Rescheduling of Developing Country Debt: Heterogeneity & State Dependence

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Abstract:

Where an economy cannot meet its external debt service obligations, it is forced to appeal to creditors for rescheduling of the debt. As such, rescheduling is evidence of a country's incapacity to carry a debt burden. This paper explores factors that explain the probability of a country requiring debt rescheduling in a panel framework. The current literature is extended by modelling a dynamic random effects panel probi, in order to identify a presence of state dependence after controlling for country heterogeneity. We find clear evidence of state dependence when a two-year lag of the dependent variable is allowed for, suggesting that overall, the fact that a country has experienced a debt reschedule in the past does make them more likely to experience further rescheduling. The paper stresses that in order to draw the appropriate policy conclusions from this finding, one must understand that the debt rescheduling variable is itself a policy response variable. The fact that further rescheduling is often required within two years of a previous action suggests that rescheduling as it took place in the 1980s and 1990s was an inadequate response that often did little to help countries move beyond their current debt crisis.

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1. Introduction

More than 50% of low-income countries are also classified by the World Bank as severely indebted. High external indebtedness has been linked to the poor economic performance of a number of least developed countries, sparking economic, political and ethical controversy concerning the role and need for debt forgiveness.

Movements such as Jubilee 2000 and Drop the Debt have called for the unconditional cancellation of least developed country debt, with visions of growth and development becoming within reach of countries currently crippled by debt. The mid 1990s saw the introduction of the World Bank's Highly Indebted Poor Countries (HIPC) initiative, whose aim was to reduce the external debt burden of highly indebted least developed countries to sustainable levels. Despite programs such as these, bilateral creditor countries remain reluctant to provide relief to heavily indebted developing countries. As in the case of Mexico in 1982, often it is only when the debt service obligations cannot be met that lenders negotiate rescheduling options.

This paper seeks to address an important empirical question in the debate surround debt relief and debt rescheduling. If a country has benefited from debt rescheduling in the past, does this make them more or less likely to require further rescheduling? When past experiences of debt rescheduling increase the chances of further rescheduling, this is known as state dependence. We will employ a dynamic panel model covering 68 countries over 14 years to examine whether there is state dependence in countries' need for debt relief. This is an important question, as the presence of state dependence has been interpreted by some as an indication that provision of debt relief simply encourages countries to act irresponsibly, knowing that they are likely to be "rescued" again if they reach crisis levels with their debt.

Some recent papers in the literature have looked at the question of possible state dependence. Generally, there is not strong evidence for the presence of state dependence (see Kraay and Nehru 2004 for a recent example). In this paper we reconsider how state dependence could be represented, and find quite strong evidence for state dependence. When most studies consider state dependence, they capture it by inclusion of a one-year lagged debt rescheduling indicator variable in the dynamic

panel. We would argue that a one-year lag is not sufficient to capture the desired effect. In fact, if a country has received debt rescheduling in one year, then it is very unlikely that their case will be seriously reviewed and further rescheduling offered the very next year. More likely, if the country is to receive further rescheduling, it would take place two or more years later. Consequently, we consider as an explanatory variable in our panel model a dummy variable that takes the value 1 if a country has received rescheduling in either of the past two years. With this variable in the model, we find very strong evidence in favour of state dependence, contrary to most previous literature.

Before proceeding to discuss the methodology and results in more detail, we would first like to question how the presence of state dependence ought to be interpreted. As already mentioned, most writers see the presence of a recurrent need for debt rescheduling as an indication of the moral hazard created by offering debt relief initiatives. Easterly (2000) argues that highly indebted countries become highly indebted as a result of bad policies rather than external shocks, and that debt forgiveness leads to further disinvestment, continued borrowing and recurrent appeals for forgiveness. He argues that "the granting of progressively more favourable terms for debt forgiveness may also have perverse incentive effects, as countries borrow in anticipation of debt forgiveness and delay policy reforms waiting for the best deal" (Easterly, 2000, p. 6). In other words, the presence of state dependence could suggest that leniency towards debtor countries simply encourages them to continue to act responsibly.

