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ABSTRACT

In this paper we investigate empirically the determinants of inflation, seigniorage and fiscal deficits in developing countries. We first test the optimal taxation theory of inflation for a group of 21 LDCs. We find that the implications of this theory is rejected for all these countries. We then proceed to implement a number of tests based on the new political economy approach to macroeconomic policies: we deal with some of the implications of a credibility and reputation model, and of a strategic government behavior model. We find that the data supports the most important predictions of the political economy view of fiscal policy. Our measures of political instability and political polarization play an important role in explaining cross country differences in seigniorage, inflation, government borrowing and fiscal deficits. We end by discussing directions for future research.

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I. Introduction

In recent years we have witnessed some important developments in the analysis of fiscal policies. Dynamic models of taxation in closed and open economies have become part of the economists' tool box; issues regarding Ricardian neutrality, or lack of it, are topics of daily discussions. We now have (or we think we have) a clear idea of what will happen to the key macro variables such as the price level, interest rates, the real exchange rate, wages, unemployment, and so on when there are different fiscal shocks. However, modern economic analyses have until recently failed to fully address the key question of what determines a country's fiscal policy. In a phrase, the problem is that economists most of the time treat the policymaker as a machine that can be programmed. Once the right policy has been singled out, the economist's task is over: it is up to the policy-maker-machine to implement it. This is a serious limitation of the traditional approach to the theory of economic policy. Policymakers, just like every other economic agent, behave purposefully and respond to incentives and constraints. There is little doubt that the Argentinian authorities, for example, have a fairly clear idea of what are the consequences of accelerating the rate of growth of domestic credit on inflation, the balance of payments, capital flight and so on. Still, even knowing these consequences they chose to go ahead. Why? To answer this question, one needs to formulate a positive theory of how policymakers behave.

A small but growing body of literature has recently pursued this positive approach to the theory of monetary and fiscal policy, building on insights developed from game theory and theory of the public choice. Most of this literature, however, has been theoretical and has dealt almost exclusively with the advanced nations.

In this paper we do two things: first we review this positive approach to economic policy, analyzing its applicability to the case of the developing countries. In doing this broad review, we extend some models, propose new theories and report some new results obtained during the course of our own research. Second, we provide new empirical evidence on the fiscal and monetary behavior of developing countries. This empirical investigation yields a general lesson: political institutions and political incentives are central determinants of observed economic policies.[2]

The paper is organized in two parts. The first reviews the recent literature on the theory of inflation and investigates the empirical evidence on time series and cross-country data. We find that this evidence is inconsistent with the conclusions of the theory of optimal taxation. We also find that inflation is very strongly related to different measures of political instability. The second part of the paper reviews the theory and the evidence on government budget deficits. Again, the central finding is that more unstable political systems tend to be associated with larger government borrowing. The paper ends with a brief concluding section that proposes new directions for future research.

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 alternative theories on the long run determinants of inflation.

II.1 The Inflation Tax

Table 1 contains data on inflation and seignorage for 52 developing countries for different subperiods 1963 and 1987.[3] For each of them we have

computed the average rate of inflation of the consumer price index and the average revenue from the inflation tax, expressed as a percentage of GDP. For every year this revenue was calculated as:

$$R = \frac{\pi m}{y} \qquad (1)$$

where π is the inflation rate, m is the monetary base and y is GDP.[4] The last row of the table shows the standard deviation of these variables across countries for each subperiod. All the data were obtained from the most recent IFS tape.[5]

These figures strikingly illustrate a wide variability in the inflation tax, both across countries and across time. First, in most countries 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 1983-87 this ratio had climbed to more than one thousand times![6] Similarly, between these two subperiods the standard deviation of inflation across countries increased by more than eight times. Third, in a number of countries, increases in the rate of inflation resulted in a reduction of the inflation tax revenue. Examples of this phenomenon are Ghana (73-78 vs. 78-83); Malawi (73-78 vs. 78-83); Zaire (73-78 vs. 78-83); and Chile (63-73 vs. 73-78). 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. 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 counterexample to the popular "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 indeed 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.

To sum up, then, the evidence presented here not only shows a wide variety of cross-country experiences with the inflation tax, but also suggest that the inflation tax rate sometimes exceeds the rate that would maximize revenues from this source. In the rest of this section we investigate empirically a number of possible explanations for these observed cross country differentials in inflation. We start by analyzing theories of dynamical optimal taxation, and then proceed to investigate models that focus on credibility constraints and political incentives.

II.2 The Theory of Optimal Taxation

A first 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 view. In the presence of tax evasion, or if there are tax collection costs in administering other tax instruments, it is optimal for the government to rely on the inflation tax (Aizenman (1987), Faig (1988) and Kimbrough (1986)). Clearly, tax evasion and tax collection costs are common-place in developing countries. Hence, according to the theory of optimal taxation we should expect developing countries to rely on the inflation tax as a source of revenue, the more so the larger are tax collection costs and the larger is tax evasion.

Suppose that the government can use the inflation tax (π) and other tax rates on output (τ) 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 $f(\tau)$ while that of the inflation tax is $h(\pi)$. Mankiw (1987) shows that in these circumstances the optimal tax policy implies:

$$h'(\pi_t) = kf'(\tau_t) \qquad (1)$$

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 tax rates move together. Mankiw (1987) tested this implication using U.S. data for 1951-82 and found a positive relationship between inflation and the average tax rate. He interprets this finding as providing support for the theory of optimal taxation as a positive theory of policy behavior.

