IMF Programs: Who Is Chosen and What Are the Effects?

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Abstract

IMF loans react to economic conditions but are also sensitive to political-economy variables. Loans tend to be larger and more frequent when a country has a bigger quota and more professional staff at the IMF and when a country is more connected politically and economically to the United States and other major shareholding countries of the IMF. These results are of considerable interest for their own sake. More importantly for present purposes, the results provide instrumental variables for estimating the effects of IMF loan programs on economic growth and other variables. This instrumental estimation allows us to sort out the economic effects of the loan programs from the responses of IMF lending to economic conditions. The estimates show that a higher IMF loan-participation rate reduces economic growth. IMF lending also lowers investment but raises international openness. In addition, greater involvement in IMF programs tends to lower the rule of law and democracy. We conclude that the typical country would be better off economically if it committed itself not to be involved with IMF loan programs.

Key Words: IMF loan program, economic growth, instrumental variables

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In recent decades, many countries have participated in loan programs of the International Monetary Fund. In fact, almost all developing countries have received IMF financial support at least once since 1970. The few exceptions include Botswana, Iraq, Malaysia, and Kuwait.

Given the broad reach of IMF loan programs, it is important to know the consequences of these programs for economic growth and other dimensions of economic performance. Do countries benefit from access to IMF loan programs or would countries be better off if these programs did not exist?

The main difficulty in answering this question is that IMF loans tend to be made in response to economic problems. This response, akin to a doctor administering to a sick patient, tends to generate a negative association between IMF loan programs and economic performance. Obviously, it would be unfair to blame the IMF for these pre-existing bad conditions. Thus, to assess the economic effects of the loan programs, one has to sort out the directions of causation, that is, distinguish the economic effects of the loans from the effects of economic conditions on the probability and size of the programs. Similar issues arise in evaluating foreign aid, debt relief, and other programs that respond to the economic health of a country.

To sort out the directions of causation, we would ideally observe experimental situations in which the IMF introduced a loan program without regard to a country's economic conditions. We try to approximate these sorts of experiments by taking a political/institutional approach to the IMF's decision-making. That is, we construct and use some political and institutional variables that, first, have substantial predictive value for IMF loan participation and, second, are arguably exogenous with respect to economic performance. We then use these political and institutional variables as instruments to isolate the effects of IMF loan programs on economic growth, investment, and other economic variables.

The key innovation of our analysis is that we model the IMF as a bureaucratic and political organization. We argue that loans are more likely to be approved and are likely to be larger when countries are more influential at the IMF. We gauge this influence by the

size of a country's quota at the IMF and by the number of the IMF's professional staff that come from the country. We also consider each country's political and economic connections to the most influential members of the IMF, the United States and the major countries of Western Europe. To measure these connections, we use voting patterns in the United Nations and the extent of bilateral trade linkages.

Our analysis shows that IMF loans are more likely to exist and to be larger in size when countries have larger quotas, more nationals on the IMF staff, and are more connected politically and economically to the United States and the major Western European countries. Considered as a whole, these political-economy variables have substantial explanatory power for IMF lending.

Our political-economy analysis of the determinants of IMF loan programs is of considerable interest for its own sake. However, most importantly, this analysis generates the instrumental variables that we use to study the effects of these programs. We can reasonably argue that our instrumental estimates isolate the effects of the loan programs on economic growth and on other economic and political outcomes. The outcomes considered include investment, inflation, government consumption, international openness, democracy, the rule of law, and the current-account balance.

Overall, our results are not favorable for the economic role of the IMF. We find that, using our instrumental variables and holding fixed an array of other explanatory variables, greater IMF loan participation has a direct negative effect on economic growth. We also find that more participation and larger loans tend to depress investment. This channel provides a further negative, but small, effect of IMF loan programs on economic growth.

We also find that more participation in IMF loan programs tends to raise international openness. This channel tends to raise economic growth but only by a small amount. In addition, greater participation in IMF loan programs may have small negative effects on democracy and the rule of law. The decrease in the rule of law generates another small indirect negative influence from IMF loan programs on economic growth. We find no significant effects from IMF loan programs on inflation, government consumption, and the current-account balance.

Overall, our conclusion from the direct and indirect effects is that greater participation in IMF loan programs reduces economic growth. Thus, from the standpoint of long-term economic performance, it seems that the typical country would be better off if it could commit itself never to be involved with IMF loan programs.

I. Characteristics of the IMF

The IMF has become an almost universal financial institution, with its membership rising from 44 states in 1946 to 184 at present. However, the members of the IMF do not have an equal voice. Each member contributes a quota subscription, as a sort of credit-union deposit to the IMF. Upon joining the Fund, a country pays 25 percent of its quota in the form of international currencies or SDRs and the remaining 75 percent in its own currency. The quota is the basis for determining voting power: each member has 250 basic votes plus one additional vote for each SDR 100,000 of quota. The initial quotas of the original members were determined at the Bretton Woods Conference in 1944. The allocations were based mainly on economic size, as measured by national income and external trade volume. Quotas of new members have been determined by similar principles.

The IMF charter calls for general quota reviews at intervals of no more than five years. These reviews allow for adjustments of quotas to reflect changes in economic power. There have been 12 general reviews since 1950, and 6 of these resulted in an increase in the total size of quotas. Most of these overall increases featured equi-proportional increases of quotas for the individual members (IMF [1998]).

The IMF's Board of Governors delegates most decision-making power to the Executive Board, which has 24 directors. Eight directors are appointed by the largest eight shareholders—the United States (37,149 million SDRs or 17.5% percent of the total IMF quotas), Japan (6.3% percent), Germany (6.1%), France (5.1%), the United Kingdom (5.1%), Saudi Arabia (3.3%), China (3.0%), and Russia (2.8%). The others are elected by sixteen groupings of the remaining countries.

The major shareholders have strong influences on the IMF's decisions. Many important decisions require special voting majorities of 85 percent. Hence, the United States alone and a group of three Western European countries have veto power. Although

the managing director has traditionally been a European, the United States has exerted the strongest voice at the IMF and has sometimes openly wielded this power to influence decisions (Kahler [1992] and Stone [2002]).

On December 31, 2001, the IMF had a staff of 2633—787 assistant staff and 1846 professionals. About two-thirds of the professional staff were economists (IMF [2002, p.86]).

The basic conception of the IMF's role, as envisioned at Bretton Woods in 1944, was to promote exchange stability and provide short-term finance to deal with temporary current-account deficits in advanced countries. Thus, with the breakdown of the "par adjustable peg system" in 1973, the IMF lost its major role as the "guarantor of fixed exchange rates" among advanced countries. Nevertheless, the IMF did not disappear, and its role expanded instead into many new areas. The IMF has now evolved into the "crisis manager" and "development financier" for developing countries.[1]

The primary role of the IMF is to provide credits to member countries in balance-of-payments difficulties. Part of the credit is provided in relation to a country's quota. The first tranche, 25% of the quota, is available automatically, without entailing any discussion of policy. The use of IMF resources beyond the first tranche almost always requires an arrangement between the IMF and the member country. Under an IMF arrangement, the amount of resources committed is released in quarterly installments, subject to the observance of policy benchmarks and performance criteria. This process is often called conditionality.

Stand-by Arrangements (SBA) and the Extended Fund Facility (EFF) are the main IMF programs designed to provide short-term balance-of-payments assistance to member countries.[2] The typical Stand-By Arrangement covers a period of 1 to 2 years, with repayments scheduled between 3 $^1/_4$ and 5 years from the date of the borrowing. The Extended Fund Facility program, introduced in 1974, was intended to provide somewhat longer-term financing in larger amounts. The EFF arrangement typically lasts up to 3 years, with repayments scheduled over a period of 4 $^1/_2$ to 10 years.

[1] See Krueger (1998) and Bordo and James (2000) for discussions of the changing role of the IMF.
[2] A number of other short-term IMF arrangements have been introduced to supplement SBA and EFF. These arrangements include the Supplemental Reserve Facility (SRF), the Country Stabilization Fund (CSF), the Compensatory and Contingent Financing Facility (CCFF), and the Systematic Transformation Facility (STF). See IMF (1998) or the IMF website for details.

The SBA and EFF programs did not cover very low-income countries. Confronted by increasing pressure, the IMF developed several new lending programs to provide long-term loans at subsidized interest rates for poor countries. The Fund established the Structural Adjustment Facility (SAF) in 1986 and the Enhanced Structural Adjustment Facility (ESAF) in 1987. The interest rate charged is 0.5%, and repayments are scheduled over 5-10 years after a 5-year grace period. Most ESAF cases were with sub-Saharan African countries and former planned economies. In 1999, the ESAF was replaced by the Poverty Reduction and Growth Facility (PRGF). Probably these activities should be viewed more as foreign aid, rather than lending or adjustment programs.

Table 1 shows the number and amounts approved for all types of IMF programs from 1970 to 2000.[3] Over this period, a total of 725 programs were approved. This total includes 594 short-term and mid-term stabilization programs (SBA and EFF), which are the focus of our analysis. The number of these short-term programs peaked in the early 1980s with the Latin American debt crisis. Although the number declined subsequently, the average size of the loans jumped because of the financial crises experienced by larger countries, such as Mexico, South Korea, Russia, Brazil, Argentina, and Turkey.

II. Determination of IMF Loan Programs

Participation in an IMF program is a joint decision between a member country and the IMF. Countries that are experiencing economic difficulties come to the IMF for a financial arrangement. Then the IMF determines whether the country meets the Fund's criteria for approval. In this section, we estimate the economic and institutional variables that influence the size and frequency of IMF lending.

A. IMF Loan Programs

To capture the economic determinants of IMF lending, we use a number of standard variables that can be found in the previous literature, which is surveyed by Knight and Santaella (1997) and Bird and Rowlands (2001). Some of these factors can be viewed

[3] The amount of loan approved was not always drawn by the member country. This situation can arise if the IMF terminated the arrangement because the borrower did not meet the conditionality, or if the country ended up not using its full allotment. Sometimes a country utilized an IMF program to build credibility and did not use the borrowing facility at all.

as influences on a country's demand for loans and others as effects on the IMF's willingness to supply loans.[4] The explanatory variables included for each country and time period are the level of international reserves in relation to imports, per capita GDP, total GDP, the lagged growth rate of per capita GDP, and a dummy variable for OECD membership.[5]

We extend the previous literature by including a number of institutional and political-economy variables as additional determinants of IMF lending. The first institutional variable is the country's share of IMF quotas. The quota measures a country's voting power at the IMF and also matters directly for a portion of the lending available to a member. Our hypothesis is that, for given economic conditions, a higher country quota raises the probability and size of an IMF loan.

In practice, quotas are persistent over time, with much of the allocations determined by the rules set out in 1944 at Bretton Woods. Basically, economically larger countries get larger quotas, but the concept of economically large involves the long ago past, rather than the present. For our purposes, we are most interested in countries that have unusually high or low current quotas, relative to their economic sizes. To get a sense of the outliers, we ran an OLS regression of IMF quota shares in 2000 on the levels of total and per capita GDP in 1995.[6] The residuals from this regression show that the countries that were most over-weighted on quotas were the United Kingdom, France, Russia, and Venezuela. The most under-weighted were China, South Korea, Hong Kong (now a part of China), and Taiwan. (Hong Kong and Taiwan, as non-members, have zero quotas.)

The second institutional variable is the share of a country's nationals among the IMF professional staff of economists. Officially, to avoid conflicts of interest, the IMF does not allow staff members to have direct influence on lending decisions for their home countries.[7] However, from the standpoint of having good information, the IMF would

[4] Knight and Santaella (1997) and Przeworski and Vreeland (2000) used a bi-variate probit model to estimate demand and supply functions for IMF loans. The estimation requires a number of identifying restrictions.
[5] The OECD dummy equals one for countries other than Turkey that have been members of the OECD since the 1960s. We found that, once these variables were considered, other measures of economic performance or political structure did not have significant explanatory power. See below for further discussion.
[6] The regression included linear and squared terms in the levels and logs of total and per capita GDP.
[7] Item 24 of the IMF *Code of Conduct for Staff* states: "The IMF will seek to avoid assigning nationals to work on policy issues relating specifically to IMF relations with their home country, unless needed for linguistic or other reasons."

often like the input from the nationals of a target country. Therefore, although own nationals cannot work directly as desk economists or mission team members for their home countries, these nationals are often sought out for comments on country programs. In addition, the presence of own nationals on the staff can help a country to get more access to inside information and, thereby, make it easier to negotiate with the IMF on the terms of a program. Our hypothesis is that, for given economic conditions, a larger national staff at the IMF raises the probability and size of a loan.[8]

We measured the staff for each country by the number of home-country nationals currently working for the Fund. Unfortunately, we lack the information to refine the staff data to consider ranks of positions. Also, it would be interesting to consider the number of ex IMF staff economists who currently work in the governments of their home countries. However, we lack the information to make this extension.