We would like to put an alternative view forward on this issue. Rescheduling of a debt usually comes about as a result of a country's inability to make the required repayments. The event of debt being rescheduled can be understood as a policy response of the creditor to the debtor nation's inability to meet its obligations. When a country is unable to make its required debt repayments, this is often a symptom of a range of wider political and economic problems confronting the leadership of that nation. Some critics of the multilateral creditors have argued that their actions in relying heavily on debt rescheduling are grossly inadequate. Indeed, debt rescheduling can easily be interpreted as offering a "solution" that focuses on the creditors interests rather than addressing the intrinsic problems facing the debtor

nation. Debt rescheduling in itself does not ease the debt burden on a heavily indebted country; it simply buys them some time to be able to generate the revenue base to be able to make the repayments that have been deferred. Likewise, debt rescheduling does nothing to assist the country to improve their level of economic activity.

Suppose a country receives access to debt rescheduling in a given year. If indeed this debt rescheduling was helpful in assisting the country onto a new path of prosperity, one would expect that the country would not require further debt relief in the foreseeable future. On the other hand, if the critics who say that debt rescheduling does nothing to assist a country in rebuilding their economy, then one may find that that same country finds themselves in a situation of needing debt rescheduling again in the near future. If there is state dependence, where past debt rescheduling increases the chances of further rescheduling being required, then this could be interpreted as a failure of debt rescheduling as a restorative policy action.

In an econometrics sense, it is important to utilise the appropriate techniques for addressing the question of state dependence. Estimation must take account of possible unobserved heterogeneity. If this is not allowed for, previous distress may appear to be a determinant of current distress, when the true cause may be that there are characteristics of individual countries which vary little over time that make them more or less likely to experience debt distress. We thus choose dynamic panel estimators that allow for unobserved heterogeneity.

The paper is constructed as follows. Section 2 provides a brief overview of some recent literature. Section 3 presents a technical discussion of the econometric issues associated with estimation, while Section 4 specifies the data and its sources, and provides some preliminary analysis, to be extended in Section 5 with the main findings. Finally, Section 6 concludes with some policy implications and limitations.

2. Brief Literature Overview

Default probabilities of developing countries have been examined extensively in the literature. Kutty (1990) pools time series and cross-sectional data from the World Bank and IMF to perform a logistic regression for the probability of developing country loan defaults. Explanatory variables include the debt service ratio, rate of growth of imports and exports, rate of growth of GDP, net resource transfer, amortisation of debt, ratio of external debt to international reserves, interest on private loans and inflation. He finds that a country's ability to service its debt depends largely on its economic performance over a long period of time.

Rahnama-Moghadam & Samavati (1991) use a probit model to explain least developed country debt rescheduling between 1973 and 1981. Interestingly, they find debt service to GDP, one of the leading indicators of creditworthiness, to be insignificant and instead, variables such as international reserves and stock of debt outstanding to have high explanatory power.

Cohen (1998) encompasses the likelihood of a debt crisis in a model aimed at explaining slow African and Latin American growth. He appeals to a panel probit model to compare rescheduling that took place in the 1970s with that in the 1980s, using debt to GDP ratios, degree of openness and continent dummies to explain the probability of rescheduling. The model reveals debt to GDP is highly significant and does not alter significantly in magnitude across the two decades. The Latin American dummy proves insignificant in the 1970s, however, is very significant for the 1980s. Further, Cohen (1998) interprets the significance of the openness variable as reflecting the credit rating of a country.

Some recent papers have considered the relationship of debt distress to quality of government policies and institutions. For example, Neumayer (2002) examines the allocation of debt forgiveness and its relationship to "good" governance. He defines debt forgiveness as a change in debt stock due to forgiveness and concludes "need" is the primary control variable, however some aspects of governance play an important role.

Current research combines the importance of quality of policy and institutions with testing for state dependence. Peter (2000) derives estimates of the probability that a developing country government is unable or unwilling to service its foreign debt by focussing on sovereign debt itself. In a panel framework, he models sovereign debt default as a logistic function of economic and political variables as well as a dummy that takes the value of one if the country has defaulted in the previous three years. We note, however, that Peter disregards the resultant initial conditions problem associated with estimating a dynamic panel in this form.

Most recently, Kraay and Nehru (2004) constrain their sample to very low income countries. They find non-financial variables to be key determinants of debt distress, and in particular identify the quality of policies and institutions rather than a recent history of distress to be important. Like most authors, they find little evidence for state dependence. Their results have some similarities and differences to an early paper by McFadden et al (1985), but they differ those of Reinhart et. al. (2003), who used quite a different and broader measure of debt distress.

