062	4.519	3.665
<b>gdpusdpc</b>	GDP per capita in US Dollars . . . . .	2265	2.214	3.075	2.722	0.934***
<b>growth</b>	annual rate of real growth (%) . . . . .	2264	2.720	6.791	2.574	3.086
<b>grw_neg</b>	annual rate of growth, when it is negative (=0 otherwise) . . . . .	2264	-1.275	4.207	-1.444	-0.848***
<b>grw_sd</b>	variability (standard deviation) on the rate of growth . . . . .	2272	5.250	3.693	5.430	4.794***
<b>health_priv</b>	private expenditures in health as share of GDP (%) . . . . .	994	2.241	1.412	2.206	2.302
<b>pop95old</b>	share of the population 65 years or older (%) . . . . .	2144	5.141	3.217	5.195	5.014
<b>pop95young</b>	share of the population aged 0-14 (%) . . . . .	2160	36.860	8.716	36.181	38.482***
<b>population</b>	total population (millions) . . . . .	2265	30.439	124.400	34.930	19.125**
<b>reg_AFR</b>	regional dummy for countries in each of IMF. Departments: Africa, Asia and Pacific, Europe I, Europe II (countries of the former Soviet Union in Europe and Central Asia) and Western Hemisphere (America). AFR is used as reference in the regressions . . . . .	2336	0.171	0.377	0.201	0.095***
<b>reg_APD</b>		2336	0.301	0.459	0.244	0.450***
<b>reg_EU1</b>		2336	0.096	0.295	0.108	0.065***
<b>reg_EU2</b>		2336	0.103	0.304	0.103	0.103
<b>reg_WHD</b>		2336	0.205	0.404	0.201	0.217
<b>year</b>	Years, from 1985 to 2000 . . . . .	2336	1.992.50	4.61	1.992.11	1.993.52***

Note: a/ Statistically significant differences in means are indicated by \*\*\* (99% confidence level) or \*\* (95%).

**TABLE A2**  
FUND-SUPPORTED PROGRAMS AND TOTAL PUBLIC SPENDING

	Total Expenditures		
	% of GDP	USD pc	DP pc
<b>L</b> Depend. Var. . . . .	<b>0.610***</b>	<b>0.619***</b>	<b>0.757***</b>
<b>L</b> .IMF(predict) . . . . .	0.117	0.050	-0.144
<b>D</b> .IMF(predict) . . . . .	0.001	0.941	0.864
<b>L</b> .gdpusdpc . . . . .	-0.076	1.581	1.116
<b>D</b> .gdpusdpc . . . . .	-0.567	<b>24.923***</b>	0.582
<b>L</b> .devaluation . . . . .	-0.006	0.048	<b>-0.039*</b>
<b>D</b> .devaluation . . . . .	<b>-0.012***</b>	0.014	<b>-0.060***</b>
<b>L</b> .year . . . . .	<b>-0.068*</b>	-0.307	<b>0.231*</b>
<b>L</b> .democracy . . . . .	-0.432	0.268	-1.202
<b>D</b> .democracy . . . . .	0.061	0.180	0.018
<b>L</b> .pop95young . . . . .	<b>0.769***</b>	<b>-4.386***</b>	0.599
<b>L</b> .pop95old . . . . .	-0.911	<b>-54.201***</b>	4.862
<b>L</b> .growth . . . . .	<b>-0.122**</b>	0.203	<b>0.668***</b>
<b>D</b> .growth . . . . .	<b>-0.181***</b>	0.067	0.122
<b>L</b> .grw_neg . . . . .	0.142	-0.019	0.420
<b>D</b> .grw_neg . . . . .	<b>0.231**</b>	0.179	<b>0.997***</b>
<b>L</b> .grw_sd . . . . .	<b>-0.754***</b>	2.230	-0.389
Number of obs . . . . .	1294	1294	1294
R-squared . . . . .	0.902	0.983	0.629
Root MSE . . . . .	3.792	19.54	12.52

