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Trade Liberalisation, Economic Crises and Growth

by

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Abstract

Many economic reforms are undertaken at a time of economic crisis. But is this a good time to undertake trade reform? In this paper we investigate whether an economic crisis at the time of trade liberalisation affects a country's subsequent growth performance. We employ threshold regression techniques on five crisis indicators commonly used in the literature, to identify the relevant "crisis values" and to estimate the differential post-liberalisation growth effects in the crisis and non-crisis regimes. We find that the post-liberalisation growth depends on the characteristics of the crisis. Broadly speaking, an internal crisis implies lower growth and an external crisis higher growth relative to the non-crisis regime. These effects appear to be present in both the short and longer runs.

JEL classification: F14, O40

Keywords: Trade liberalisation, Growth, Crises

Outline

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Non-Technical Summary

Trade policy liberalisations have been widespread in the last three decades, particularly among developing countries. But not all trade reforms have been as successful as anticipated, which is partly attributable to weaknesses in the way that the reform packages were constructed and implemented. In many cases a crisis was necessary to trigger the reforms, which has led to the suggestion that an economic crisis may be an unfortunate time to undertake trade reforms. This is an important question, because an economic crisis indicates that the policy status quo is unsustainable, which makes it a politically convenient time to undertake economic reforms. Here we present evidence that an economic crisis at the time of trade liberalisation does affect countries' post-liberalisation growth performances, and that these effects depend on the characteristics of the crisis. We consider five crisis indicators commonly used in the literature (output falls, inflation increases, exchange rate depreciations, increased external debt to export ratios and increased current account deficits), which we are also able to combine into two factors representing the internal and external dimensions of a crisis. We employ threshold regression techniques on our crisis indicators to identify the relevant "crisis values" and the differential post-liberalisation growth effects in the crisis and non-crisis regimes.

Our evidence supports earlier results that trade liberalisation increases economic growth in the long run. We also find evidence of significant crisis thresholds, at levels below those normally assumed in the literature, for all our indicators. While liberalisation leads to higher long run growth whether there is a crisis or not, the characteristics of the crisis appear to influence the level of post-liberalisation growth. Liberalisation when output is declining, inflation is increasing or the exchange rate is depreciating at above threshold levels, leads to lower subsequent growth than otherwise. But if the debt to export ratio or the current account deficit is increasing at above crisis levels at the time of liberalisation, then growth will be higher than otherwise. Our composite indicators provided some, albeit tentative support for the notion that an internal crisis at the time of liberalisation leads to dampen the growth effects of trade liberalisation, while an external crisis at that time tends to amplify them. When we explicitly allow trade liberalisations to have both short and long run growth effects our long run conclusions are largely unaffected. And the short run results generally support the conclusion of a J-curve effect found in the earlier literature. Compared to the post-liberalisation average, growth is lower in the year of liberalisation, and higher three years later. These short-run effects are also crisis sensitive, exhibiting a similar pattern to the long run effects with respect to the individual crisis indicators.

So, is an economic crisis a good or a bad time for a country to undertake trade liberalisation? Our results suggest that the answer depends on the nature of the crisis. Liberalisations at a time of external (but not internal) crisis appear to bring additional growth benefits by alleviating the constraints imposed by the crisis. But liberalisations at a time of internal crisis may exacerbate adjustment problems and discourage the resource reallocations which are necessary for trade liberalisation to be successful. Interestingly, our results suggest that these crisis-related effects may extend beyond the short run.

1. Introduction

Is an economic crisis a *good or a bad* time for a country to undertake trade liberalisation? This is a question for which policymakers need an answer, since an economic crisis is often a politically *convenient* time to undertake economic reforms. The policy status quo is clearly unsustainable. But while immediate policy reforms in some areas are clearly called for, it is not obvious that the reform package should include significant trade liberalisation, though it often does. Here we present evidence that an economic crisis at the time of trade liberalisation does affect a country's post-liberalisation growth performance. Furthermore, its effects depend on the characteristics of the crisis.

Trade policy liberalisations have been widespread in the last three decades, particularly among developing countries. The reasons for this include the perceived limitations of import substitution as a development strategy¹; the weight of empirical evidence suggesting a positive relationship between openness and growth²; and, not least, the influence of the International Financial Institutions (IFIs - the World Bank and IMF) which often required that trade liberalisation be included as part of a package of reforms when agreeing to loans³. Despite their early promise, recent experience and evidence suggests that not all trade reforms have been as successful as anticipated (Winters, 2004). This is partly attributable to weaknesses in the reform packages themselves, including inappropriate timing and sequencing of reforms, their lack of credibility to private agents and doubts over the commitment to reform shown by some political actors. In many cases it seems a crisis was necessary to trigger the reforms. Could it be, therefore, that an economic crisis is an unfortunate time to undertake *trade* reforms?

In this paper we examine whether the extent and type of economic crisis at the time of liberalisation affects post-liberalisation growth. We consider five crisis indicators commonly used in the literature (output falls, inflation increases, exchange rate depreciations, increased

¹ This view is far from being uncontroversial. Rodrik (1999) argues that IS policies actually worked quite well at least until the mid-1970s and that the poor performance of such countries after 1973 was the result of an inability to respond to macro-shocks and not to the policy of import substitution. Moreover defenders of IS policies argue that it has often been misinterpreted and that it is not a rationale for indiscriminate protection. They also cite evidence of successful selective intervention in some of the successful and so-called liberal trading countries of East Asia (Rodrik, 1995; Baldwin, 2003; Cline, 2004).

² Again, this statement is not uncontroversial. Rodriguez and Rodrik (2000) criticise much of the existing literature on growth and openness, arguing that the evidence linking outward orientation and growth is overstated.

³ For the period 1980-89, 79% of all loans had conditions in the trade policy area, in excess of those which attached to any other policy (Greenaway, 1998).

external debt to export ratios and increased current account deficits), which we are also able to combine into two factors representing the internal and external dimensions of a crisis. We employ threshold regression techniques on our crisis indicators to identify the relevant “crisis values” and the differential post-liberalisation growth effects in the crisis and non-crisis regimes. Our results indicate that an economic crisis at the time of liberalisation does affect post-liberalisation growth, with the direction of the effect depending on the nature of the crisis. An internal crisis implies lower growth and an external crisis higher growth relative to the non-crisis regime.