As with quotas, the number of nationals working at the IMF tends to reflect the economic sizes of countries (although the fit for staffs turns out to be substantially poorer than that for quotas). For our purposes, we are most interested in countries that have surprisingly high or low staff sizes. To get a sense of these outliers, we ran another OLS regression, this time for IMF staff shares in 2000 on levels of total and per capita GDP in 1995. The residuals from this regression show that the countries that were most over-weighted on the IMF staff were the United Kingdom, France, India, Canada, and Peru. Those that were most under-weighted were China, Japan, Indonesia, Taiwan, and Hong Kong.

One concern is that the number of country nationals on the IMF staff is endogenously determined by the country's experience with IMF programs, rather than the reverse. However, a country's history of IMF program turns out not to have much impact

[8] An example of this sort of influence is described by Mussa (2002), the head of the IMF's research department until summer 2001. He observed that, although the IMF anticipated the inevitable collapse of the Argentine economy in 2001, it did not halt its existing loan programs but instead provided increased financial support. He argued that this continuation of support arose because the IMF's economists became too close to their clients (see Mussa [2002]). Probably not coincidentally, in June 2002, the long-time head of the IMF's Latin America Department, an Argentine economist, was dismissed. He was replaced by an Indian economist (*The Economist* [2002]).

on the hiring of that country's nationals—the lagged loan-participation rate lacks significant explanatory power for the size of the national staff.[9]

The IMF is also a political organization governed by its major shareholders. A common claim is that the IMF plays the roles best suited to the national interests of the United States. In the Cold War era, the IMF often supported countries—such as Argentina, Egypt, the Philippines, and Zaire—that were important to the United States for foreign policy reasons, despite the lack of effective reform programs (see Krueger [1998] and Bordo and James [2000]). This sort of political influence was even clearer in the 1994 Mexican crisis, where the IMF approved a loan of unprecedented scale, amounting to $17.8 billion or 688 percent of Mexico's quota. The loan approval process featured intense lobbying by the U.S. government, including an incident where the Clinton Administration's pressure for rapid action was so strong that the usual minimal notice to executive directors was not given. In protest, some European directors abstained in the voting (Krueger [1998]). As another example of apparent U.S. influence, in December 1997, the IMF approved a record-breaking loan to South Korea: $21 billion (1757 percent of quota). In this case, the U.S. Treasury and the IMF apparently collaborated to work out the form of the package (Blustein [2001]).

We use as a proxy for a country's political proximity to the United States the fraction of the votes that each country cast in the U.N. General Assembly along with the United States.[10] We construct analogous variables for France, Germany, and the United Kingdom. Our hypothesis is that greater political proximity to the United States or the major Western European countries raises the probability and size of IMF loan programs.

[9] In a regression with the log of the IMF staff share as the dependent variable, the significant explanatory variable, aside from the log of the lagged staff share, is the log of the IMF quota share. The estimated coefficient on the lagged IMF loan-participation rate is positive but statistically insignificant.

[10] We compiled data for 1975-85 on voting patterns in the United Nations from the Inter-University Consortium for Political and Social Research of the University of Michigan. We then updated from on-line data available at the United Nations (unbisnet.un.org). The variable that measures the political proximity with the United States is the fraction of times that the United States and the country in question voted identically (either both voting yes, both voting no, or both voting abstention [or non-participation]) in all General Assembly plenary votes in a given year. Decisions adopted without votes and votes in which the country in question was not eligible to participate were excluded. Our results do not change qualitatively if we use some alternative measures, for example, if we exclude non-participation or abstention.

A recent study by Thacker (1999) used a different form of U.N. voting variable to investigate the U.S. influence over the IMF's lending decisions.[11] U.N. voting variables have also been used by Ball and Johnson (1996) and Alesina and Dollar (2000) to explain foreign-aid patterns.

We measure economic proximity to the United States by the ratio of the country's bilateral trade with the United States to the country's GDP. We construct analogous variables for the three Western European countries. Our hypothesis is that greater trade intensity with the United States or the European countries raises the probability and size of IMF loan programs.[12]

B. Empirical Framework for the Determination of IMF Loan Programs

We have compiled data from 1975 to 2000. Although data are available for some variables and countries on an annual basis, we do not have annual observations for the national origin of the IMF staff, which we obtained at five-year frequencies. Some of the other variables that we consider later (such as educational attainment, life expectancy, and fertility rates) are also available, at best, at five-year frequencies. Since we think that little information can be gained in any event from annual observations, we arranged all of the data at five-year intervals. Hence, our panel covers 130 countries over the five five-year periods 1975-79, 1980-84, 1985-89, 1990-94, and 1995-99. The panel is unbalanced with a total of 613 observations.[13]

We measured a country's involvement with IMF loan programs in several ways. The first measure considers approvals of new loans. Our dummy variable for program approval equals one if the IMF and the country made a new loan agreement at any time during a five-year period. As mentioned before, we focus in this paper on the IMF's short-

[11] Thacker used only "key" U.N. votes, as designated by the U.S. Treasury. He then constructed the fraction of the votes on these key issues that each country cast in the U.N. General Assembly along with the United States. One problem with this procedure is that the designation of which votes are key is subjective. In any event, we could not apply this approach in our setting, because the U.S. Treasury information is available only since 1983. In addition, we lack analogous information for the European countries. Thacker found that the level of his U.N. voting variable was not significantly related to IMF lending. However, the first difference of his variable had a significantly positive effect. We do not find this pattern with our specification and sample period.

[12] Thacker (1999) and Bird and Rowlands (2001) used U.S. exports to each member country as an explanatory variable for IMF lending decision. They found unexpected *negative* coefficients.

[13] This sample excludes countries that lacked IMF membership during each five-year period.

term stabilization programs (SBA and EFF). Hence, loan approval and our other measures of involvement with IMF loan programs consider only these kinds of loans. However, most of our results are similar if we use all types of IMF loans.

The second variable refers to participation in IMF loan programs. Our IMF loan-participation rate is the fraction of months during each five-year period that a country operated under an IMF loan program. Thus, the participation rate varies almost continuously between zero and one. Note that participation in a five-year period often reflects loan programs that were approved in the previous five-year period. Moreover, the approval of a new program counts for participation only for the months contained within the current five-year period.

Finally, we use a variable that takes account of the sizes of IMF loans. Our measure is the average for each five-year period of the ratio of outstanding IMF loans to GDP.[14] This variable is analogous to our participation measure in that it includes loans that were approved in the previous five-year period and counts newly approved loans only to the extent that they are outstanding during the current five-year period.

Since program approval is a binary-choice variable, we use a probit model to explain this variable:

$$(1) \qquad I_{it}^{*} = \alpha + \beta X_{it} + \gamma Z_{it} + \delta * time_{t} + u_{it},$$

$$(2) \qquad I_{it} = 1 \quad if \quad I_{it}^{*} > 0,$$
$$= 0 \quad if \quad I_{it}^{*} \leq 0.$$

The dependent variable, $I_{it,}$ equals one if country i made at least one new loan agreement with the IMF during period t and equals zero otherwise. The vector X_{it} denotes country-specific economic factors that influence the existence and size of IMF loan programs. This vector includes the values at the beginning of the period of the ratio of foreign reserves to imports, per capita GDP, and total GDP. It also includes the growth rate of per capita GDP during the previous five years and the dummy for OECD membership. In addition, the regression includes time dummies to control for common effects of external factors such as world interest rates. The vector Z_{it} comprises the institutional and geopolitical factors that

[14] We measure GDP by the PPP-adjusted value from Penn-World Tables 6.1, as reported in Heston, Summers, and Aten (2002).

measure each country's political-economy connections to the IMF—the values at the beginning of the period of the share of IMF quotas and staff, the political proximity to the United States and the European countries (based on the U.N. voting patterns), and the intensity of trade with the United States and the European countries. The variable u_{it} is a random error term.

We use a Tobit model to explain IMF program participation. This specification takes account of the censoring of the dependent variable at zero. The model is

$$F_{it}^* = \alpha + \beta X_{it} + \gamma Z_{it} + \delta * time_t + u_{it}, \quad (3)$$

$$F_{it} = \min[1, \max(0, F_{it}^*)], \quad (4)$$

where X_{it}, Z_{it}, and time are defined as before. The dependent variable, F_{it}, is the fraction of time for which country i participated in an IMF loan program during period t.

The model for IMF loan sizes also requires a censored-regression framework. The Tobit specification is

$$L_{it}^* = \alpha + \beta X_{it} + \gamma Z_{it} + \delta * time_t + u_{it}, \quad (5)$$

$$L_{it} = \max[0, L_{it}^*], \quad (6)$$

where L_{it} is the average for period t of the ratio of IMF loans to GDP for country i. L_{it} =0 applies if the country had no loan outstanding during period t.

The specifications in equations (1)-(6) can be viewed as reduced-form models that reflect the demand for and supply of IMF loans. We tried various functional forms for each model and selected the ones that delivered the best goodness-of-fit. Per capita GDP and the log of GDP each enter as quadratics. The IMF quota share, the IMF staff share, the U.N. voting variables, and the bilateral-trade-share variables enter as logs.[15]

The Tobit and probit models apply to panel data for 130 countries over the five five-year periods from 1975 to 1999. To estimate these systems, we allow for within-country correlation of the error terms over time. Our reasoning is that a country that is

[15] To keep the zero observations when making the log transformations, we added 0.0009 to each observation of staff share, 0.0002 to each observation of quota share, and 0.0001 to each observation of bilateral trade share. These values are the minimum non-zero observations for staff share, quota share, and bilateral trade share, respectively, in the sample. The results are not sensitive to the specific values added for the log transformations.

favored by the IMF in one period—due to unexplained factors—is likely to be similarly favored in other periods.[16]

The summary statistics for all variables are in Table 2. Over the sample period, the average ratio of IMF loans to GDP (including the zeroes) was 0.003. For countries with positive loans, the average ratio to GDP was 0.007. Countries on average participated in an IMF financial arrangement 19% of the time, and 36% of the observations (for five-year periods) featured at least one IMF program approval.

C. Basic Results on the Determinants of IMF Lending

We begin with the Tobit equation for the ratio of IMF loans to GDP, as shown in equations (5) and (6). Consider first the results in columns 1-4 of Table 3. Column 1 excludes all political-economy variables. Column 2 includes the IMF staff share and the U.N. voting and trade intensity variables associated with the United States. Column 3 substitutes the IMF quota share for the IMF staff share. Column 4 includes all four of these political-economy variables.

The estimated coefficient of the lagged growth rate of per capita GDP is significantly negative in all of the specifications. The estimated coefficient in column 4 implies that, holding fixed the other explanatory variables, a decline in per capita GDP growth by 1 percentage point per year would increase the ratio of IMF lending to GDP by 0.06 percentage point.

The estimated coefficient of the ratio of international reserves to imports is also significantly negative in all of the specifications. The estimated coefficient in column 4 implies that a decrease in reserves by one month of imports would raise the ratio of IMF lending to GDP by 0.13 percentage point.

The ratio of IMF loans to GDP has a non-linear relationship with per capita GDP. In all specifications, the estimated coefficient on the level is significantly positive and the estimated coefficient on the square is significantly negative. (The two variables together are always jointly significant; the p-value is 0.05 or less.) Hence, the loan-GDP ratio

[16] We get similar results when we estimate random-effects models, although the IMF staff share becomes less statistically significant. We do not emphasize these results because the conditions needed for the satisfactory implementation of random-effects Tobit or probit models seem unlikely to hold. In particular, these specifications require strict exogeneity of the explanatory variables. See Wooldridge (2002).

initially increases with per capita GDP but later decreases.[17] The estimated coefficients in column 4 imply that the switch occurs at a per capita GDP of $3750 (1996 U.S. dollars), which is below the sample median of $4150. The overall marginal effect of per capita GDP at the sample mean of $6745 is estimated to be negative. At that point, an increase in per capita GDP by $1000 is estimated to decrease the ratio of IMF lending to GDP by 0.14 percentage point.