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 some important implications of the theory, including the

fact that seignorage and income taxes should have a unit root and should be cointegrated. His results for 10 European nations are mixed; in only some countries seignorage has behaved as predicted by the optimal taxation theory.[7]

Poterba and Rotemberg (1990) make a distinction between governments that can commit to a course of action and those that cannot. In their model, in the commitment case inflation and taxes will be positively correlated, 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 for these nations the evidence does not provide a generalized support to the optimal taxation view of inflation. As in previous cases this theory only seems to hold for the case of the United States.

This type of work has recently been criticized on two counts. On 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 (but not necessarily actual) 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.

II.3 Testing Theories of Optimal Taxation for LDCs

As Grilli (1989), among others, has pointed out, an important implication of the optimal taxation hypothesis is that both the inflation rate and the tax rate should have a unit root. Table 2 contains augmented Dickey-Fuller unit root tests for these two variables for 21 countries with long enough annual time series.[8] In all cases, except inflation in India, the unit root hypothesis is not rejected. However, a potential limitation of these tests is the very short length of the time series. Indeed, it is well known that as the number of observations is reduced the power of the augmented Dickey-Fuller test greatly diminishes. For the case of inflation we can get around this problem by using quarterly data.[9] This is done in Table 3 we report augmented Dickey-Fuller tests for a larger group of 44 countries. As can be seen, as in the case of Table 2, for the vast majority of the countries the hypothesis that inflation follows a unit root cannot be rejected.

These results are not, however, sufficient evidence in favor of the optimal taxation theory of inflation. Indeed, a unit root is a necessary but not sufficient condition of the optimal taxation theory. In order to provide strong support for this theory it is required that seignorage is 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 2:

$$\Delta INF_t = \alpha_0 + \alpha_1 \Delta TAX_t + \epsilon_t \qquad (2)$$

where INF is the yearly rate of inflation and TAX is the (implicit) yearly rate of tax on output computed, as in Table 2 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 equal to one.[10] The results obtained from these regressions using both OLS and instrumental variables are reported in Table 4.[11] 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 other sources of revenue fall. There are a number of possible explanations for these results.[12] But the simplest, and the one that we explore in the rest of this paper, is that the theory of optimal taxation does not apply to these countries; the alternative view that we analyze is the political economy one.

II.4 Credibility and Inflation

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. 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)). Finally, as remarked in Calvo (1978) and more recently in Persson-Tabellini (1990), policy discretion generally results in a multiplicity of equilibria. Hence, 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.

These qualitative properties of models with policy discretion are remarkably consistent with the empirical evidence reported in Subsection II.3 on optimal taxation and with the evidence on devaluation crises (see Edwards 1989). 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.

Recent developments of the literature on credibility have pointed out that reputation can be a substitute for commitments. This suggests an obvious line of empirical attack: to try to 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 voters; (iii) electing a new government stabilizes expectations and, thus, reduces the extent of the disruption. 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 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 it. If the government cares about being in office, this punishment creates

incentives not to engage in policy surprises.

This model of reputation yields two central positive implications. 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 because it just created policy surprises.

Table 5 reports some preliminary evidence consistent with these two implications. This table reports the results of estimating an OLS regression of average inflation against various measures of political instability and polarization, on cross-country data. Estimation is by seemingly unrelated regressions (SUR). In the first specification of Table 5 (Panel A), political instability is measured as the frequency of (regular and irregular) government changes during the relevant time interval. In the second specification we distinguish between the frequency of regular government changes and the frequency of military coups. Since the latter mode 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

striking: the estimated coefficients are almost always positive and often highly significant. The same results are obtained if we replace the actual frequency of government change with a measure of 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 described in more detail in Section II.5 below.

It should be noticed that the evidence reported in Table 5 could have several other explanations, some of which will be addressed in later sections of the paper. One of such explanations, 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.[13]

II.5 Long Run Seignorage, Tax Reforms and Political Instability

In the previous subsections we presented empirical results based on a number of alternative approaches to analyze the time series properties of inflation and government debt in developing countries. 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 discussed in Section II.2, the long-run characteristics of inflation and debt 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, 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 (1989) 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, according to this model, 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 (CET) (1989) confront the data by estimating an equation of the following form for a group of 79 countries:

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

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.

The question to be posed to the data concerns the role and explanatory power of the political variables, once the economic variables relating to the stage of development and the structure of the economy are being controlled for. Perhaps the most difficult problem faced in this type of empirical analysis in finding empirical counterparts for the analytical constructs "political instability" and "political polarization." With respect to the former CET use an estimated cross-country probit equation to compute an index of the probability of government change for a particular country in any given year. This probit equation 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 indicator differs from the index of actual frequency of government change used in Table 5, 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 regression analysis of seignorage CET included the following structural variables: (a) share of agriculture in GDP. Its sign is expected to be negative; 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 seignorage; 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:[14]

$$\begin{aligned} \text{Seignorage} = &- \underset{(0.032)}{0.020} + \underset{(0.0005)}{0.0021}\ \text{Share of Agriculture in GDP} \\ &- \underset{(0.0182)}{0.0431}\ \text{Openness} - \underset{(0.024E\text{-}5)}{0.44E\text{-}5}\ \text{GDP per Capita} \\ &+ \underset{(0.0004)}{0.0019}\ \text{Urbanization} + \underset{(0.0539)}{0.1583}\ \text{Political Instability Index} \end{aligned}$$

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

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

These results are very suggestive. Not only does the regression explain a high percentage of the cross-country variability of seigniorage, but all variables have the expected sign.[15] 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 controlling for other structural variables, political instability plays an important role in explaining long-run cross-country differentials in inflation.