The remainder of the paper is organised as follows. Section 2 briefly reviews the theoretical and empirical literature linking crises, trade liberalisation and growth. Section 3 discusses our data, methodology and long run results, while Section 4 adds in short run effects. Section 5 concludes.

2. Background: Trade Liberalisation and Growth

The potential growth and welfare effects of trade liberalisation are well known⁴. While the immediate impact is likely to be negative as resources become redundant in areas of comparative disadvantage, their reallocation into areas of comparative advantage will see a rise in the growth rate in the medium run as income moves to a higher steady state level⁵. Longer run gains in the growth rate must come through improvements in factor productivity and these can emerge through a variety of channels. Increased imports of capital and intermediate goods not available domestically may directly raise the productivity of manufacturing production (Lee, 1995) and increased trade (exports and imports) with advanced economies could indirectly raise growth by facilitating the spillover of knowledge and technology. Learning by doing may be more rapid in export industries⁶. The magnitude of these long run growth effects will vary across countries, depending on their sectors of comparative advantage in particular.

⁴ Dornbusch (1992) and Krueger (1998) provide useful surveys of the gains from trade liberalisation.

⁵ The static gains from trade liberalisation need not be limited to such resource allocation gains. Further gains can arise from reductions in rent seeking, corruption and smuggling. Other gains include those resulting from economies of scale in exporting industries, reduced market power in protected markets, and increased variety and quality of imported goods available to domestic producers and consumers.

⁶ Indirect evidence suggestive of the importance of learning by doing in export industries is provided by the recent literature on exporting and productivity (for reviews see Wagner, 2007 and Greenaway and Kneller 2007).

While the empirical literature on openness and growth is quite voluminous⁷ (Dollar (1992), Sachs and Warner (1995), and Frankel and Romer (1999) are prominent examples), that on trade liberalisation and growth is much more limited. Some comparative cross-country studies have been undertaken, including Little, Scitovsky and Scott (1970), Krueger (1978), Bhagwati (1978) and Papageorgiou, Michaely and Choksi (1991) (PMC). The latter is the most sanguine, concluding that trade liberalisation results in a more rapid growth of exports and GDP, without significant transitional costs of unemployment⁸. Other studies find that liberalisation tends to lead to a growth in exports and an improvement in the current account (although some of this arises as a result of import compression), and that while some countries have increased investment following liberalisation, others suffer an investment slump, so that the impact on growth may be positive or negative, although there seem to be more cases of a positive than a negative growth effect (Greenaway, 1998).

Econometric studies are relatively more plentiful. Greenaway, Leybourne and Sapsford (1997) use a smooth transition model to test for a transition in the level and trend of real GDP per capita for 13 countries in the PMC sample and relate these transitions in GDP to liberalisation. While all countries displayed a transition in the level or trend, in the majority of cases the transition was negative⁹, and where it was positive it generally could not be related to liberalisation episodes¹⁰. Greenaway, Morgan and Wright (1998, 2002) (GMW) use a dynamic panel model to examine both the short- and long-run impact of liberalisation on growth in a large sample of countries. Results using three alternative measures of liberalisation suggest a J-curve effect, whereby growth at first falls but then increases following liberalisation. Wacziarg and Welch (2003) update the Sachs and Warner (1995) indicator of trade liberalisation, and then regress per capita output growth on country (and time) fixed effects and their binary indicator of trade liberalisation. They find that the difference in growth between a liberalised and a non-liberalised country is 1.53 percentage points. Salinas and Aksoy (2006) use an alternative indicator¹¹ and find that trade liberalisation increases growth by between 1 and 4 percent, depending upon the specification.

⁷ It has also been subject to criticism on both methodological and measurement grounds by Rodriguez and Rodrik, (2000).

⁸ Critiques of these results are provided by Collier (1993) and Greenaway (1993).

⁹ Maurer (1998) finds in the majority of cases neither a positive nor a negative impact on growth of the liberalisation episodes defined by PMC.

¹⁰ Greenaway and Sapsford (1994) model liberalisation as a discrete break rather than a smooth transition, and again find little evidence of liberalisation increasing a country's growth rate.

¹¹ Though the liberalisation dates in this study are generally consistent with those of Wacziarg and Welch.

Although the later empirical evidence provides broad support for the hypothesis that trade liberalisation improves economic growth, this support is far from universal and it is clear that some liberalisations have been more successful than others. Given the variety of circumstances under which trade liberalisations have occurred this is hardly surprising. Where liberalisations have been the outcome of a specific policy review process, have had broad political support and have been undertaken (with or without the support of IFIs) in a stable economic and political environment they are likely to be sustained and successful. But in many cases trade liberalisations have been undertaken as part of a “package” of reforms emerging from an economic or political crisis.

Crises appear to facilitate some reforms¹². Drazen and Grilli (1993) model a “war-of-attrition” in an economy that has settled into a Pareto-inferior equilibrium, and where reforms are resisted because of uncertainty over who is more willing to bear the costs. An economic crisis may then help to move the economy to a welfare-superior path, as reforms that would be resisted under normal circumstances, may be accepted if the losses from a continuing crisis are large. Such an approach seems particularly promising for explaining macroeconomic stabilisations, where the distribution costs are low and there is likely to be consensus on the policies required, and this is confirmed by the empirical evidence (Bruno and Easterly (1996), Bruno (1996), Drazen and Easterly (2001) and Alesina et al (2006)). But with structural reforms (e.g. trade and labour market reforms) the distributional costs are higher and there is a lower likelihood of consensus on the appropriate policies (Rodrik, 1996). The empirical evidence on whether crises facilitate structural reforms is correspondingly less decisive. Lora (1998) finds empirical support (in Latin America) for the hypothesis that a crisis involving a decline in real income is likely to facilitate trade reforms, although he notes that the effect is quantitatively small. Tornell (1998) presents empirical evidence on the relationships among drastic political change, a major economic crisis (measured by inflation and a decline in output) and trade liberalisation. Using Probit models explaining the start of liberalisation he finds that the unconditional probability of reform is 2.7%, increasing to 27% with an economic crisis and 60% with both an economic and political crisis. Campos et al (2006), however, find that, unlike political crises, economic crises have no significant impact on the implementation of reforms.

