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The Political Economy of Fiscal Policy and Inflation in Developing Countries

An Empirical Analysis

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and
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Despite recent advances in understanding the macroeconomics of fiscal policy in developing countries, few studies has asked why fiscal policies differ from country to country or what institutional or legal arrangements help maintain fiscal discipline. This paper finds a positive correlation between political variables (coups, elections) and specific fiscal policy actions using a political economy approach.

This paper — a product of the Public Economics Division, Country Economics Department — is part of a larger effort in PRE to study the political economy of fiscal policies in developing countries. Copies are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Ann Bhalla, room N10-061, extension 37699 (80 pages, with tables).

Most economists treat fiscal policy as exogenous and consider licymakers as machines to be programmed. Rarely do they seek to determine why, for instance, some countries rely on the inflation tax while others use direct taxation, let alone what political factors affect such decisions. Yet without a theory of how fiscal policymakers behave, at both the revenue and the expenditure levels, there is no guarantee that policy advice will turn out to be sound.

Edwards and Tabellini present the results of an empirical analysis of the political economy of fiscal policy for a group of developing countries. They look at alternative ways of incorporating political variables into the explanation of government policy actions. Dividing their results into three sections, one each for inflation, budget deficits, and devaluations, they find that:

• The equilibrium inflation rate is higher the more citizens disagree about which party should hold office, and the more unlikely it is that the government currently in office will be reappointed.

• Political instability and polarization lead to a collective myopia that sometimes tempts

policymakers to borrow too heavily and to leave the bills to their successors.

• Governments tend to implement adjustment policies — including major devaluations — early in their tenure in office, when they command political authority. But if political conflict arises, they may lack the strength to change the macroeconomic status quo and will resort instead to inflation and deficits.

Edwards and Tabellini argue that their results have important implications for the design of adjustment and stabilization programs. Institutional reforms that make it harder for a government to reverse course without warning will increase the credibility of the reforms, thereby reducing political instability — and the equilibrium level of inflation. The creation of independent central banks should also be a priority. This and other reforms that take money creation out of the hands of governments will boost macroeconomic stability

Their results serve as a general endorsement of World Bank conditionality.

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An Empirical Analysis*

by
Sebastian Edwards and Guido Tabellini

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I. Introduction

The importance of fiscal policy in the developing countries has long been recognized. More and more economists have recently argued that fiscal policy plays a crucial role in the determination of overall economic performance in the LDCs. In fact, new empirical studies suggest that macroeconomic (and especially fiscal) stability may indeed be an important element in explaining the difference in real performance between the East Asian and the Latin American countries.[1]

However, in spite of important recent developments in theoretical, and to some extent empirical, aspects of the macroeconomics of fiscal policy, modern analyses have until now failed to address the key question of what determines a country's fiscal stance. In a phrase, the problem is that economists most of the time treat fiscal policy as exogenous, and consider the policymaker to be like a machine that can be programmed. Very few studies ask questions like: "Why do some countries rely heavily on the inflation tax, while others use primarily direct taxation?" Or, "Why do some Central Banks (or monetary systems for that matter) allocate a high proportion of their credit to the public sector and others don't?" Even fewer studies have used modern economic analysis to ask what type of institutions or legal arrangements will help maintain fiscal discipline and sustain stabilization efforts. There is little hope that we will be able to provide lasting policy advice until we understand the forces underlying the

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[1] In most (but not all) Latin American countries we observe cycles that go from fiscal indiscipline to real exchange rate overvaluation, to increased trade restrictions and exchange controls. There is wide agreement that this scenario is translated into poor economic performance. On the other hand, this type of behavior has been largely absent in the East Asian nations. See, for example, the World Development Report, 1988 as well as the abundant literature on adjustment that has emanated in the last few years from the World Bank and the IMF.

differences in fiscal behavior, both at the revenue and expenditure levels. To answer these questions we need to formulate a positive theory of how policymakers behave.

A relatively small but growing body of literature has indeed recently pursued a positive approach to the theory of monetary and fiscal policy, building on insights developed from game theory and from the theory of public choice. This literature, which has come to be known collectively as the political economy approach to macroeconomic policy, tries to explain specific macroeconomic actions of policymakers, including their inclination towards given expenditure patterns, and their reliance on particular sources of revenue. Most of this literature, however, has been theoretical and has dealt almost exclusively with the advanced nations. The purpose of this paper is to provide a (partial) remedy to this situation, by presenting a series of empirical results on the political economy of inflation and fiscal policy for a group of developing countries. More specifically, we discuss in detail alternative ways of incorporating empirically political variables into the explanation of government policy actions. In doing this we both survey some of the limited existing empirical literature on the subject, and we report new results for a cross section of countries. The emphasis of the paper is eminently empirical. This has been deliberate, since we believe that it is precisely in this area where a major research effort is required. In fact, throughout the paper we argue that many of the insights and implications of the political economy models can be empirically tested, and we suggest specific ways of doing so. Those readers interested in pursuing in greater detail the theoretical angles of this topic are referred to the survey by Persson and Tabellini (1990), and to the literature cited there.

The paper is divided into three parts that deal, respectively, with inflation, budget deficits and devaluations. In the first part the recent literature on the theory of inflation is reviewed, and time series and cross-country data are used to investigate the validity of a number of recent theoretical propositions. We report results that support the view that variables related to political factors help explain cross-country differentials in the inflation tax. The second part of the paper reviews the theory and the evidence on government budget deficits, and government borrowing. Here, the central finding is that more unstable political systems tend to be associated with larger borrowing. Finally, the third part of the paper focuses on the stabilization episodes in developing countries. We argue that the failure of some of these episodes is rooted in both political weakness of the government and on political instability of the country. We analyze this proposition empirically by focusing on 39 stabilization periods. Our findings, based on nonparametric techniques, support the hypothesis that stabilizations tend to fail in those nations with more unstable politics. The last section contains brief concluding remarks and proposes new directions for future research. Finally, the paper has two appendices: Appendix I deals with tests of the optimal tax theory of inflation; Appendix II deals with the measurement of political instability.

II. Inflation

In this section we systematically analyze the theory and evidence on inflation for a large group of developing countries. We start by providing a broad analysis of the data and then move to test whether political variables help explain the observed cross country variability in the inflation tax. More specifically, we investigate the most important empirical

implications of credibility based models and of models that rely on the idea cf strategic government behavior.

II.1 Th Inflation Tax

Table 1 contains data on inflation and on seignorage for 52 developing countries for four subperiods between 1963 and 1987: 1963-73, 1973-78, 1978-83 and 1983-87.[2] For each subperiod we have presented data on the averaç rate of inflation -- that is the average rate of change in the consumption price index -- as well as the average revenue from the inflation tax, expressed as a per.entage of GDP. For every year this revenue was computed as:

$$R - \frac{\pi m}{y} \tag{1}$$

where π is the inflation rate, m is the monetary base and y is GDP.[3] All the data were obtained from the most recent IFS tape.[4]

These figures strikingly illustrate a wide variability in the inflation tax, both across countries and across time. First, in almost every case there is an important increase in the rate of the inflation tax in the late 1970s and early 1980s. Second, the cross country variability is remarkable, both regarding the rates as well as revenues. For the period 1963-73 the ratio of higher to lower rate of the inflation tax was 41 times For 1983-

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[2]The countries have been grouped geographically.

[3]In the actual computations we used nominal m and y. If real base and GDP are used the results would be the same, as long as we use the GDP deflator to compute the real stock of monetary base.

[4]A problem with the raw IFS data is that while the price level is a yearly average the monetary figures are "end cf year". This was tackled by "centering" the monetary variables and, thus, constructing yearly "average" figures for the monetary variables.

87 this ratio had climbed to more than one thousand times![5] Third, in some

countries such as Ghana (73-78 vs. 78-83); Malawi (73-78 vs. 78-83); Zaire

(73-78 vs. 78-83); and Chile (63-73 vs. 7. 78), increases in the rate of the

inflation tax (π) were associated with declines in revenue from the

inflation tax.[6] Fourth, contrary to the popular belief, we observe very

wide differences in behavior within Latin America. For example, in every

period we can find some Latin American countries with a very low rate of

inflation; in fact, lower than the average of the Asian nations. This is an

important finding since it provides a devastating counterexample to the

popular "geographical" or "cultural" theory of inflation differentials

across countries. According to that view cultural reasons explain why Latin

America is fiscally irresponsible. Our data, however, show that Latin

America is far from being a homogeneous group. Thus, any good theory that

attempts to explain the determinants of fiscal policy and the inflation tax

should be capable of explaining the different behavior encountered within

the Latin American region.

Figures 1 through 3 depict the relationship between the rate of

inflation and the log of the inflation tax revenue for a group of selected

countries. These diagrams suggest that in most of these countries there is

a Laffer curve type relation between the rate of inflation and the inflation

tax revenue. Moreover, they also suggest that at one point or another some

of these countries may indeed have been on the "wrong side" of this curve.

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[5] This excludes Togo which has a negative recorded rate of inflation tax.

[6] The extent of this phenomenon is probably greater than what is apparent from Table 1, since, as argued by Tanzi (1977) and Olivera (1967), inflation may reduce the base of other taxes -- either through encouraging the underground economy or because of collection lags.

To sum up, then, the data presented here shows a remarkable variety of cross-country experiences with the inflation tax. The empirical challenge faced by the analyst is to explain these differences in behavior across countries and time. In the rest of this section we take up this challenge by empirically investigating the way in which political variables affect the degree of reliance on the inflation tax.

II.2 Credibility and Inflation

A number of authors have recently investigated whether the evolution of inflation conforms to the theory of optimal taxation.[7] These studies have found that for most countries the central implications of that theory are rejected by the data.[8] The main exception to these findings is the U.S. (see Mankiw 1987). In Appendix I to this paper the regression results we report for 29 developing nations show that the hypothesis that inflation follows an optimal path is rejected.

Perhaps the simplest explanation of why governments do not behave according to the theory of optimal taxation is that they lack credibility. Since the work of Calvo (1978) and Kydland-Prescott (1977), it is well known that the optimal inflation tax is time-inconsistent in the absence of binding policy commitments. In a credible (or time consistent) equilibrium with policy discretion, the government relies too much on the inflation tax. The reason for this is that once the public has chosen its money balances it is in the government's interest to rely more heavily on inflation as a

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[7]The most important implication of the theory of inflation as optimal taxation is that, to the extent that all taxes have distortionary effects, they should exhibit co-movements through time. The reason for this is that a government that minimizes welfare costs will equalize the marginal cost of different taxes at every moment in time.

[8]A battery of tests have been used to investigate the validity of the optimal tax implications. See the brief review in Appendix I of this paper.

source of revenue. Moreover, in any such equilibrium, the inflation tax is a residual: any change in government spending is reflected one-for-one in higher inflation, with little or no effect on other sources of revenue (see Persson-Tabellini (1990)). Also, as Calvo (1978) and Persson-Tabellini (1990) have pointed out, policy discretion generally results in multiple equilibria. Thus, any specific equilibrium is intrinsically "fragile". This may result in sudden bursts of accelerating inflation, accompanied by devaluations and speculative attacks on fixed exchange rate regimes.[9]

The recent literature on credibility has argued that reputation can be a substitute for commitments. This suggests an obvious line of attack: to try and explain differences in the observed rates of inflation in various countries as due to differences in the strength of reputational incentives in each country. Persson and Tabellini (1990) have formulated a simple model of reputation with enough institutional content to yield positive predictions. The model is built on three central assumptions: (i) unexpected policy actions disrupt the system of expectations of private economic agents (for instance, leading to higher expected inflation and to higher nominal wages); (ii) this disruption of economic expectations has negative welfare effects on the voters; (iii) electing a new government reduces the extent of the disruption (i.e., stabilizes expectations), as the economy focuses on a new set of policy proposals. This model of reputation points out that the government incentive to maintain its reputation has an important political dimension: the cost of policy surprises is that the government is less

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[9] These qualitative properties of models with policy discretion are remarkably consistent with the empirical evidence reported in Section II.3 on optimal taxation and with evidence on devaluations reported in Section IV below. Moreover, they are robust: for instance, they would also result (with some qualifications) from models in which even actual (and not just expected) inflation is distorting or undesirable.

likely to be reappointed in office. The citizens realize that reappointing a government who created policy surprises means higher expected inflation in the future, and hence lower social welfare. Thus, they are less likely to reappoint him. If the government cares about being in office, this "punishment" creates incentives not to engage in policy surprises.

The Persson-Tabellini model of reputation yields two central positive implications, which can, in principle, be subject to some form of empirical testing. First, the equilibrium inflation rate is higher the more the citizens disagree about which government they prefer to hold office. In other words, more polarized and "heterogeneous" societies encounter greater difficulty in enforcing low inflation through reputational forces. Second, the equilibrium inflation rate tends to be higher the more unlikely it is that the government currently in office will be reappointed. In other words, reputation is not very effective if the government is "weak". Intuitively, the threat of being thrown out of office becomes less powerful if society is very polarized, or if the government is already weak. In the last case, this occurs because a weak government has little to lose (since it is already likely to be thrown out of office anyway). In the former case, it occurs because if society is very polarized, citizens are unwilling to switch party and punish a government just because it created policy surprises.

A serious problem in testing the main implications of the Persson-Tabellini model (and, for that matter, of most political economy models) resides on finding empirical counterparts for the key political variables, such as political instability, weakness and polarization. In this paper we have tackled this problem by using two broad data sets on political and institutional characteristics of countries, assembled by Banks and Taylor and Jodice (1983), to construct proxies for these theoretical concepts. These

data sets include time series information on changes in government, coup attempts (successful or unsuccessful) and political motivated riots, among others, and can, thus, be used to both classify countries into different political categories and to construct indexes of political instability. In Appendix II of this paper we include a detailed discussion on possible alternative ways of actually measuring political variables and we explain, at some length, the procedures that we have actually used in this paper.

In Table 2 we report some preliminary evidence consistent with the two main implications of the Persson-Tabellini model on credibility and reputation. This table reports the results of estimating a simple OLS regression of average inflation against various measures of political instability and polarization, on cross-country data (see Appendix II for greater details on measurement issues). In the first specification of Table 2, political instability is measured as the frequency of (regular and irregular) government changes during the relevant time interval. We interpret this variable as being a proxy for the probability of the government being replaced. In the second specification we distinguish between the frequency of regular government changes and the frequency of coups. Since the latter form of government transfer is likely to involve a more radical change in the ideology of the government, the frequency of coups is a measure of both instability and polarization of the political system. The results are quite striking: the estimated coefficients are always positive and generally highly significant for most time periods.[10]

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[10]The same results are obtained if we replace the actual frequency of government change with the expected probability of a government change, estimated from a probit model. This alternative measure of political instability, used for the first time in Cukierman, Edwards and Tabellini (1989), is discussed later in the text and described in greater detail Appendix.