An interesting empirical extension of the CET model of strategic political behavior and tax reform 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 variables, political instability and the reliance on taxes on foreign trade should be positively related in cross-country data.

This conjecture is tested in Table 6 on a cross section of industrialized and developing countries. The dependent variable is the ratio of trade taxes as a percentage of government revenues obtained from the IMF Government Finance Statistics. The structural variables are the same as those discussed above and used by CET in their seignorage investigation. The political variables are the estimated political instability index described before, 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.

The results in Table 6 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. 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 (1989) for seigniorage

collection. A possible explanation for these differences in the results 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 that can be affecting these results 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 is not any longer 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 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 empirical implications of the "credibility-based theory" of economic policy and of the political theory of strategic tax reforms.

III. Fiscal Deficit

In this section 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 7 and 8 contain alternative indicators of fiscal policy for our sample of 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 first variable is quite reliable, since the quality of the data on each country's monetary survey is relatively good, and it is comparable across countries. However, it excludes borrowing by the government from private non-bank investors and from foreign creditors. The second variable, on the other hand, 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 7B 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.

Most of the main conclusions obtained for the inflation tax are applicable to both indicators in Table 7: we observe important differences across countries and across time, as well as across countries within a region. Moreover, there is a very clear relation between Table 1 and Table 7A, 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 8. 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 in many countries (and mostly in Africa and Latin America) the government borrows in extremely large proportions from the domestic monetary authorities.

III.2 Political Instability and Budget Deficits

In the previous section we argued 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, we argued, is that political instability can lead to a form of collective myopia. This same intuitive reason has been applied in a number of recent papers by Tabellini and Alesina (1990), Alesina and Tabellini (1989, 1990), and Persson and Svensson (1989), in attempt 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 making a policy decision, this policymaker chooses both the intertemporal profile of spending and taxes as well as how to allocate the resources acquired by issuing debt (or 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. Then 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 polarization lead to a form of collective myopia, even if the policymaker and the voters are rational and forward looking.

Alesina and Tabellini (1989) in particular focus on developing countries. They consider an economy with two groups of agents identified by their productive role: the "workers" (wage earners) and the "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. If there is a change of government, however, the debt will be repaid by the opponent, by reducing the transfers to the workers constituency. Since these costs are not internalized, the capitalist government overborrows. 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). They show that these 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 of future majorities.

This general idea, that political alternation 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 spending, 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 for the developing nations is consistent with these implications.

Tables 9A(i,ii), 9B(i,ii), 10A and 10B report several alternative regressions of budget deficits against different measures of political instability. The method of estimation is Seemingly Unrelated Regressions (SUR) on two systems of equations (each system being made up of the same variables measured at different points in time). The dependent variables are the two measures of budget deficit reported in Table 7A. The explanatory variables, on the other hand, are: (1) indicators of the structure of the economy and (2) alternative measures of political instability. The structural variables are the same as the ones used to compare the structure of taxation in the previous section: 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 periods). Several alternative variables were used as measures of political instability: Table 9A uses the actual frequency of government change (lumping together coups and regular government transfers); while in Table 9A(i) we include the structural variables and in Table 9A(ii) we only included the political instability measure. Tables 9B(i and ii) distinguish between the frequency of coups and of regular government transfers. Presumably, coups are associated with more radical changes in the nature and ideological preferences of the government; if so, according to the theory summarized above, the frequency of coups ought to have a stronger positive impact on the budget deficit. In tables 10A and 10B we dropped all the variables relating

to the structure of the economy except for the urbanization variable.

We see from these tables that our measure of political instability is, in general, positively related to budget deficits: its estimated coefficient is almost always positive, and it is significant for a large number of regressions. As expected, coups and regular government changes have different coefficients, and as expected coups generally have a bigger and more significant estimated coefficient.

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, we also tried other measures of political instability, constructed along the lines of CET (1989). The results obtained were very similar to those reported in Tables 9 and 10. Finally, the same results are obtained if each equation is estimated separately by OLS, rather than by SUR.

We infer from these results that indeed more politically unstable countries have tended to have larger budget deficits. In principle, one could argue that budget deficits lead to instability, rather than vice versa. But this is unlikely to be the case. Instability is a deep-rooted feature of a political system, that generally reflects institutional and sociological factors, and is generally not affected by the economic performance of a government. Moreover, the same results reported in Tables 9 and 10 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 Tables 9 and 10 (rather than just the frequency of government change in each of those time intervals).[16]

On the other hand, the results of Tables 9 and 10 leave room for improvements. First, as already mentioned, our indicators of budget deficit contain measurement error. Second, we probably have omitted some relevant economic variables that may influence a country decision of how much to borrow. Finally, we do not have reliable measures of political polarization; and yet, according to the theory, political instability matters more in more polarized countries. The results reported above suggest that trying to solve these problems may indeed shed light on the fiscal behavior of many developing countries.