¹² This is not surprising according to Rodrik (1996), who states that “There is a strong element of tautology in the association of reform with crisis. Reform naturally becomes an issue only when current policies are not perceived to be working. A crisis is just an extreme instance of policy failure. That policy reform should follow crisis, then, is no more surprising than smoke following fire” (pp. 26-27).

Even if an economic crisis does facilitate structural reforms in general, it need not be a good time to undertake trade liberalisation; for two reasons. First, trade reform works by correcting distortions in relative prices, but high and variable inflation can confound price signals, making it difficult to disentangle relative price changes from changes in the general price level, thereby blunting the incentives to move resources between industries (Rodrik, 1992). Moreover, the slowdown in domestic activity associated with crises can exacerbate transitional unemployment as resources shift between sectors, increasing opposition to reforms and increasing the likelihood they will be reversed (Morrissey, 1995). Second, if trade liberalisation is to be successful (and sustained), the private sector must respond to the changed incentives, and if private agents are sceptical of the commitment of policymakers, they will be slow to undertake the (sunk) costs associated with shifting resources between import competing and export sectors. The short run adjustment will be prolonged and the efficiency gains will be delayed. In such a situation there will be few that gain from liberalisation, while some will lose due to increased foreign competition. Such an outcome is likely to make it politically difficult to sustain reforms as well as limiting their impact. Thus scepticism on behalf of the private sector may be more likely for liberalisations undertaken in times of crisis. This scepticism may be compounded if trade liberalisation is undertaken as part of a package of reforms that countries were obliged to negotiate if they wanted financial support from the IFIs (Rodrik, 1989b). In the absence of a crisis and conditions requiring trade reform laid down by IFIs, it would be clear to the private sector that a government that undertook liberalisation would be committed to the reforms. In the presence of intervention from IFIs however, there is an incentive for uncommitted governments to undertake reform temporarily to receive funds. In this situation it is difficult for the private sector to distinguish between a government committed to reform and one that is undertaking reform for financial gain¹³.

These considerations combine to suggest that a trade liberalisation undertaken at a time of crisis may reflect weaker commitment from policymakers and higher scepticism from private agents. If so it will be less likely to be sustained and successful, and therefore less likely to have a significant growth promoting impact. The nature of the crisis itself may also be important. A severe “internal” crisis (falling output and high and variable inflation) will

¹³ Support from IFIs cannot be taken as a signal of a lack of local commitment, however, since such support can act as an external anchor strengthening the credibility of reforms and providing short-term finance that can alleviate the short-term costs for governments committed to reform (Morrissey, 1995).

distort price signals and delay any growth enhancing benefits. A severe “external” crisis (currency depreciation, growing current account deficit and high debt to export ratio) will also constrain growth and is more likely to lead a “not otherwise reform minded government” to undertake reforms in order to obtain support from IFIs. Of course the trade liberalisation itself will eventually free up these constraints, particularly if the external crisis occurs in the context of a highly inward-looking policy regime. In practice an economic crisis will exhibit both internal and external symptoms, which is why we include indicators of both in the empirical analysis that follows.

3. Data, Methodology and Results

The starting point for our empirical analysis is an equation similar to the initial regression estimated by GMW (2002)¹⁴:

$$\Delta \ln y_{i,t} = \beta_1 \ln y_{i,60} + \beta_2 SYR_{i,60} + \beta_3 \Delta \ln TTI_{i,t} + \beta_4 \Delta \ln POP_{i,t} + \beta_5 \left(\frac{INV}{GDP} \right)_{i,t} + \delta LIB_{i,t} + \eta_t + \varepsilon_{i,t} \quad (1)$$

where i denotes country and t time; and

y_{it} = GDP per capita

$y_{i,60}$ = GDP per capita in 1960 (the base period)

$SYR_{i,60}$ = Average years of secondary schooling in the population over 15 in 1960

TTI = Terms of trade index

POP = Population

INV/GDP = Ratio of gross domestic investment to GDP

LIB = Dummy variable taking the value one for all years after and including the year of liberalisation and zero otherwise.

We estimate this equation using annual data for a panel of (up to) 75 countries over the period 1960-2003. Much of the data is from the World Bank’s World Development Indicators (2005) database; including GDP, population, investment and the terms of trade. Data on schooling is from Barro and Lee (2001). The indicator of trade liberalisation is from Wacziarg and Welch (2003)¹⁵, and is a broad measure.

¹⁴ There are two major differences between (1) and the initial static equation estimated by GMW. The first is that we replace the level of secondary school enrolment with the average years of secondary schooling in the population over 15 as a measure of human capital, since as Pritchett (2001) argues, enrolment ratios are not an ideal measure of the stock of human capital, and indeed may be negatively correlated with it. The second is that we include a full set of time dummies, η_t , to account for time-specific heterogeneity in growth rates across countries.

¹⁵ As noted above, this is an update of the indicator in Sachs and Warner (1995), who constructed a dummy variable of openness, with a country being classified as closed if it displayed at least one of five criteria, namely;

The results of estimating equation (1) are reported in Table 1. The first regression is our base specification, excluding the liberalisation dummy. The outcomes for the control variables are largely in line with existing results, particularly those reported by GMW (2002). We find negative and significant coefficients on initial GDP per capita and population growth, and positive and significant coefficients on initial schooling, investment and the terms of trade index. In regression 2 we add the liberalisation dummy. This leaves the control variables largely unchanged, with the liberalisation dummy itself positive and significant. The estimated coefficient indicates that liberalisation has a favourable impact on growth of around 2 percent in the years following it. This is in line with estimates reported by GMW (1998 and 2002), Wacziarg and Welch (2003) and Salinas and Aksoy (2006).