The positive relation between IMF lending and per capita GDP in the low range of per capita GDP likely reflects the Fund's reluctance to provide stabilization loans to countries that are not creditworthy. The negative effect in the upper range of per capita GDP likely signals the decreased demand for IMF loans among the rich countries, which have other sources of credit.

We find that, after controlling for the log of per capita GDP and its square, the dummy for OECD membership has negative estimated coefficients in all of the specifications. The estimated value is not statistically significant in columns 1-4 but is marginally significant in some cases that we consider later.[18] The negative coefficient on the OECD dummy can be interpreted as another indicator of a low demand for IMF loans by advanced economies.

The log of total GDP enters as a level and its square. The estimated coefficients are, in each case, positive for the level of log(GDP) and negative for the square. The two coefficients are jointly marginally significant in some cases, with p-values ranging from 0.06 in column 4 to 0.62 in column 2. Thus, this scale variable appears not to be very important in the determination of the ratio of IMF loans to GDP. These variables turn out to be more important in some of the systems for IMF program participation and approval.

The results in columns 2-4 of Table 3 indicate that the political-economy variables are important overall for explaining IMF lending decisions. When considered jointly, the p-values for the statistical significance of these variables range from 0.008 (column 4) to 0.015 (column 2)—see the line denoted p-value (a) in the table. If we consider the group

[17]If we replace IMF stabilization loans by total IMF loans as the dependent variable, the estimated coefficient on the level of per capita GDP becomes smaller in magnitude and statistically insignificantly different from zero, while the square term remains negative and statistically significant. Hence, per capita GDP has a monotonically decreasing effect on the ratio of total IMF loans to GDP.

[18] No substantial changes occur in the main results if we exclude the OECD dummy variable in the various systems.

of these variables exclusive of the bilateral trade share with the United States, the p-values are all less than 0.005—see the line denoted p-value (b).

In column 4, the IMF staff share, the IMF quota share, and the economic proximity to the United States, as gauged by bilateral trade, each have individually significantly positive estimated effects at the 5% critical level. The estimated coefficient on the U.N. voting variable with the United States is also positive and individually significant at the 10% level.

The estimated coefficients in column 4 imply that an increase in the log of the IMF quota share by 1.25 (its standard deviation) raises the IMF loan size by 1.2 percent of GDP. An increase in the log of the IMF staff share by 1.26 (the variable's standard deviation) is estimated to raise IMF lending by 0.21 percent of GDP. A rise in the log of the U.N. voting variable for the United States by 0.48 (its standard deviation) is estimated to raise the ratio of IMF lending to GDP by 0.22 percentage point. Similarly, an increase in the log of the intensity of trade with the United States by 1.4 (its standard deviation) is estimated to raise the ratio by 0.25 percentage point.

Column 5 modifies the specification from column 4 to measure the U.N. voting and trade intensity variables in relation to the IMF's major European shareholders, rather than the United States. The U.N. voting and bilateral trade variables are now averages for France, Germany, and the United Kingdom. The estimated coefficient on the U.N. variable for Europe is positive and significant at the 5% level. The estimated effect of the European trade variable is not statistically significant.[19]

Column 6 includes U.N. voting and trade intensity variables for the United States together with those for the average of the European countries. In this setting, only the U.N. voting variable for Europe and the U.S. trade intensity variable are individually statistically significant at the 5% level. However, for our purposes, the most important result is the joint significance of the political-economy variables. This joint significance is clear—the p-value is 0.008 for all six variables and 0.007 for the four variables exclusive of the two

[19] We report here only the results when the U.N. voting and trade variables are averages for the three European countries. Since the U.N. voting variables for France, Germany, and the United Kingdom are highly correlated (correlations above 0.95), it is hard to disentangle the effects for the individual countries. The correlations between the U.N. voting variables for the United States and each of the European countries is much lower—ranging from 0.7 to 0.8. The trade intensity variables are substantially less correlated than the voting variables, ranging from 0.03 (between the United States and France) to 0.45 (between France and Germany).

trade intensity measures.

Table 4 presents estimation results from the Tobit equations for the IMF loan-participation rate, as specified in equations (3) and (4). The results are, in most respects, similar to those for loan size. For example, the p-values for joint significance of the political-economy variables are all below 0.003. The estimated coefficients on the IMF quota share, IMF staff share, and the U.N. voting and trade intensity variables with the United States are all positive and individually at least marginally statistically significant in columns 2-4. The estimated coefficient on the U.N. voting variable for Europe is significantly positive in columns 5 and 6.

Table 5 presents the estimation results from the probit equations for the approval of IMF loan programs, as specified in equations (1) and (2). The results are, in most respects, similar to those found for loan size and participation. However, the statistical significance of the IMF quota variable is less than that found before.

D. Additional Determinants of IMF Lending

Table 6 considers other possible determinants of IMF loan programs, many of which have been proposed in previous studies. These additional variables are added one at a time to the regressions for IMF loan size, loan-participation rate, and loan approval shown in column 6 of Tables 3, 4, and 5 respectively. The additional explanatory variables are measured as lagged values or at the beginning of each period.

Previous studies, such as Conway (1994), Knight and Santaella (1997), and Przeworski and Vreeland (2000), considered other measures of economic performance as determinants of IMF lending. For example, some studies included current-account balances, fiscal balances, and inflation. However, we find that, once per capita GDP growth and international reserves are considered, these additional economic variables tend not to contribute significantly to the explanation of IMF loan programs.[20] Table 6 shows these results.[21]

[20] Other economic variables that could be considered include the presence of currency and banking crises. The problem is that the existence of these crises cannot be regarded as exogenous to other contemporaneous economic events (see, for example, Frankel and Rose [1996]). If we add a dummy variable for the presence of a currency crisis during each five-year period to the regressions, it has statistically significant positive effects on the probability and size of IMF lending. However, no substantial changes occur in the estimated coefficients of the other explanatory variables. A dummy variable for banking crises turns out to be

Other studies, such as Edwards and Santaella (1993) and Bird and Rowlands (2001), include measures of political and institutional structure. The idea is that the IMF might want to encourage political liberalization by providing loans more readily to countries with more democracy, rule of law, and so on. However, these earlier studies did not find these additional variables to be important as determinants of IMF program participation.

We have extended our analysis to consider indicators of democracy and the rule of law. The democracy index is based on the measure of political rights compiled by Freedom House. The rule-of-law index is based on the indicator from *International Country Risk Guide* for the maintenance of the rule of law. Table 6 shows the results. We found that these political and legal variables were statistically insignificant in most cases. One exception is that the estimated effect of democracy on the ratio of IMF loans to GDP is positive and marginally significant. However, the estimated coefficient on democracy is statistically insignificant in the systems for IMF program participation and approval. Thus, there is only a little evidence that the IMF tilted its loan-approval process toward countries that were more democratic.

Our findings are consistent with the IMF's provisions, which direct its officers not be influenced in their lending decisions by the political character of the member. However, the IMF has often been criticized for its assistance to dictatorial regimes or inept governments. Perhaps in response to this criticism, in July 1997, the IMF adopted new guidelines that dictated suspension or delay of financial assistance to any country with "poor governance" (see McQuillan and Montgomery [1999]). Therefore, perhaps in the future, we will see more responsiveness of IMF lending to democracy and the rule of law.

It is interesting to contrast our results with those of Alesina and Dollar (2000), who found that bilateral foreign-aid flows responded significantly positively to democracy. However, as in our results for IMF lending, they found no statistically significant response

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statistically insignificant, once the currency-crisis dummy is included. Note that IMF lending does not, by any means, accompany every currency crisis. Since 1970, only one-third of currency-crisis observations were linked with IMF program participation in the same year or one year later (see Park and Lee [2002]). On the other side, many IMF programs occur in the absence of a currency crisis. Hutchison (2001) notes that, in a sample of 67 developing countries over 1975-97, only 18% of IMF program participation observations were associated with currency crises.

[21] If we replace IMF stabilization loans by total loans as the measure of loan size, the estimated coefficients on the current-account balance and the fiscal balance are negative and statistically significant in some cases. These results suggest that the structural-adjustment loans directed to low-income countries are particularly responsive to current-account and fiscal deficits.

to the rule of law. They also found that foreign direct investment responded significantly positively to the rule of law but not to democracy. Thus, if we put all of these results together, we find that bilateral foreign aid responded positively to democracy, IMF lending may have responded positively to democracy, and foreign direct investment responded not at all to democracy. The situation is reversed for rule of law, with foreign direct investment responding positively and bilateral foreign aid and IMF lending being unaffected.

For our purposes, an important finding is that the role of our political-economy variables is robust to the introduction of the additional economic and political variables. We always find that the set of political-economy variables—IMF quotas and professional staff and the political and economic proximity to the major shareholding countries of the IMF—remain jointly highly significant. Thus, for the purpose of explaining economic growth, we have some basis for using these political-economy variables as instruments.

III. Economic Effects of IMF Loan Programs

Many previous studies have used cross-country data to assess the economic effects of IMF loan programs. This research, surveyed by Haque and Kahn (1998), yields conflicting results, depending on the sample and methodology.[22] Our major concern with the various studies is their treatment of the endogeneity of IMF loan programs. The natural approach, as in program evaluation more generally, is to use instrumental variables (see Wooldridge [2002]). The problem, however, is that good instrumental variables have not been available for evaluations of IMF loan programs. Thus, our major contribution is to use an instrumental-variables approach, based on the political-economy determinants of IMF lending that we investigated in the previous section. The instrumental variables that we use are the IMF quota and staff shares and the measures of a country's political and economic proximity to the United States and the major Western European countries.[23]

[22] The studies include Goldstein and Montiel (1986); Conway (1994); Przeworski and Vreland (2000); Dicks-Mireaux, Mecagni, and Schadler (2000); and Hutchison (2001).

[23] We also include a dummy for IMF membership as an instrument in order to control for the non-member countries that were not eligible for IMF loans. Since there are only three observations for non-members in the sample, this IMF membership dummy plays a minor role.

We begin with a study of economic growth, using an empirical framework that has been widely used in previous studies (see, for example, Barro and Sala-i-Martin [2003, Ch. 12]). We include in this analysis a representative set of the explanatory variables that have been used in previous work. Therefore, our first set of results isolates effects of IMF loan programs on economic growth, while holding constant this representative group of explanatory variables. These estimates do not consider that IMF programs can also influence economic growth indirectly by affecting some of the explanatory variables. Therefore, we subsequently explore the effects of IMF loan programs on a number of these explanatory variables. This analysis is of interest for its own sake and also allows us to estimate additional, indirect effects of IMF loan programs on economic growth.

A. Economic Growth

Table 7 presents panel regression results for economic growth. The dependent variables are the five-year growth rates of per capita GDP for the periods 1975-80, 1980-85, 1985-90, 1990-95, and 1995-2000. The independent variables, detailed in the table, are, first, the log of per capita GDP at the start of each period; second, measures of human capital at the start of each period (educational attainment and life expectancy); third, the ratio of investment to GDP and the fertility rate; fourth, changes in the terms of trade; and, fifth, institutional and policy variables (government consumption, subjective indexes of the rule of law and democracy, international openness, and inflation).[24]

Estimation is by three-stage least squares, using mostly lagged values of the independent variables as instruments (see the notes to Table 7). To summarize briefly, the estimated coefficients on initial per capita GDP, fertility, government consumption, and inflation are significantly negative. The estimated coefficients on school attainment, life expectancy, international openness, the investment ratio, the rule-of-law index, and the growth rate of the terms of trade are significantly positive. The effect from democracy is

[24] In a preliminary version of this paper, we also included as independent variables dummies for the occurrence of currency and banking crises in each of the five-year periods. We found, as in Barro (2001), that currency and banking crises had significantly negative estimated effects on economic growth. In the present analysis, we exclude the currency and banking crisis variables because they are endogenous—that is, they would be related to current economic outcomes, such as the rate of economic growth. Moreover, we lack adequate instruments for currency and banking crises.

non-linear: the estimated coefficient on the linear term is significantly positive, whereas the estimated coefficient of the square of democracy is negative and marginally significant.

Our primary interest is in the impact of IMF loan programs. We examine the effects of two measures: the IMF loan-GDP ratio and the IMF loan-participation rate (fraction of months in each five-year period that a country participated in an IMF loan program). The participation variable picks up effects from involvement with an IMF program that are unrelated to the sizes of loans.