IV. 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. 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. We have 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 supportive 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.

The theoretical models reviewed and formulated in this paper offer at least two 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. But there is a third possible hypothesis, suggested by the recent work of Alesina-Drazen (1989) and Aizenman (1990): 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.

Presumably all three hypotheses contain important elements of truth. Yet, discriminating among them, and assessing their relative importance in concrete instances is one of the main tasks for future research. For only then can the positive theory of economic policy lead to normative suggestions for institutional reforms that would redirect the policymakers incentives and allow better policies to be implemented.

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Footnotes

[1]This is a revised version of a paper presented at the Arizona State University Conference on Political Economy. We wish to thank the National Science Foundation, the University of California Pacific Rim Program and the World Bank for supporting this project. We thank James Lothian, Michael Bruno, Felipe Morandé, Javad Shirazi, Ajay Chiiber, Chad Leechor, Miguel Savastano and the participants of seminars at the World Bank, the National Bureau of Economic Research, and the Econometric Society Meetings (Barcelona, 1990). Miguel Savastano, Tom Harris and Julio Santaella provided excellent research assistance.

[2]A similar conclusion has been reached in Nouriel Roubini's paper prepared for this conference.

[3]The countries have been grouped geographically.

[4]In the actual computations we used nominal m and y. If real monetary base and GDP were used the results would be the same, as long as both variables are deflated with the GDP price index.

[5]A problem with the data is that while the price level is a yearly average the monetary figures are "end of year". This was tackled by "centering" the monetary variables.

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

[7]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 constrain the ability to use seignorage.

[8]These tests are done on annual data. See Table 4 for the length of each time series. 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.

[9]Unfortunately, there are no quarterly data for government revenues. Naturally, the quarterly data contain additional information over the annual data only if the government decision interval is a quarter. For monetary policy, this is likely to be the case.

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

[11]Instrumental variables estimation was used in order to account for possible endogeneity of the TAX variable as a result of the Tanzi-Olivera effect.

[12]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 in driving these results. Also, the instrumental variables estimation was undertaken in order to eliminate this endogeneity problem. In developing more complicated versions of this model a number 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.

[13]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 change in the nominal exchange rate and in a real exchange rate

appreciation, rather than depreciation.

[14]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 imports plus exports over GDP. Notice that this equation excludes the mining and manufacturing shares. Including them results in an insignificant coefficient, with the expected sign, with no other changes in the regression.

[15]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.

[16]Roubini, in his contribution to this volume, obtained independently very similar results.

TABLE 1

Inflation Tax in Selected Developing Countries

(Averages)

	1963-1973		1973-1978		1978-1983		1983-1987	
	Inflation Rate	Inflation Revenue As % of GNP	Inflation Rate	Inflation Revenue	Inflation Rate	Inflation Revenue	Inflation Rate	Inflation 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	1.52	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	
	Inflation Rate	Inflation Revenue As % of GNP	Inflation Rate	Inflation Revenue	Inflation Rate	Inflation Revenue	Inflation Rate	Inflation 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
Sample Standard Deviation	13.1	3.7	42.5	4.1	30.5	2.7	109.9	15.1

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

Augmented Dickey-Fuller Unit Root Tests for

Inflation and Taxes: Selected Developing Nations

Country	Inflation		Taxes	
	$\hat{\tau}$	$\hat{\tau}_t$	$\hat{\tau}$	$\hat{\tau}_t$
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	-2.188
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: $\hat{\tau}$ tests the hypothesis of unit root without a time trend, while $\hat{\tau}_t$ includes a time trend. The critical values of these tests at 95% confidence for 25 observations are $\hat{\tau} = -3.0$ and $\hat{\tau}_t = -3.6$.

TABLE 3

Augmented Dickey Fuller Tests for Quarterly Inflation

	$\hat{\tau}$	$\hat{\tau}_\tau$	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
Singapore	-2.321	-2.395	87

Table 3 (cont)

	$\hat{\tau}$	$\hat{\tau}_t$	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	-4.026*	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^o of unit root is rejected at 95% confidence.

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

TABLE 4

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	0.078 (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 4 (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

[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 5

Inflation and Political Instability

Panel A. Specification 1:

	1963 - 1973	1973 - 1978	1978 - 1983	1983 - 1988
Intercept	5.957*	20.615*	13.180*	-138.699
	(2.443)	(6.863)	(5.894)	(85.606)
Frequency of Govt. Change	11.953*	20.192	51.394**	929.986**
	(6.410)	(16.866)	(17.333)	(260.543)
System Weighted R^2	0.092			
System Weighted SE	0.99			
Number of Observations	51			

Panel B. Specification 2:

	1963 - 1973	1973 - 1978	1978 - 1983	1983 - 1988
Intercept	8.287**	23.636**	15.171**	-41.624
	(2.389)	(6.729)	(4.892)	(44.225)
Regular Govt. Transfer	2.708	7.711	22.214*	89.200
	(4.836)	(9.031)	(8.394)	(81.208)
Coups	-.429	-7.379	45.999*	2051.078**
	(10.682)	(24.415)	(20.263)	(201.870)
System Weighted R^2	0.413			
System Weighted SE	0.98			
Number of Observations	50			

Table 5 (cont).