Table 1: Initial Results

<i>Δlny</i>	1	2	3	4	5	6
<i>lny</i> ₆₀	-0.005 (-3.18)***	-0.005 (-3.12)***				
<i>INV/GDP</i>	0.26 (10.42)***	0.23 (9.20)***	0.27 (7.73)***	0.26 (7.45)***	0.21 (7.35)***	0.20 (6.95)***
<i>ΔlnPOP</i>	-0.54 (-3.39)***	-0.55 (-3.43)***	-0.67 (-1.87)*	-0.74 (-2.03)**	-0.36 (-1.36)	-0.28 (-1.06)
<i>SYR</i> ₆₀	0.005 (2.07)**	0.008 (0.31)				
<i>ΔlnTTI</i>	0.02 (1.92)*	0.02 (1.83)*	0.02 (2.31)**	0.019 (2.22)**		
<i>LIB</i>		0.02 (5.47)***		0.018 (4.78)***		0.028 (7.24)***
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	No	No	Yes	Yes	Yes	Yes
Observations	952	952	1327	1327	2619	2619
F-Statistic	26.23***	310.95***	15.25***	206.43***	13.02***	13.57***
<i>R</i> ²	0.34	0.36	0.34	0.36	0.27	0.29

Notes: t-statistics in brackets. All models estimated using White Heteroscedasticity-Consistent standard errors. *, **, *** indicate significance at the 10, 5 and 1 percent level respectively.

(i) Average tariff rates of 40% or more, (ii) Non-tariff barriers covering 40% or more of trade, (iii) A Black Market exchange rate (BMP) that is depreciated by 20% or more relative to the official exchange rate, on average, (iv) A state monopoly on major exports, (v) A socialist economic system. The date of liberalisation is then defined as the year in which none of these criteria are met. The openness measure of Sachs and Warner (1995) was heavily criticised by Rodriguez and Rodrik (2000), who argued that the information on the BMP and the state monopoly on major exports played the major role in its classification of countries. They went on to argue that a high BMP is likely to reflect factors other than trade policy, including macroeconomic mismanagement, weak enforcement of the rule of law and high levels of corruption, while the information on the state monopoly of exports works like an Africa dummy (since the study from which the data were taken comes from a study of 29 African countries only). In updating this indicator, Wacziarg and Welch (2003) note that the liberalisation date is less subject to criticism, and are careful to cross-check their liberalisation dates against case studies of reforms in developing countries.

One limitation of estimating (1) is that data constraints mean that only 39 out of the 75 countries (and only 952 observations out of a potential 2767) are included in the analysis. Three variables are responsible for this: initial output per capita, initial schooling and the terms of trade index. We therefore drop initial output per capita and schooling in regressions 3 and 4, replacing them with a full set of country dummies. Including country fixed effects allows us to drop time invariant variables, with the country dummies capturing the impact of country-specific factors on growth, including the country-specific initial levels of output per capita and schooling. The estimated coefficients on the remaining control variables are largely unaffected, as is the coefficient on the liberalisation dummy which remains highly significant. Finally, in regressions 5 and 6 we drop the terms of trade variable, which increases our sample to 2619, and allows the inclusion of all 75 countries. This exclusion lowers the coefficient on population, which also becomes insignificant, but has little impact on the investment coefficient. That on the liberalisation dummy increases in size but is still within the range of estimates in the literature, and is again highly significant.

The regressions in Table 1 give an estimate of the average impact of trade liberalisation on growth across all liberalising countries. Using the final regression (6) as a base, we now explore whether these growth effects differ depending on (a) whether the country faced an economic crisis at the time of liberalisation; and (b) if it did, the nature of the crisis. Several variables have become standard indicators of aspects of an economic crisis (Alesina et al, 2006; Campos et al, 2006): the proportional decline in per capita GDP (*OUT*), the inflation rate¹⁶ (*INF*), the nominal exchange rate (*XR*), the ratio of debt to exports (*DEBT*), and the current account deficit (*CAD*). Data on these variables is again taken from the World Development Indicators (2005) database. Each represents a specific aspect of an economic crisis. Individually they are informative, but will be even more so if they can be combined in some way. In particular it is of some interest whether the internal or external dimensions of an economic crisis at the time of liberalisation have different implications for a country's subsequent growth performance.

Factor analysis is a method of condensing a number of random variables into a smaller number of uncorrelated variables for the purposes of analysis¹⁷. We implement the factor

¹⁶ The results reported are based on the GDP deflator rather than the CPI index, since the GDP deflator is available for more countries and more years. Our results are robust to the use of either the CPI or GDP deflator, however.

¹⁷ For an introduction to principal components and factor analysis see Kline (1994). Campos et. al. (2006) employ principal components to construct an index of social and political instability.

analysis procedure using the original data on our five crisis variables and employing the maximum likelihood factor method, which looks to explain as much variation as possible in the *population* correlation matrix, as estimated from the sample correlation matrix. The results yield two retained factors, with the rotated factor loadings as reported in Table 2. While there cannot be said to be a definitive separation of variables, the first factor (which explains over 80% of the variance in the variables) has its largest positive weightings on OUT, INF and, to a lesser extent DEBT, while the second factor (which explains the remainder of the variance) has its largest positive weightings on CAD and XR. In what follows we therefore label the first factor INT and interpret it as an indicator of the *internal* dimension of the crisis, and the second factor EXT and interpret it as an indicator of its *external* dimension. Clearly inferences made from these interpretations should be treated with caution.

Table 2: Rotated Factor Loadings

	Factor 1 [INT]	Factor 2 [EXT]
<i>OUT</i>	0.497	-0.112
<i>INF</i>	0.466	0.077
<i>XR</i>	0.023	0.150
<i>DEBT</i>	0.216	-0.033
<i>CAD</i>	-0.094	0.282

Combined the two factors account for all of the variance in the crisis variables, with INT accounting for 82 percent of the variance of the crisis variables, and EXT 18 percent.

For each crisis indicator we calculate a standardised score as,

$$CRS_{jit} = \frac{X_{jit} - \bar{X}_{jit}}{s_{jit}},$$

where X_{jit} is the value of indicator j in country i in period t , \bar{X}_{jit} is the average of this indicator for this country over the five years up to and including t , and s_{jit} is the standard deviation of the indicator over this five year period. The interpretation of the standardised score is straightforward, and standardised scores can be compared since converting our data to scores results in a distribution with mean 0 and standard deviation 1. A standardised score of 0.5, for example, indicates that the value of this indicator at time t was half a standard deviation above its recent average. Given the way that the indicators have been defined, higher values indicate a deeper crisis. In the analysis below we are interested in the value of the crisis variable at the time of liberalisation, CRS_{jiLIB} .