**TABLE A3**  
LIST OF COUNTRIES AND SUB SAMPLES

Country	Years IMF	S1	S2	S3
Albania . . . . .	5.71	S1	S2	S3
Algeria . . . . .	4.81	S1	S2	
Angola . . . . .	0.00			
Argentina . . . . .	11.76			S3
Armenia . . . . .	4.48	S1	S2	
Azerbaijan . . . . .	4.13	S1	S2	
Bahamas, The . . . . .	0.00			
Bahrain . . . . .	0.00			
Bangladesh . . . . .	6.59	S1		S3
Barbados . . . . .	1.31	S1	S2	
Belarus . . . . .	1.00	S1	S2	
Belize . . . . .	1.24	S1	S2	
Benin . . . . .	9.61	S1		S3
Bhutan . . . . .	0.00			
Bolivia . . . . .	12.10			S3
Bosnia & Herzegovina . . . . .	1.00			
Botswana . . . . .	0.00			
Brazil . . . . .	6.35	S1		S3
Bulgaria . . . . .	7.34	S1		S3
Burkina Faso . . . . .	9.77	S1		S3
Burundi . . . . .	5.26	S1	S2	S3
Cambodia . . . . .	3.56	S1	S2	
Cameroon . . . . .	7.86	S1		S3
Cape Verde . . . . .	1.16	S1	S2	
Central African Republic . . . . .	2.45	S1	S2	
Chad . . . . .	8.23	S1		S3
Chile . . . . .	3.02	S1	S2	
China . . . . .	0.00			
Colombia . . . . .	1.03	S1	S2	
Comoros . . . . .	2.45	S1	S2	
Congo, Dem. Rep. Of . . . . .	4.42	S1	S2	
Congo, Republic of . . . . .	5.41	S1	S2	S3
Costa Rica . . . . .	6.59	S1		S3
Cote d'Ivoire . . . . .	10.94			S3
Croatia . . . . .	4.50	S1	S2	
Cyprus . . . . .	0.00			
Czech Republic . . . . .	1.00			
Djibouti . . . . .	2.37	S1	S2	
Dominica . . . . .	3.05	S1	S2	
Dominican Republic . . . . .	3.63	S1	S2	
Ecuador . . . . .	8.20	S1		S3
Egypt . . . . .	8.06	S1		S3
El Salvador . . . . .	6.73	S1		S3
Equatorial Guinea . . . . .	5.72	S1	S2	S3
Eritrea . . . . .	0.00			
Estonia . . . . .	6.82	S1		S3
Ethiopia . . . . .	5.62	S1	S2	S3
Fiji . . . . .	0.00			
Gabon . . . . .	9.20	S1		S3
Gambia, The . . . . .	8.55	S1		S3
Georgia . . . . .	4.08	S1	S2	