Column 1 of Table 7 includes as an independent variable the contemporaneous IMF loan-GDP ratio. Column 2 allows also for a lagged effect, that is, from the IMF loan-GDP ratio in the previous five-year period. In these columns, the estimation includes as instruments the actual current and lagged IMF loan-GDP ratios. Thus, these results do not take account of the endogeneity of IMF lending. Columns 3 and 4 have a parallel treatment for the IMF loan-participation rate. Columns 5 and 6 include simultaneously the IMF loan-GDP ratios and IMF loan-participation rates.

Column 1 shows that the estimated coefficient of the contemporaneous IMF loan-GDP ratio is significantly negative. The estimated coefficient (-0.32, s.e. =0.10) implies, if viewed causally, that an increase in IMF lending by 1 percent of GDP (about one standard deviation) lowers the growth rate contemporaneously by 0.32 percentage point per year. However, our conjecture is that this strong inverse relation between IMF lending and growth reflects the endogeneity of the lending.

Column 2 adds a lagged effect of IMF lending. The estimated contemporaneous effect is similar to that in column 1. The lagged effect is also negative, but the estimated coefficient is not statistically significant, -0.08 (0.10).

Columns 3 and 4 show a similar pattern of results for the IMF loan-participation rate. In column 3, the estimated coefficient, -0.013 (0.005), implies, if viewed causally, that an increase in IMF program participation by 0.3 (about one standard deviation) lowers the growth rate by 0.38 percentage point per year. Column 4 shows that the estimated lagged effect is again negative but statistically insignificant, -0.005 (0.005).

Column 5 shows that loan size and loan participation each contribute to the negative relation with economic growth. The estimated coefficient of the contemporaneous IMF loan-GDP ratio is again significantly negative: -0.26 (0.11). The

estimated coefficient of the loan-participation rate is negative and marginally significant: -0.0079 (0.0049). Thus, there may be a threshold effect, whereby participation in IMF lending of any positive amount is negatively related to growth. Then, in addition, the larger the loan the lower the growth rate. Column 6 shows that the lagged effects are still not important.

In columns 7-12, the estimation technique switches to use as instruments the contemporaneous and lagged values of the following variables: the logs of the IMF quota and staff shares, the logs of the fractions of U.N. votes along with the United States and the European countries, and the logs of the intensity of trade with the United States and the European countries.[25] The actual values of IMF loan-GDP ratios and loan-participation rates are now excluded from the instrument lists.

The results in column 7 should be compared to those in column 1. With the use of the instrumental variables, the estimated coefficient on the contemporaneous IMF loan-GDP ratio becomes much smaller in magnitude and is now statistically insignificantly different from zero (-0.06, s.e. =0.16). We conclude that the main reason for the significantly negative coefficient in column 1 is the endogeneity of the IMF lending—that is, lower economic growth increases the likely size of IMF loans within the contemporaneous five-year period.

In column 8, which adds the lagged IMF loan-GDP ratio, the estimated coefficient on the lagged value is larger in magnitude than that for the contemporaneous ratio. However, the lagged coefficient is still statistically insignificant, -0.20 (0.16). Moreover, the contemporaneous and lagged values are jointly insignificantly different from zero (p-value = 0.42). Therefore, when we use the political-economy variables as instruments, we cannot reject the hypothesis that economic growth is independent of the ratio of IMF loans to GDP.[26]

The results for the IMF loan-participation rate, shown in columns 9 and 10 of Table 7, provide a different picture. In column 9, the estimated coefficient of the contemporaneous loan-participation rate is negative and statistically significant: -0.0163

[25] The results do not change qualitatively if we exclude the bilateral trade variables from the list of instruments.

[26] We also estimated regressions that use total IMF loans, rather than IMF stabilization loans. The results are similar: when we apply instrumental estimation, the estimated coefficients on the contemporaneous and lagged IMF loan-GDP ratios are negative but statistically insignificantly different from zero.

(0.0065). The magnitude of this point estimate is larger than before (-0.0126 in column 3). Thus, in contrast to the results for loan size, the use of instruments to control for endogeneity raises the estimated magnitude of the negative effect of IMF loan participation on economic growth. The point estimate of -0.0163 implies that an increase in the loan-participation rate by 0.3 (about one standard deviation) lowers the rate of economic growth within the contemporaneous five-year period by 0.5 percent per year. In column 10, the estimated lagged effect is also negative but not statistically significant: -0.0082 (0.0074).

Columns 11 and 12 show that the same conclusions emerge when IMF loan size and participation are included simultaneously. The contemporaneous loan-participation rate is significantly negative in columns 11 and 12, lagged participation is insignificant in column 12, and the loan-GDP ratios are insignificant in columns 11 and 12.

To sum up, our main conclusion is that participation in IMF loan programs has a significantly negative effect on economic growth over the contemporaneous five-year period. This result holds up (in column 9) when we use reasonable instruments for participation in IMF loan programs. Thus, we think that this estimate reflects the negative effect of program participation on growth, rather than the negative effect of growth on the participation rate. We also found a strong inverse relation between economic growth and the contemporaneous IMF loan-GDP ratio when we did not instrument (in column 1), but this relation disappears when we use our instruments (in column 7). Thus, the negative effect of IMF lending programs on growth seems to involve the fact, rather than the amount, of IMF lending.[27]

B. Effects of IMF Loan Programs on Other Variables

IMF loan programs may also influence economic growth indirectly by affecting some of the explanatory variables that we held constant in the systems shown in Table 7. The possibilities include effects on investment, inflation, government consumption, international openness, democracy, and the rule of law. This section investigates whether IMF lending has important effects on these variables and, thereby, additional influences on economic growth.

[27] Another possible explanation for the results is that the IMF loan-participation rate looks more important because it is measured more accurately than the IMF loan-GDP ratio. This interpretation still leaves us with the conclusion that IMF loan programs are bad for economic growth.

1. Investment

Table 8 shows cross-country panel regressions for the investment ratio. The dependent variables are the averages of the ratio of investment to GDP over the five five-year periods from 1975-79 to 1995-99. The specification follows the form of Table 7, except that the lagged investment ratio is added as an explanatory variable. Since the investment ratio displays a high degree of serial dependence, this lagged dependent variable has a lot of explanatory power. The estimated coefficients are around 0.6 and are highly significant.

As before, columns 1-6 show the results when the IMF loan-GDP ratios and loan-participation rates are included in the instrument lists, whereas columns 7-12 use the political-economy variables as instruments. The contemporaneous impact of the IMF loan-GDP ratio on the investment ratio is significantly negative in column 1 of Table 8. The estimated coefficient, -0.55 (s.e. = 0.15), implies that an increase in IMF lending by 1 percent of GDP is associated with a decrease in the investment ratio by 0.55 percentage point. The estimated coefficient using the instruments in column 7 is similar. That is, unlike the case for economic growth, the negative relation between the IMF loan-GDP ratio and the investment ratio does not seem to reflect reverse causation from economic outcomes (in this case, the investment ratio) to IMF lending.

In column 2 of Table 8, the lagged effect from IMF lending is insignificant. However, this lagged effect is significantly negative with the instrumental estimation in column 8. These estimates show that a higher IMF loan-GDP ratio reduces the investment ratio contemporaneously with a coefficient of -0.37 (0.25) and at a five-year lag with a coefficient of -0.41 (0.22).[28]

Column 3 shows a significantly negative relation between the IMF loan-participation rate and the investment ratio, and column 9 shows that this effect is even larger in magnitude when the instruments are used. Column 4 indicates a recovery of the investment ratio in the subsequent five years, but the instrumental estimates in column 10 do not show this recovery. Columns 5, 6, 11, and 12 show that it is difficult to break down

[28]The estimated coefficient of 0.6 on the lagged investment ratio implies that the contemporaneous effect of -0.37 would, in addition, carry over to the next five-year period with an estimated coefficient of -0.22.

the effects of IMF loan programs on investment into contributions from participation versus those from loan size. However, the instrumental estimates in column 11 suggest that larger loans and a greater participation rate each tend to depress investment.

Overall, we find substantial evidence that IMF loan programs reduce the ratio of investment to GDP. Since the investment ratio in turn affects economic growth in Table 7, we have isolated an indirect channel by which IMF lending depresses economic growth. This effect adds to the direct impact of IMF lending on growth that we found in Table 7.

We consider first the point estimates for indirect effects on growth and investigate later the statistical significance of these effects. Consider as an example the estimated coefficient of -0.018 on the IMF loan-participation rate in column 9 of Table 8. If we multiply this value by the estimated coefficient on the investment-GDP ratio in the growth regression (0.070 in column 9 of Table 7), we get -0.001. This indirect effect adds to the direct coefficient of -0.016 shown for the effect of the IMF loan-participation rate on growth in column 9 of Table 7. Thus, this indirect effect adds, but only in a minor way, to the negative effect of IMF loan participation on economic growth.

As another example, consider the estimated coefficient of -0.55 on the IMF loan-GDP ratio in column 7 of Table 8. If we multiply this value by the estimated coefficient on the investment-GDP ratio in the growth regression (0.068 from column 7 of Table 7), we get an indirect effect on economic growth of -0.037. The direct effect of the IMF loan-GDP ratio was given by the coefficient -0.058 (column 7 of Table 7) and was insignificantly different from zero. However, the inclusion of the indirect effect from investment results in a larger point estimate for the overall negative effect of the IMF loan-GDP ratio on economic growth.

2. Other variables

Table 9 examines the effects of IMF loan programs on other policy and performance variables. We consider five variables that were used as explanatory variables for economic growth in Table 7: the inflation rate, the government consumption ratio, the international openness ratio, the democracy indicator, and the rule-of-law indicator. We also consider the current-account balance as a ratio to GDP, although this variable was not included as a growth determinant in Table 7. In each case, the forms of the regressions are

analogous to those used for the investment-GDP ratio in Table 8. Table 9 shows only the estimated coefficients for the IMF loan-GDP ratios and the IMF loan-participation rates. In each case, the upper section shows the coefficient estimates when the IMF variables are included in the instrument lists, and the lower section shows the estimates when the political-economy variables are used as instruments.

a. Inflation rate. Panel A has the results for the inflation rate. We find no significant effects on inflation from the contemporaneous or lagged IMF loan-GDP ratios and IMF loan-participation rates. Hence, IMF loan programs do not have any clear effects on inflation.

b. Government consumption. Panel B refers to the ratio to GDP of government consumption (exclusive of outlays for education and defense). We find no significant effects on this ratio from the contemporaneous or lagged IMF loan-GDP ratios and IMF loan-participation rates.[29]

c. International openness. Panel C considers the international-openness variable. The main finding, in the section that uses the political-economy variables as instruments, is the significantly positive effect of the contemporaneous IMF loan-participation rate (column 9). An increase in the participation rate by 0.28 (its sample standard deviation) is estimated to raise the openness ratio by 0.03. Hence, there is evidence that participation in IMF loan programs encourages international openness within the contemporaneous five-year period. The contemporaneous IMF loan-GDP ratio is also positive but not statistically significant (column 7).

The spur to international openness provides an indirect channel whereby participation in IMF loan programs encourages economic growth. In terms of point estimates, consider the estimated coefficient on the IMF loan-participation rate of 0.105 from column 9 of Table 9, panel C. If we multiply this value by the estimated coefficient of 0.0097 for the openness variable in the growth regressions (Table 7, column 9), we get an indirect effect on growth of 0.001. This effect offsets the direct estimate of -0.016 (Table 7, column 9) but only to a minor extent.[30]

[29] Conway (1994) also considered this channel and found insignificant effects of IMF loan programs on government consumption.

[30] Additional indirect effects arise because higher international openness tends to stimulate investment (Table 8), which then further promotes economic growth (Table 7). However, these kinds of more distant indirect

d. Democracy. Panel D of Table 9 has results for the democracy indicator. The main finding of interest, in the section that uses the political-economy variables as instruments, is the marginally significant negative effect from the IMF loan-GDP ratio. These effects show up contemporaneously in column 7 and also with a five-year lag in column 8. The tendency for IMF programs to retard democracy is of considerable interest for its own sake.