Of course these indicators only signal a “crisis” if their value exceeds some *positive* threshold. This threshold is unknown, a priori. But our interest is not simply in what threshold might be said to indicate a crisis at the time of the liberalisation. Rather we are concerned with what threshold indicates a crisis of sufficient magnitude that it has implications for the liberaliser’s subsequent growth¹⁸. To determine this we employ the panel threshold regression model of Hansen (1999), and estimate thresholds for our crisis indicators that allow the coefficient on the liberalisation dummy to vary discretely depending upon the value of the crisis indicator at the time of liberalisation. The regression for a single threshold equation is given by

$$\Delta \ln y_{i,t} = \beta_4 \Delta \ln POP_{i,t} + \beta_5 \left(\frac{INV}{GDP} \right)_{i,t} + \delta_1 LIB_{i,t} I(CRS_{jLIB} \leq \lambda_j) + \delta_2 LIB_{i,t} (CRS_{jLIB} > \lambda_j) + \nu_i + \eta_t + \Delta \varepsilon_{i,t} \quad (2)$$

Here the observations are divided into two regimes depending upon whether the value of the crisis indicator at the time of liberalisation (CRS_{jLIB}) is smaller or larger than the estimated threshold for that indicator (λ_j). The impact of liberalisation on growth will be given by δ_1 for observations in the low (“non-crisis”) regime ($CRS_{jLIB} \leq \lambda_j$) and by δ_2 for observations in the high (“crisis”) regime ($CRS_{jLIB} > \lambda_j$). To estimate (2) we firstly have to estimate the threshold parameter which is taken as the value that minimises the concentrated sum of squared errors from the least squares regression. In order to allow us to concentrate on crises we impose the restriction that the threshold must be positive¹⁹. Having found the threshold we identify whether it is statistically significant by testing the null hypothesis that $\delta_1 = \delta_2$. A complication is that the threshold is not identified under the null hypothesis, implying that classical tests do not have standard distributions. We follow Hansen (1999) and bootstrap to obtain the p -value for the test²⁰.

The results for a single threshold for each indicator are presented in Table 3A. Despite the variety of indicators used, definite patterns can be discerned. First, there is at least one significant crisis threshold for all indicators, and in the majority of cases these estimated thresholds are less than unity and *all* are less than the values (1.5 or 2) commonly imposed in

¹⁸ Many studies use these standardised scores to create “crisis” dummy variables. Whether a country is in crisis is determined by imposing some threshold value (usually 1.5 or 2) on the standardised score.

¹⁹ To ensure a reasonable number of observations in each regime we generally impose the restriction that at least 10 percent of observations must lie in each regime.

²⁰ The bootstrap distribution of the test statistic was computed using 1000 replications of the procedure proposed in Hansen (1999).

the literature. This suggests that smaller crises may be more important than normally thought. Second, trade liberalisation raises growth in both crisis and non-crisis regimes. Third, the individual indicators fall into two groups in terms of their predictions of the sign of the effect of a crisis at the time of liberalisation on subsequent growth. Liberalising during a time of crisis involving above threshold falls in output, increases in inflation or depreciations of the exchange rate is associated with lower subsequent growth than otherwise, while liberalising during a crisis involving above threshold increases in the debt to export ratio or the current account deficit is associated with enhanced subsequent growth. These results lend support to the arguments, noted above, that liberalisation at a time of high inflation or unemployment will reduce subsequent growth benefits by masking relative price signals and delaying resource reallocations. They also support a view that trade liberalisation may ease external constraints. These issues are investigated further in the short run analysis of the next section.

Table 3A: Endogenous Threshold Results

$\Delta \ln y$	<i>Crisis Indicator</i>						
	<i>OUT</i>	<i>INF</i>	<i>XR</i>	<i>DEBT</i>	<i>CAD</i>	<i>INT</i>	<i>EXT</i>
<i>INV / GDP</i>	0.19 (6.25)***	0.20 (6.45)***	0.21 (7.15)***	0.24 (7.43)***	0.22 (6.38)***	0.25 (7.34)***	0.26 (7.40)***
$\Delta \ln POP$	-0.28 (-0.99)	-0.23 (-0.82)	-0.39 (-1.46)	-0.37 (-1.05)	-0.54 (-1.78)*	-0.52 (-1.56)	-0.46 (-1.34)
<i>LIB1</i>	0.038 (7.87)***	0.043 (7.85)***	0.034 (5.73)***	0.023 (4.97)***	0.030 (5.62)***	0.027 (5.50)***	0.020 (3.98)***
<i>LIB2</i>	0.025 (4.60)***	0.022 (4.85)***	0.024 (5.80)***	0.50 (4.43)***	0.051 (4.33)***	0.012 (2.00)**	0.033 (6.33)***
λ_1	0.05 (66 th)	0.09 (54 th)	0.9 (34 th)	1.34 (88 th)	1.09 (90 th)	0.51 (75 th)	0.78 (72 nd)
<i>p-value</i>	0.009***	0.00***	0.045**	0.00***	0.047**	0.005***	0.018**
Observations	2494	2458	2384	1890	1961	1774	1774
F	12.18***	12.34***	13.50***	9.30***	8.72***	10.25***	10.62***
R^2	0.28	0.29	0.29	0.24	0.25	0.28	0.28

Notes: All models include a full set of unreported country and time dummies. t-statistics in brackets based on White Heteroscedasticity-Consistent standard errors. *, **, *** indicate significance at the 10, 5 and 1 percent level respectively. The p-value of the significance of the estimated threshold is calculated using the bootstrap procedure of Hansen (1999).