Naturally, the evidence reported in Table 2 could have several other explanati~ns, some of which will be addressed in later sections of the paper. One such explanation, however, is the one summarized in the previous pages: more unstable and polarized countries have greater credibility problems, because the reputational incentives of a government are weaker.[11]

II.3 Long Run Seignorage, Tax Reforms and Political Instability

Our preceding analysis centered on the behavior of inflation and government debt in developing countries through time. We now turn to the question of how to compare the long-run properties of these same variables across countries.

According to the theory of optimal taxation, the long-run properties of the inflation tax rate and of government debt will depend on the cost of administering tax collection. High tax collection costs and tax evasion force developing countries to rely on highly inefficient forms of taxation,

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[11]In a recent paper David Romer (1989) has proposed an alternative procedure for testing whether the absence of commitment matters in monetary policy. His main proposition is that in the absence of commitment, there will be an inverse relationship between inflation and openness. The reason for this, Romer argues, is that engaging in surprise monetary expansions -- as a government will tend to do in the absence of commitment -- will generate an exchange rate depreciation. To the extent that the cost of depreciation increases with openness, more open countries will, in the absence of commitment, tend to have lower inflation. Using a sample of 57 countries (both industrialized as well as LDCs) Romer finds some empirical support for his model. Indeed when only developing nations are considered, he obtains coefficients for openness that range from -1.237 to -2.417, and are always significant. Although Romer's work constitutes an early attempt at empirically testing the credibility hypothesis, and his results are somewhat suggestive, his analysis is not free of problems. Perhaps the most important limitation of this study is the contention that expansive monetary surprises will generate a depreciation. This is only valid in the context of freely fluctuating nominal exchange rate regimes. If, on the other hand, the country in question has a predetermined nominal exchange rate system -- as most LDCs do -- surprise monetary expansions will generally tend to result in no immediate change in the nominal exchange rate and in a real exchange rate appreciation, rather than depreciation. Only eventually, once international reserves are exhausted, will monetary surprises result in a devaluation crisis.

such as inflation or trade related taxes. This explanation raises a natural question. Why do some countries have higher tax collection costs and higher tax evasion than others? In the traditional development literature, this question is answered by arguing that the taxing capacity of a country is technologically constrained by its stage of development and by the structure of its economy: a country with a large agricultural sector, for instance, is more susceptible to tax evasion than a country with a large corporate manufacturing industry. Cukierman, Edwards and Tabellini (1990) have explored an alternative answer to this question. Namely, that the evolution of the tax system of a country depends on the features of its political system, and not just on those of its economy.

Their central idea can be stated as follows. An inefficient tax system (i.e., one that facilitates tax evasion and imposes high tax collection costs) acts as a constraint on the revenue collecting capacities of the government. This constraint may be welcomed by those who disagree with the goals pursued by the current government. In particular, a government (or a legislative majority) may deliberately refrain from reforming a tax system, for fear that a more efficient tax apparatus will be used in the future to carry out spending or redistributive programs that the current government disapproves of. Of course, this is more likely to happen in countries with more unstable and polarized political systems. Hence, more unstable and polarized political systems rely on inefficient taxes, such as seignorage and trade taxes, to a greater extent than more stable and homogeneous countries.

Cuikerman, Edwards, Tabellini (1990) (CET) confront the data by estimating an equation of the following form:

$$y = f(x,p)$$

where y = fraction of total revenue collected through seignorage

x = vector of variables measuring the available tax bases (such as size of the manufacturing, mining, and agricultural sectors, size of imports and exports, per capita income, etc. -- see Tait, Gratz and Eichengreen (1979)).

p = vector of political variables measuring the political instability and/or polarization of the country.

The key empirical issue addressed by CET refers to the explanatory power of the political variables, once we control for the structural economic variables. CET use an estimated cross-country probit equation in order to compute an index of the probability of government change for a particular country in any given year. This probit equation, which is explained in great detail in Appendix II, regresses instances of actual government changes against political variables (riots, repressions, and so on), economic variables (consumption growth, inflation, income per capita) and institutional variables. With respect to polarization they use two alternative proxies: (i) frequency of coup attempts; (ii) an index of income distribution. This constructed indicator of political instability differs from the index of actual frequency of government change used in Table 2, in that it provides a measure of the _expected_ probability of government change, derived from broad cross country evidence.

In addition to the political instability index, in their regressions on seignorage, CET included the following structural variables: (a) share of agriculture in GDP. Its sign is expected to be positive: since it is relatively costly to tax agriculture, governments with a large agricultural sector will tend to rely more heavily on taxes with low administering cost, such as seignorage and trade taxes; (b) share of mining and manufacturing

on GDP. Its sign is expected to be negative, also for cost effective reasons; (c) foreign trade share on GDP. Its sign is expected to be positive, since in an open economy it is easier to tax international trade; (d) GDP per capita whose sign is expected to be negative. More advanced nations are able to implement more sophisticated and efficient tax systems, and thus will tend to rely less heavily on easy to collect but highly distortive taxes such as trade taxes; and (e) urbanization ratio, whose sign is expected to be negative. The reason is that it is relatively easier to tax the urban population than the rural population.

For a sample of 58 developing nations, CET obtained the following results from an OLS regression (standard errors in parentheses) of seignorage on political instability and other structural variables:[12]

$$
\begin{array}{ll}
\text{Seignorage} = - & 0.020 + 0.0021 \text{ Share of Agriculture in GDP} \\
& (0.032) \quad (0.0005)
\end{array}
$$

$$
\begin{array}{l}
- \;0.0431 \text{ Openness} - 0.44E\text{-}5 \text{ GDP Capita} \\
\;\;(0.0182) \qquad\qquad\quad (0.024E\text{-}5)
\end{array}
$$

$$
\begin{array}{l}
+ \;0.0019 \text{ Urbanization} + 0.1583 \text{ Political Instability Index} \\
\;\;(0.0004) \qquad\qquad\quad\;\; (0.0539)
\end{array}
$$

$$\bar{R}^2 = 0.448$$

$$\text{S.E.} = 0.049$$

The CET results are very suggestive. Not only does the regression explain a high percentage of the cross-country variability of seigniorage,

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[12]All variables are measured as averages for 1971 - 1982. Seigniorage is the change of high powered money as a percentage of government tax revenue plus increase in high powered money. Openness is measured as import plus export over GDP. Notice that this equation excludes the mining and manufacturing shares. Including results in an insignificant coefficient, with the expected sign, with no other changes in the regression.

but all variables have the expected sign.[13] Moreover, the coefficient of
the political instability index is highly significant. When a broader group
of countries that includes industrialized nations was considered, the
results were similar to those reported here. All in all, then, the CET
results provide broad support for the hypothesis that, even after control-
ling for other structural variables, political variables play an important
role in explaining long-run cross-country differentials in inflation.

An interesting empirical extension of the CET (1990) model is that the
use of other inefficient taxes, such as import tariffs and export taxes,
should also be positively related to political instability. That is, just
as in the case of seignorage, after controlling for other structural vari-
ables, political instability and the reliance on taxes on foreign trade
should be positively related in cross-country data. This conjecture is
tested in Table 3 on a cross section of industrialized and developing[14]
countries. The dependent variable is the ratio of trade taxes as a
percentage of government revenues obtained from the IMF Government Financial
Statistics. As in the CET seignorage paper structural and political vari-
ables are included as regressors. The political variables are the estimated
political instability index described above, the observed frequency of
regular (democratic) government change and the frequency of coups. In
addition, we incorporated a dummy variable for industrialized nations and
one for Latin American countries.

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[13]Urbanization has a positive rather than negative coefficient. This
however is consistent with the view that political polarization matters:
political disagreement is generally considered by political scientists to be
more acute in urban areas.

[14]See Appendix for list of countries.

The results in Table 3 are mixed. First the coefficients for the structural variables, with the exception of GDP per capita in two of the regressions, have the expected sign, and some of them are highly significant.[15] Second, in both regressions where it is included, the political instability index has the expected positive sign; however, in neither was its coefficient significant. Third, when the frequency of coups is added, as a proxy for political polarization, its coefficient is positive as expected but, again, it is not significant at conventional levels. Moreover, in this last regression, the frequency of regular government transfers has the wrong sign. These less than fully satisfactory results on trade taxes contrast with the highly supportive results obtained by CET (1990) for seigniorage. A possible explanation for these differences is that, contrary to the case of seigniorage, trade taxes also play an important role in determining the productive structure of a country. Indeed, by providing protection to certain sectors these types of taxes shape the incentive structure of the economy. An additional difference between seignorage and trade taxes is that, while seignorage can be manipulated through administrative decisions, changes in trade taxes usually require congressional approval. Once these elements are incorporated into the analysis, the straightforward implication of the CET model of strategic government behavior may not be applicable to trade taxes.

The empirical evidence discussed in this section can be summarized as follows: (1) the data for a large number of developing nations rejects the optimal taxation hypothesis of seignorage. This means, then, that explanations of cross country differences in inflation and seignorage should be

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[15]In fact, for many of the coefficients with t-statistics below two, the probability that they had the expected sign was fairly high.

sought outside of the realm of the optimal policy framework; (2) the incorporation of political and institutional variables, such as frequency of government changes, military coups and a constructed political instability index, indicate that these variables play an important role in explaining cross country variability in inflation. More specifically, we find evidence supporting the most important empirical implications of the "credibility-based theory" of economic policy and of the strategic political government behavior of tax reforms.

III. Fiscal Deficit

In this section we move away from inflation, and turn our attention to fiscal deficits. More specifically, we investigate the evidence on government borrowing and we attempt to explain observed cross country differences with the help of some recent developments in the positive theory of fiscal policy.

III.1 Government "Borrowing" From the Monetary System and Fiscal Deficits: The Evidence

Tables 4 and 5 contain important data on two indicators of fiscal policy for our 52 countries. Table 7A contains two measures of the size of budget deficits: the public sector borrowing from the domestic monetary system, and the fiscal deficits of the central government, both as percentages of GDP. Both variables are imperfect measures of the true budget deficit, but for different reasons. The most important limitation of the first variable is that it excludes borrowing by the government from private non-bank investors and from foreign creditors. The second variable, on the other hand, in principle includes all the borrowing done by the central government, irrespective of who is the creditor. But the quality of the data is much less reliable, and it is less directly comparable across

countries since the definition of what is included in the central government accounts differs greatly across countries -- see, for example, World Development Report 1988, p. 47, and Blejer and Chu (1988).

Table 4B displays the correlation coefficients between these two alternative measures of budget deficit, for different time periods. They are always positive and quite high at least over some time periods. On the other hand, the fact that in many cases the correlation coefficient is low highlights the measurement problems faced in this area of macroeconomics.

Most of the main conclusions obtained for the inflation tax are applicable to both indicators in Table 4A: we observe important differences across countries and across time, as well as across countries within a region. Moreover, there is a clear relation between Table 1 and Table 4A, tending to support the long maintained hypothesis that budget deficits are an important determinant of inflation. This suggestion is further strengthened by the evidence reported in Table 5. This table contains data on the proportion of the Central Bank's credit that goes to the (central) government. These data are quite striking, showing that while in some countries (mainly in Africa) the government gets as much of 80% of the credit, in others it obtains as little as 15 percent (e.g., Korea). These differences across countries are possibly capturing a number of characteristics of these countries, including the degree of development of the domestic capital market, the stage of development of the countries and their ability to borrow from the world capital market. However, the cross country differences appear to be too large to be explained by economic variables only. This indeed suggests that institutional and political aspects play an important role in explaining these differences in behavior. Studying the role of these political and institutional variables is the main purpose of

the recent theory that we describe, and scrutinize empirically, in the remainder of this section.

III.2 Political Instability and Budget Deficits

We have argued in the preceding sections that political instability and disagreement between current and future political majorities can explain why countries retain inefficient tax systems without attempting to reform them. The reason for this is that political instability can lead to a form of collective myopia. This same intuitive reason has been investigated in a number of recent papers by Tabellini and Alesina (1990), Alesina and Tabellini (1989, 1990), and Persson and Svensson (1989), to explain the occurrence of budget deficits.

Consider a policymaker (or a political majority) who must choose how much to spend and tax in the current period, and what to spend on or whom to tax. When setting policy, this policymaker chooses both the intertemporal profile of spending and taxes as well as how to allocate the resources acquired by issuing debt (or the resources lost through a surplus). Suppose that this policymaker is aware that in the future he may be replaced by a policymaker (or majority) with different preferences about some aspects of fiscal policy. Moreover, he realizes that, whereas he is in control of how to allocate the proceeds of his borrowing, the allocation of the burden of repaying the debt in the future may not be under his control. This asymmetry may prevent today's policymaker from fully internalizing the costs of running a deficit, the more so the greater is the difference between his preferences and the expected preferences of the future majority. In simple terms, the policymaker may wish to borrow in excess of the optimum, and let his successors "pay the bills." Thus, political instability and polariza- tion lead to a form of collective myopia, even if the policymaker and the

voters are rational and forward looking.

In a recent paper, Alesina and Tabellini (1989) have developed a variant of this model for the case of developing countries. They consider an economy with two groups of agents identified by their productive role: "workers" (wage earners) and "capitalists" (owners of physical capital and profit earners). The two groups have their own political representatives ("parties") that alternate in office. Each party, when in office, attempts to redistribute income in favor of its constituency. With political uncertainty (i.e., with uncertainty about the identity of future governments), the government in office finds it optimal to issue debt. This occurs because the current government does not fully internalize the future costs of servicing the debt. The government that borrows (say the capitalist one) also controls how the proceeds of the debt issue are allocated: they are transferred to the capitalist constituency. However, if there is a change of government, and the "workers" take over the government, they will have to pay this debt by reducing the transfers to their constituency (wage earners). The most important implication of this setup is that, since borrowing costs are not internalized, the government in office overborrows.[16]

The idea that political alternation among groups with different preferences and ideologies induces the government to choose strategically the time path of a state variable, has several other applications yet to be investigated (such as to the choice of capital versus current public spend-

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[16]Alesina and Tabellini (1990), in a more general setting, show that this result extends to the case in which current and future governments disagree about the composition of spending (rather than the distribution of income). And Tabellini and Alesina (1990) show that the results go through even if the policies are chosen directly by the voters (rather than by the party in office), provided that current majorities are uncertain about the identity and preferences on future majorities.

ing, or the choice of investment in legal and social infrastructures).
Moreover, the existing theoretical research on this subject has very sharp
testable implications. We now ask whether the evidence is consistent with
these implications.