The general impression formed from the most recent papers in the literature is that there is not strong evidence for state dependence in debt rescheduling. However, as noted in the introduction, we argue that the search for state dependence has been too narrow, and that when a dynamic panel is estimated with a two-period lag on the dependent variable, we find strikingly different results.

3. Methodology

The variable of interest in this study is the propensity of a country, i, to receive debt relief in the form of debt rescheduling at time period t. This propensity, y_{it}*, itself is unobservable, however, we observe an indicator of financial "distress", y_{it}, when the country has its debt rescheduled. The realised indicator variable describes two states of the dependent variable. That is, where the propensity of a country to receive debt relief is greater or equal to some "distress" threshold, then the country will be observed as having their debt rescheduled. The dependent variable can therefore be modelled based on the realised binary outcome of the indicator variable. Let y_{it} take a value of one where the country reschedules its debt and zero otherwise:

$$y_{it} = \begin{cases} 1 & \text{if } y^*_{it} \geq \text{distress threshold} \\ 0 & \text{if } y^*_{it} < \text{distress threshold} \end{cases} \qquad [1]$$

Interest now lies in the probability of observing a zero (no reschedule) and a one (reschedule). That is,

$$P(y_{it} = 1) = P(y_{it}^* \geq \text{threshold})$$

Assuming a linear functional form for the latent variable provides

$$y_{it}^* = x_{it}'\beta + v_{it} \qquad i = 1 \ldots N, \quad t = 1 \ldots T$$

where $v_{it} = \varepsilon_i + \eta_{it}$.

x_{it} is the vector of explanatory variables, β the vector of unknown coefficients and v_{it} the unknown error term. We follow Butler and Moffitt (1982) by decomposing v_{it} into its two components: ε_i denotes the unobserved time-invariant country-specific effect and η_{it} the $iidN(0, \sigma^2_\eta)$ time and country varying component.

The next question is whether the heterogeneity should be treated as fixed effects, whereby the country heterogeneity are parameters to be estimated, or as random drawings. Fixed effects may be desired for their consistency properties in the case where time-constant omitted variables are arbitrarily related to the observed x_{it}. Given the nature of the study, such correlation is likely and so fixed effects would seem to be appropriate. However, the use of non-linear maximum likelihood in estimating a large number of country effects along with β engenders inconsistency through the so-called incidental parameters problem. Thus, a random effects panel probit model will be used despite the potential for omitted variable bias. Following Chamberlain (1980), a correction for such bias is attempted by specifying ε_i as a linear function of the country means of the time-varying components of $\boldsymbol{x}$ (Arulampalam, 1998). For

notational ease, let $\boldsymbol{x}$ now contain these additional time averages of time-varying components of $\boldsymbol{x}$.

Under these specifications, the correlation of composite error terms over time is

$$corr(v_{it}, v_{is}) = \rho = \frac{\sigma_\varepsilon^2}{\sigma_\varepsilon^2 + \sigma_\eta^2} \qquad t \neq \text{s.}$$

The model can be estimated by Maximum Likelihood, although the presence of a correlation between v_{it} and v_{is} means that there is no simple closed form expression for the maximum likelihood estimator. Estimates are obtained using an approximation that involves Gaussian quadrature, using the Hermite integration formula and eight quadrature points (for more detail see Greene (2000, p. 839) and Butler and Moffitt (1982)).

In order to address the question of state dependence in the incidence of debt crises, the random effects panel probit model will need to be augmented with a lagged dependent variable as regressor. State dependence implies the actual experience of the country having its debt rescheduled has an effect on the current incidence of debt distress. Conversely, spurious state dependence, or heterogeneity, is where the unobserved (and possibly unobservable) characteristics of that country influence the country's propensity to require debt relief. Given the observed explanatory variables x_{it}, the model has the specification

$$y_{it}^* = x_{it}'\beta + \gamma y_{it-1} + v_{it} \qquad i = 1 \ldots N, \quad t = 1 \ldots T$$

where $v_{it} = \varepsilon_i + \eta_{it}$

so that

$$y_{it}^* = x_{it}'\beta + \gamma y_{it-1} + \varepsilon_i + \eta_{it}.$$

For state dependence to be present, past relief has an effect on the current need for debt rescheduling, rendering $\gamma \neq 0$. We allow the possibility that this past effect could be either positive or negative.