Evidence that different dimensions of an economic crisis at the time of liberalisation may have differing implications for subsequent growth rates, reinforces our interest in exploring their combined effects through our two estimated factors (INT and EXT). The single threshold results for these two composite indicators suggest that liberalisation during an internal crisis (INT above its threshold) is associated with dampened growth, while liberalisation during an external crisis (EXT above its threshold) is associated with amplified growth. We next use the two independently estimated thresholds to construct four separate liberalisation dummy variables, each reflecting one of the four possible situations at the time

of liberalisation: $LIB(N,N)$ (no crisis), $LIB(E,N)$ an external but no internal crisis, $LIB(N,I)$ an internal but no external crisis, and $LIB(E,I)$ a crisis in both dimensions. The results are shown as regression 1 in Table 3B. The strongest growth effects arise when the EXT indicator is above its threshold (the coefficient on $LIB(E,N)$ is significantly different from the coefficients on $LIB(N,N)$ and $LIB(N,I)$, but not that on $LIB(E,I)$). Liberalisation in the absence of a crisis is also associated with significant growth effects, but liberalisation when there is an internal but no external crisis, has no significant implications for subsequent growth. While these results are interesting and suggestive, they are based on dummy variables that are defined by two thresholds each estimated ignoring the other. Our final step therefore is joint estimation of these thresholds. In view of the apparent importance of the EXT indicator, we use the estimated threshold on EXT to divide the sample into two regimes (i.e. EXT above and below the threshold at the time of liberalisation) and then sequentially check for independent thresholds on INT in each of these two regimes. The outcomes are shown in the final two columns in Table 3B. There is one significant second threshold, that on INT in the low (non-crisis) regime for EXT. Its value is the same as the separately estimated threshold for INT, and the results are virtually identical to those in the second column as a consequence.

Table 3B: Endogenous Threshold Results

	1	2	3
INV / GDP	0.26 (7.40)***	0.26 (7.42)***	0.26 (7.40)***
$\Delta \ln POP$	-0.51 (-1.53)	-0.51 (-1.52)	-0.45 (-1.34)
$LIB(N, N)$	0.025 (4.52)***	0.025 (4.52)***	0.020
$LIB(N, I)$	0.009 (1.49)	0.009 (1.49)	(3.97)***
$LIB(E, N)$	0.033 (6.23)***	0.033 (6.34)***	0.032 (6.13)***
$LIB(E, I)$	0.029 (2.93)***		0.039 (3.35)***
λ_1 (EXT)	0.78	0.78	0.78
λ_2 (INT)	0.51	0.51	0.00
p -value	N/A	0.013**	0.584
Observations	1744	1744	1744
F	10.42***	10.52***	10.68***
R^2	0.28	0.28	0.28

Notes: All models include a full set of unreported country and time dummies. t-statistics in brackets based on White Heteroscedasticity-Consistent standard errors. *, **, *** indicate significance at the 10, 5 and 1 percent level respectively. The p-value of the significance of the estimated threshold is calculated using the bootstrap procedure of Hansen (1999).

In combination, the results from this section support the view that an economic crisis at the time of liberalisation can have a significant impact on post-liberalisation growth. In particular,

liberalisation at a time of internal economic crisis (falling output and increasing inflation) does not appear to yield subsequent growth benefits of the same magnitude as those found with liberalisation in the absence of a crisis or where an external crisis is also present. This is consistent with the discussion in Section 2 which suggested that an internal crisis would very likely hamper and obscure the potential benefits of a trade liberalisation.

4. Short-Run Impacts of Liberalisation on Growth

The preceding section drew no distinctions among the post-liberalisation periods. Given our limited sample sizes, our results are likely to reflect a combination of short and longer run influences. They could therefore be viewed as suggesting that the detrimental effects of an internal crisis at the time of liberalisation go beyond the short run. As mentioned above, GMW (1998, 2002) found evidence of a J-curve effect, whereby growth initially declines or remains stable following liberalisation, and then increases after a period of time. In this section we modify their approach to consider three issues. Firstly, whether a similar short run relationship holds for our specification and sample. Secondly, whether the inclusion of short run effects disturbs our threshold estimates for the long run growth relationship. Lastly, whether any short run growth effects of trade liberalisation are also crisis dependent.

As a first step to capturing both the short-run and long-run effects of liberalisation on growth we estimate,

$$\Delta \ln y_{i,t} = \beta_4 \Delta \ln POP_{i,t} + \beta_5 \left(\frac{INV}{GDP} \right)_{i,t} + \delta LR_{i,t} + \phi_j \sum_{J=0}^3 SR(J)_{i,t} + v_i + \eta_t + \Delta \varepsilon_{i,t} \quad (3)$$

Alongside the long run (post-) liberalisation dummy described above (now relabelled LR), this equation includes four additional liberalisation dummies, each corresponding to a single year - the year of liberalisation ($SR(0)$) and each of the subsequent three years ($SR(1)$, $SR(2)$ and $SR(3)$). The impact of liberalisation on growth in the year of liberalisation and in each of the subsequent three years is therefore given by $\delta + \phi_j : j = 0, -1, 2, 3$. The results are shown in the second column of Table 4A. The estimated coefficients on INV/GDP , $\Delta \ln POP$ and LR are very similar to those in the corresponding regression in Table 1. The estimates for the short-run post-liberalisation dummies indicate that growth is significantly lower than the post-liberalisation average in the year of liberalisation, is no different from this average in the following two years and is sufficiently higher in the third year to recover what had been lost in the year of liberalisation. Our sample thus replicates the type of J-curve effects found previously.

Table 4A: Endogenous Threshold Results (Long run threshold only)

	<i>Linear</i>	<i>Crisis Variables</i>						
		OUT	INF	<i>XR</i>	<i>DEBT</i>	CAD	INT	EXT
<i>INV / GDP</i>	0.20 (6.75)***	0.19 (5.95)***	0.19 (6.12)***	0.20 (6.90)***	0.23 (7.23)***	0.22 (6.16)***	0.25 (7.19)***	0.25 (7.25)***
$\Delta \ln POP$	-0.30 (-1.12)	-0.28 (-1.01)	-0.24 (-0.84)	-0.40 (-1.48)	-0.36 (-1.02)	-0.54 (-1.81)*	-0.53 (-1.57)	-0.47 (-1.39)
<i>LR1</i>	0.029 (7.13)***	0.042 (8.03)***	0.048 (8.29)***	0.036 (5.83)***	0.025 (4.42)***	0.034 (5.54)***	0.029 (5.02)***	0.022 (3.83)***
<i>LR2</i>		0.029 (5.14)***	0.026 (5.29)***	0.026 (5.37)***	0.051 (4.66)***	0.056 (4.70)***	0.013 (2.01)**	0.035 (5.82)***
<i>SR(0)1</i>	-0.022 (-2.73)***	-0.027 (-3.38)***	-0.029 (-3.47)***	-0.016 (-2.53)**	-0.009 (-1.41)	-0.019 (-2.67)***	-0.010 (-1.51)	-0.01 (-1.60)
<i>SR(1)1</i>	0.001 (0.17)	-0.002 (-0.26)	-0.002 (-0.34)	-0.002 (-0.29)	-0.002 (-0.22)	-0.005 (-0.65)	0.0002 (0.03)	-0.0005 (-0.07)
<i>SR(2)1</i>	0.003 (0.62)	-0.001 (-0.13)	-0.001 (-0.27)	0.001 (0.09)	-0.004 (-0.77)	-0.0003 (-0.04)	-0.002 (-0.32)	-0.002 (-0.44)
<i>SR(3)1</i>	0.021 (4.32)***	0.017 (3.16)***	0.015 (2.92)***	0.015 (2.79)***	0.009 (1.64)	0.01 (1.68)*	0.009 (1.63)	0.009 (1.53)
λ_1		0.05	0.09	0.9	1.34	1.09	0.51	0.78
<i>p-value</i>		0.00***	0.00***	0.047**	0.00***	0.004***	0.007***	0.019**
Observations	2619	2494	2458	2384	1890	1961	1774	1774
F	13.31***	11.95***	12.16***	13.20***	9.03***	8.53***	9.92***	10.25***
R^2	0.30	0.29	0.30	0.29	0.24	0.25	0.28	0.28