The negative effect of IMF lending on democracy implies indirect effects on economic growth. As an example of point estimates, consider the estimated coefficient of -2.25 on the contemporaneous IMF loan-GDP ratio in column 7 of Table 9, panel D. If we multiply this value by the corresponding coefficients on the level and square of the democracy index (0.041 and –0.026, respectively, in column 7 of Table 7) and evaluate at the sample mean for democracy of 0.68, we get an indirect marginal effect on growth of -0.013. This effect reinforces the direct coefficient of -0.058, shown in column 7 of Table 7. However, this direct effect was itself not statistically significant.

e. Rule of law. Panel E has the results for the rule-of-law index. As with democracy, there is some indication that IMF loan programs reduce the rule of law. The clearest finding, in the section that uses the political-economy variables as instruments, is the significantly negative effect from the lagged IMF loan-participation rate. An increase in the participation rate by 0.28 (its sample standard deviation) is estimated to lower the rule-of-law indicator in the subsequent five-year period by 0.03.

The findings on rule of law are consistent with those reported for foreign aid by Svensson (2000) and Alesina and Weder (2002). These studies found that an increase in foreign aid led to a rise in official corruption. The rationale was that foreign aid fostered rent-seeking activities by interest groups and government officials. Analogous possibilities might arise for IMF lending.

The reduction in the rule-of-law index implies an additional negative, indirect effect from IMF loan participation on economic growth. In terms of point estimates, consider the estimated coefficient of -0.12 on the lagged IMF loan-participation rate in column 10 of Table 9, panel E. If we multiply this value by the corresponding coefficient on the rule-of-law index in the growth regression (0.0170 in column 10 of Table 7), we get

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effects turn out to be quantitatively negligible. Therefore, we ignore these effects in our discussion.

an indirect effect on growth of -0.002. This effect adds to the direct estimate of -0.008 (Table 7, column 10) for the lagged IMF loan-participation rate, although this direct effect was not statistically significantly different from zero. Again, the magnitude of the indirect effect on growth is relatively minor.

f. Current-account balance. Panel F of Table 9 considers the effects of IMF loan programs on the current-account balance, expressed as a ratio to GDP. When the actual IMF loan-GDP ratios are included in the instrument lists, the estimates show a negative contemporaneous relation between the IMF loan-GDP ratio and the current-account balance (column 1). However, when we use the political-economy variables as instruments, the point estimate becomes positive, though insignificantly different from zero (column 7). Therefore, we infer that the inverse contemporaneous relation between the IMF loan-GDP ratio and the current-account balance reflects the endogeneity of the loan programs—a weaker current account raises the likely size of an IMF loan program.

The results that use the political-economy variables as instruments (the lower section of panel F) indicate that IMF loan participation may improve the current-account balance. However, none of the estimated coefficients are statistically significant—for example, the estimated coefficient of the contemporaneous IMF loan-participation rate in column 9 is 0.018 (0.013). This value implies that an increase in the participation rate by 0.28 would raise the ratio of the current-account balance to GDP by 0.005.

g. Overall indirect effects on growth. The results discussed thus far considered point estimates for indirect effects of IMF loan programs on economic growth. The broad pattern is that these effects exist but seem not to be quantitatively important. To assess the statistical significance of the indirect effects, we have to estimate combined systems that include equations for economic growth, the investment ratio, the government consumption ratio, and so on. We estimated these systems by three-stage least-squares to get p-values for the indirect effects implied by the estimates in Tables 7-9.[31] The results are in Table 10. All of these estimates use the political-economy variables as instruments. Panel A shows estimates when contemporaneous and lagged IMF loan-GDP ratios are included, and panel B has the estimates for contemporaneous and lagged IMF loan-participation rates. The

[31] Alternatively, we could use the point estimates for indirect effects implied by the three-stage least-squares estimation of the combined system. The problem with this procedure is that misspecification of any of the equations makes all of the estimates inconsistent.

direct effects shown come from columns 8 and 10 of Table 7. The indirect effects are computed from the estimates in columns 8 and 10 of Tables 7-9.

In panel A, column 1, the point estimate of the total of the indirect effects for the contemporaneous IMF loan-GDP ratio is -0.046, compared to the direct effect of -0.044. In column 2, the point estimate of the total of the indirect effects for the lagged IMF loan-GDP ratio is -0.048, compared to the direct effect of -0.203. Note that the individual and total indirect effects of IMF loan-GDP ratios on economic growth are all statistically insignificant at the 5% level (columns 3-5). At the 10% level, the negative effect of the IMF loan-GDP ratio on the rule of law implies a statistically significant indirect negative effect on growth (columns 2 and 4).

In panel B, column 1, the point estimate of the total of the indirect effects for the contemporaneous IMF loan-participation rate is -0.0005, compared to the direct effect of -0.0141. In column 2, the point estimate of the total of the indirect effects for the lagged IMF loan-participation rate is -0.0010, compared to the direct effect of -0.0082. In both cases, columns 3-5 show that the total of the indirect effects for IMF loan-participation rates is statistically insignificantly different from zero. For individual effects, the one statistically significant indirect channel at the 5% level comes from the negative influence of the lagged IMF loan-participation rate on the rule of law (columns 2 and 4). At the 10% level, another statistically significant indirect channel comes from the negative effect of the contemporaneous IMF loan-participation rate on investment (columns 1 and 3).

The uncertainty about the various indirect effects means that the total effects of IMF loan programs on growth are less precisely estimated than the direct effects. For example, in column 5 of panel B, the p-value for the direct effects on growth of the contemporaneous and lagged IMF loan-participation rates is 0.004. This result accords with our previous discussion, which stressed that IMF loan participation had significantly negative effects on economic growth. The results shown in column 1 at the bottom of panel B indicate that the point estimates for the total effects of IMF loan-participation rates on economic growth are larger in magnitude than the direct effects—that is, the total indirect effects are also negative, though small in magnitude. Nevertheless, because of the uncertainty attached to the total indirect effect, the p-value for the total effects of the contemporaneous and lagged IMF loan-participation rates (0.034 in column 5) is higher

than that for the direct effects alone (0.004).

In panel A, the direct and total effects of contemporaneous and lagged IMF loan-GDP ratios are statistically insignificant (the p-values in column 5 are 0.32 and 0.57, respectively). The result for direct effects accords with our previous discussion, in which the instrumental estimates showed that IMF loan-GDP ratios were not significantly related to economic growth. Now this finding applies also to the total effects, which add in the indirect effects on growth.

The results leave us with the question of what the direct negative effects of IMF loan participation on growth represent. That is, we know that these effects do not derive from channels involving the other explanatory variables that were held constant in the growth regressions shown in Table 7. These channels involved investment, inflation, government consumption, international openness, democracy, and the rule of law. However, the IMF may matter through channels involving additional variables.

As an example, the moral hazard created by the potential for IMF loans may cause governments to spend excessively on public investment or transfers, which were not included in our government consumption variable. The IMF programs may also encourage inefficient behavior on the part of government bureaucrats. IMF conditionality may harm economies in ways not captured by the inflation rate and the other variables considered. For example, there may be effects on tax structure and regulations. Finally, IMF loan programs may influence the size and structure of private credit markets. These possibilities constitute promising avenues for future research.

IV. Concluding Observations

We began with a political-economy approach to the IMF's lending decisions. Holding fixed a set of standard economic variables, the probability and size of IMF loans were larger when a country had a bigger quota, more nationals working on the professional staff, and more political and economic proximity to the United States and the major Western European countries. We measured political proximity by voting patterns in the U.N. General Assembly and economic proximity by bilateral trading volume. The set of political-economy variables was statistically significant overall for explaining the size of IMF loans, the frequency of participation in IMF lending programs, and the probability of

IMF loan approval.

This political-economy analysis of IMF lending practices is of substantial interest for its own sake. More importantly for present purposes, the results allow us to create a set of instrumental variables to use to estimate the effects of IMF loan programs on economic and political variables. If we do not instrument, we find that the IMF loan-GDP ratio has a substantial inverse relation to economic growth in the contemporaneous five-year period. However, the instrumental estimates indicate that the contemporaneous relation of the IMF loan-GDP ratio to economic growth is statistically insignificant. Thus, the apparent inverse relation likely reflects the endogenous response of IMF lending to weak economic conditions. In contrast, the instrumental estimates still show that the IMF loan-participation rate has a statistically significant negative influence on economic growth. Therefore, greater IMF program participation, rather than larger loans, seems to retard economic growth.

We also analyzed the effects of IMF loan programs on other economic and political variables— investment, inflation, government consumption, international openness, democracy, rule of law, and the current-account balance. The instrumental estimates show that higher IMF loan-GDP ratios and loan participation rates reduce investment. In addition, greater loan participation raises international openness and lowers the rule of law. A larger IMF loan-GDP ratio may also reduce democracy. We find no statistically significant effects of IMF loan programs on inflation, government consumption, and the current-account balance.

The effects of IMF loan programs imply indirect influences on economic growth—for example, the negative effects on investment and the rule of law reduce growth, whereas the positive effect on international openness raises growth. However, these indirect effects on growth turn out to be quantitatively small, and the total of these indirect effects is statistically insignificantly different from zero.

The bottom line is that IMF loan programs tend to have adverse economic consequences. The harm shows up in lower economic growth and investment and less rule of law, offset by an increase in international openness. We conclude that the typical country would be better off if it could commit itself not to be involved with IMF loan programs.

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Table 1. Approval of IMF Loan Programs, 1970-2000

Cells show number of programs approved and
amounts committed (in parentheses) in millions of SDRs.

	Stabilization Programs		Structural Programs		
Period	SBA	EFF	SAF	ESAF/PRGF	Total
1970-1974	82 (4,913)				82 (4,913)
1975-1979	83 (8,091)	7 (1,895)			90 (9,945)
1980-1984	116 (20,520)	26 (22,692)			142 (43,213)
1985-1989	90 (14,117)	3 (1,277)	29 (1,455)	7 (955)	129 (17,804)
1990-1994	79 (14,974)	12 (14,479)	8 (130)	27 (3,309)	126 (32,893)
1995-2000	72 (83,250)	24 (36,659)	1 (182)	59 (6,961)	156 (126,052)

Notes: An approval of an IMF program indicates that a new IMF financial arrangement was approved for a country in the fiscal year (from May of the previous year to April of the current year). SBA is Stand-by Arrangement, EFF is Extended Fund Facility, SAF is Structural Adjustment Facility, and ESAF is Enhanced Structural Adjustment Facility. The ESAF was replaced in 1999 by the Poverty Reduction and Growth Facility (PRGF).

Source: IMF (2000, Appendix Table II-1).

Table 2. Summary Statistics for Variables Used in Regressions

Variable	Mean	Median	σ
IMF loan-GDP ratio (EFF and SBA only)	0.0027	0	0.0094
IMF loan-GDP ratio (EFF and SBA only), sub-sample of positive loans	0.0066	0.0027	0.0139
IMF loan-participation rate (EFF and SBA only)	0.185	0	0.279
IMF loan approval frequency (EFF and SBA only)	0.364	0	0.481
Per capita GDP growth rate (lagged)	0.014	0.015	0.036
International reserves (months of imports)	3.300	2.651	2.850
GDP per capita (1996 U.S. thousand dollars)	6.745	4.100	6.729
Log (GDP) (1996 U.S. million dollars)	10.177	9.971	2.062
Group of advanced OECD countries	0.176	0	0.381
IMF quota share (log)	-5.822	-6.171	1.246
IMF staff share (log)	-5.663	-5.795	1.256
Political proximity to the United States (log)	-1.441	-1.423	0.478
Political proximity to major Europe (log)	-0.882	-0.963	0.342
Intensity of trade with the United States (log)	-3.090	-3.082	1.448
Intensity of trade with major Europe (log)	-3.412	-3.332	1.006

Notes to Table 2

The sample consists of the 613 observations for the five five-year periods from 1975 to 1999 that are used in the regressions in Tables 3, 4, and 5. The IMF loan-GDP ratio is the average for each five-year period. Participation is the fraction of time that a country was in an IMF loan program in each five-year period. IMF loan approval takes on the value 1 if a loan is approved within a five-year period. Only the EFF and SBA loans are included. The figures on GDP are the PPP-adjusted values, as discussed in Summers and Heston (1991) and Heston, Summers, and Aten (2002). The group of advanced OECD countries consists of countries other than Turkey that have been members of the OECD since the 1970s. The share of IMF staff nationals is the fraction of own nationals in IMF economists. The share of IMF quota is the fraction of each country's quota in the IMF total. Political proximity to the United States is the log value of the fraction of times out of all votes that each country voted in the U.N. General Assembly along with the United States. Political proximity to major Europe is the average value of the political proximity measures for France, Germany, and the United Kingdom. Trade intensity with the United States is the bilateral trade (exports and imports) between a country and the United States, expressed as a ratio to the country's GDP. Trade intensity with major Europe is the average value of the trade intensity measures for France, Germany, and the United Kingdom. All variables except the per capita GDP growth rate and the IMF loan variables are observed at the beginning of each five-year period. The per capita GDP growth rate is the average over the previous five-year period.