The inclusion of the lagged dependent variable gives rise to the so-called initial conditions problem. While it is possible to assume that the initial observation y_{i0} is uncorrelated with η_{it} for all i and t, unless the initial observation is completely exogenous, it will be correlated with the unobserved country effect. An assumption of exogeneity is unwarranted, since countries rescheduling their debt in 1980 may be doing so as a result of previous rescheduling or because of prior observable and unobservable factors.

In order to combat this initial conditions problem, the approach of Heckman (1981) is followed. This involves treating the initial condition as random and approximating the conditional distribution by specifying the initial latent variable y_{i0}* as a linear function of exogenous instruments. In obtaining suitable instruments for distress, the observed variables are partitioned into two time periods: the initial time period 1980 (let $t = 0$) and 1981-1994
($t = 1, \ldots, T\text{-}1$).[1] Data from 1980 is retained as part of the set of exogenous instruments, while the remaining data is used for the structural model. Identification then requires at least one additional variable associated with the initial debt situation of the country be included in the full instrument set. The initial latent variable then takes the form:

$$y_{i0}^{*} = x_{i0}'\beta_0 + \alpha_i$$

where x_{i0} is the vector of strictly exogenous instruments.

While ε_i and η_{i0} are orthogonal by assumption, potential correlation between α_i and ε_i is allowed for by specifying the linear function:

$$\alpha_i = \psi\varepsilon_i + \eta_{i0.}$$

Correlation between the individual effects is given by

$$\rho_{\varepsilon\alpha} = \frac{\psi\sigma_{\varepsilon}}{\sigma_{\alpha}}.$$

Again, to simplify empirical computations the unobserved effects are assumed independent of the disturbance terms, and we do not allow for serially correlated disturbances in the model.

Wooldridge (2002) proposed an alternative to Heckman's (1981) approach to dynamic unobserved effects models which can be used with standard Maximum Likelihood estimation. His method conditions on the initial dependent variable observation as well as the structural z_{i0}. In estimation this means that y_{i0} and z_{i0} are included as additional explanatory variables in each time period. Ease of application has seen this method readily adopted in applied work. For completeness, we estimate dynamic random effects probit models using both the Heckman (1981) and Wooldridge (2002) approaches.

[1] Where data for 1980 is missing, the first recorded time period is used in the instrument set, and the remaining for the structural model.

4. Data

This study uses a panel of country-level data covering the years 1980-1994, compiled from a number of sources. The sample of 135 countries excludes those classified by the World Bank as high income, with the rationale that the economic situation of these countries would not be such as to require assistance during the sample period. Due to missing data, further reduction of the sample down to 68 countries was necessary.

The selection of structural model explanatory variables contains a number of short-term liquidity factors as well as longer-term indicators of economic health and growth. The particular variables are chosen according to accepted wisdom in the debt relief literature. The variables, their definitions, units and source are presented in Table 1.

Inflation may have a negative effect on the probability of rescheduling, given that an increase in the price level erodes the real value of debt (Kutty, 1990, p. 1654). However, a rise in domestic prices will also affect the country's ability to expand exports, thus foreign exchange reserves may contract, rendering a balance of payments crisis and difficulty in servicing external debt. Hence, the alleged benefit of inflation to the debtor country will necessarily rest in the impact it has on the terms of trade.

Easterly (2001) describes worsening terms of trade, and in particular terms of trade shocks, as an explanation for country indebtedness. Given this rationale, an increase in the terms of trade is expected to contribute negatively to the probability of reschedule, although large shocks in either direction may be harmful to the state of the economy.

Faster economic growth frees funds for service of the debt (Easterly, 2001, p. 2). Thus, growth is expected to decrease the probability of distress for an economy. Similarly, investment as a share of GDP represents the country's prospective for future growth and should be negatively related to the probability of distress. The ratio of M2 to GDP provides an indication of financial depth and stability in the economy.