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

Standard errors in parentheses.

Method of estimation: the samples corresponding to the 4 subperiods were pooled and then seemingly unrelated regressions were used.

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

TABLE 6

Trade Taxes and Political Instability

(Ordinary Least Squares)

	(1)	(2)	(3)
Intercept	0.4616**	0.0834	0.0927
	(0.0001)	(0.0654)	(0.0604)
Agriculture	-	0.0065**	0.0059**
		(0.0014)	(0.0013)
Mining and Manufacturing	-0.0071**	-	-
	(0.0012)		
Foreign Trade	0.0061	0.0401	0.0329
	(0.0310)	(0.0357)	(0.0330)
GDP per Capita	0.69E-5	-0.22E-5	-0.42E-5
	(0.50E-5)	(0.47E-5)	(0.43E-5)
Urbanization	-0.0025*	-0.0003**	-0.0002
	(0.0006)	(0.0008)	(0.0007)
Industrialized	-0.1619**	-0.0917	-0.0573
	(0.0379)	(0.0522)	(0.0394)
Latin America	-	-0.0003	
		(0.0417)	-
Political Instability	0.1113	0.0317	
	(0.0904)	(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

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

TABLE 7A

Budget Deficit as Percentage of GDP

Country	1963 - 1973 (1)	1963 - 1973 (2)	1973 - 1978 (1)	1973 - 1978 (2)	1978 - 1983 (1)	1978 - 1983 (2)	1983 - 1988 (1)	1983 - 1988 (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 7A (cont.)

Country	1963 - 1973 (1)	1963 - 1973 (2)	1973 - 1978 (1)	1973 - 1978 (2)	1978 - 1983 (1)	1978 - 1983 (2)	1983 - 1988 (1)	1983 - 1988 (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
Sample Standard Deviation	1.1	1.9	2.2	4.9	2.3	4.7	2.8	4.9

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 7B

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 8

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 8 (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 9A(i)

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	2.459**	3.846*	6.372**	10.226**	6.799**	11.946**	5.068	12.660**
	(.896)	(1.634)	(1.958)	(3.089)	(2.165)	(4.310)	(2.876)	(4.410)
Freq. of Govt Chg	1.120	3.235*	-1.028	-0.714	0.850	3.909	-2.815	6.120
	(.889)	(1.425)	(1.620)	(1.923)	(1.835)	(2.807)	(1.962)	(3.661)
GDP p Cap	-.00003	.00006	.00007	-0.0004	-.00009	---	-.0005	-.0005
	(.0002)	(.0003)	(.0005)	(.0005)	(.0004)	(---)	(.0004)	(.0006)
Urbaniz.	-0.018	-.053*	-.060	-0.077	-0.051	-.120*	0.006	-0.071
	(.014)	(.024)	(.035)	(.047)	(.032)	(.059)	(.040)	(.063)
Forgn Trd	-1.671**	0.668	-1.403	-0.020	-0.608	0.388	-.474	-0.980
	(.506)	(.883)	(1.001)	(1.584)	(.907)	(1.640)	(1.326)	(2.032)
Agricult.	-0.016	-0.024	-0.062	-0.107	-0.067	-0.145	-.048	-.176*
	(.016)	(.029)	(.036)	(.057)	(.040)	(.077)	(.050)	(.078)

System weighted R_2^2 was 0.219 with 144 degrees of freedom for (1)
System weighted R^2 was 0.164 with 149 degrees of freedom for (2)

Note: 2 SUR regressions were run, one for each set of 4 OLS regressions for each dependent variable.

Note: the 2 dependent variables, denoted by (1) and (2) above, are:
(1): Percentage 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 9A(ii)

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	0.563	1.714**	1.689**	3.839**	2.610**	3.769**	2.879**	3.831**
	(.308)	(.463)	(.448)	(.635)	(.584)	(1.033)	(.667)	(1.191)
Freq. of Govt Chg	1.052	2.296	-0.136	-1.105	0.985	3.814	-2.373	5.823
	(.961)	(1.302)	(1.270)	(1.507)	(1.729)	(2.623)	(1.852)	(3.408)

System weighted R^2 was 0.994 with 160 degrees of freedom for (1)
System weighted R^2 was 0.984 with 168 degrees of freedom for (2)

Note: 2 SUR regressions were run, one for each set of 4 OLS regressions for each dependent variable.

Note: the 2 dependent variables, denoted by (1) and (2) above, are:
(1): Percentage 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 9B(i)