In Tables 6A and 6B we include two sets of cross-country regressions.
The dependent variables are the two measures of budget deficit reported in
Table 4A: (1) change in the monetary system's credit to the government (as
a percentage of GDP); and (2) the deficit of the central government as
percent of GDP. The explanatory variables, on the other hand, are: (i)
indicators of the structure of the economy and (ii) alternative measures
of political instability. The structural variables are the same used in the
analysis of seignorage reported above, namely, per capita income, the share
of agriculture in total output, the share of exports plus imports in total
output, and the degree of urbanization (averaged over the relevant time per-
iods). With respect to political instability, we tried, as in the results
reported previously, alternative variables. Table 6A uses the actual
frequency of government change (lumping together coups and regular govern-
ment transfers), while Table 6B distinguishes between the frequency of coups
and of regular government transfers. As pointed out previously, our view is
that coups are associated with more radical changes in the nature and
ideological preferences of the government, and thus they should have a
stronger positive impact on the budget deficit.

We see from these tables that our measure of political instability is
generally positively related to budget deficits: its estimated coefficient
is almost always positive, and in some (but not all of them) it is signifi-
cant. As expected, coups and regular government changes have different
coefficients and, again as expected, coups generally have larger estimated

coefficients.

To assess the robustness of these estimates we added a set of dummy variables that grouped countries into different geographical regions: Asia, Africa and Latin America. These dummy variables were generally insignificant and the remaining coefficients were not affected. Finally, as in the regressions on trade taxes reported in Table 3 above, we also tried other measures of political instability, constructed along the lines of CET (1989). The results were very similar to those reported in Tables 6A and 6B. These results provide some suggestive preliminary evidence supporting the view that are politically more unstable tend to have larger budget deficits.

It may be argued that a possible problem with this evidence is the presence of reverse causation, and that budget deficits lead to instability, rather than vice versa. This is unlikely. Instability is a deep-rooted feature of a political system, that generally reflects institutional and sociological factors, and is generally not affected by short term economic performance of a government. Moreover, the same results reported in Tables 6A and 6B hold when we measure political instability as the frequency of government change from 1950 up to the end of each of the periods reported in Table 6A (rather than just the frequency of government change in each of those time intervals).[17]

Although the results reported in Tables 6A and 6B are encouraging, they are not as positive as those on inflation and on seignorage. Moreover, we are aware that they leave ample room for improvements; they ought to be regarded as preliminary and suggestive. First, as already mentioned, our

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[17]Moreover, instrumental variables estimates in Cukierman, Edwards and Tabellini (1989) show that the results on the role of political stability on the inflation tax hold after correcting for (potential) reversed causation.

measures of budget deficit contain measurement error. Second, it is not unlikely that we have omitted some relevant economic variables that may influence a country decision of how much to borrow. Finally, our measures of political polarization are not fully reliable; and yet, according to the theory, political instability matters more in more polarized countries. Of course, all of this indicates that the next steps in this research program should be aimed at trying to solve these problems. In spite of this, however, we think that these results, together with those on inflation and seignorage reported in the previous section, clearly show that it is possible to implement serious tests on the main implications of political economy models of macroeconomic policies. Moreover, the preliminary evidence is largely supportive of these models.

IV. Stabilization Attempts. Devaluations. and Politics

Historically, cross-country differences in fiscal behavior have not only been present in long term trends, but also during macroeconomic adjustment programs, such as stabilization attempts and devaluations. A key question that has long haunted macroeconomists is what determines the degree of success of these adjustment programs. Why are some stabilizations and adjustment devaluations able to achieve their goals, while others fail so miserably? This question is also related to the political economy of macroeconomic policy.

It is well known that in order for a nominal devaluation to be successful -- in the sense of generating a _real_ exchange adjustment and, thus, positively affecting the external sector -- it is necessary to supplement it with restrictive fiscal and credit policies. However, a number of countries that embark on an adjustment program _cum_ devaluation

fail to implement the required restrictive fiscal corrections. In these cases instead of achieving external sector equilibrium, the country will tend to move towards more severe macroeconomic imbalance, higher inflation and a more serious balance of payments crisis.

An important element in trying to understand why some stabilization programs (including their devaluation component) succeed while others fail, is understanding the fundamental asymmetry between inflation and borrowing, on the one hand, and other fiscal policy actions, such as reducing expenditure and increasing taxes. Printing money and issuing government debt are generally administrative decisions that can be taken in a (relatively) arbitrary fashion; raising taxes or cutting spending, on the contrary, are usually policy decisions that require a political consensus. A government who is unable for political reasons to balance the budget, may still be able to print money. This suggests that failed devaluations and stabilizations may reflect the inability to make a collective decision to change the macroeconomic status quo (as opposed to being the result of a deliberate policy decision). In other words, a failed devaluation may simply be due to a political deadlock that precludes the government from undertaking those fiscal policy actions required to assure its success.

This line of thought may explain why in many developing countries inflation and government borrowing are often residual sources of government funds, and why implementing a successful stabilizations and devaluations may be so difficult. When the resolution of political conflict is difficult, inflation and government deficit may be the only way out, if no political consensus can be reached on other policy decisions. In this section we briefly discuss two possible theoretical avenues for formalizing this view -- decentralized policymaking and bargaining and coalitions -- and we

provide empirical evidence that supports the hypothesis that stabilizations attempts typically fail in countries that exhibit high political instability.

A first promising approach for understanding the sources of failed stabilizations and devaluations is based on the policy consequences of decentralized policymaking. A feature of several developing countries is that their fiscal policy decision process is decentralized amongst several decision units: local governments, public corporations, and different parts of the central government de facto have some spending authority. This decentralized process can lead to decisions that are mutually incompatible and against the collective interest. Inflation and deficits may be the only way to restore compatibility.

Within this setting, it is easy to show that the decentralization of the decisionmaking process results in overspending in the local public goods. Intuitively, each individual realizes that the cost of financing its good falls on the rest of the community, and that he pays only a fraction $1/N$ of this cost where N is the number of individuals in this country. Hence, he does not fully internalize the costs of spending in this type of good. The result is too much public spending and too little private consumption, the more so the larger is the number of "decentralized" policy-makers.[18] Intuitively, decentralization of the fiscal policy decision process leads to excessive government spending.[19]

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[18] A second useful analytical approach for understanding the outcome of stabilization programs is based on models of bargaining and coalition formation.

[19] A version of this simple idea has been applied by Weingast et al. (1979) to explain the size of government in industrial societies. Aizenman (1990) exploits it to explain the excessive use of the inflation tax. Sanguinetti (1990) adds to a similar framework an optimizing and "benevolent"

Models of bargaining and coalition formation provide a second natural avenue for the analysis of how political pressures influence fiscal policy in developing countries. Consider a gove⟩ ᵢment, or a legislature, or a cabinet who has to decide whether or not to undertake some unpopular policy action, such as introducing some spending cuts, or raising some taxes to supplement a devaluation. The groups negatively affected by this policy action have the option to use "voice", in the sense of Hirschman (1970), as a protest against the government decision. Suppose further that "voice" actions hurt the government (for instance, because they inflict losses on other groups of the population, or because they lead to a loss of economic resources for society as a whole). Then we have a bargaining situation, similar to a "war of attrition", where the bargaining power of the government and of the opposing social groups determines whether the unpopular policy is implemented, or whether it is interrupted, or whether protests occur.[20]

This general framework can be applied to several economic or political situations, including the determinants of the degree of success of a stabilization program, or a nominal devaluation adjustment. It can also be used to explain why a government prolongs an unsustainable fiscal regime despite its commitment to fixed exchange rates or, even when it is clear that a fiscal adjustment is required for a devaluation to become successful. This line of

federal government that decides on the profile of a federal tax. He shows that in the non-cooperative equilibrium, the government spends more than if there is cooperation among the federal and local fiscal authorities.

[20]Alesina and Drazen (1990) study a model of this kind, along the lines pioneered by Bliss and Nalebuff (1986). In the Alesina-Drazen paper, the decision to stabilize requires the consent of two rival groups of citizens. The two groups are engaged in a war of attrition: the first one to give in bears a disproportionate burden of the stabilization. In equilibrium, both groups refrain from accepting the stabilization right away. As a result, the stabilization is delayed, even though such a delay is inefficient for society as a whole.

research is indirectly supported by several empirical findings. For example, Berg and Sachs (1988) find that debt repayment difficulties are more pronounced in countries where the political conflict is more polarized.[21]

The above discussion suggests a number of avenues for empirically analyzing the role of political considerations in the outcome of devaluation episodes. Our central proposition is that governments that are politically stronger will generally find it easier to implement the fiscal adjustment required as a supplement to a successful devaluation. A first specific test is to inquire -- using non-parametric methods, for example -- whether devaluations indeed tend to fail in those countries with more unstable and polarized political environment. A second test would be to investigate the timing of devaluation episodes. Since, in democratic regimes governments are usually stronger at the beginning of their administration, we would expect to find most devaluation attempts taking place in the early years of a government's tenure in office. A third potential test is related to the idea of decentralization and policy coordination. In general, we would expect that in those nations with more decentralized (and more polarized) political systems, it would be more difficult to implement the fiscal

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[21]Similar casual evidence is provided by Dornbusch (1987). Both studies hence support the idea that changing the status quo and implementing unpopular policy decisions is more difficult in more polarized and divided countries. This is indeed an implication of the Alesina and Drazen (1989) theoretical model. Perhaps even more to the point, Roubini and Sachs (1988) find that different industrial countries have had very different fiscal responses to adverse economic shocks. The countries that have relied on government borrowing to a greater extent are typically led by unstable coalition governments. Roubini and Sachs (1988) interpret this finding as evidence that fiscal deficits and lack of fiscal discipline reflect a country's inability to change the status quo in the face of adverse economic circumstances. This inability is more pronounced in political systems fractionalized among many small parties, in which coalitions are fragile and each coalition member has a veto power but no capacity to impose its will on the political majority.

adjustment required by a successful devaluation. In the subsection that follows we use data on 39 devaluation episodes to implement the first two tests described here.[22]

IV.1 The Politics of Successful Devaluation Programs: Some Preliminary Empirical Evidence

The purpose of this subsection is to use a cross country data set to investigate the extent to which political considerations determine the degree of success of 39 devaluation programs.

IV.1.1 The Data Set

The data set on devaluations used in our empirical investigation corresponds to that assembled by Edwards (1989) in his study on real exchange rates in developing countries. The episodes are listed in Table 7, and have been classified into a group (Panel A) of countries that implemented a stepwise devaluation and a group (Panel B) that adopted a crawling peg after devaluing. As can be seen all devaluations are substantial -- of at least 15 percent.

The stated objective of these devaluations, and their accompanying packages, was to help solve the external crises in these countries by reversing the real exchange rate overvaluation -- that is, by generating a real exchange rate depreciation -- improving the current account and improving the net foreign position.[23] Edwards analyzed the degree of economic success of these devaluations using a two step procedure. First, he analyzed the evolution of a set of external sector indicators -- the real exchange rate, the current account, and the net foreign asset position -- in

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[22]We don't attempt, however, to directly test the decentralization hypothesis.

[23]These are in fact the stated objectives of the IMF programs that were associated with most of these devaluations.

the period following the devaluations. The second step consisted of analy-

zing the behavior of a group of macroeconomic indicators.[24].

In classifying these episodes in successful and unsuccessful Edwards

concentrated on the behavior of three key indicators during the period

following the devaluations: (1) Real exchange rates. The focus here was

on the behavior of an effectiveness index defined as the ex-post real

exchange rate elasticity of nominal devaluations; (2) behavior of net

foreign assets of the monetary system; and (3) behavior of the current

account ratio. Given the difficulties associated with classifying in a

clear cut fashion some of these episodes as successful or unsuccessful, a

three way classification was used: (1) successful episodes; (2) unsuc-

cessful episodes; (3) devaluations with a limited degree of success.[25]

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[24]Although this approach is highly revealing it does have some problems, including the fact that other variables are not kept constant. For a discussion of the methodological limitations of this approach see Edwards (1989c).

[25]In order for an episode to qualify as successful the following two conditions had to be met: (1) three years after the devaluation the effectiveness index had to exceed 0.3; and (2) three years after the devaluation either the current account or net foreign assets indicators had to exhibit an improvement relative to the year before the crisis. The first requirement implies that in order for an episode to be classified as successful no more than 70% of the devaluation impact on the real exchange rate has to be eroded in three years. The second requirement means that a real depreciation per se is not enough for the nominal devaluation to be considered a success; in addition, the external sector accounts had to be improved. An episode was defined as unsuccessful if three years after the devaluation the real exchange rate was below its value the year before the crisis -- that is, the effectiveness index was negative -- or if even when the effectiveness index was positive (but still below 0.3) both the net foreign assets and current account positions had worsened 1 and 3 years after the devaluation. These definitions of success and failure are quite strict and are able to sharply discriminate between countries. A number of episodes, however, sit in between these two extreme groups. We have called them limited-success episodes, since in most of them we observe some improvement in the level of the real exchange rate and/or the external sector accounts.

Table 8 contains Edwards' 39 episodes classified according to this criterion. As can be seen, among the 29 stepwise devaluers, there are 13 clearcut successful cases, 9 clearcut failures and 7 limited-success cases. For the 10 crawlers there are three successful episodes, five unsuccessful ones and two cases of limited success. The 13 successful stepwise devaluers (Panel A.1 of Table 7) were able to sustain substantial real depreciations in the medium term. The average for the effectiveness index after 3 years is 0.66 indicating that on average 2/3 of these nominal devaluations had been transmitted into a real devaluation. For these 13 countries as a group, 3 years after the crisis the RER stood on average 66% higher than its value immediately before the devaluations. For the 9 stepwise cases with limited success (Panel A.2 in Table 7) the average value of the effective-ness index is still an impressive 0.49. On the whole, then, this evidence strongly shows that for a large number of cases nominal devaluations have been helpful in generating real exchange rate realignments.

For the 9 unsuccessful stepwise episodes, on the other hand, the index of devaluation effectiveness had an average of -0.21 three years after the crisis, indicating that at that time the RER was more then 20% below its value immediately prior to the crisis. For these cases devaluations not only failed to generate a real exchange realignment, but even worse, three years after the event the magnitude of the external disequilibrium had greatly increased. In fact, for these countries in the three years following the devaluation the net foreign assets ratio declined on average by more than 10%.