Surplus and debt to GDP are direct indicators of the debt burden relative to the country's income. A high level of debt creates uncertainty through both illiquidity and investment disincentives. Therefore, debt to GDP can be expected to increase the probability of distress, while a surplus will reduce it.

The prevalence of war may induce high debt through destroying productive assets and increasing the need for funds to finance government spending (Easterly 2001), in which case, a positive sign on the dummy variable is plausible. Nevertheless, wartime could have a boom effect on the economy, and hence, a certain degree of ambiguity remains regarding the sign.

It is also unclear how government crises will affect the probability of rescheduling. Crisis may signal poor governance and thus increased risk of distress, yet on the other hand indicate an improvement in the previous government, decreasing the probability.

In essence, the black market premium represents a proxy for the degree of corruption present in the economy. During the early 1980s this variable was of particular interest, with belief at the time that increased aid to developing countries resulted in heavier pockets of government officials, hence enhancing the inability of a country to service its debt.

Instruments used to approximate the initial propensity of the country to receive debt rescheduling include ten-year averages of each of debt to GDP, money and quasi money to GDP, and the black market premium, as well as percapita income lagged one period, and a dummy variable taking the value of one where the country is classified by the World Bank as severely indebted, and zero otherwise. For the ten-year averages, where the full previous ten years were unavailable, an average of the preceding available years was used.

Summary statistics for the structural variables are provided in Table 2. As can be seen, there were very few observations for war and government crises. Most countries appear to run public deficits rather than surpluses. Inflation rates were particularly variable, with Nicaragua reporting a rate of over 24000% in 1988 and

Argentina reaching in excess of 4000% in the late 1980s. These extreme outliers were omitted from estimation.

Briefly examining the data on reschedules, the probability of a country in the sample rescheduling its debt in any particular year is 24.4%. Figure 1 displays the probability of reschedule, given a particular year. The mean number of reschedules per country was 3.66. Interestingly, Poland recorded the most frequent rescheduling arrangements, with 12 reschedules during the 14 years. Moreover, 45% of countries who partook in a rescheduling arrangement were forced to reschedule again sometime during the following two years.

5. Results

5.1 Static Panel Probit Model Results

A static panel model is first estimated, and results are given in Table 3. We find a number of highly significant variables. Greater investment and the higher values of the black market premium appear to reduce the probability of a country having its debt rescheduled, while debt service to exports and debt to GDP have positive coefficients as predicted. Surprisingly, consolidated public sector surplus has a very large positive marginal effect. This result carries through all of the dynamic panel results that follow. This suggests that countries running comparatively large deficits are less likely to have their debt rescheduled. Such a strong and unanticipated sign could perhaps be the result of reverse causality. Perhaps countries that have a large debt, and hence experienced rescheduling, do not have the luxury of further borrowing and are forced to operate with non-deficit budgets.

The large t-statistic on ρ provides evidence of country level unobserved heterogeneity. The next set of results considers the presence of heterogeneity or state dependence.

5.2 Dynamic Panel Probit Results: One Year State Dependence

Estimation results for both Heckman's (1981) and Wooldridge's (2002) dynamic panel probit estimation procedures are presented in Table 4. In this table of results we include the standard one-lag dependent variable to capture state dependence.

Both models find investment, surplus and debt to GDP ratios to be highly significant and of the same sign as the static model. Growth, war, government crises and the ratio of M2 to GDP remain insignificant. A strong degree of country heterogeneity is present, with ρ remaining highly significant. Conversely, the initial conditions in Heckman's model appear to be insignificant, with the *t*-statistic on θ of 0.3383. This indicates that the endogenous initial conditions approach to estimating the probability of rescheduling may not be necessary. With this in mind, the dynamic panel probit model was estimated without the initial condition instrumentation, and indeed, results proved similar to the alternative models.

Of greater interest, however, is the negative but insignificant coefficient on the lagged dependent variable. This implies that, after controlling for observed and unobserved heterogeneity, there is no evidence that past rescheduling has an effect on the probability of a country receiving further rescheduling in the current period. This result mirrors the results of Kraay and Nehru (2004).

Note however, that using Wooldridge's (2002) estimation procedure, there is weak evidence that previous rescheduling would reduce the probability of rescheduling in the current period. In fact, the estimated marginal effect suggests that where a country has its debt rescheduled in the previous year, it would be 12% less likely to require debt relief in the current period, *ceteris paribus*.