**TABLE A3**  
LIST OF COUNTRIES AND SUB SAMPLES (Continuación)

Country	Years IMF	S1	S2	S3
Ghana . . . . .	11.78			S3
Grenada . . . . .	1.64	S1	S2	
Guatemala. . . . .	2.59	S1	S2	
Guinea . . . . .	13.38			S3
Guinea Bissau . . . . .	0.00			
Guyana . . . . .	10.12			S3
Honduras . . . . .	6.29	S1		S3
Hungary . . . . .	7.75	S1		S3
India . . . . .	1.66	S1	S2	
Indonesia . . . . .	3.16	S1	S2	
Iran . . . . .	0.00			
Jamaica. . . . .	9.73	S1		S3
Jordan . . . . .	9.42	S1		S3
Kazakhstan . . . . .	6.05	S1		S3
Kenya . . . . .	6.99	S1		S3
Kiribati . . . . .	0.00			
Korea . . . . .	4.90	S1	S2	
Kuwait . . . . .	0.00			
Kyrgyz Republic. . . . .	7.12	S1		S3
Lao PDR. . . . .	6.63	S1		S3
Latvia . . . . .	7.13	S1		S3
Lebanon . . . . .	0.00			
Lesotho . . . . .	8.72	S1		S3
Liberia . . . . .	1.43	S1	S2	
Libya . . . . .	0.00			
Lithuania. . . . .	5.74	S1	S2	S3
Macedonia FYR . . . . .	3.41	S1	S2	
Madagascar . . . . .	9.63	S1		S3
Malawi . . . . .	10.13			S3
Malaysia . . . . .	0.00			
Maldives . . . . .	0.00			
Mali . . . . .	13.38			S3
Malta . . . . .	0.00			
Marshall Islands . . . . .	0.00			
Mauritania . . . . .	12.16			S3
Mauritius. . . . .	1.50	S1	S2	
Mexico . . . . .	8.30	S1		S3
Moldova . . . . .	5.29	S1	S2	S3
Mongolia . . . . .	6.29	S1		S3
Morocco . . . . .	5.95	S1	S2	S3
Mozambique . . . . .	10.52			S3
Myanmar . . . . .	0.00			
Namibia . . . . .	0.00			
Nepal. . . . .	6.24	S1		S3
Netherlands Antilles . . . . .	0.00			
Nicaragua . . . . .	4.99	S1	S2	
Niger . . . . .	10.96			S3
Nigeria . . . . .	3.90	S1	S2	
Oman. . . . .	0.00			
Panama . . . . .	7.93	S1		S3
Papua New Guinea . . . . .	4.60	S1	S2	

**TABLE A3**  
LIST OF COUNTRIES AND SUB SAMPLES (Continuación)

Country	Years IMF	S1	S2	S3
Paraguay . . . . .	0.00			
Peru . . . . .	8.27	S1		S3
Philippines . . . . .	11.92			S3
Poland . . . . .	5.83	S1	S2	S3
Qatar . . . . .	0.00			
Romania . . . . .	5.15	S1	S2	S3
Russia . . . . .	5.37	S1	S2	S3
Rwanda . . . . .	5.13	S1	S2	S3
Samoa . . . . .	0.52			
Sao Tome & Principe . . . . .	3.18	S1	S2	
Saudi Arabia . . . . .	0.00			
Senegal . . . . .	13.93			S3
Seychelles . . . . .	0.00			
Sierra Leone . . . . .	6.87	S1		S3
Slovak Republic . . . . .	1.67	S1	S2	
Solomon . . . . .	0.00			
South Africa . . . . .	0.00			
Sri Lanka . . . . .	6.27	S1		S3
St. Kitts and Nevis . . . . .	0.00			
St. Lucia . . . . .	0.00			
Suriname . . . . .	0.00			
Swaziland . . . . .	0.00			
Syria . . . . .	0.00			
Tajikistan . . . . .	3.18	S1	S2	
Tanzania . . . . .	10.09			S3
Thailand . . . . .	4.63	S1	S2	
Togo . . . . .	12.07			S3
Tonga . . . . .	0.00			
Trinidad & Tobago . . . . .	2.07	S1	S2	
Tunisia . . . . .	4.49	S1	S2	
Turkey . . . . .	2.45	S1	S2	
Turkmenistan . . . . .	0.00			
Uganda . . . . .	11.66			S3
Ukraine . . . . .	5.08	S1	S2	S3
United Arab Emirates . . . . .	0.00			
Uruguay . . . . .	8.47	S1		S3
Uzbekistan . . . . .	1.24	S1	S2	
Vanuatu . . . . .	0.00			
Venezuela . . . . .	4.00	S1	S2	
Vietnam . . . . .	3.30	S1	S2	
Vincent & the Grenadines . . . . .	0.00			
Yemen . . . . .	4.60	S1	S2	
Zambia . . . . .	7.48	S1		S3
Zimbabwe . . . . .	6.12	S1		S3