Table 3. Determinants of IMF Loan-GDP Ratio

(cells show estimated coefficients with standard errors in parentheses)

	(1)	(2)	(3)	(4)	(5)	(6)
Per capita GDP	-0.086	-0.088	-0.054	-0.055	-0.054	-0.057
growth rate	(0.027)	(0.026)	(0.020)	(0.021)	(0.020)	(0.021)
International	-0.0014	-0.0012	-0.0012	-0.0013	-0.0014	-0.0012
Reserves	(0.0005)	(0.0004)	(0.0004)	(0.0004)	(0.0005)	(0.0004)
GDP per capita	0.0025	0.0017	0.0017	0.0018	0.0024	0.0017
	(0.0010)	(0.0009)	(0.0009)	(0.0009)	(0.0011)	(0.0095)
GDP per capita	-0.00025	-0.00021	-0.00024	-0.00024	-0.00028	-0.00024
Squared	(0.00009)	(0.00007)	(0.00009)	(0.00009)	(0.00010)	(0.00009)
Log (GDP)	0.0039	0.0024	0.0057	0.0056	0.0077	0.0056
	(0.0037)	(0.0033)	(0.0036)	(0.0036)	(0.0039)	(0.0036)
Log (GDP) squared	-0.00014	-0.00010	-0.00046	-0.00048	-0.00061	-0.00048
	(0.00018)	(0.00016)	(0.00023)	(0.00023)	(0.00026)	(0.00023)
Group of advanced	-0.0025	-0.0047	-0.0026	-0.0040	-0.0074	-0.0061
OECD countries	(0.0063)	(0.0067)	(0.0072)	(0.0076)	(0.0083)	(0.0079)
Log (IMF quota)			0.0100	0.0098	0.0105	0.0096
			(0.0039)	(0.0039)	(0.0040)	(0.0037)
Log (IMF staff)		0.0020		0.0017	0.0019	0.0017
		(0.0010)		(0.0009)	(0.0009)	(0.0009)
Political proximity		0.0047	0.0051	0.0046		-0.0004
to the U.S.		(0.0028)	(0.0028)	(0.0028)		(0.0035)
Political proximity					0.0083	0.0085
to major Europe					(0.0036)	(0.0044)
Intensity of trade		0.0021	0.0018	0.0018		0.0019
with the U.S.		(0.0008)	(0.0007)	(0.0007)		(0.0007)
Intensity of trade					0.0003	0.0003
with major Europe					(0.0008)	(0.0008)
p-value (a)		0.015	0.012	0.008	0.002	0.008
(b)		0.003	0.003	0.004	0.005	0.007
Number of obs.	613	613	613	613	613	613

Notes to Table 3

The dependent variable is the average of the IMF loan-GDP ratio over the five-year periods 1975-1979, 1980-1984,…,1995-1999. A Tobit model was applied to the panel data for the five five-year periods. The estimation allows for within-country correlation of the error terms over time. The summary statistics for all variables are shown in Table 2. See the notes to Table 2 for definitions of variables. Period dummies are included (not shown). Robust standard errors of the estimated coefficients are reported in parentheses. The p-value (a) indicates the significance level associated with a test of the joint hypothesis that the estimated coefficients of the included political-economy variables—IMF quota share, IMF staff share, U.N. voting variable(s), and trade intensity variable(s)—are all equal to zero. The p-value (b) applies to the same group of variables except for the trade intensity variable(s).

Table 4. Determinants of IMF Loan-Participation Rate

(cells show estimated coefficients with standard errors in parentheses)

	(1)	(2)	(3)	(4)	(5)	(6)
Per capita GDP	-2.13	-2.17	-1.66	-1.69	-1.68	-1.75
growth rate	(0.70)	(0.67)	(0.72)	(0.72)	(0.71)	(0.71)
International	-0.046	-0.041	-0.041	-0.042	-0.045	-0.041
reserves	(0.013)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
GDP per capita	0.101	0.080	0.077	0.083	0.094	0.078
	(0.029)	(0.028)	(0.029)	(0.029)	(0.030)	(0.030)
GDP per capita	-0.0097	-0.0089	-0.0092	-0.0094	-0.0100	-0.0092
squared	(0.0022)	(0.0021)	(0.0022)	(0.0022)	(0.0024)	(0.0023)
Log (GDP)	0.26	0.23	0.29	0.28	0.33	0.29
	(0.13)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
Log (GDP) squared	-0.0090	-0.0091	-0.0141	-0.0149	-0.0179	-0.0151
	(0.0064)	(0.0060)	(0.0067)	(0.0067)	(0.0068)	(0.0068)
Group of advanced	-0.14	-0.28	-0.22	-0.27	-0.39	-0.35
OECD countries	(0.21)	(0.23)	(0.23)	(0.24)	(0.26)	(0.25)
Log (IMF quota)			0.155	0.146	0.164	0.150
			(0.082)	(0.080)	(0.081)	(0.080)
Log (IMF staff)		0.072		0.068	0.073	0.067
		(0.032)		(0.032)	(0.031)	(0.032)
Political proximity		0.254	0.274	0.254		0.038
to the U.S.		(0.095)	(0.095)	(0.095)		(0.119)
Political proximity					0.42	0.37
to major Europe					(0.13)	(0.17)
Intensity of trade		0.044	0.043	0.040		0.043
with the U.S.		(0.020)	(0.020)	(0.020)		(0.020)
Intensity of trade					0.006	0.005
with major Europe					(0.032)	(0.032)
p-value (a)		0.0009	0.0030	0.0011	0.0002	0.0016
(b)		0.0000	0.0003	0.0000	0.0001	0.0001
Number of obs.	613	613	613	613	613	613

Notes: The dependent variable is the fraction of time that a country participated in an IMF loan program during each five-year period. Estimation was by the Tobit procedure, including allowance for within-country correlation of the error terms over time. See the notes to Tables 2 and 3 for additional information.

Table 5. Determinants of IMF Loan Approval

(cells show estimated coefficients with standard errors in parentheses)

	(1)	(2)	(3)	(4)	(5)	(6)
Per capita GDP	-4.0	-4.2	-3.7	-3.8	-3.6	-3.8
growth rate	(1.8)	(1.8)	(1.8)	(1.8)	(1.8)	(1.8)
International	-0.108	-0.101	-0.100	-0.102	-0.109	-0.102
reserves	(0.029)	(0.028)	(0.028)	(0.028)	(0.029)	(0.028)
GDP per capita	0.194	0.157	0.148	0.158	0.187	0.157
	(0.068)	(0.071)	(0.071)	(0.072)	(0.071)	(0.073)
GDP per capita	-0.0185	-0.0174	-0.0173	-0.0178	-0.0192	-0.0178
squared	(0.0049)	(0.0049)	(0.0049)	(0.0051)	(0.0053)	(0.0052)
Log (GDP)	0.65	0.61	0.66	0.65	0.76	0.66
	(0.29)	(0.29)	(0.30)	(0.30)	(0.29)	(0.30)
Log (GDP) squared	-0.024	-0.023	-0.027	-0.028	-0.035	-0.030
	(0.014)	(0.014)	(0.016)	(0.016)	(0.016)	(0.016)
Group of advanced	-0.49	-0.75	-0.62	-0.74	-0.96	-0.84
OECD countries	(0.47)	(0.54)	(0.51)	(0.54)	(0.58)	(0.58)
Log (IMF quota)			0.14	0.12	0.17	0.14
			(0.18)	(0.18)	(0.18)	(0.18)
Log (IMF staff)		0.139		0.135	0.149	0.136
		(0.082)		(0.082)	(0.080)	(0.082)
Political proximity		0.49	0.53	0.49		0.17
to the U.S.		(0.26)	(0.25)	(0.26)		(0.38)
Political proximity					0.75	0.57
to major Europe					(0.34)	(0.50)
Intensity of trade		0.090	0.092	0.087		0.094
with the U.S.		(0.050)	(0.050)	(0.050)		(0.051)
Intensity of trade					-0.016	-0.027
with major Europe					(0.075)	(0.075)
p-value (a)		0.018	0.082	0.041	0.021	0.060
(b)		0.005	0.024	0.009	0.036	0.029
Number of obs.	613	613	613	613	613	613

Notes: The dependent variable is a dummy variable that equals one if a new IMF loan program was approved in any year of each of the five-year periods. Estimation was by the probit procedure, including allowance for within-country correlation of the error terms over time. See the notes to Tables 2 and 3 for additional information.

Table 6. Additional Determinants of IMF Loan Programs

(cells show estimated coefficients with standard errors in parentheses)

	Dependent variable for IMF loan programs		
Independent variables	Loan-GDP Ratio	Participation rate	Approval
Current account/GDP (lagged)	-0.011 (0.012)	-0.24 (0.40)	0.09 (0.91)
Inflation rate (lagged)	0.0014 (0.0022)	0.059 (0.079)	0.28 (0.26)
Fiscal balance/GDP (lagged)	-0.012 (0.026)	0.55 (0.54)	1.07 (1.29)
International openness (lagged)	-0.0058 (0.0036)	-0.28 (0.15)	-0.77 (0.37)
Democracy index (initial year)	0.0049 (0.0029)	0.092 (0.097)	0.03 (0.26)
Rule-of-law index (initial year)	0.0019 (0.0063)	0.07 (0.19)	0.43 (0.49)

Notes: The new independent variables are added, one at a time, to the regressions for IMF loan programs shown in column 6 of Tables 3, 4, and 5, respectively. Table 6 shows only the estimated coefficient and standard error of the new variable. The current-account variable is the ratio of the current-account balance to GDP, both in nominal US dollars, averaged over each five-year period. The inflation rate is the growth rate over each period of a consumer price index. The fiscal balance variable is the average for each period of the ratio of the central government's overall budget surplus to GDP. The international openness variable is the average for each period of the ratio of exports plus imports to GDP. The democracy index, expressed on a zero-to-one scale, with one the most favorable, is based on the indicator of political rights compiled by Freedom House. The rule-of-law index, expressed on a zero-to-one scale, with one the most favorable, is based on the indicator from *International Country Risk Guide* for the maintenance of the rule of law. The democracy and rule-of-law indexes are observed at the beginning of each period.

Table 7. Regressions for per capita GDP Growth

(cells show estimated coefficients with standard errors in parentheses)

	(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	instruments include IMF loan-GDP ratios and loan-participation rates					
Log (per capita GDP)	-0.0271 (0.0038)	-0.0260 (0.0038)	-0.0290 (0.0039)	-0.0293 (0.0040)	-0.0283 (0.0038)	-0.0277 (0.0039)
Male upper-level schooling	0.0037 (0.0018)	0.0034 (0.0017)	0.0039 (0.0018)	0.0038 (0.0018)	0.0039 (0.0017)	0.0036 (0.0017)
Log (life expectancy)	0.064 (0.023)	0.063 (0.023)	0.073 (0.023)	0.074 (0.023)	0.069 (0.023)	0.068 (0.022)
Log (total fertility rate)	-0.0149 (0.0061)	-0.0151 (0.0060)	-0.0143 (0.0061)	-0.0152 (0.0061)	-0.0146 (0.0060)	-0.0154 (0.0060)
Investment/GDP	0.070 (0.033)	0.060 (0.033)	0.069 (0.033)	0.060 (0.033)	0.073 (0.033)	0.068 (0.032)
Government consumption/GDP	-0.086 (0.027)	-0.083 (0.027)	-0.096 (0.027)	-0.091 (0.027)	-0.082 (0.026)	-0.077 (0.026)
Inflation rate	-0.0154 (0.0080)	-0.0190 (0.0079)	-0.0154 (0.0080)	-0.0190 (0.0079)	-0.0149 (0.0079)	-0.0186 (0.0077)
Openness measure	0.0109 (0.0049)	0.0110 (0.0048)	0.0097 (0.0049)	0.0092 (0.0049)	0.0098 (0.0048)	0.0093 (0.0048)
Rule-of-law index	0.0168 (0.0081)	0.0165 (0.0080)	0.0191 (0.0081)	0.0191 (0.0082)	0.0166 (0.0080)	0.0161 (0.0080)
Democracy index	0.044 (0.021)	0.046 (0.021)	0.045 (0.021)	0.050 (0.021)	0.047 (0.021)	0.052 (0.021)
Democracy index squared	-0.030 (0.019)	-0.032 (0.019)	-0.032 (0.020)	-0.037 (0.020)	-0.034 (0.019)	-0.039 (0.019)
Growth rate of terms of trade	0.068 (0.028)	0.068 (0.028)	0.074 (0.028)	0.074 (0.028)	0.071 (0.028)	0.070 (0.028)
Contemporaneous IMF loan	-0.324 (0.099)	-0.309 (0.102)	--	--	-0.255 (0.110)	-0.251 (0.111)
Lagged IMF loan	--	-0.075 (0.102)	--	--	--	-0.034 (0.110)
Contemporaneous IMF participation	--	--	-0.0126 (0.0045)	-0.0104 (0.0047)	-0.0079 (0.0049)	-0.0057 (0.0052)
Lagged IMF participation	--	--	--	-0.0054 (0.0047)	--	-0.0042 (0.0050)
p-value	0.001	0.004	0.005	0.012	0.001	0.005