We next consider the proposition that one year is not a sufficient amount of time to identify the presence of state dependence.

5.3 Dynamic Panel Probit Results: One- or Two-Year State Dependence

Table 5 contains results where the lagged variable takes a value of one where the country rescheduled in either of the previous two years. All of the signs for the structural explanatory variables are the same as those for the previous two models, regardless of whether we use the Heckman (1981) or Wooldridge (2002) estimation procedure, and t statistics are of a similar order of magnitude.

Most striking of the results are those concerning the question of heterogeneity or state dependence. Under both estimation approaches, the estimated coefficient on lagged debt rescheduling has not only changed sign, but also shows as significant. This means that if a country has had any rescheduling over the last two years, they are significantly more likely to need to "come back for more". The estimated marginal effects indicate that the probability of requiring rescheduling is between .073 and .113 higher when a country experienced a previous reschedule sometime in the past two years. Bearing in mind that in only 24% of cases did rescheduling take place, these marginal effects are very high.

Moreover, there is evidence to suggest that this state dependence is not simply a case of country heterogeneity, and that successive rounds of rescheduling are being undertaken across the board for the countries in our sample.

This shows, therefore, that results from studies focussing on state dependence over successive years fail to capture the true extent of the problem: while a country may not need to (or might not have the face to) appeal to their creditors for debt relief in a successive year, the rescheduling of their debt does little to alleviate the debt burden that they carry. In fact, the postponing of these debt repayments seems to add to the problems being faced by these debt ridden countries. It seems that if the goal is to help countries achieve long term, sustainable levels of debt, it is not enough to simply reschedule the debt obligations of these highly indebted countries.

6. Conclusions

This paper has attempted to identify economic factors which explain the probability of a country requiring debt relief in the form of debt rescheduling. We use a panel probit model to control for both observed and unobserved heterogeneity, and a dynamic panel probit model to identify state dependence over one and two years.

Results from the one-year dynamic random effects panel probit concur with those of the most recent debt relief literature. We show, however, that when a longer state horizon is allowed for, evidence points strongly in favour of state dependence.

Conventional wisdom has suggested that state dependence is an indication of the moral hazard associated with debt relief: once countries become aware of debt relief opportunities, they act with indiscretion, knowing that relief will possibly be forthcoming. We would argue, however, that when debt rescheduling is the main mechanism of debt relief, there is nothing intrinsically beneficial for the debtor in this arrangement. The debt is not cancelled, just deferred. In fact, debt rescheduling is primarily motivated by the creditor wanting to give themselves the best chance of having their loan repaid. It is generally only offered when the debtor is unable to make repayments. Consequently, we would suggest the real story of the strong state dependence found in this paper is that indeed debt rescheduling is not enough to allow a country to bring themselves out of a deep hole of debt, and hence countries are almost bound to return for more in the near future.

The results in this paper turn the tables around to demand answers from those who make the rescheduling decisions. Clearly, rescheduling is not sufficient to free up funds and allow countries to move towards steady economic growth. Moreover, it is our view that debt relief should not be used as a reward for "good" policies and "good" governance. Indeed, the required institutional changes that bring about "good" governance cannot ultimately be pursued without first lifting - and removing - the debt burden that cripples heavily indebted poor countries. The onus lies very much on developed countries to consider the benefits of debt forgiveness over debt rescheduling.

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Figure 1

Percent of countries rescheduling in the particular year from the reduced sample of 68 developing countries.