Discriminant analy_is was used to test whether it was possible to statistically discriminate among successful and unsuccessful groups based on the behavior of macroeconomic variables only. The two groups of countries

pursued macroeconomic policies (domestic credit and fiscal policies) that

were significantly different from a statistical point of view. In fact, the

results obtained from the discriminant analysis were quite striking,

indicating that by and large it was possible to statistically discriminate

between these two groups on the basis of their macroeconomic policies only.

According to these results, three years after the devaluation only one

country which was classified as successful in Table 8 did not belong to that

group: Egypt 1979. The posterior probability of it belonging to the

successful group was only 2%. These results, then, confirm the existence of

a strong and statistically significant relation between macroeconomic (and

especially fiscal) policies and successful stepwise devaluations. The

question that remains to be answered is why some countries were able to

indeed implement corrective fiscal policies alongside devaluations and

others weren't. As argued in the preceding discussion, our answer is that

this has to do with the political economy of fiscal policy. In the rest of

this section we turn to the empirical analysis of this hypothesis. In doing

this Edwards grouped the successful and limited success countries into a

broad success group.

IV.1.2 The Timing of Devaluations

An important empirical implication of the approach to stabilization

discussed above is that governments will tend to implement adjustment

policies -- including major devaluations -- earlier in their tenure in

office. The reason for this is that at this time governments in democratic

regimes are usually politically stronger than later in their period. We

analyzed this implication of the theory by investigating the timing of the

devaluations in each country. Two indicators were constructed: (1) number

of years elapsed between the last government change and the devaluation, and

(2) number of years between the devaluation and the next government change. Additionally countries were classified according to their political regime into three groups: presidential democracies, where the date of the election is predetermined; parliamentary democracies and dictatorial rule. Classifying some of these countries into a political regime is not completely straightforward. Two particularly difficult cases refer to Egypt under Nassar and Cyprus under Makarios, where the leaders term was extended beyond what was considered "normal". Both cases, however, were labelled as democratic presidential regimes.

Table 9 contains summary statistics for the timing of these 39 devaluations episodes. This information is quite impressive, showing that, as was expected from the discussion, in democratic regimes devaluations indeed tend to take place during the early years of each administration; very few devaluation attempts have indeed taken place during the last few years. An additional interesting piece of information in this table is that there is no evidence that dictatorships front-load their devaluations.

IV.1.3 Political Determinants of Successful Devaluations

The most important empirical implication of our previous discussion is that countries with a weaker, more unstable and polarized political environment will generally have greater difficulties in implementing the fiscal adjustment required for a devaluation to be successful. This suggests that it should be possible to "predict" the degree of success of a devaluation through the use of political variables only. This is indeed what we do in this section through the implementation of a series of discriminant analyses on our 39 devaluation episodes.

We used the Jodice and Taylor data set to define three groups of political indicators for the different devaluation episodes. The first set

captures the _historical_ political environment of the countries previous to the devaluation. It measures a number of variables, such as political riots, successful coups and the like, from 1948 (the first year in the data set) to the year prior to the devaluation. The second and third sets of indicators deal with the political environment in the period immediately following the devaluation. They measure the same political indicators one year after the devaluation and for the three year period following the devaluation.

Ten variables in each of these sets of indicators for measuring the degree of political instability were actually used:

(1) politically motivated attacks;

(2) politically related deaths;

(3) successful coups attempts;

(4) politically motivated strikes;

(5) political demonstrations and riots;

(6) politically motivated assassinations;

(7) frequency of government transfers, either regular or unscheduled (via coups);

(8) an overall measure of violence defined as the frequency of protests, strikes, deaths, assassination attempts and attacks;

(9) frequency of unsuccessful government transfers, including unsuccessful coups;

(10) frequency of political repression computed as the number of related executions plus political sanctions imposed by the government on its opponents.

In order to correct by country size, those variables were defined in per capita terms. Table 10 contains some summary statistics for our last four indicators -- frequency of government change, violence index, unsuccessful

transfers and repression index. Additionally, in order to shed additional light on these data we have added the frequency of successful coups.

Once these data sets were assembled we proceeded in the following way: we selected subsets of these political indicators to test whether we could discriminate between successful and unsuccessful devaluations on the basis of the political environment only. The results obtained were very encouraging, showing that in most cases by using political variables we could classify most devaluation episodes correctly. In what follows we provide a detailed discussion of 2 of these exercises

DISCRIMINANT ANALYSIS 1: The purpose of this exercise was to classify the devaluation episodes into three groups: successful devaluations, limited success and unsuccessful devaluations. In this first discriminant analysis we used the following political indicators: successful coups; attacks; assassinations, deaths, strikes and riots; that is, we used variables (1) through (6) from our list. Each of them was defined for both the country's political history as well as for the 3 year period following the devaluation. As can be seen from Table 11, only 2 of the 39 devaluations episodes were misclassified: Jamaica 1967 and Kenya. According to the economic classification criterion summarized in Table 7 both of these devaluations were of limited success. However, according to the political indicators criterion they were classified as successful. The posterior probability of these episodes belonging to the successful devaluation group were 0.63 for Jamaica and 0.91 for Kenya.

Overall, these results are extremely supportive of our contention that the political environment is clearly related to the degree of success of adjustment and devaluation episodes: only 2 episodes out of 39 appear to be misclassified. However, a possible problem with these results is that the

discriminant analysis incorporates too many variables (12) for purposes of classification. More specifically, it is possible to think that by incorporating the political indexes for the period of 3 years following the devaluation we are providing "too much" information. In order to investigate how the results were affected by these considerations we also undertook discriminant analyses using separately the historical political variables, on the one hand, and the post-devaluation indexes on the other.

When historical variables only were used the results were still very supportive of the theory: only five of the episodes were misclassified. One of the episodes classified as successful on economic grounds (Chile) is classified as "limited success" on political grounds; another 3 economically successful (Ecuador 1979, Colombia 1967, and Egypt 1970) devaluations are misclassified as unsuccessful when the political criterion is used; finally one of the episodes classified as unsuccessful on economic grounds (Israel, 1971) is misclassified as having had limited success when the political criteria is used. All in all, however, the results are still remarkable with only 12.8% of the episodes being misclassified.[26]

DISCRIMINANT ANALYSIS 2: In this exercise we used indicators on frequency of government change, overall violence, unsuccessful transfer attempts and political executions (variable (7) through (10) in our list). In the initial analysis we used these indicators for all three time periods: historical, for one year after and three years after the devaluation. When this was done, all 39 episodes were classified correctly! In order to check for the robustness of these results, we also performed a discriminant test

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[26]When instead of using the historical political variables only, we restricted the analysis to the post (3 years) devaluation indicators, the results were similar: only 5 (different) episodes were misclassified.

where these four political indicators were defined for the historical period and for the three years after the devaluation. The results obtained in this case are reported in Table 12. As can be seen they are still remarkably strong, with only 6 episodes out of 39 being misclassified.

It may be argued that the classification of the 39 episodes into three groups (successful, limited success and unsuccessful) reported in Table 7 is somewhat arbitrary. In order to determine whether this three-way classification indeed affected our analysis, we reclassified the devaluation episodes into two groups: successful -- which now pulls together the previous successful and limited success groups -- and unsuccessful. The rationale behind this is that there are at least some grounds for arguing that in the so-called "limited success episodes" some of the objectives of the devaluation programs were accomplished. When our discriminant analysis No. 1 was redone for this two-way classification of the degree of success of the devaluations the results were even more favorable than before: now every episode is classified correctly. When other groups of variables were used in two-way classification discriminant analyses, the results were also very satisfactory; in most cases every episode was correctly classified.

To summarize, then, the discriminant analyses reported here indicate, in a substantive way, that as the political economy approach predicts, there is a close relationship between political instability and the ability to undertake painful stabilization adjustment.

V. Concluding Remarks

There are very large differences in the monetary and fiscal policies implemented by different countries or in the same country at different points in time. In this paper we have asked how can these differences be

explained?   In the previous pages we argued that this is one of the central
questions to be addressed by the theory of economic policy, and we suggested
that an answer can be found by focusing on the incentive constraints faced
by the policymakers.   In particular, we emphasized credibility constraints
and various political incentives.   Our empirical findings are very support-
ive of this line of research.   In our sample of developing countries,
inflation and budget deficits are systematically related to political
variables, and in particular to different measures of political instability.
Moreover, our empirical analysis clearly suggests that the degree of success
of stabilization and devaluation programs is closely related to the
politⁱa. ..l institutional framework in specific countries.

The theoretical models reviewed and formulated in this paper offer at
least three different hypotheses of how political instability and more
generally political institutions influence the policy formation process.
First, political instability and polarization determines the strength of
reputational incentives, and hence ultimately the government credibility.
Second, political instability determines the rate of time preference of
society as a whole, and hence matters for any collective intertemporal
decision.   Third, political institutions and in particular the degree of
political cohesion influences a society's capacity to make decisions and to
change the status quo in the face of adverse economic circumstances.   As the
empirical results reported in this paper indicate, some of the most
important implications of models based on these three hypotheses cannot be
rejected.   Thus, discriminating among them, and assessing their relative
importance in concrete instances is an important task of future research.

The results reported in this paper provide some important policy
implications that can be exploited to advantage in the design of adjustment

and stabilization programs. More specifically, according to these results institutional reforms that reduce government's ability to engage in discretionary unexpected policies will increase their credibility and, thus, will tend to reduce political instability and the equilibrium level of inflation. Our results also indicate that reforms that take away from government's hand money creation, and thus the possibility of using the inflation tax as a residual source of funds, will reduce the reliance on seignorage and inflation. At a more general level, these results indicate that any reform that limits government's ability to behave strategically in an intertemporal sense, will increase macroeconomic stability, reduce inflation and result in lower deficits and domestic debt. In that regard a particularly important reform is the creation of an independent Central Banks that cannot be manipulated at will by the party in office. The recent (late 1989) Chilean and New Zealand experiences in this direction are, in fact, promising and are likely to be an important material for analysis in the years to come.

From a more specific political angle the results reported in this paper also suggest that institutional reforms aimed at generating reduced polarization and lower (perceived) political instability will tend to result in a more stable macroeconomic environment. For example, it may be argued that an institutional setting with a reduced number of political parties (although not necessarily two) will in general, and with other things given, tend to result in lower deficits and inflation. Also policy actions tending at reducing the degree of polarization -- such as, for example, reducing the extent of income inequality or the level of poverty -- are likely to end up resulting in a more stable macro environment.

Finally, and at a more practical level, these results can also be interpreted as providing empirical support for World Bank conditionality.

Indeed to the extent that the Bank resources are only made available on the condition of some policy actions being undertaken, governments abilities to act strategically will be reduced. It is still open, however, whether the current style of conditionality is the more appropriate or if, in the light of our results regarding the importance of political factors, alternative forms of conditionality should be sought.

APPENDIX I

The Theory of Optimal Taxation: Theory and Tests

An important question is whether the observed pattern of the inflation

tax can be explained as the optimal government response to a politically

desired path of public spending. The modern theory of public finance lends

some support to this point of view. Under the eminently plausible assump-

tions of tax evasion, and administrative tax collection costs it is optimal

for the government to rely (at least partially) on the inflation tax (see,

for example, Aizenman (1987)).[27]

Suppose that the government can use the inflation tax (π) and other

tax rates on output (r) to finance its expenditures. Both taxes are

distortionary and impose a welfare cost that is increasing on their rate.

The cost of the output tax rate is $f(r)$ while that of the inflation tax is

$h(\pi)$. Then Mankiw (1987) shows that the optimal tax policy implies:

$$h'(\pi_t) - kf'(r_t) \tag{A.1}$$

where k is a parameter of the money demand function. Thus, at the optimum

the marginal cost of each tax has to be equated in every period. This

implies that as government expenditure changes, inflation and non-inflation

taxes move together. Mankiw (1987) tests this implication using U.S. data

for 1951-82; his results show that there has indeed been a positive rela-

tionship between inflation and the tax rate. Mankiw interprets this finding

as providing support for the theory of optimal taxation as a positive theory

of policy behavior.

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[27]This result is true even if money facilitates the process of exchange
and reduces transaction costs, as in the models of Faig (1988) and Kimbrough
(1987), so that money essentially acts like an intermediate input.

More recently a number of authors have extended Mankiw's work both theoretically and empirically. Vittorio Grilli (1989) has pointed out that Mankiw's tests fail to exploit a number of important implications of the theory, including the fact that seignorage and income taxes should have a unit root, and that there should exist cointegration between different measures of government revenue and between revenues and expectations. His empirical results for a group of 10 European nations are mixed, suggesting that while in some countries seignorage has behaved as predicted by optimal taxation theory, in others it has not done so. Grilli also extends Mankiw's work by allowing the possibility of a variable velocity and by explicitly incorporating the fact that fixed exchange rate agreements constraint the ability to use seignorage.

Poterba and Rotemberg (1990) make a distinction between governments that can commit to a course of action and those that cannot do so. In their model, in the commitment case inflation and taxes will be positively cor-related, while in the absence of commitment inflation will be a positive function of both taxes and total government liabilities as a percentage of GNP. They estimate both versions of the model, using OLS and instrumental variables, on time series data for five countries -- France, Germany, Japan, the U.K., and the U.S. -- and conclude that the evidence does not provide a generalized support to the optimal taxation view of inflation. As in previ-ous cases this theory only seems to hold for the case of the United States.

This type of work has recently been criticized on two different counts. On the one hand, Dornbusch (1989) has pointed out that while the theory is based on marginal tax rates, most (if not all) empirical tests have used computed average rates. On the other hand, Judd (1990) points out that the welfare costs of the inflation tax should be related to expected inflation,

rather than to actual inflation. Thus, according to the theory of optimal taxation, tax rates and expected inflation should move in the same direction. Moreover, any innovation in government spending or the tax bases should result in unexpected changes in actual inflation. While Judd's distinction between expected and unexpected inflation is important, his argument that only expected inflation has welfare costs is not generally valid (for instance, it relies on the government neglecting the redistributions within the private sector that are brought about by unexpected inflation or deflation). We return to this point below.