Notes: LRI and SR(J)I refer to the long run and short run liberalisation dummies in regime I = 1-3. All models include a full set of unreported country and time dummies. t-statistics in brackets based on White Heteroscedasticity-Consistent standard errors. *, **, *** indicate significance at the 10, 5 and 1 percent level respectively. The p-value of the significance of the estimated threshold is calculated using the bootstrap

To begin the process of examining how these results are affected by a crisis at the time of liberalisation, we initially used a modified version of equation (3) which estimated common crisis thresholds for all five post-liberalisation dummies. The broad pattern of outcomes remained as before, but for three of the indicators we now had a significant second threshold. In the light of this evidence that different crisis levels may be applicable to the short and long run growth effects²¹, we proceeded in two steps. First, we estimated crisis thresholds for the long run dummies in (3) only, applying no crisis thresholds on the short run dummies. The results are shown in the remaining columns of Table 4A. The estimated thresholds for the crisis indicators are identical to those of the preceding section, and the coefficients on the long-run post-liberalisation dummies are the same or slightly higher in both regimes. For all the single indicators (except DEBT), the estimated coefficients on the short-run dummies

²¹ The single thresholds and the lower values of the double thresholds were similar to the thresholds reported in Table 3A (except for XR where both estimated thresholds were much higher). The estimated long run coefficients in the non-crisis regimes were the same or slightly higher than the corresponding coefficients in Table 3A. Of the indicators with two thresholds, only INF has coefficients in its crisis regimes that significantly differ from each other, indicating that the second thresholds arise to accommodate the short-run effects for the other indicators at least.

show the same J-curve pattern as the linear case. However, there is enough variation in the effects of these individual indicators that when they are aggregated (along with DEBT) into the combined indicators no significant short run effects are evident.

Our second step involves estimating crisis-indicator-based thresholds for the short run post-liberalisation dummies, taking as given the estimated thresholds for the long run dummies. The equation estimated is

$$\Delta \ln y_{i,t} = \beta_4 \Delta \ln POP_{i,t} + \beta_5 \left(\frac{INV}{GDP} \right)_{i,t} + (\delta_1 LR_{i,t}) I(CRS_{ijLIB} \leq \bar{\lambda}_{Lj}) + \left(\sum_{j=0}^3 \varphi_{1,j} SR(J)_{i,t} \right) I(CRS_{ijLIB} \leq \lambda_{Sj}) + (\delta_2 LR_{i,t}) I(CRS_{ijLIB} > \bar{\lambda}_{Lj}) + \left(\sum_{j=0}^3 \varphi_{2,j} SR(J)_{i,t} \right) I(CRS_{ijLIB} > \lambda_{Sj}) + \nu_i + \eta_t + \Delta \varepsilon_{i,t}$$

where $\bar{\lambda}_{Lj}$ is the long-run threshold for crisis indicator j as reported in Table 4A. The results are shown in Table 4B. Only two of the individual crisis indicators (OUT and XR) have significant short run thresholds, and both of these are higher than their long run values. The estimated coefficients on the long run liberalisation dummies are largely unaffected. The estimated coefficients on the short run dummies exhibit a similar J-curve pattern to before. Compared to the post-liberalisation long run, there is lower growth in the year of liberalisation and higher growth three years later. Negative growth in the liberalisation year is predicted for countries in the high crisis regimes by the OUT²² and INF indicators, again confirming concerns that high inflation or unemployment may mask relative price signals and delay resource reallocation. For the combined indicators, we find a significant short run threshold for INT, at a value below its long run threshold. But the only J-curve effect evident is lower growth in the short-run crisis regime in the year of liberalisation²³.

We can now address the three issues noted at the start of this section. Firstly, our results confirm the presence of the short run J-curve effects found in the earlier literature. Secondly, the long run results are essentially unaffected by the allowance for short run effects. The estimated long run crisis-thresholds are unchanged. The estimated coefficients tend to be slightly higher, but the pattern is unchanged. Lastly, there is evidence that the short run growth J-curve is also crisis sensitive. Output, inflation or exchange rate crises at the time of

²² This is unsurprising but not tautological. The growth rate $[y_{it} - y_{it-1}] / y_{it-1}$ differs from the OUT crisis indicator $-[y_{it} - \bar{y}_{i5}] / s_{it}$.

²³ Given the mixed bag of short run results for the individual indicators, it is perhaps unsurprising that consideration of separate short and long run thresholds tends to generate few significant short run results for our composite indicators. Given this outcome we see little point in pursuing joint thresholds in the short run.

liberalisation imply lower growth in the liberalisation year but a stronger recovery three years later. A current account crisis exhibits the opposite pattern. The only significant effects for the combined indicators are in the liberalisation year, where there is lower growth with an internal crisis or the absence of an external crisis.