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	2.497**	3.961*	5.120*	9.574**	7.494**	11.542*	5.135	13.667**
	(.824)	(1.707)	(1.962)	(3.155)	(2.187)	(4.377)	(3.133)	(4.952)
Reg Govt. Transfrs	-.478	0.139	1.063	0.652	-0.831	1.470	-1.562	1.493
	(.500)	(.948)	(.860)	(1.075)	(1.202)	(1.753)	(1.345)	(2.265)
Coups	4.146**	4.623	-2.199	-0.024	4.237	4.872	0.860	7.719
	(1.355)	(2.498)	(1.502)	(2.098)	(2.212)	(3.223)	(2.375)	(4.398)
GDP p Cap	.00006	.0001	-.0007	-.0008	.0002	---	-.0004	-.0004
	(.0002)	(.0004)	(.0005)	(.0006)	(.0004)	(---)	(.0005)	(.0006)
Urbaniz.	-0.021	-0.050	-0.013	-0.054	-0.066	-0.107	-0.002	-.063
	(.014)	(.026)	(.039)	(.051)	(.034)	(.059)	(.045)	(.066)
Forgn Trd	-1.470**	0.903	-1.203	0.342	-0.252	0.493	-0.224	-1.342
	(.476)	(.939)	(.977)	(1.595)	(.911)	(1.638)	(1.355)	(2.006)
Agricult.	-0.016	-0.021	-0.048	-0.104	-0.081	-0.142	-0.054	-0.197*
	(.015)	(.031)	(.037)	(.059)	(0.041)	(.080)	(.054)	(.085)

System weighted R_2^2 was 0.219 with 144 degrees of freedom for (1)
System weighted R^2 was 0.164 with 149 degrees of freedom for (2)

Note: 2 SUR regressions were run, one for each set of 4 OLS regressions for each dependent variable.

Note: the 2 dependent variables, denoted by (1) and (2) above, are:
(1): Percentage 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 9B(ii)

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	0.682**	2.096**	1.677**	3.622**	2.752**	3.835**	2.812**	4.430**
	(.247)	(.421)	(.418)	(.624)	(.513)	(.962)	(.602)	(1.040)
Reg Govt. Transfrs	-0.539	-0.079	0.596	0.069	0.028	2.085	-1.449	1.774
	(.560)	(.871)	(.616)	(.799)	(.958)	(1.571)	(1.061)	(1.907)
Coups	4.563**	4.003	-1.937	0.029	2.579	3.100	1.117	6.431
	(1.479)	(2.196)	(1.501)	(1.941)	(1.997)	(2.977)	(2.035)	(3.951)

System weighted R_2^2 was 0.995 with 152 degrees of freedom for (1)
System weighted R^2 was 0.973 with 160 degrees of freedom for (2)

Note: 2 SUR regressions were run, one for each set of 4 OLS regressions for each dependent variable.

Note: the 2 dependent variables, denoted by (1) and (2) above, are:
(1): Percentage 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 10A

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	1.283**	2.761**	2.953**	4.991**	3.461**	4.376*	3.168**	3.759
	(.397)	(.642)	(.763)	(1.218)	(.851)	(1.754)	(1.112)	(1.986)
Freq. of Govt Chg	1.330	2.875*	0.093	-1.012	1.415	4.447	-2.984	6.269
	(.939)	(1.271)	(1.241)	(1.555)	(1.757)	(2.699)	(1.843)	(3.561)
Urbaniz.	-0.021*	-0.031*	-0.033*	-0.031	-0.024	-0.023	-0.003	-0.003
	(.008)	(.013)	(.016)	(.025)	(0.017)	(.034)	(0.021)	(.033)

System weighted R2 was 0.988 with 156 degrees of freedom for (1)
System weighted R2 was 0.984 with 160 degrees of freedom for (2)

Note: 2 SUR regressions were run, one for each set of 4 OLS regressions for each dependent variable.

Note: the 2 dependent variables, denoted by (1) and (2) above, are:
(1): Percentage change in the Moneatry 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 10B

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	1.315**	3.043**	2.945**	4.698**	3.457**	4.239*	2.813*	3.867*
	(.356)	(.653)	(.750)	(1.231)	(.827)	(1.721)	(1.086)	(1.881)
Reg Govt. Transfers	-0.418	0.055	0.756	0.093	0.140	2.246	-1.641	1.830
	(.547)	(.863)	(.593)	(.819)	(.980)	(1.611)	(1.051)	(1.978)
Coups	4.492**	4.048	-2.089	0.034	2.512	3.375	1.256	6.881
	(1.432)	(2.169)	(1.411)	(1.975)	(2.044)	(3.035)	(1.992)	(4.106)
Urbaniz.	-0.017*	-0.026*	-0.033*	-0.029	-0.019	-0.016	0.002	0.009
	(.007)	(.013)	(.016)	(.026)	(.018)	(.035)	(.022)	(.033)

System weighted R2 was 0.993 with 148 degrees of freedom for (1)
System weighted R2 was 0.976 with 152 degrees of freedom for (2)

Note: 2 SUR regressions were run, one for each set of 4 OLS regressions for each dependent variable.

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

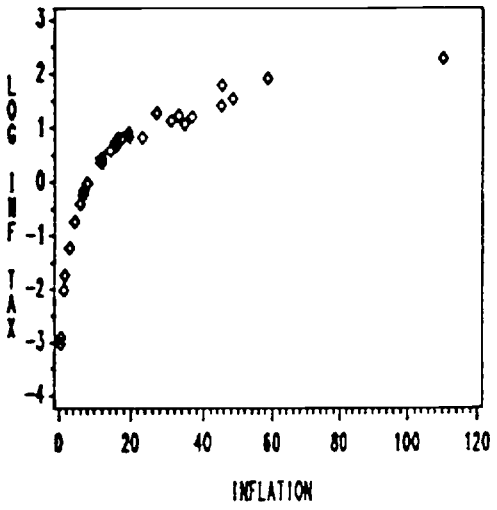
Standard Errors are in parentheses
* means the coefficient is significant at the 5% level
** means the coefficient is significant at the 1% level