Table 7, continued

	(7)	(8)	(9)	(10)	(11)	(12)
Independent variables	instruments include political-economy determinants of IMF loans					
Log (per capita GDP)	-0.0271 (0.0038)	-0.0268 (0.0037)	-0.0296 (0.0037)	-0.0307 (0.0038)	-0.0298 (0.0038)	-0.0303 (0.0039)
Male upper-level schooling	0.0036 (0.0018)	0.0033 (0.0018)	0.0041 (0.0017)	0.0040 (0.0017)	0.0040 (0.0018)	0.0038 (0.0017)
Log (life expectancy)	0.064 (0.023)	0.065 (0.023)	0.075 (0.023)	0.077 (0.023)	0.076 (0.023)	0.078 (0.023)
Log (total fertility rate)	-0.0147 (0.0063)	-0.0152 (0.0062)	-0.0142 (0.0060)	-0.0157 (0.0061)	-0.0142 (0.0062)	-0.0155 (0.0062)
Investment/GDP	0.068 (0.032)	0.059 (0.032)	0.070 (0.031)	0.067 (0.032)	0.070 (0.032)	0.062 (0.032)
Government consumption/GDP	-0.095 (0.028)	-0.087 (0.028)	-0.088 (0.025)	-0.086 (0.026)	-0.093 (0.028)	-0.086 (0.028)
Inflation rate	-0.0121 (0.0065)	-0.0150 (0.0067)	-0.0121 (0.0065)	-0.0131 (0.0064)	-0.0113 (0.0064)	-0.0143 (0.0067)
Openness measure	0.0115 (0.0049)	0.0116 (0.0048)	0.0097 (0.0048)	0.0093 (0.0048)	0.0096 (0.0049)	0.0094 (0.0048)
Rule-of-law index	0.0199 (0.0083)	0.0202 (0.0082)	0.0180 (0.0079)	0.0170 (0.0082)	0.0188 (0.0081)	0.0185 (0.0083)
Democracy index	0.041 (0.021)	0.048 (0.021)	0.047 (0.021)	0.053 (0.022)	0.046 (0.021)	0.055 (0.022)
Democracy index squared	-0.026 (0.020)	-0.032 (0.020)	-0.033 (0.019)	-0.038 (0.020)	-0.032 (0.020)	-0.040 (0.020)
Growth rate of terms of trade	0.070 (0.028)	0.075 (0.028)	0.076 (0.028)	0.076 (0.028)	0.076 (0.028)	0.080 (0.028)
Contemporaneous IMF loan	-0.058 (0.163)	-0.044 (0.163)	--	--	0.108 (0.186)	0.115 (0.186)
Lagged IMF loan	--	-0.203 (0.161)	--	--	--	-0.156 (0.179)
Contemporaneous IMF participation	--	--	-0.0163 (0.0065)	-0.0141 (0.0068)	-0.0184 (0.0074)	-0.0166 (0.0078)
Lagged IMF participation	--	--	--	-0.0082 (0.0074)	--	-0.0047 (0.0083)
p-value	0.72	0.42	0.012	0.026	0.037	0.085

Notes to Table 7

The system has five equations, corresponding to the periods 1975-80, 1980-85, 1985-90, 1990-95, and 1995-2000. The sample comprises 86 countries and 391 total observations. The dependent variables are the growth rates of per capita GDP. Data on GDP are from Penn-World Tables version 6.1, as described in Summers and Heston (1991) and Heston, Summers, and Aten (2002).

The log of per capita GDP, the average years of male secondary and higher schooling, and the log of life expectancy at age one are measured at the beginning of each period. The ratios of government consumption (exclusive of spending on education and defense) and investment (private plus public) to GDP, the inflation rate, the total fertility rate, the growth rate of the terms of trade (export over import prices), and the democracy index are period averages. The rule-of-law index is the earliest value available (for 1982 or 1985) in the first equation and the period average for the other equations. The openness variable is the ratio of exports plus imports to GDP, filtered for the estimated effects on this measure from the logs of population and area. The IMF loan-GDP ratios and loan-participation rates are described in the notes to Tables 2-4.

Estimation is by three-stage least squares. Instruments are the actual values of the variables for schooling, life-expectancy, openness, and the terms of trade; dummy variables for Spanish or Portuguese colonies and other colonies (which have substantial explanatory power for inflation); lagged values of the log of per capita GDP, the government consumption ratio, and the investment ratio; and the initial values for each period of the rule-of-law index and democracy index. In the first two equations, the rule-of-law indicator is for 1982 or 1985. The current and lagged values of the IMF loan-GDP ratios are used as instruments in columns 1 and 2, and the current and lagged values of the IMF loan-participation rates are used as instruments in columns 3 and 4. Columns 5 and 6 include as instruments the current and lagged values of the IMF loan-GDP ratios and the IMF loan-participation rates. Columns 7-12 use as instruments the current and lagged values of the log of the IMF staff share, the log of the IMF quota share, the log of the fraction of U.N. votes along with the United States and major Europe, and the log of the trade intensity with the United States and major Europe. The actual values of the IMF-loan-GDP ratios and IMF loan-participation rates are excluded from these instrument lists.

Individual constants (not shown) are included for each period. The p-values indicate the significance level associated with a test of the hypothesis that the coefficients on the IMF variables included in each column are jointly zero.

Table 8. Regressions for Investment Ratio

(cells show estimated coefficients with standard errors in parentheses)

	(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	instruments include IMF loan-GDP ratios and loan-participation rates					
Lagged investment/GDP	0.582 (0.034)	0.572 (0.034)	0.584 (0.035)	0.589 (0.035)	0.580 (0.034)	0.587 (0.034)
Log (per capita GDP)	-0.0024 (0.0046)	-0.0029 (0.0047)	-0.0037 (0.0047)	-0.0016 (0.0047)	-0.0024 (0.0047)	-0.0010 (0.0047)
Male upper-level schooling	0.0029 (0.0022)	0.0030 (0.0022)	0.0033 (0.0022)	0.0032 (0.0022)	0.0029 (0.0022)	0.0028 (0.0022)
Log (life expectancy)	0.061 (0.028)	0.063 (0.028)	0.070 (0.028)	0.067 (0.029)	0.062 (0.028)	0.058 (0.028)
Log (total fertility rate)	-0.0192 (0.0074)	-0.0208 (0.0075)	-0.0176 (0.0074)	-0.0153 (0.0074)	-0.0188 (0.0074)	-0.0167 (0.0074)
Government consumption/GDP	-0.099 (0.033)	-0.098 (0.033)	-0.115 (0.033)	-0.118 (0.033)	-0.097 (0.033)	-0.098 (0.033)
Inflation rate	-0.0079 (0.0108)	-0.0056 (0.0104)	-0.0016 (0.0111)	-0.0048 (0.0109)	-0.0078 (0.0108)	-0.0084 (0.0103)
Openness measure	0.0260 (0.0055)	0.0269 (0.0055)	0.0258 (0.0055)	0.0256 (0.0055)	0.0260 (0.0055)	0.0263 (0.0054)
Rule-of-law index	0.0044 (0.0102)	0.0058 (0.0102)	0.0067 (0.0104)	0.0082 (0.0105)	0.0044 (0.0102)	0.0081 (0.0103)
Growth rate of terms of trade	0.066 (0.039)	0.067 (0.038)	0.079 (0.039)	0.084 (0.039)	0.068 (0.039)	0.082 (0.038)
Contemporaneous IMF loan	-0.55 (0.15)	-0.50 (0.16)	--	--	-0.51 (0.17)	-0.42 (0.17)
Lagged IMF loan	--	-0.11 (0.14)	--	--	--	-0.23 (0.15)
Contemporaneous IMF participation	--	--	-0.0118 (0.0056)	-0.0173 (0.0061)	-0.0033 (0.0062)	-0.0093 (0.0066)
Lagged IMF participation	--	--	--	0.0151 (0.0063)	--	0.0186 (0.0066)
p-value	0.000	0.001	0.036	0.006	0.001	0.003

Table 8, continued

	(7)	(8)	(9)	(10)	(11)	(12)
Independent variables	instruments include political-economy determinants of IMF loans					
Lagged investment/GDP	0.619 (0.033)	0.614 (0.033)	0.591 (0.034)	0.595 (0.034)	0.607 (0.033)	0.618 (0.033)
Log (per capita GDP)	-0.0043 (0.0043)	-0.0043 (0.0044)	-0.0047 (0.0047)	-0.0045 (0.0047)	-0.0049 (0.0045)	-0.0040 (0.0046)
Male upper-level schooling	0.0031 (0.0020)	0.0027 (0.0021)	0.0032 (0.0022)	0.0032 (0.0022)	0.0032 (0.0021)	0.0027 (0.0021)
Log (life expectancy)	0.060 (0.027)	0.061 (0.027)	0.073 (0.028)	0.073 (0.029)	0.065 (0.028)	0.062 (0.028)
Log (total fertility rate)	-0.0188 (0.0070)	-0.0196 (0.0073)	-0.0173 (0.0075)	-0.0170 (0.0075)	-0.0184 (0.0073)	-0.0175 (0.0074)
Government consumption/GDP	-0.086 (0.032)	-0.075 (0.033)	-0.105 (0.032)	-0.105 (0.032)	-0.089 (0.032)	-0.075 (0.033)
Inflation rate	-0.0054 (0.0082)	-0.0092 (0.0085)	-0.0047 (0.0085)	-0.0044 (0.0085)	-0.0055 (0.0083)	-0.0090 (0.0086)
Openness measure	0.0233 (0.0052)	0.0243 (0.0052)	0.0245 (0.0055)	0.0244 (0.0054)	0.0236 (0.0053)	0.0240 (0.0052)
Rule-of-law index	0.0065 (0.0098)	0.0036 (0.0102)	0.0061 (0.0103)	0.0066 (0.0106)	0.0055 (0.0100)	0.0057 (0.0104)
Growth rate of terms of trade	0.075 (0.038)	0.083 (0.039)	0.085 (0.039)	0.086 (0.039)	0.082 (0.038)	0.097 (0.039)
Contemporaneous IMF loan	-0.55 (0.23)	-0.37 (0.25)	--	--	-0.39 (0.26)	-0.23 (0.27)
Lagged IMF loan	--	-0.41 (0.22)	--	--	--	-0.50 (0.24)
Contemporaneous IMF participation	--	--	-0.0182 (0.0083)	-0.0188 (0.0090)	-0.0112 (0.0090)	-0.0133 (0.0098)
Lagged IMF participation	--	--	--	0.0022 (0.0102)	--	0.0130 (0.0110)
p-value	0.0185	0.0134	0.0292	0.090	0.0336	0.0372

Notes: The system has five equations, corresponding to the periods 1975-79, 1980-84, 1985-89, 1990-94, and 1995-99. The dependent variables are averages of the ratio of investment to GDP. These data are from Heston, Summers, and Aten (2002). The sample now comprises 86 countries and 389 total observations. See the notes to Table 7 for other information.