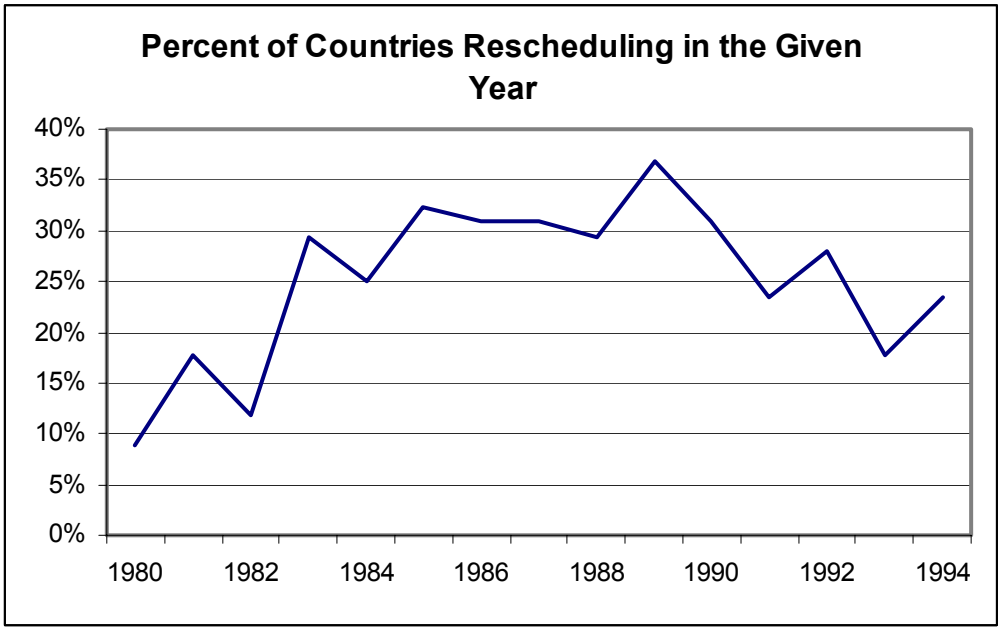

Table 1

Data Definitions and Sources

Variable	Units	Source
Debt reschedule (DRESCH)	1 = First year of rescheduling arrangement 0 = Otherwise	Bruno & Easterly (1998). Originally from the World Bank World Debt Tables
Inflation (INFL)	December over December % change in the CPI	Bruno & Easterly (1998).
Terms of trade (TOT)	Goods and services annual % change	World Bank Macro Time Series Database
GDP per capita growth (GROWTH)	Log per capita growth rate	Bruno & Easterly (1998). Originally from the World Bank National Accounts Statistics.
Investment share (INVSHARE)	Share of GDP in PPP constant prices.	Bruno & Easterly (1998). World Bank updated version of Summers-Heston (1991) data.
Consolidated public sector surplus (SURPLUS)	Share of GDP. Positive value indicates a surplus.	Bruno & Easterly (1998).
Debt to GDP (DEBT/Y)	Ratio of external debt to GDP	World Bank Macro Time Series Database
Debt to Exports (PVDSE)	Ratio of net present value of total debt service to exports.	World Bank Debt Reporting System: Global Development Finance & World Development Indicators.
GDP per Capita (PCY)	Real GDP per capita.	World Bank Macro Time Series Database.
M2/GDP (M2/Y)	Ratio of money and quasi money to GDP	World Bank Macro Time Series Database.
War	1 = War taking place on national territory 0 = Otherwise	Bruno & Easterly (1998).
Government Crisis (GOV CRISIS)	1 = Rapidly developing situation threatening downfall of the present regime - excluding situations of revolt aimed at such overthrow. 0 = Otherwise	World Bank Social Indicator Time Series Database. Recoded from count data to binary indicator.
Black Market Premium (BMP)	Ratio of parallel to official exchange rate minus one.	World Bank Macro Time Series Database

Table 2

Summary statistics on the structural model variables.

INFL		TOT		GROWTH	
Mean	1.3070	Mean	0.0013	Mean	0.0026
Median	0.1181	Median	-0.0022	Median	0.0070
Mode	0	Mode	0	Mode	#N/A
Standard Deviation	10.0827	Standard Deviation	0.1508	Standard Deviation	0.0515
Minimum	-0.1496	Minimum	-0.5837	Minimum	-0.2469
Maximum	240.3104	Maximum	1.0249	Maximum	0.3058

INVSHARE		SURPLUS		DEBT/Y	
Mean	0.1448	Mean	-0.0640	Mean	0.8843
Median	0.1381	Median	-0.0541	Median	0.5963
Mode	0.1726	Mode	-0.0430	Mode	0.4683
Standard Deviation	0.0800	Standard Deviation	0.0788	Standard Deviation	1.0644
Minimum	0.0067	Minimum	-0.6200	Minimum	0.1100
Maximum	0.4322	Maximum	0.1860	Maximum	12.0500