FIGURE 1

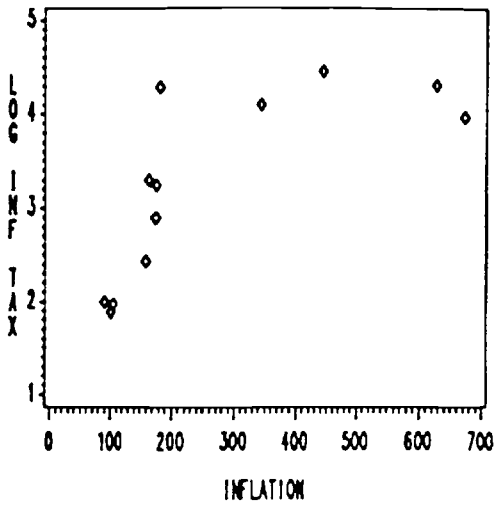
INFLATION TAX

(SELECTED DEVELOPING COUNTRIES)

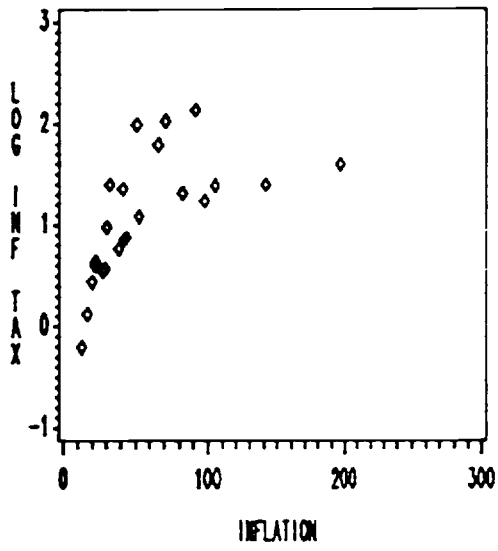
TURKEY



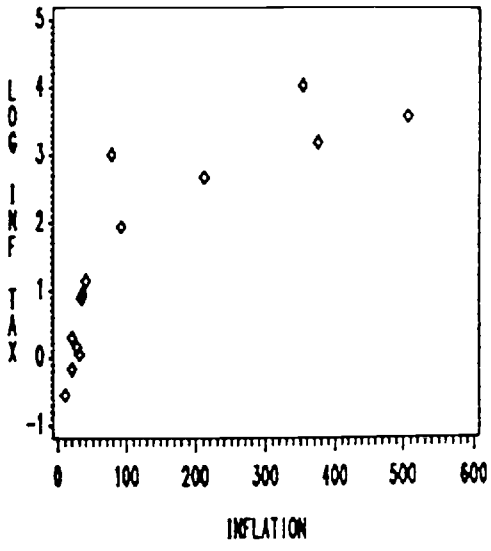
ARGENTINA



BRAZIL



CHILE

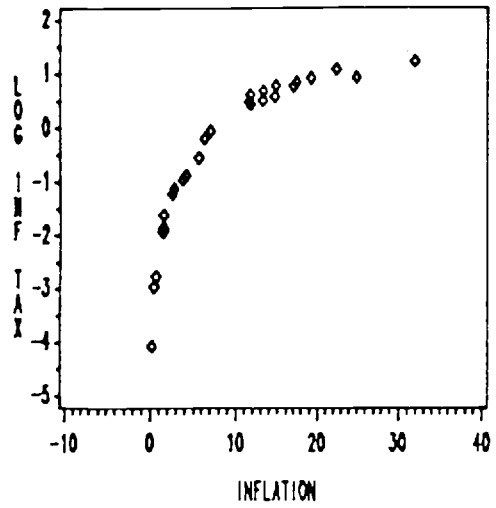


SOURCE: CONSTRUCED FROM RAW DATA OBTAINED FROM THE I.F.S.

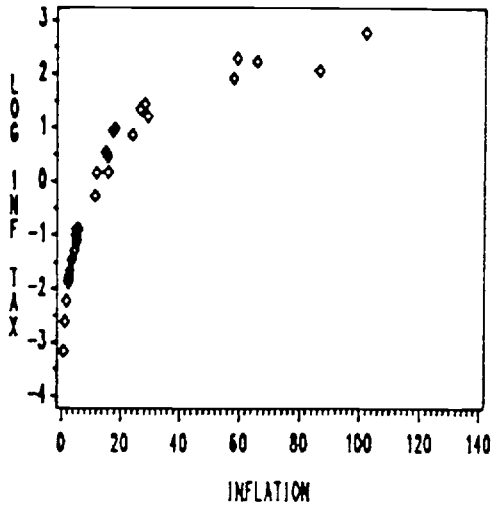
FIGURE 2.