As Grilli (1989) has pointed out, a necessary (but not sufficient) empirical implication of the optimal taxation theory is that both the inflation rate and the tax rate should have a unit root.[28] In Tables A.1 and A.2 we use the augmented Dickey-Fuller (ADF) test for unit roots on these two variables for a large number of developing countries. While Table A.1 presents results obtained using annual data for both inflation and tax rates, Table 5 presents ADF tests on quarterly data for the inflation tax rate only. (There are no quarterly data on tax rates.)[29] As can be seen from Table A.1, in all cases, except inflation in India, the unit root hypothesis cannot be rejected. The results in Table A.3 show that, as in the case of Table A.2, for the vast majority of the countries the hypothesis that inflation follows a unit root cannot be rejected.

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[28]That is, their time series should have the following form: $x_t = x_{t-1} + u_t$, where u_t is an error term.

[29]The taxation rate is computed, as in Mankiw, as the ratio of government tax revenues to GDP. The raw data were obtained from the IMF Government Financial Statistics. While Table 2 contains data for those 21 countries with data on both π and τ, Table 3 presents data on π only for a larger group of 44 nations.

However, a unit root is a necessary but not sufficient condition of the optimal taxation theory. Indeed, the theory says that in order to maintain the optimalty condition (1) in the presence of shocks, seignorage should be positively correlated with the rate of the income tax. To investigate this aspect of the optimal taxation theory for the LDCs we estimated a Mankiw type regression for the countries in Table A.1. The following equation was estimated on the first differences of the rate of inflation and the tax rate:

$$\Delta INF_t = \alpha_0 + \alpha_1 \Delta TAX_t + \epsilon_t \tag{A.2}$$

where INF is the yearly rate of inflation and TAX is the (implicit) yearly rate of tax on output computed, as in Table A.1 and in Mankiw (1987), as the ratio of tax revenues to GDP. If the theory of optimal taxation presented above is correct, α_1 would be significantly positive. Moreover, Mankiw argues that it should be roughly one.[30] The results obtained from running these regressions using both OLS and instrumental variables are reported in Table A.3.[31] As can be seen, for most countries, these results strongly reject the hypothesis that there is a positive relation between the output tax rate and the inflation tax rate. Other preliminary work not reported here for reasons of space indicates that at the core of this rejection lies a striking stylized fact: the inflation tax often behaves as a residual source of government revenue. It goes up when spending increases or when

[30]Mankiw's results for the U.S. were (standard deviations in parentheses). $\Delta INF = -0.1 + 1.44 \Delta TAX$. When the change in the nominal
          (0.4)   (0.49)
interest rate was used instead of ΔINF the coefficient of ΔTAX was much closer to unity.

[31]Instrumental variables estimation was used in order to account for possible endogeneity of the TAX variable as a result of the Tanzi-Olivera effect. When cointegration tests were computed the results were very similar to those obtained from the regression analysis, rejecting the hypothesis that TAX and INF moved jointly through time.

other sources of revenue fall. There are a number of possible explanations

for these results, including that the optimal taxation theory does not apply

to these countries.[32]

It has recently been argued by Judd (1990) that one possible explanation

for the empirical rejection of the implications of the theory of optimal

taxation is that expected inflation, and not actual inflation, imposes

welfare costs. In this case, it would indeed be optimal for the government

to respond to innovations to government spending and tax bases by means of

unexpected inflation and deflation (i.e., to let inflation be a residual

source of government revenue). Judd, in fact, has argued that when analyzing

inflation, all its effects on government revenues (and not only seigniorage)

should be considered. More specifically, Judd points out that inflation

should be primarily treated as a tax on a stock of liabilities, including

(especially) the government debt.[33] Judd then shows that if money demand is

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[32]For example, there may be serious measurement problems; alternatively
we may be facing a two way causality problem stemming from the presence of a
Tanzi type effect where inflation reduces the effective tax rate. However,
the fact that the optimal taxation hypothesis fails for countries with very
low average inflation suggests that the Tanzi effect is not very important.
Also, the instrumental variables estimation was undertaken in order to elim-
inate this endogeneity problem. In developing more complicated versions of
this model a numbe   of institutional characteristics proper of the LDCs
should be considered. For example, one ought to take into account the fact
that often domestic capital markets are not well developed. Hence most
public borrowing has to be done abroad, using external debt. This
introduces two complications that may change the nature of the optimal
policy. First, developing countries generally face credit constraints in
international capital markets. Secondly, to the extent that they can borrow
abroad, they can only borrow in foreign currency; this means that external
debt may increase exposure to exchange rate risk or terms of trade risk.
Both of these complications presumably weaken the tax smoothing principle,
since they raise the cost of issuing public debt. However, they do not
alter the prescription that the inflation rate should covary positively with
other tax rates.

[33]Judd correctly points out that in the U.S., the monetary base is very
small relative to the stock of Federal Government debt, and this
concentrating on the seigniorage impact of inflation is misleading. This,

derived from a specific transaction cost model and depends on expected future inflation, as in Turnovsky and Brock (1980), the optimal inflation rate is white noise.[34] In the case of the developing nations the results reported in Tables 2 and 3 indicate that contrary to Judd's implications, for the vast majority of cases the hypothesis of unit root cannot be rejected. Moreover, Ljung-Box test for those countries for which a unit root was rejected indicate that inflation did not follow a white noise process.

To summarize, then, the results reported in this Appendix clearly indicate that the various versions of the theory of inflation as a component of a dynamic optimal tax plan, are rejected by the data. This, then, provides a sound empirical motivation for investigating alternative explanations for the observed cross country differentials in inflation illustrated on Table 1.

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of course, is a valid point for the U.S. and other industrial countries. However, most of our developing nations have very low domestic government debt. Moreover, in many of them this debt is indexed.

[34]This contention, of course, is exactly the opposite to that of the Grilli and Poterba and Rotemberg models discussed above, where a white process for inflation means a rejection of the optimal taxation policy. This sharp difference in implications is due to the fact that Grilli and Poterba and Summers postulate that actual (rather than expected) inflation imposes welfare costs.

APPENDIX II

The Measurement of Political Instability

A central proposition of a large number of political economy models is that political instability and political institutions affect policy decisions. For example, most models of strategic government behavior predict that countries that are politically more unstable will tend to rely more heavily on the inflation tax, and will tend to have higher fiscal deficits. This means, then, that in order to empirically test the implications of these theoretical models we have to measure political instability. In this Appendix we discuss some ways of doing this and present some results taken from Cukierman, Edwards, Tabellini (1989).

In the models discussed in Sections II and III of the paper, political instability is defined as the perceived probability that the government in office will be replaced by a government with different political views (preferences). This replacement can be of a normal democratic form, or alternatively, it can be unscheduled, taking place via a coup.

From a cross country comparative perspective, more unstable countries are those that, on average, have a higher (perceived) probability of being replaced. The simplest way of measuring political instability is by calculating the frequency of government change through time. That is:

$$\text{INST} = \frac{n}{Y}, \tag{B.1}$$

where n is the number of government changes during the period under consideration, and Y is the number of years comprised in that time period. The variable n can either include or exclude irregular government transfers via coups.

However, this index of political instability is too simple and, thus, unable to capture more subtle aspects of the political reality of different countries. A particular serious limitation is that for countries with no observed government changes during the period under analysis -- that is, countries with continuous dictatorial rule during the period -- the value of the index will be zero. This will be the case even if the actual perceived probability of a government change is greater than zero. One way of tackling this problem is by computing perceived probabilities of default from time series on political, institutional, and economic developments for each country. These estimated perceived probabilities can then be used in cross country regressions that try to determine the role of political factors in the design of economic policy. This approach has been followed, for example, by Cukierman, Edwards and Tabellini (1989) in their paper on seignorage and political stability.

In constructing their index of political instability, CET used a data set on political developments across the world compiled by Taylor-Jodice (1983). These data contain yearly observations on regular and irregular (i.e. coups) government transfers, unsuccessful coup attempts, executive adjustments, and other political events. Cukierman, Edwards and Tabellini proceeded as follows. First, they estimate a yearly probit model on time series data, or on pooled time series and cross country data, over the period 1948-82. The dependent variable took a value of 0 for the years in which there was no government change (regular or irregular), and a value of 1 otherwise. Changes in the composition of the executive were not considered to be changes in government. The explanatory variables in the probit model fell in three broad classes: economic variables, designed to measure the recent economic performance of the government; political variables,

accounting for significant political events that may signal the imminence of a crisis; and structural variables, accounting for institutional differences and country specific factors that do not change, or that change only slowly over time. These structural variables consisted of three dummy variables that group countries in three categories, according to their political institutions: (i) democracies; (ii) democracies in which the election date is determined by the constitution; and (iii) democracies ruled by a single majoritarian party. Even though these three groups are too broad to account for the variety of existing political institutions, CET argue that at least they discriminate between very different constitutional environments. All these variables are defined in Table A.4 below.

Table A.5 reports the results of the probit regression when all countries were pooled together in the same data, with country specific dummies. Notice that although most variables have the expected sign, only a few are significant. According to these results government changes are made more likely by unusual inflation in the previous year, and by unusually low growth of private consumption over the current and previous two years. (As explained in Table A.4, these variables are measured in deviation from their country means.) Moreover, riots, political repressions, adjustments in the composition of the executive, and unsuccessful attempts to change the government all signal the imminence of a political crisis. Two of the institutional dummies are significant: not surprisingly (perhaps) democracies have more frequent government changes than non-democratic regimes. Also, coalition governments or minority governments are less stable than majoritarian governments. CET report that these estimates were very robust to changes in the model specification. As a second index of instability, CET estimated the same probit regression on each country separately (except

that the structural variables have been dropped and all lags of the same variables have been constrained to have the same coefficient, in order to save degrees of freedom).

The pooled time series-cross country and the country specific probit regressions were used by CET to compute two _estimated frequencies_ of government change for 79 countries during the period 1971-82. These indexes were actually calculated by averaging the estimated probabilities of government change over that time period. Table A.5 contains a comparison, in the form of Spearman rank coefficients, of the two estimated instability indexes and to more simple index calculated out of observed historical frequencies of government change. Here P stands for the estimated index using pooled data, PS refers to the instability index estimated from country-specific data and F is the historical frequencies index. As can be seen, the degree of correlation across indexes is high but not overwhelming, suggesting that all three indexes could be used to advantage in cross country studies of the political economy of macroeconomic policies.

The purpose of this Appendix has been to discuss ways in which statistical methods can be used to generate variables related to political developments, that can then be used in cross country studies on the political economy of macroeconomic policy. The existence of data sets with vast information on political developments facilitate this task, allowing researchers to use conventional methods to generate these political indexes. Moreover, the results obtained in regressions that directly use these indexes are highly encouraging, suggesting that this avenue for empirical inquiry can be particularly fruitful.

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TABLE 1
Inflation Tax in Selected Developing Countries
(Averages)

	1963-1973		1973-1978		1978-1983		1983-1987	
	Infla-tion Rate	Infla-tion Revenue As % of GNP	Infla-tion Rate	Infla-tion Revenue	Infla-tion Rate	Infla-tion Revenue	Infla-tion Rate	Infla-tion Revenue
Algeria	4.8	n.a.	10.4	5.41	10.0	5.15	9.2	5.49
Burundi	3.4	0.33	13.8	1.58	14.4	1.79	6.8	0.84
Cameroon	3.8	0.49	13.6	1.81	11.4	2.52	5.3	1.40
Congo	3.6	0.56	10.9	1.77	10.6	1.32	7.1	1.32
Côte d'Ivoire	3.9	0.70	16.3	3.33	10.7	2.14	4.5	0.81
Ethiopia	1.8	0.20	14.9	2.33	6.4	1.18	3.8	0.82
Ghana	10.0	1.51	58.7	9.81	73.2	7.84	28.6	2.09
Kenya	3.2	0.60	16.0	2.75	13.1	2.05	8.1	1.10
Madagascar	3.7	0.66	8.9	1.60	22.8	4.54	12.5	1.77
Malawi	5.5	0.63	9.6	1.28	13.0	1.25	17.4	1.49
Nigeria	5.9	0.54	22.3	2.64	14.7	2.32	15.2	2.41
Senegal	4.7	0.66	12.8	2.34	10.7	2.24	6.7	2.21
Sudan	5.1	0.74	17.6	2.60	27.5	5.56	35.3	n.a.
Tanzania	10.0	1.77	15.1	3.03	25.1	7.08	32.9	7.41
Togo	2.9	0.39	13.1	2.42	12.0	3.22	-0.3	-1.04
Tunisia	3.8	0.96	6.2	1.55	9.9	2.60	7.4	2.05
Uganda	n.a.	n.a.	n.a.	n.a.	36.8	4.56	179.6	20.24
Zaire	19.0	3.61	50.9	10.72	59.8	9.14	53.3	7.87
Zambia	6.0	0.82	14.6	2.69	13.5	2.29	38.0	5.64
Bangladesh	12.6	n.a.	17.8	1.83	13.2	1.23	10.4	1.07
Burma	7.3	1.76	14.4	2.69	3.5	0.70	11.0	1.58
India	8.3	1.33	7.3	1.15	10.1	1.43	7.8	1.13
Korea	13.4	1.14	17.9	1.85	15.8	1.44	2.6	0.25
Malaysia	2.2	0.37	6.8	1.19	5.9	1.06	1.5	0.29
Pakistan	6.8	1.96	14.2	3.41	8.9	2.29	4.9	1.23
Philippines	8.7	0.86	13.5	1.13	13.8	1.06	19.5	1.17
Singapore	3.1	0.80	6.2	1.43	5.2	1.22	0.5	0.11

Table 1 (cont).