M2/Y		WAR		GOV CRISIS	
Mean	0.2905	Mean	0.1510	Mean	0.1055
Median	0.2410	Median	0	Median	0
Mode	0.3033	Mode	0	Mode	0
Standard Deviation	0.1731	Standard Deviation	0.3582	Standard Deviation	0.3074
Minimum	0.0180	Minimum	0	Minimum	0
Maximum	1.3248	Maximum	1	Maximum	1

Table 3
Static Panel Probit Model

Variable	Coefficient	Marginal effect	t statistic
CONSTANT	-1.0754	0.1411	-3.1408
INFL	-0.0268	-0.0045	-1.5491
TOT	-0.8469	-0.1433	-1.8625
GROWTH	-0.7545	-0.1277	-0.5296
INVSHARE	-3.6494	-0.6176	-2.2316
SURPLUS	5.3178	0.8999	3.6466
PVDSE	0.2127	0.0360	3.1051
DEBT/Y	0.8247	0.1396	4.3497
WAR	-0.2101	-0.0477	-0.8693
CRISIS	0.0883	0.0232	0.3944
M2Y	-0.2199	-0.0372	-0.3368
BMP	-0.0468	-0.0079	-2.0800
ρ	0.2764		3.6707

Table 4
Dynamic Panel Probit Model
One-Year State Dependence

	Heckman			Wooldridge		
Variable	Coefficient	Marginal effect	t statistic	Coefficient	Marginal effect	t statistic
CONSTANT	-0.6138	0.2697	-1.8820*	-1.2455	0.1065	-2.6705
DRESCH(t-1)	-0.1562	-0.0442	-0.994	-0.31	-0.1231	-1.8023
INFL				-0.0363	-0.0208	-1.8426
TOT	-0.9604	-0.2177	-2.0220*	-0.5154	-0.2958	-1.0333
GROWTH	-0.0832	-0.0189	-0.0534	-0.0912	-0.0523	-0.0585
INVSHARE	-6.219	-1.4097	-2.6830*	-7.1231	-4.0885	-3.2406
SURPLUS	5.419	1.2284	3.3980*	5.0968	2.9255	3.1744
PVDSE				0.1793	0.1029	2.026
DEBT/Y	0.8021	0.1818	4.5190*	0.6789	0.3897	2.7134
WAR	-0.3854	-0.0985	-1.612	-0.0994	-0.0393	-0.3667
GOV CRISIS	-0.1525	-0.0432	-0.7032	-0.1199	-0.0474	-0.4785
M2Y				0.5672	0.3256	0.4588
BMP				-0.0448	-0.0257	-1.697
θ	18.19		0.3383			
ρ	0.3583		4.3220*	0.2136		2.3192

Table 5
Dynamic Panel Probit Model
One and Two-Year State Dependence

	Heckman			Wooldridge		
Variable	Coefficient	Marginal effect	t statistic	Coefficient	Marginal effect	t statistic
CONSTANT	-1.1610	0.1228	-3.8141	-1.2090	0.1133	-3.8700
DRESCH(t-1 or t-2)	0.3675	0.1133	1.9903	0.3837	0.0729	2.4980
INFL	-0.0228	-0.0042	-1.2879	-0.0358	-0.0028	-1.6342
TOT	-0.7903	-0.1459	-1.6168	-0.7857	-0.0620	-1.5834
GROWTH	-1.5930	-0.2942	-1.0044	-1.8820	-0.1485	-1.2390
INVSHAR	-2.4760	-0.4572	-1.6322	-3.4160	-0.2696	-1.8718
SURPLUS	4.4130	0.8149	2.8824	4.2870	0.3383	2.7676
PVDSE	0.1677	0.0310	2.6526	0.1111	0.0088	1.3731
DEBT/Y	0.6657	0.1229	3.6120	0.5509	0.0435	2.4162
WAR	-0.1099	-0.0278	-0.4687	-0.0207	-0.0030	-0.0858
CRISIS	-0.0151	-0.0040	-0.0619	-0.1166	-0.0158	-0.4883
M2Y	-0.1593	-0.0294	-0.3050	-0.2722	-0.0215	-0.2669
BMP	-0.0401	-0.0074	-1.9210	-0.0211	-0.0017	-0.9167
θ	16.7300		2.7041			
ρ	0.1928		2.0301	0.0001		0.0000