INFLATION TAX
(SELECTED DEVELOPING COUNTRIES)

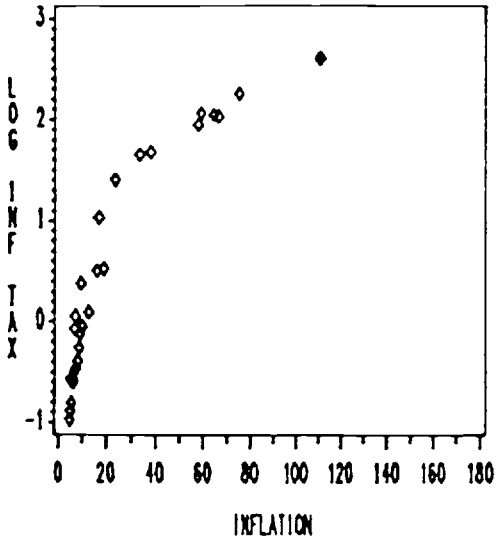
EL SALVADOR



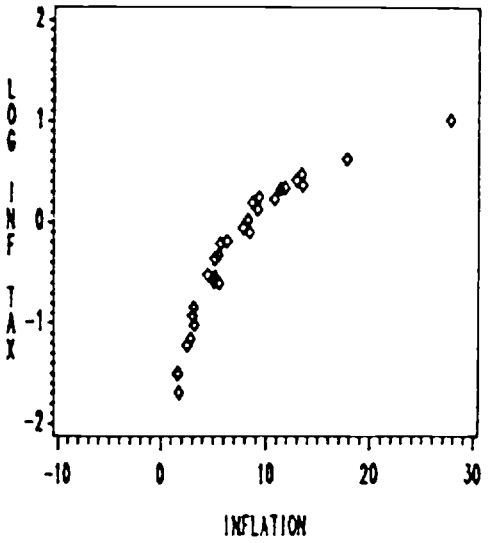
MEXICO



PERU



INDIA



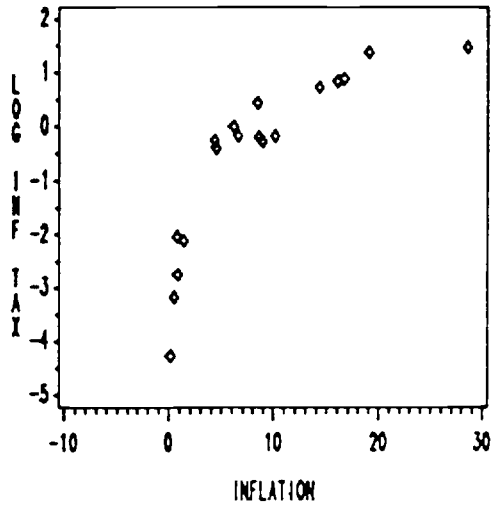
SOURCE: CONSTRUCED FROM RAW DATA OBTAINED FROM THE I.F.S.

FIGURE 3

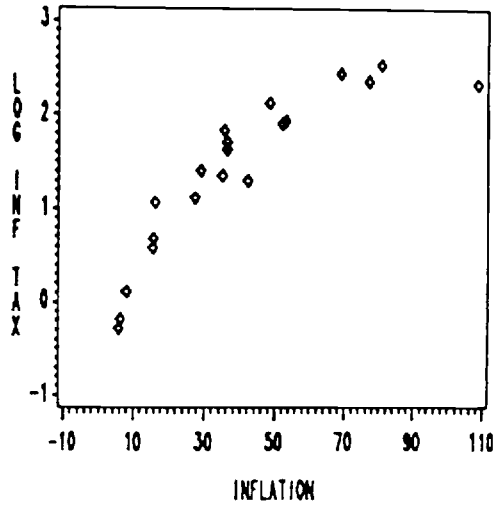
INFLATION TAX

(SELECTED DEVELOPING COUNTRIES)

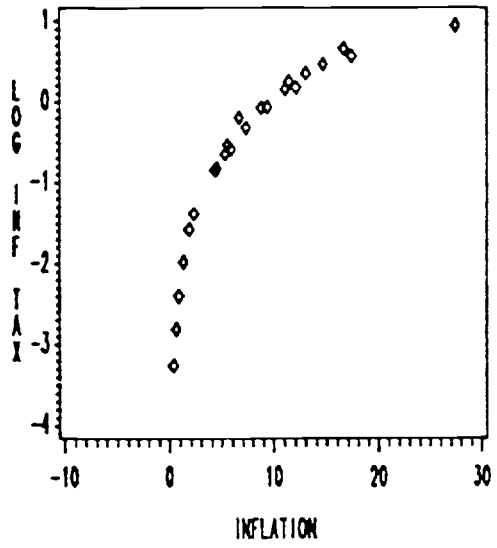
ETHIOPIA



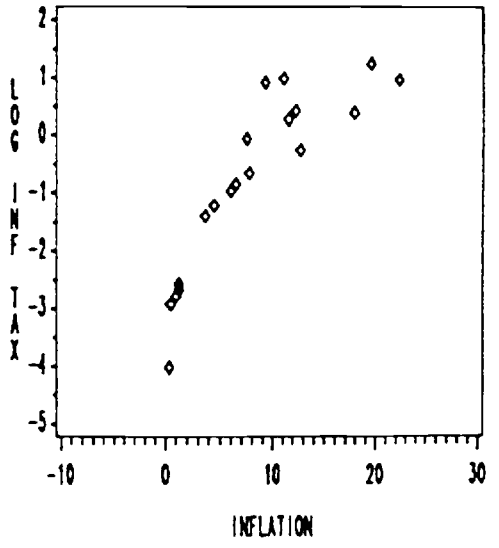
ZAIRE



COTE D IVOIRE



TOGO



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