	1963-1973		1973-1978		1978-1983		1983-1987	
	Infla-tion Rate	Infla-tion Revenue As % of GNP	Infla-tion Rate	Infla-tion Revenue	Infla-tion Rate	Infla-tion Revenue	Infla-tion Rate	Infla-tion Revenue
Sri Lanka	4.3	0.68	6.7	0.83	15.9	1.89	8.5	0.91
Greece	3.9	0.69	15.7	2.82	21.9	3.64	19.3	2.81
Spain	7.4	2.13	18.4	5.34	14.5	3.62	8.5	2.12
Portugal	6.2	3.36	23.3	11.08	21.6	7.32	17.4	6.36
Turkey	7.7	1.63	24.9	5.03	53.8	7.73	41.7	4.61
Yugoslavia	15.1	3.53	16.9	4.55	32.7	7.54	84.4	9.38
South Africa	4.5	0.75	11.5	1.63	13.8	1.92	15.7	2.73
Argentina	30.3	n.a.	200.1	25.03	174.7	12.04	380.1	22.00
Bolivia	8.4	0.85	18.7	1.71	99.6	8.67	524.1	105.68
Brazil	34.5	5.20	36.2	4.42	96.2	6.66	199.7	8.24
Chile	65.7	24.95	244.7	13.06	25.1	1.45	22.5	1.27
Colombia	11.5	1.71	23.7	3.12	24.6	2.94	20.6	1.97
Costa Rica	3.8	0.62	12.2	1.85	37.4	5.93	13.9	2.19
Dominican Rep.	3.4	0.35	10.4	1.04	9.2	0.82	24.7	2.33
Ecuador	6.1	0.91	14.8	2.34	20.9	3.28	27.9	3.64
El Salvador	1.6	0.19	13.6	1.82	14.4	2.29	22.7	3.25
Honduras	2.9	0.29	8.1	0.92	11.4	1.32	3.7	0.52
Jamaica	5.8	0.62	20.1	2.51	17.5	2.46	18.8	2.95
Mexico	4.6	0.53	20.2	2.05	46.6	3.93	85.3	4.36
Nicaragua	27.1	3.38	7.9	0.91	32.6	6.14	462.1	8.61
Paraguay	3.8	0.34	11.3	1.02	16.9	1.62	24.8	1.97
Peru	9.9	1.32	33.9	5.54	75.4	7.35	109.4	8.04
Uruguay	62.2	7.82	62.4	5.68	46.5	3.81	66.9	4.42
Venezuela	2.4	0.31	8.2	1.44	13.2	2.52	15.8	2.83

Inflation Rate   — line 64x (CPI)
Inflation Revenue — (line 64x) x (line 34) + (line 99b)
                    Inflation Rate times the Ratio Money/GDP

Source: IFS Tapes

TABLE 2

Inflation and Political Instability

Specification 1:

	1963 - 1973	1973 - 1978	1978 - 1983	1983 - 1988
Intercept	2.664	18.669*	15.654*	-132.98
	(3.146)	(8.240)	(6.454)	(84.25)
Frequency of Govt. Change	23.654*	29.121	41.623*	907.42**
	(9.521)	(26.873)	(20.205)	(263.76)
R^2 (adj.)	0.092	0.003	0.060	0.175
SE	11.884	41.794	28.371	370.36
N	51	51	51	51

Specification 2:

	1963 - 1973	1973 - 1978	1978 - 1983	1983 - 1988
Intercept	6.126*	20.279*	14.325**	-41.256
	(2.935)	(7.617)	(5.222)	(44.389)
Regular Govt. Transfer	5.041	3.242	24.530*	89.752
	(7.012)	(13.360)	(9.626)	(81.815)
Coups	13.212	45.236	44.427	2039.5**
	(15.481)	(37.510)	(23.919)	(203.30)
R^2 (adj.)	0.003	-0.008	0.194	0.701
SE	12.561	42.428	26.498	225.22
N	50	50	50	50

Standard errors are in parentheses.

The dependent variable is the average rate of inflation over the relevant time interval.

*   : significant at the 5% level.
** : significant at the 1% level.

TABLE 3

Trade Taxes and Political Instability

(Ordinary Least Squares)

	(1)	(2)	(3)
Intercept	0.4616** (0.0001)	0.0834 (0.0654)	0.0927 (0.0604)
Agriculture	-	0.0065** (0.0014)	0.0059** (0.0013)
Mining and Manufacturing	-0.0071** (0.0012)	-	-
Foreign Trade	0.0061 (0.0310)	0.0401 (0.0357)	0.0329 (0.0330)
GDP per Capita	0.69E-5 (0.50E-5)	-0.22E-5 (0.47E-5)	-0.42E-5 (0.43E-5)
Urbanization	-0.0025* (0.0006)	-0.0003** (0.0008)	-0.0002 (0.0007)
Industrialized	-0.1619** (0.0379)	-0.0917 (0.0522)	-0.0573 (0.0394)
Latin America	-	-0.0003 (0.0417)	-
Political Instability	0.1113 (0.0904)	0.0317 (0.0980)	
Regular Government Transfers	-	-	-0.0277 (0.0385)
Coups Frequency	-	-	0.1544 (0.1267)
$\bar{R}^2$	0.712	0.675	0.681
MSE	0.085	0.091	0.089
N	61	61	61

Standard errors are in parentheses

*Means significant at 5% level;
**Means significant coefficient at 1% level.

TABLE 4A

Budget Deficit as Percentage of GDP

Country	1963 - 1973 (1)	(2)	1973 - 1978 (1)	(2)	1978 - 1983 (1)	(2)	1983 - 1988 (1)	(2)
Greece	1.4	1.8	3.3	3.4	5.9	5.8	6.5	10.3
Portugal	-0.2	1.6	5.3	7.0	4.6	10.7	0.7	9.7
Spain	1.8	1.4	1.7	1.4	4.1	4.5	0.5	7.1
Turkey	0.4	2.5	2.3	2.9	4.0	4.1	1.0	6.2
Yugoslavia	1.0	1.0	1.5	1.4	0.3	0.4	.	0.0
S. Africa	0.8	3.1	1.0	4.4	.	3.6	.	4.5
Argentina	.	.	.	5.3	.	6.4	7.0	7.0
Bolivia	3.8	2.8	0.1	3.8	5.5	12.3	2.5	16.0
Brazil	0.5	0.0	-0.9	0.3	0.1	2.3	-0.1	8.2
Chile	.	2.5	.	2.0	0.2	-1.5	1.5	2.2
Colombia	0.5	1.0	0.4	0.2	0.2	2.3	1.5	2.8
Costa Rica	0.3	3.3	1.5	3.0	2.7	4.2	1.0	2.1
Dominican Rep.	0.8	1.7	0.7	0.4	2.4	3.0	0.7	1.5
Ecuador	0.7	2.7	.	1.1	.	2.5	1.1	1.2
El Salvador	0.2	0.5	0.4	0.2	2.9	4.0	0.1	1.9
Honduras	0.2	1.3	0.4	0.9	1.9	4.1	1.2	8.0
Mexico	1.1	2.0	1.8	3.9	3.4	6.3	5.9	9.1
Nicaragua	0.0	1.2	1.0	5.0	7.5	13.6	3.3	22.9
Panama	0.1	3.3	2.5	7.4	.1.2	8.6	2.2	5.2
Paraguay	0.3	0.3	-0.6	-0.2	0.2	0.0	0.4	0.4
Peru	1.1	2.9	2.4	5.2	2.3	4.3	4.0	7.2
Uruguay	1.6	2.3	1.5	2.3	2.5	2.6	4.5	3.0
Venezuela	0.1	-0.2	-2.9	0.6	1.1	1.6	-1.2	-1.2
Jamaica	0.4	3.1	4.7	11.3	8.0	16.3	0.2	13.7
Bangladesh	.	1.9	0.9	0.3	0.7	-1.2	0.3	-0.8
Burma	2.8	-2.0	2.9	1.8	-3.3	-1.2	-0.9	0.1
Sri Lanka	1.1	6.6	1.2	6.7	4.3	13.3	1.1	9.2
India	1.3	4.3	1.3	4.1	3.0	5.9	3.5	7.9
Korea	0.1	0.8	0.9	1.5	1.1	2.1	0.2	0.6
Malaysia	0.4	5.4	0.6	7.2	1.0	13.1	-1.0	8.2
Pakistan	2.2	5.7	2.7	8.1	3.2	6.6	2.3	7.2
Philippines	0.4	0.9	0.3	1.1	1.3	2.1	0.2	2.6
Singapore	-3.0	0.3	-3.0	-0.7	-0.4	-1.9	1.0	-2.4
Algeria	1.9	.	3.2	.	2.7	.	5.1	.
Burundi	0.6	-0.4	0.0	-0.5	2.3	1.1	0.8	-0.1
Cameroon	0.1	.	.	1.3	.	0.1	0.7	-0.2
Congo, Peop. Rep.	0.1	2.2	2.0	.	0.0	4.8	1.1	3.3
Zaire	0.5	4.1	7.3	13.7	5.2	6.8	10.8	2.8
Ethiopia	0.2	0.9	1.8	3.4	2.4	6.0	3.0	9.2
Ghana	1.9	4.8	6.1	7.8	3.5	5.7	3.9	1.2
Cote D'Ivoire	0.0	.	1.0	.	1.8	.	0.0	.
Kenya	1.0	3.8	1.2	3.7	2.4	4.1	1.6	4.2
Madagascar	0.3	.	-1.8	.	6.7	.	2.9	.
Nigeria	1.5	2.1	1.0	-2.8	3.3	-8.7	2.3	4.7
Senegal	0.5	0.9	0.7	1.5	2.2	2.5	0.6	7.1

Table 4A (cont.)

Country	1963 - 1973 (1)	(2)	1973 - 1978 (1)	(2)	1978 - 1983 (1)	(2)	1983 - 1988 (1)	(2)
Sudan	1.9	2.2	3.3	3.2	2.1	3.9	.	.
Tanzania	1.0	4.6	2.9	5.7	6.4	8.4	3.0	5.9
Togo	0.0	.	.	27.2	0.6	8.5	0.1	2.7
Tunisia	0.4	1.2	0.9	2.9	0.8	4.7	1.1	6.6
Uganda	3.3	6.5	3.1	4.9	3.5	3.6	3.5	3.9
Zambia	2.5	4.3	7.8	12.8	6.7	13.6	13.4	11.5

Note:
(1) - Change in Monetary System's Credit to the Government (IFS, line 32an)
(2) - Central Government Budget Deficit (IFS line 80..h, supplemented by
80..t or 80.r. where necessary)

TABLE 4B

Correlation between Two Measures of Budget Deficit

Periods	Correlation Coefficients
1963-73	.34
1973-78	.79
1978-83	.64
1983-88	.30

Pearson Correlation coefficients between columns (1) and (2) in Table 7A.

TABLE 5

Domestic Credit to the Public Sector as a Fraction of

Total Credit From the Central Bank

(in percentages)

	1963-1973	1973-1978	1978-1983	1983-1988
Algeria	45.4	15.9	35.5	62.1
Burundi	41.7	27.2	45.3	71.6
Cameroon	3.2	22.5	18.9	24.2
Congo	22.8	44.4	40.8	53.4
Côte d'Ivoire	2.8	2.4	25.7	40.9
Ethiopia	42.9	36.2	50.7	54.7
Ghana	51.4	72.4	72.5	50.9
Kenya	10.8	26.9	50.8	62.4
Madagascar	-7.8	43.9	90.8	85.4
Malawi	11.1	22.6	64.3	82.3
Nigeria	41.2	19.3	60.4	77.6
Senegal	0.1	6.5	27.8	48.6
Sudan	n.a	n.a	n.a	n.a.
Tanzania	25.4	45.0	88.3	93.3
Togo	0.7	14.2	30.7	27.7
Tunisia	44.8	15.5	9.6	5.2
Uganda	47.7	90.8	89.9	86.5
Zaire	71.8	84.6	76.1	71.3
Zambia	10.8	71.6	94.0	87.1
Bangladesh	61.5	55.1	40.1	25.2
Burma	n.a	n.a	n.a.	n.a.
India	82.3	64.6	65.0	74.6
Korea	33.4	32.6	22.9	15.1
Malaysia	5.6	6.6	12.6	17.6
Pakistan	64.3	55.2	56.9	58.7
Philippines	35.9	20.1	22.3	38.2
Singapore	n.a.	n.a.	n.a.	n.a.
Sri Lanka	84.5	63.6	64.5	67.8

Table 5 (cont.)

	1963-1973	1973-1978	1978-1983	1983-1988
Greece	28.5	27.9	48.6	56.8
Spain	33.2	31.9	52.0	47.6
Portugal	5.6	33.2	46.3	47.4
Turkey	51.2	32.1	48.1	67.1
Yugoslavia	32.1	35.3	17.3	6.3
South Africa	29.8	45.7	31.6	12.0
Argentina	n.a.	20.9	29.0	35.9
Bolivia	87.9	56.1	78.1	41.1
Brazil	32.9	-36.2	24.9	12.0
Chile	89.3	80.1	37.7	15.8
Colombia	42.9	13.9	6.9	33.4
Costa Rica	35.5	34.8	37.1	25.0
Dominican Republic	50.6	43.1	37.4	37.1
Ecuador	48.2	28.1	13.6	38.4
El Salvador	27.9	29.9	47.5	39.9
Honduras	24.2	18.7	31.9	38.5
Jamaica	11.6	65.4	88.5	82.3
Mexico	42.3	79.2	82.2	56.3
Nicaragua	22.8	25.3	54.0	74.3
Panama	59.8	63.1	65.5	83.1
Paraguay	50.1	13.2	5.3	16.7
Peru	52.3	45.5	35.2	30.8
Uruguay	44.2	34.2	31.1	46.1
Venezuela	12.1	3.3	8.6	6.7

(Line 12a) + Sum of (line (11) + (line 12a) + (line 12b) + (line 12c)
        + (line 12d) + (line 12e) + (line 12f)
(Central Bank's credit to the government as a fraction of total Central
Bank's credit)

Source: IFS tapes.