Table 9. Effects of IMF Loan Programs
on other Policy and Performance Variables

A. Inflation rate

	(1)	(2)	(3)	(4)	(5)	(6)
Independent Variables	instruments include IMF loan-GDP ratios and loan-participation rates					
Contemporaneous IMF loan	0.25 (1.01)	-0.23 (1.09)	--	--	-0.02 (1.14)	-0.44 (1.20)
Lagged IMF loan	--	1.40 (1.04)	--	--	--	1.69 (1.14)
Contemporaneous IMF participation	--	--	0.011 (0.026)	0.003 (0.030)	0.012 (0.028)	0.015 (0.033)
Lagged IMF participation	--	--	--	0.015 (0.031)	--	-0.014 (0.034)
p-value	0.81	0.33	0.66	0.81	0.91	0.64

	(7)	(8)	(9)	(10)	(11)	(12)
Independent variables	instruments include political-economy determinants of IMF loans					
Contemporaneous IMF loan	0.38 (1.61)	0.90 (1.70)	--	--	-0.45 (1.90)	-0.06 (2.01)
Lagged IMF loan		-1.48 (1.83)	--	--		-1.18 (2.00)
Contemporaneous IMF participation	--	--	0.031 (0.038)	0.048 (0.046)	0.035 (0.044)	0.042 (0.054)
Lagged IMF participation	--	--	--	-0.031 (0.052)	--	-0.015 (0.058)
p-value	0.81	0.69	0.42	0.57	0.72	0.86

Table 9, continued

B. Government consumption ratio

	(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	instruments include IMF loan-GDP ratios and loan-participation rates					
Contemporaneous IMF loan	-0.07 (0.16)	-0.11 (0.17)	--	--	-0.06 (0.18)	-0.09 (0.19)
Lagged IMF loan		0.09 (0.16)	--	--	--	0.09 (0.16)
Contemporaneous IMF participation	--	--	-0.002 (0.005)	-0.003 (0.006)	-0.001 (0.006)	-0.001 (0.007)
Lagged IMF participation	--	--		0.003 (0.007)	--	0.002 (0.007)
p-value	0.65	0.54	0.71	0.26	0.91	0.96

	(7)	(8)	(9)	(10)	(11)	(12)
Independent variables	instruments include political-economy determinants of IMF loans					
Contemporaneous IMF loan	0.15 (0.27)	0.16 (0.28)	--	--	0.25 (0.31)	0.21 (0.32)
Lagged IMF loan	--	-0.04 (0.24)	--	--	--	0.02 (0.26)
Contemporaneous IMF participation	--	--	-0.002 (0.008)	0.001 (0.010)	-0.005 (0.010)	-0.002 (0.011)
Lagged IMF participation	--	--		-0.008 (0.011)	--	-0.007 (0.012)
p-value	0.48	0.85	0.78	0.74	0.72	0.91

Table 9, continued

C. International openness variable

	(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	instruments include IMF loan-GDP ratios and loan-participation rates					
Contemporaneous IMF loan	-0.08 (0.52)	0.06 (0.57)	--	--	-0.38 (0.58)	-0.25 (0.61)
Lagged IMF loan		-0.32 (0.57)	--	--	--	-0.33 (0.60)
Contemporaneous IMF participation	--	--	0.019 (0.021)	0.026 (0.024)	0.027 (0.024)	0.033 (0.026)
Lagged IMF participation	--	--		-0.018 (0.026)	--	-0.011 (0.027)
p-value	0.88	0.85	0.37	0.56	0.52	0.77

	(7)	(8)	(9)	(10)	(11)	(12)
Independent variables	instruments include political-economy determinants of IMF loans					
Contemporaneous IMF loan	1.44 (1.07)	1.54 (1.08)	--	--	0.43 (1.18)	0.40 (1.23)
Lagged IMF loan		-1.01 (1.08)	--	--	--	-0.93 (1.20)
Contemporaneous IMF participation	--	--	0.105 (0.046)	0.122 (0.051)	0.098 (0.050)	0.114 (0.057)
Lagged IMF participation	--	--		-0.029 (0.048)		-0.012 (0.054)
p-value	0.18	0.27	0.022	0.049	0.065	0.15

Table 9, continued

D. Democracy indicator

	(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	instruments include IMF loan-GDP ratios and loan-participation rates					
Contemporaneous IMF loan	-0.61 (0.74)	-0.08 (0.81)	--	--	-1.54 (0.82)	-0.77 (0.91)
Lagged IMF loan		-1.12 (0.80)	--	--	--	-1.74 (0.84)
Contemporaneous IMF participation	--	--	0.021 (0.030)	0.031 (0.035)	0.060 (0.034)	0.068 (0.041)
Lagged IMF participation	--	--		-0.021 (0.037)	--	0.003 (0.040)
p-value	0.41	0.28	0.48	0.67	0.11	0.047

	(7)	(8)	(9)	(10)	(11)	(12)
Independent variables	instruments include political-economy determinants of IMF loans					
Contemporaneous IMF loan	-2.25 (1.33)	-1.80 (1.37)	--	--	-2.89 (1.50)	-1.76 (1.61)
Lagged IMF loan	--	-1.74 (1.28)	--	--	--	-2.59 (1.36)
Contemporaneous IMF participation	--	--	-0.004 (0.053)	-0.018 (0.060)	0.034 (0.056)	-0.010 (0.067)
Lagged IMF participation	--	--	--	0.032 (0.060)	--	0.083 (0.067)
p-value	0.091	0.098	0.93	0.87	0.15	0.11

Table 9, continued

E. Rule-of-law indicator

	(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	instruments include IMF loan-GDP ratios and loan-participation rates					
Contemporaneous IMF loan	-0.18 (0.54)	-0.01 (0.56)	--	--	-0.07 (0.65)	0.05 (0.69)
Lagged IMF loan	--	-0.64 (0.49)	--	--	--	-0.12 (0.56)
Contemporaneous IMF participation	--	--	-0.003 (0.023)	0.051 (0.030)	0.024 (0.030)	0.051 (0.033)
Lagged IMF participation	--	--		-0.057 (0.030)	--	-0.054 (0.032)
p-value	0.74	0.41	0.90	0.12	0.70	0.37

	(7)	(8)	(9)	(10)	(11)	(12)
Independent variables	instruments include political-economy determinants of IMF loans					
Contemporaneous IMF loan	-0.26 (0.86)	-0.32 (0.86)	--	--	1.34 (1.13)	1.26 (1.15)
Lagged IMF loan	--	-1.45 (0.85)	--	--	--	0.15 (1.00)
Contemporaneous IMF participation	--	--	-0.051 (0.045)	-0.013 (0.051)	-0.075 (0.050)	-0.038 (0.056)
Lagged IMF participation	--	--	--	-0.117 (0.052)	--	-0.113 (0.057)
p-value	0.77	0.22	0.26	0.037	0.26	0.093

Table 9, continued

F. Ratio of current-account balance to GDP

	(1)	(2)	(3)	(4)	(5)	(6)
Independent variables	instruments include IMF loan-GDP ratios and loan-participation rates					
Contemporaneous IMF loan	-0.44 (0.19)	-0.41 (0.19)	--	--	-0.51 (0.21)	-0.51 (0.21)
Lagged IMF loan	--	-0.15 (0.22)	--	--	--	-0.34 (0.23)
Contemporaneous IMF participation	--	--	-0.007 (0.007)	-0.014 (0.008)	-0.005 (0.009)	-0.005 (0.009)
Lagged IMF participation	--	--	--	0.009 (0.009)	--	0.016 (0.010)
p-value	0.019	0.062	0.32	0.24	0.017	0.027

	(7)	(8)	(9)	(10)	(11)	(12)
Independent variables	instruments include political-economy determinants of IMF loans					
Contemporaneous IMF loan	0.24 (0.27)	0.12 (0.27)	--	--	-0.37 (0.32)	-0.39 (0.32)
Lagged IMF loan	--	0.55 (0.33)	--	--	--	0.55 (0.38)
Contemporaneous IMF participation	--	--	0.018 (0.013)	0.017 (0.014)	0.025 (0.014)	0.028 (0.015)
Lagged IMF participation	--	--	--	0.004 (0.015)	--	-0.008 (0.008)
p-value	0.88	0.17	0.16	0.33	0.17	0.19

Notes to Table 9

Each system takes the form of those in Table 8. Except for democracy and the rule of law, the dependent variables are averages for 1975-79, 1980-84, 1985-89, 1990-94, and 1995-99. For democracy, the values are for 1980, 1985, 1990, 1995, and 1999. For the rule of law, the values are for 1985, 1990, 1995, and 1999 (four equations only). See the notes to Table 7 for the definitions of variables. In panel A, the dependent variable is the inflation rate. In panel B, it is the ratio to GDP of government consumption, exclusive of spending on education and defense. In panel C, it is the international-openness variable. In panel D, it is the democracy indicator. In panel E, it is the rule-of-law indicator. In panel F, it is ratio of the current-account balance to GDP, derived from the IMF, *International Financial Statistics*. The IMF loan-GDP ratios and loan-participation rates are used as instruments in the first part of each table. The political-economy variables are used as instruments in the second parts.

Table 10. Direct and Indirect Effects of IMF Loan Programs on Economic Growth

A. IMF loan-GDP ratio (political-economy variables used as instruments)

	(1) Cotemporaneous IMF Loan	(2) Lagged IMF Loan	(3) (1)=0	(4) p-values: (2)=0	(5) (1)=(2)=0
Direct effect	-0.044	-0.203	0.75	0.16	0.32
Indirect effects:					
Investment ratio	-0.022	-0.024	0.16	0.11	0.15
Inflation rate	-0.014	0.003	0.42	0.83	0.72
Govt. consumption ratio	-0.014	0.022	0.54	0.37	0.64
Openness variable	0.018	-0.012	0.76	0.92	0.95
Democracy index	-0.009	-0.008	0.51	0.51	0.78
Rule-of-law index	-0.006	-0.029	0.68	0.087	0.23
Total indirect effects	-0.046	-0.048	0.60	0.39	0.66
Total effect	-0.090	-0.251	0.70	0.32	0.57

B. IMF loan-participation rate (political-economy variables used as instruments)

	(1) Cotemporaneous Participation	(2) Lagged Participation	(3) (1)=0	(4) p-values: (2)=0	(5) (1)=(2)=0
Direct effect	-0.0141	-0.0082	0.013	0.18	0.004
Indirect effects:					
Investment ratio	-0.0013	0.0001	0.070	0.80	0.17
Inflation rate	-0.0001	0.0007	0.87	0.30	0.53
Govt. consumption ratio	-0.0001	0.0004	0.91	0.51	0.78
Openness variable	0.0011	-0.0003	0.74	0.94	0.95
Democracy index	0.0000	0.0001	0.83	0.81	0.97
Rule-of-law index	-0.0002	-0.0020	0.69	0.039	0.11
Total indirect effects	-0.0005	-0.0010	0.69	0.44	0.65
Total effect	-0.0146	-0.0092	0.22	0.25	0.034

Notes to Table 10

The results all use the political-economy variables as instruments. Panel A includes contemporaneous and lagged IMF loan-GDP ratios. Panel B includes contemporaneous and lagged IMF loan-participation rates.

The point estimates of direct effects on economic growth come from Table 7—column 8 for IMF loan-GDP ratios and column 10 for IMF loan-participation rates. Table 10 also shows indirect effects on growth, involving the influences of IMF loan programs on some of the explanatory variables included in the regressions in Table 7. The point estimates of indirect effects on growth come from combining the estimates in columns 8 and 10 of Tables 8 and 9 with the estimates shown in columns 8 and 10 of Table 7. For example, consider the indirect effect that involves the influence of the contemporaneous IMF loan-GDP ratio on investment (-0.022 in column 1 of Table 10, panel A). This coefficient is the product of the estimated effect of the IMF loan-GDP ratio on the investment ratio (-0.37 in column 8 of Table 8) and the estimated effect of the investment ratio on growth (0.059 in column 8 of Table 7). The total indirect effect is the sum of the effects working through six channel variables—investment, inflation, government consumption, international openness, democracy, and the rule of law. The total effect is the sum of the direct effect and the total indirect effect.

The p-values for the effects on economic growth come from three-stage least-squares estimation of a combined system that includes seven variables—economic growth and the six channel variables. This combined system allows for correlation of error terms contemporaneously across the variables, as well as over time for each variable. The p-values in column 3 refer to the hypothesis that the direct or indirect effect from the contemporaneous IMF loan-GDP ratio or IMF loan-participation rate is zero. The p-values in column 4 refer to lagged values of the IMF variables. The p-values in column 5 refer to the contemporaneous and lagged IMF variables jointly.