TABLE 6A

Budget Deficit and Political Instability

Dependent Variable:	1963 - 1973		1973 - 1978		1978 - 1983		1983 - 1988	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Explanatory Variables:								
Intercept	2.333**	4.406**	5.888**	15.596**	5.751**	11.820**	1.536	11.546*
	(.788)	(1.593)	(1.995)	(4.468)	(2.047)	(4.064)	(2.967)	(4.717)
Agricult.	-0.020	-0.042	-0.055	-0.182*	-0.053	-0.156*	-0.007	-0.162
	(.015)	(.030)	(.037)	(.087)	(.039)	(.069)	(.051)	(.081)
Forgn.Trd.	-1.665**	1.301	-1.245	0.074	-0.550	0.407	-0.118	-1.434
	(.508)	(.952)	(1.048)	(2.283)	(.840)	(1.600)	(1.393)	(2.125)
GDP p Cap	-0.0002	0.0002	-0.0002	0.00005	0.00003	-0.0003	-0.0008	-0.0005
	(.0002)	(.0004)	(.0005)	(.0012)	(.0005)	(.0009)	(.0005)	(.0008)
Urbaniz.	-0.013	-0.075**	-0.043	-0.152	-0.050·	-0.112	0.051	-0.058
	(.014)	(.027)	(.038)	(.076)	(.037)	(.069)	(.043)	(.066)
Freqncy of Govt. Change	1.468	3.338*	-0.622	-3.653	2.098	7.589*	0.553	9.383*
	(.816)	(1.594)	(2.011)	(4.439)	(1.908)	(3.818)	(2.472)	(3.885)
R^2 (adj.)	0.262	0.173	0.063	0.074	0.021	0.108	-0.032	0.155
SE	0.923	1.738	2.171	4.812	2.298	4.483	2.905	4.432
N	46	42	42	43	43	44	45	43

Note: the 2 dependent variables, denoted by (1) and (2) above, are:

(1): Change in the Monetary System's credit to the government (as a percentage of GDP)
(2): Central Government budget deficit (as percentage of GDP)

Standard Errors are in parentheses
* means the coefficient is significant at the 5% level.
** means the coefficient is significant at the 1% level

TABLE 6B

Budget Deficit and Political Instability

	1963 - 1973		1973 - 1978		1978 - 1983		1983 - 1988	
Dependent Variable:	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Explanatory Variables:								
Intercept	2.351**	4.433**	5.108**	14.358**	6.593**	12.998**	1.279	13.39**
	(.746)	(1.612)	(1.827)	(4.347)	(2.088)	(3.974)	(3.001)	(4.504)
Agricult.	-0.020	-0.038	-0.051	-0.179*	-0.071	-0.184*	-0.007	-0.197*
	(.014)	(.030)	(.035)	(.085)	(.039)	(.077)	(.052)	(.079)
Forgn.Trd.	-1.501**	1.286	-1.064	0.560	-0.557	0.344	0.056	-1.550
	(.490)	(.994)	(.982)	(2.214)	(.821)	(1.604)	(1.413)	(2.075)
GDP p Cap.	-0.00007	0.0001	-0.0008	-0.001	0.00003	-0.0007	-0.0009	-0.0007
	(.0002)	(.0004)	(.0005)	(.001)	(.0005)	(.0009)	(.0006)	(.0008)
Urbaniz.	-0.015	-0.065*	-0.010	-0.099	-0.051	-0.089	0.057	-.053
	(.013)	(.027)	(.037)	(.078)	(.039)	(.067)	(.045)	(.064)
Reg Govt. Transfers	0.055	0.857	1.316	0.516	-0.350	2.414	0.752	2.021
	(.512)	(1.071)	(.916)	(2.051)	(1.244)	(2.052)	(1.334)	(2.012)
Coups	2.903*	2.483	-1.673	-2.564	3.919	5.106	-0.354	8.208
	(1.152)	(2.448)	(1.934)	(4.570)	(2.478)	(4.582)	(2.915)	(4.441)
R^2(adj.)	0.317	0.104	0.098	0.042	0.023	0.093	-0.042	0.164
n SE	0.879	1.780	2.085	4.833	2.292	4.546	2.902	4.455
N	47	44	44	45	45	46	46	45

Note: the 2 dependent variables, denoted by (1) and (2) above, are:
(1): Change in the Monetary System's credit to the government (as a percentage of GDP)
(2): Central Government budget deficit (as percentage of GDP)

Standard Errors are in parentheses
* means the coefficient is significant at the 5% level.
** means the coefficient is significant at the 1% level

TABLE 7

Devaluation Crises in Selected Developing Countries:

Rate of Devaluation (percentage)[a]

Country	Year of Devaluation Crisis	Percentage of Devaluation			
		Year of Devaluation	One Year After Devaluation	Two Years After	Three Years After
A. Stepwise Devaluations					
Argentina	1970	25.0	0.0	0.0	0.0
Bolivia	1972	66.6	0.0	0.0	0.0
Bolivia	1979	25.0	0.0	0.0	684.0
Colombia	1962	34.3	0.0	0.0	50.0
Colombia	1965	50.0	0.0	16.7	7.1
Costa Rica	1974	28.8	0.0	0.0	0.0
Cyprus	1967	16.6	0.0	0.0	0.0
Ecuador	1961	20.0	0.0	0.0	0.0
Ecuador	1970	38.8	0.0	0.0	0.0
Egypt	1962	23.9	0.0	0.0	0.0
Egypt	1979	78.8	0.0	0.0	0.0
Guyana	1967	15.9	0.9	0.6	0.2
India	1966	58.6	-0.3	1.0	-0.9
Indonesia	1978	50.6	0.3	-0.0	2.7
Israel	1962	66.6	0.0	0.0	0.0
Israel	1967	16.6	0.0	0.0	0.0
Israel	1971	20.0	0.0	0.0	7.1
Jamaica	1967	15.9	0.9	-0.6	0.2
Jamaica	1978	86.4	5.1	0.0	0.0
Malta	1967	16.6	0.0	0.0	0.0
Nicaragua	1979	43.0	0.0	0.0	0.0
Pakistan	1972	130.1	-10.2	0.0	0.0
Peru	1967	44.4	0.0	0.0	0.0
Philippines	1962	94.0	0.2	0.0	0.0
Philippines	1970	63.7	0.0	5.3	-0.7
Sri Lanka	1967	24.1	0.0	0.5	0.0
Trinidad	1967	15.9	0.9	-0.6	0.2
Venezuela	1964	38.1	0.0	0.0	0.0
Yugoslavia	1965	66.6	0.0	0.0	0.0
B. Devaluations Followed by Crawling Peg					
Bolivia	1982	684.0	155.1	1700.0	.
Chile	1982	88.2	19.2	46.5	43.3
Colombia	1967	16.7	7.1	5.7	6.9
Ecuador	1982	32.6	63.1	24.1	42.5
Kenya	1981	35.9	23.7	8.4	14.3

Table 7 (cont.)

Country	Year of Devaluation Crisis	Percentage of Devaluation			
		Year of Devaluation	One Year After Devaluation	Two Years After	Three Years After
Korea	1980	36.3	6.1	6.9	6.2
Mexico	1976	59.6	13.9	-0.0	0.3
Mexico	1982	267.8	49.1	33.7	93.0
Pakistan	1982	29.6	5.1	13.7	4.0
Peru	1975	16.2	54.2	87.9	50.4

[a]Devaluation of the official rate with respect to the U.S. dollar. In the case of multiple rates the IFS reports the "most common" of them.

Source: Edwards (1989)

TABLE 8

Successful and Unsuccessful Devaluations

A. **Stepwise Devaluers**

    A.1. - **Successful Devaluation Episodes**

Costa Rica	1974
Cyprus	1967
Ecuador	1970
Egypt	1979
Guyana	1967
India	1966
Indonesia	1978
Israel	1962
Pakistan	1972
Philippines	1962
Philippines	1970
Sri Lanka	1967
Venezuela	1964

    A.2. - **Limited-Success Devaluations**

Egypt	1962
Ecuador	1961
Israel	1967
Jamaica	1967
Malta	1967
Peru	1967
Trinidad	1967

    A.3. - **Unsuccessful Devaluations**

Argentina	1970
Bolivia	1972
Bolivia	1979
Colombia	1962
Colombia	1965
Israel	1971
Jamaica	1978
Nicaragua	1979
Yugoslavia	1965

B. **Crawlers**

    B.1. - **Successful Crawlers**

Chile	1982
Colombia	1967
Korea	1980

Table 8 (cont.)

B.2. - Limited-Success Crawlers

| Kenya | 1981 |
| Pakistan | 1982 |

B.3. - Unsuccessful Crawlers

Bolivia	1982
Ecuador	1982
Mexico	1976
Mexico	1982
Peru	1975

Source: See text.

TABLE 9

Summary Statistics on Timing of Devaluations

	Presidential Democracies	Parliamentary Democracies	Dictatorial Regimes
Percentage of cases where 2 or _fewer_ years elapsed since last government transfer	77.3%	70.0%	42.9%
Percentage of cases where devaluation took place 1 or fewer years years before _next_ government transfer	31.8%	20.0%	0.0%

TABLE 10

Summary Statistics on Political Instability

For Devaluation Episodes

	Frequency of Govt. Transfers	Frequency of Coups	Violence Index	Unsuccessful Transfer Attempts	Regression Index
A. Historical Indicators					
Successful	0.55	0.06	0.05	0.29	0.30
Limited Success	0.67	0.07	0.18	0.28	0.25
Unsuccessful	0.54	0.13	0.20	0.35	0.15
B. Post Devaluation (3 Years) Indicators					
Successful	0.33	0.06	0.07		0.09
Limited Success	0.44	0.01	0.36		0.07
Unsuccessful	0.73	0.11	0.36		0.08

TABLE 11

Discriminant Analysis of Devaluation Episodes

According to Political Instability

	Percentage of Countries Classified Correctly
Successful	100.0%
Limited Success	77.8%
Unsuccessful	100.0%

TABLE A.1

Augmented Dickey-Fuller Unit Root Tests for

Inflation and Taxes: Selected Developing Nations

Country	Inflation		Taxes	
	$\uparrow$	$\uparrow_t$	$\uparrow$	$\uparrow_t$
Brazil	-0.172	-0.714	-2.278	-1.521
Burma	-2.437	-2.721	-0.709	-0.069
Burundi	-1.415	-0.634	-1.178	-1.876
Ecuador	-0.008	-2.732	-0.216	-1.811
El Salvador	-0.693	-2.419	-2.169	-2.197
Ethiopia	-1.422	-1.128	-0.808	-2.18?
Ghana	-1.580	-1.850	-0.868	-1.646
Greece	-0.064	-2.265	-1.000	-1.189
Honduras	-1.434	-1.373	-0.320	-2.768
India	-3.216	-4.150	-2.640	-2.748
Jamaica	-0.818	-1.390	-0.520	-1.729
Kenya	-1.731	-1.118	-1.179	-2.969
Malaysia	-1.903	-2.040	-0.004	-1.719
Nigeria	-1.260	-1.753	-1.689	-0.281
Pakistan	-2.138	-2.369	-1.213	-2.075
Philippines	-1.233	-2.608	-2.436	-2.601
Singapore	-1.972	-1.677	2.019	1.005
South Africa	-0.001	-2.707	0.003	-2.761
Yugoslavia	-2.772	-1.901	-0.835	-2.452
Zambia	-0.534	-1.593	-0.065	-3.255

NOTE: T tests the hypothesis of unit root without a time trend, while T_t includes a time trend. The critical values of these tests at 95% confidence for 25 observations are $T = -3.0$ and $T_t = -3.6$.

TABLE A.2

Augmented Dickey Fuller Tests for Quarterly Inflation

	$\uparrow$	$\uparrow_t$	N
Argentina	-2.578	-3.638*	122
Bangladesh	-3.210*	-3.415	71
Brazil	2.901*	2.179	119
Burundi	-2.389	-2.331	86
Cameroon	-2.391	-2.681	98
Chile	-2.000	-2.059	95
Colombia	-2.231	-3.728*	122
Congo	-2.295	-2.185	96
Côte d'Ivoire	-1.792	-1.874	102
Dominican Republic	-1.125	-3.227	121
Ecuador	1.390	-0.530	123
El Salvador	-1.045	-3.354	122
Ethiopia	-2.645	-2.604	87
Greece	-1.327	-1.957	123
Honduras	-2.468	-2.622	122
Hong Kong	-2.520	-2.511	75
India	-3.208*	-3.298	122
Korea	-1.746	-2.332	71
Madagascar	-1.144	-2.053	86
Malawi	-0.355	-1.041	25
Malaysian	-2.654	-2.713	123
Mexico	-1.328	-3.521*	123
Nigeria	-2.935*	-3.454*	118
Pakistan	-2.275	-2.442	123
Paraguay	-1.669	-2.967	122
Perú	0.122	-1.863	119
Philippines	-2.747	-3.076	123
Portugal	-1.577	-1.384	122
Senegal	-1.945	-1.918	78
Singapora	-2.321	-2.395	87

Table A.2 (cont)

	$\hat{\tau}$	$\hat{\tau}_\tau$	N
Somalia	-1.541	-3.490*	93
South Africa	-0.806	-3.069	123
Spain	-1.480	-1.494	123
Sri Lanka	-1.602	-2.446	123
Sudan	-1.670	-2.987	115
Tanzania	-1.369	-2.678	70
Togo	-1.933	-2.417	67
Tunisia	-2.216	-4.0^6*	123
Turkey	-1.556	-2.000	72
Uganda	-1.040	-1.526	26
Uruguay	-2.458	-2.522	123
Venezuela	2.941*	1.368	123
Zaire	-1.917	-2.644	93
Zimbabwe	-1.933	-3.553	22

*The H^0 of unit root is rejected at 95% confidence.

These data correspond to line 64X of the International Financial Statistics.

TABLE A.3

A Test of the Theory of Optimal Taxation in

Selected Developing Countries: 1954-1987[a]

$$\Delta INF = \alpha_0 + \alpha_1 \Delta TAX + \epsilon_t$$

Country	OLS			Instrumental Variables[b]			
	α_0	α_1	D.W.	α_0	α_1	D.W.	N
Brazil	6.977 (1.820)	-0.062 (-0.052)	1.035	6.980 (1.722)	-0.062 (-0.051)	1.053	25
Burma	0.426 (0.238)	0.180 (0.257)	1.678	-0.768 (-0.353)	0.660 (0.743)	1.578	23
Burundi	0.266 (-0.118)	1.282 (1.020)	2.274	-0.561 (-0.225)	1.192 (0.888)	2.282	18
Ecuador	0.830 (0.631)	-0.365 (-0.384)	2.682	1.167 (0.847)	-0.439 (-0.452)	2.686	32
El Salvador	0.873 (0.984)	-0.462 (-0.768)	2.099	1.026 (1.092)	-0.479 (-0.762)	2.099	31
Ethiopia	2.653 (0.964)	-3.519 (-1.683)	2.653	3.159 (1.000)	-3.831 (-1.669)	2.639	20
Ghana	-3.065 (-0.306)	-5.561 (-1.397)	2.299	-1.028 (-0.094)	-6.601 (-1.471)	3.315	19
Greece	0.404 (0.482)	-0.472 (-1.133)	2.158	0.717 (0.877)	-0.580 (-1.170)	2.213	31
Honduras	0.016 (0.023)	-0.324 (-0.322)	2.412	0.193 (0.297)	0.323 (0.346)	2.316	31
India	1.118 (0.881)	-5.220 (-3.049)	2.012	0.611 (0.485)	-5.152 (-3.112)	2.007	30
Jamaica	1.327 (0.874)	-1.770 (-2.500)	1.702	1.495 (0.910)	-1.735 (-2.358)	1.698	25
Kenya	0.007 (0.008)	0.631 (1.150)	2.548	-0.096 (-0.097)	0.658 (1.145)	2.543	26
Malaysia	0.076 (0.094)	-1.118 (-0.206)	2.157	0.079 (0.087)	-0.108 (-0.189)	2.157	25
Nigeria	-0.396 (-0.140)	-0.431 (-0.576)	3.030	2.147 (0.895)	-0.390 (0.671)	3.095	18
Pakistan	0.204 (0.195)	-0.537 (-0.766)	2.214	0.025 (0.023)	-0.790 (-1.090)	2.210	32
Philippines	0.366 (0.173)	-5.367 (-2.668)	2.358	0.979 (0.437)	-5.937 (-2.800)	2.336	29

Table A.3 (cont).

Country	OLS			Instrumental Variables [b]			
	α_0	α_1	D.W.	α_0	α_1	D.W.	N
Singapore	0.638 (0.452)	-0.763 (-1.335)	1.747	0.782 (0.501)	-0.782 (-1.288)	1.746	21
South Africa	0.228 (0.762)	0.780 (1.865)	1.887	0.251 (0.798)	0.755 (1.772)	1.880	32
Sri Lanka	0.246 (0.267)	0.601 (1.435)	2.342	0.289 (0.294)	0.610 (1.400)	2.340	32
Yugoslavia	2.717 (1.397)	-0.394 (-0.665)	1.316	2.779 (1.293)	-0.456 (-0.653)	1.304	25
Zambia	1.547 (1.250)	-0.232 (-0.750)	1.897	1.394 (1.0207)	-0.233 (-0.698)	1.899	20

Standard errors are in parentheses.

[a] For many countries the period was shorter, and was determined by data availability. Only countries with 18 or more observations were considered. t-statistics in parenthesis. N is the total number of observations available.

[b] Lagged and twice lagged ΔINF and ΔTAX were used as instruments.

TABLE A.4

Variables Used in Cukierman-Edwards-Tabellini's
Probit Analysis of Political Instability

1. **Government Change**

Government change = Dummy variable taking a value of 1 for the years in
which there is either a coup or a regular government transfer, and a
value of 0 otherwise. [Source: Taylor-Jodice (1983)].

2. **Economic Performance**

Inflation = Annual rate of growth of GDP deflator. [Source: Constructed
from Summers-Heston (1988)]

Economic Growth = Cumulative rate of growth of private consumption in the
current and previous two years. [Source: Summers-Heston (1988)]

3. **Political Events**

Riots = Violent riots. [Source: Taylor-Jodice (1983)]

Repressions = Political executions and government imposed sanctions.
[Source: Taylor-Jodice (1983)]

Executive Adjustments = Changes in the composition of the executive not
resulting in government transfers. [Source: Taylor-Jodice (1983)]

Attempts = Unsuccessful attempts to change the government, taking the form
of unsuccessful coups and unsuccessful government transfers. [Source:
Taylor-Jodice (1983)]

Years = Years from previous government change.

4. **Structural Variables**

GDP Per Capita in constant U.S. $ of 1975 = [Source: Summers-Heston (1988)]

Democracy = a dummy variable taking a value of 1 for democracies and 0
otherwise. [Source: Banks, various volumes]

Elections = a dummy variable taking a value of 1 if the election date is
determined by the constitution and 0 otherwise. [Source: Banks,
various volumes]

Majority = a dummy variable taking a value of 1 for presidential systems or
for parliamentary governments supported by a single majority party, and
0 otherwise. [Source: Banks, various volumes]

The variables inflation, consumption growth, protests, riots, and
repressions are all in deviation from their country-specific means.

Source: Cukierman, Edwards and Tabellini (1989).

TABLE A.5

Cukierman-Edwards-Tabellini Probit Estimates of Government Change

Cross Section of Countries

Dependent Variable: Government change

Explanatory Variables:	Current	Lagged Once	Lagged Twice
Government Change	-	-.0793 (.0822)	-.0315 (.0774)
Inflation	-	.0020 (.0012)	-.0030 (.0023)
Consumption Growth	-.3894 (.2652)	-	-
Riots	.0052 (.0040)	-.0016 (.0040)	.0060 (.0037)
Repressions	.0047** (.0018)	-.0013 (.0009)	.0019 (.0013)
Executive Adjustment	.0828** (.0242)	.0493* (.0234)	-.0182 (.0226)
Attempts	.3995** (.0670)	-.0138 (.0358)	-.0232 (.0357)
Years	-.0004 (.0113)	-	-
GDP Per Capita	.13 E-4 (.23 E-4)	-	-
Democracy	.6195** (.2010)	-	-
Election	-.2436 (.2259)	-	-
Majority	-.3291* (.1341)	-	-

Note: Standard errors are in parenthesis. A * (**) denotes significance at the 5 (1%) confidence interval.

The country-specific dummies have been omitted from the table but included in the regression.

Observations: change = 0: 1399
change = 1: 593
Total : 1992

Time period: 1948-82. If a country became independent after 1948, only the years since independence have been included.

Source: Cukierman, Edwards and Tabellini (1989).

TABLE A.6

Spearman Rank Correlation Coefficients

Between Different Measures of Political Instability

	P	PS
PS	.856 (.0001)	*
F	.831 (.0001)	.913 (.0001)

F = Actual average frequency of government change.

P = Estimated average frequency obtained from the probit regressions of Table 3.

PS = Estimated average frequency obtained by running the probit model separately on each country.

The numbers in parentheses are the significance probability of the estimated coefficient under the null hypothesis that the true coefficient is zero.

Source: Cukierman, Edwards and Tabellini (1989).

INFLATION TAX
(SELECTED DEVELOPING COUNTRIES)

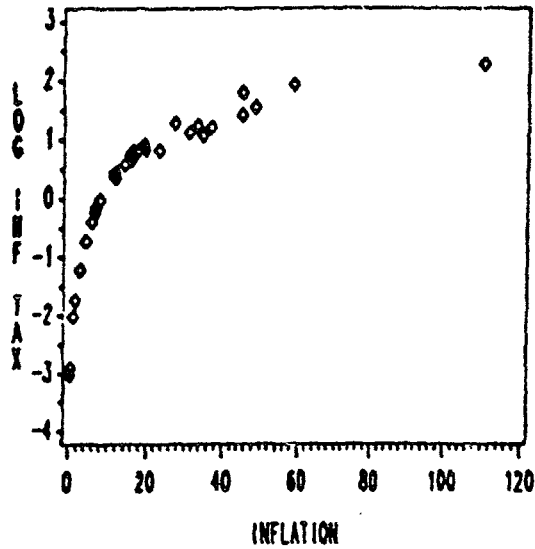ETHIOPIA
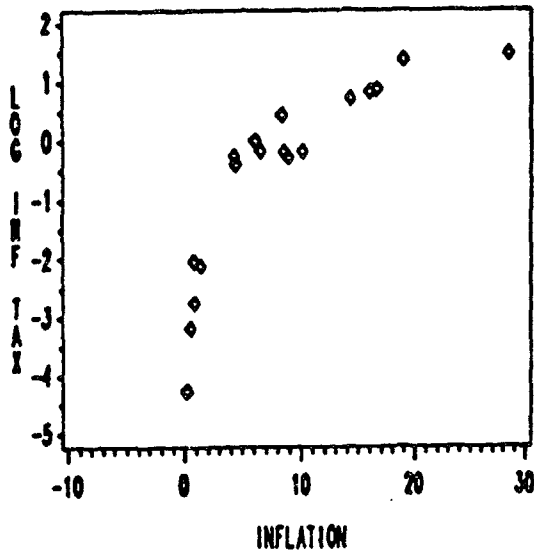
ZAIRE
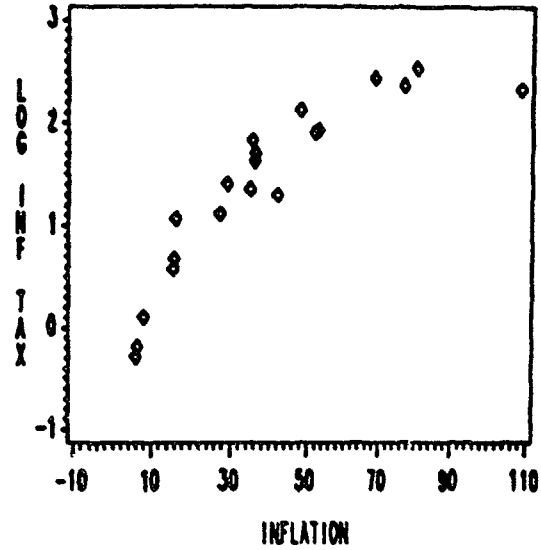
COTE D IVOIRE
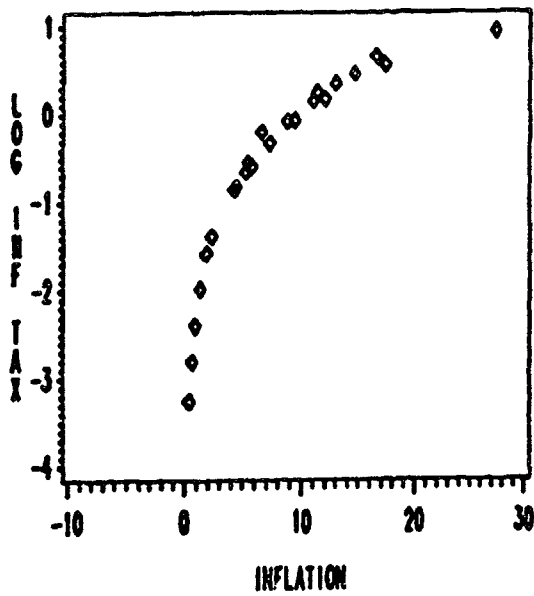
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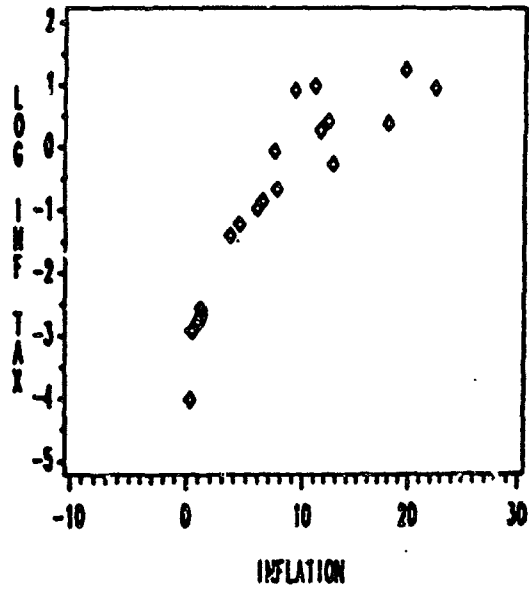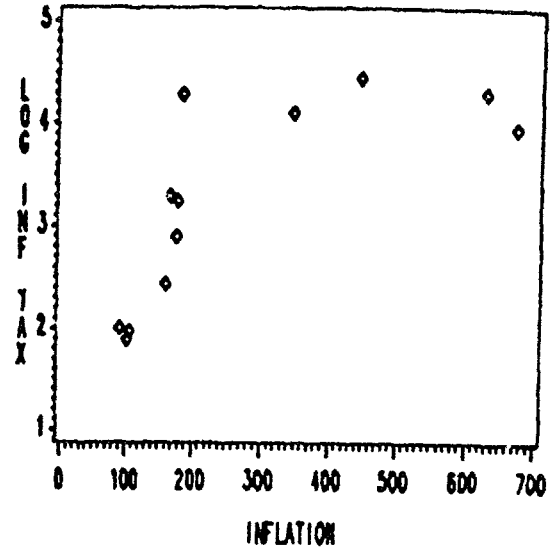
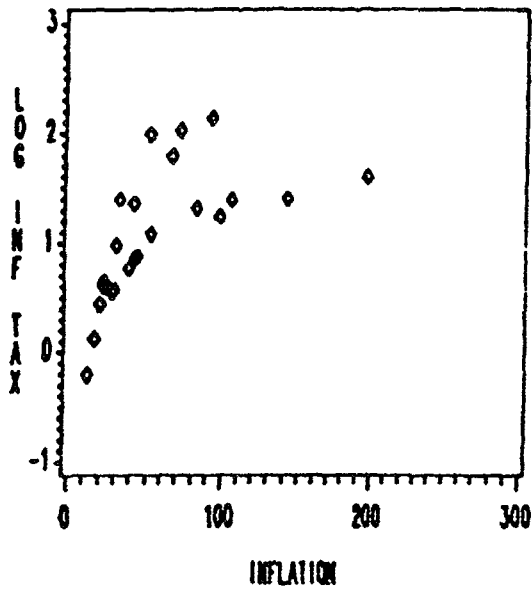SOURCE: CONSTRUCED FROM RAW DATA OBTAINED FROM THE I.F.S.

INFLATION TAX
(SELECTED DEVELOPING COUNTRIES)
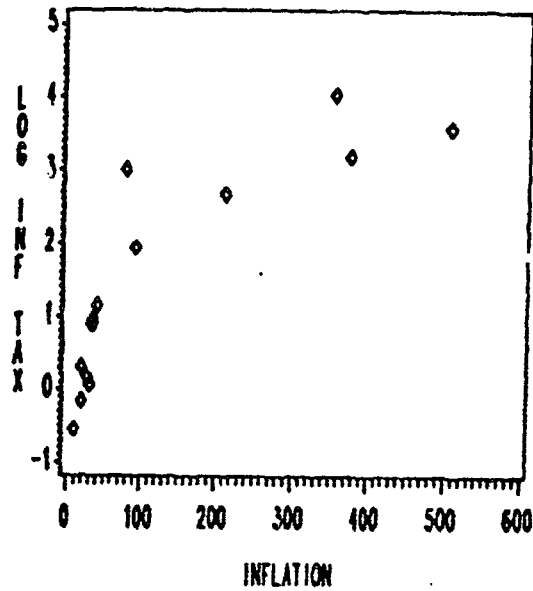

SOURCE: CONSTRUCED FROM RAW DATA OBTAINED FROM THE I.F.S.

TABLE 12

Discriminant Analysis: Aggregate Instability Indexes -

Historical and 3 Years After Devaluation

	Percentage of Countries Classified Correctly
Successful	87.5%
Limited Success	100.0%
Unsuccessful	71.4%

	Title	Author	Date	Contact for paper
WPS689	Do Tax Policies Stimulate Investment in Physical and Research and Development Capital?	Anwar Shah John Baffes	May 1991	A. Bhalla 37699
WPS690	The Terms-of-Trade Effects from the Elimination of State Trading in Soviet-Hungarian Trade	Gabor Oblath David Tarr	May 1991	J. Smith 37350
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	Title	Author	Date	Contact for paper
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