Table 4B: Endogenous Threshold Results (Short Run Thresholds)

	<i>Crisis Variables</i>						
	OUT	INF	<i>XR</i>	<i>DEBT</i>	CAD	INT	EXT
<i>INV / GDP</i>	0.19 (5.97)***	0.20 (6.15)***	0.21 (6.93)***	0.23 (7.24)***	0.22 (6.17)***	0.25 (7.19)***	0.25 (7.21)***
$\Delta \ln POP$	-0.31 (-1.11)	-0.23 (-0.80)	-0.38 (-1.40)	-0.37 (-1.04)	-0.53 (-1.76)*	-0.59 (-1.73)*	-0.47 (-1.39)
<i>LR1</i>	0.041 (7.80)***	0.048 (8.35)***	0.037 (6.00)***	0.025 (4.34)***	0.034 (5.50)***	0.028 (4.84)***	0.022 (3.86)***
<i>LR2</i>	0.033 (5.80)***	0.026 (5.23)***	0.025 (5.24)***	0.055 (5.31)***	0.056 (4.73)***	0.017 (2.56)**	0.034 (5.68)***
<i>SR(0)1</i>	-0.013 (-1.85)*	-0.026 (-2.92)***	-0.01 (-1.56)	-0.007 (-1.21)	-0.023 (-2.89)***	0.007 (0.96)	-0.019 (-2.18)**
<i>SR(0)2</i>	-0.114 (-4.44)***	-0.053 (-2.47)**	-0.021 (-2.07)**	-0.021 (-0.83)	-0.005 (-0.45)	-0.040 (-5.34)***	-0.0003 (-0.03)
<i>SR(1)1</i>	0.002 (0.28)	-0.005 (-0.72)	-0.007 (-0.93)	0.002 (0.33)	-0.006 (-0.78)	0.005 (0.69)	0.0007 (0.07)
<i>SR(1)2</i>	-0.021 (-1.19)	0.017 (0.91)	0.004 (0.44)	-0.022 (-0.62)	0.001 (0.11)	-0.010 (-0.79)	-0.002 (-0.29)
<i>SR(2)1</i>	0.001 (0.24)	-0.005 (-1.00)	-0.011 (-1.85)*	-0.003 (-0.54)	0.004 (0.55)	-0.004 (-0.61)	0.0003 (0.04)
<i>SR(2)2</i>	-0.011 (-0.79)	0.024 (1.27)	0.012 (1.72)*	-0.010 (-0.81)	-0.014 (-1.75)*	0.002 (0.16)	-0.006 (-0.96)
<i>SR(3)1</i>	0.013 (2.44)**	0.012 (2.31)**	0.0007 (0.12)	0.012 (1.88)*	0.014 (2.25)**	0.010 (1.64)	0.012 (1.42)
<i>SR(3)2</i>	0.029 (2.40)**	0.035 (2.27)***	0.029 (3.68)***	-0.005 (-0.47)	-0.005 (-0.43)	0.007 (0.65)	0.005 (0.73)
$\lambda_L exog$	0.05	0.09	0.9	1.34	1.09	0.51	0.78
λ_S	0.79	1.6	1.4	1.3	0.59	0.17	0.45
<i>p-value</i> (λ_S)	0.00***	0.131	0.044**	0.658	0.337	0.011**	0.621
Observations	2494	2458	2384	1890	1961	1774	1774
F	11.91***	11.84***	12.84***	8.95***	8.26***	9.92***	9.89***
R^2	0.30	0.30	0.30	0.24	0.25	0.29	0.28

Notes: LRI and SR(J)I refer to the long run and short run liberalisation dummies in regime I = 1-3. All models include a full set of unreported country and time dummies. t-statistics in brackets based on White Heteroscedasticity-Consistent standard errors. *, **, *** indicate significance at the 10, 5 and 1 percent level respectively. The p-value of the significance of the estimated threshold is calculated using the bootstrap procedure of Hansen (1999).

5. Main Conclusions

Our evidence supports earlier results that trade liberalisation increases economic growth in the long run. We also find evidence of significant crisis thresholds, at levels below those normally assumed in the literature, for all our indicators. While liberalisation leads to higher long run

growth whether there is a crisis or not, the characteristics of the crisis appear to influence the level of post-liberalisation growth. Liberalisation when output is declining, inflation is increasing or the exchange rate is depreciating at above threshold levels leads to lower subsequent growth than otherwise. But if the debt to export ratio or the current account deficit is increasing at above crisis levels at the time of liberalisation, then growth will be higher than otherwise. Our composite indicators provided some, albeit tentative support for the notion that an internal crisis at the time of liberalisation leads to dampen the growth effects of trade liberalisation, while an external crisis at that time tends to amplify them.

The explicit allowance for trade liberalisations to have both short and long run growth effects did not materially affect our long run conclusions. The same pattern of coefficients remained with post-liberalisation growth rates estimated to be a little higher if anything. The estimated short run coefficients generally supported the conclusion of a J-curve effect found in the earlier literature. Compared to the post-liberalisation average, growth is lower in the year of liberalisation, and higher three years later. These short-run effects were also found to be crisis sensitive to some degree, exhibiting a similar pattern to the long run effects with respect to the individual crisis indicators. Output, inflation or exchange rate crises at the time of liberalisation imply lower growth in the liberalisation year, but a stronger recovery three years later. A current account crisis shows the opposite pattern.

So, is an economic crisis a *good or a bad* time for a country to undertake trade liberalisation? Our results suggest that the answer depends on the nature of the crisis. Liberalisations at a time of external (but not internal) crisis appear to bring additional growth benefits by alleviating the constraints imposed by the crisis. But liberalisations at a time of internal crisis may exacerbate adjustment problems and discourage the resource reallocations which are necessary for trade liberalisation to be successful. Interestingly, our results suggest that these crisis-related effects may extend beyond the short run.

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Appendix 1

Countries in the Sample and their Liberalisation Dates:

1. Albania (1992)
2. Argentina (1991)
3. Armenia (1995)
4. Australia (1964)
5. Azerbaijan (1995)
6. Bangladesh (1996)
7. Barbados (1966)
8. Benin (1990)
9. Bolivia (1995)
10. Botswana (1979)
11. Brazil (1991)
12. Bulgaria (1991)
13. Burkina Faso (1998)
14. Burundi (1999)
15. Cameroon (1993)
16. Cape Verde (1991)
17. Chile (1976)
18. Colombia (1986)
19. Costa Rica (1986)
20. Cote d'Ivoire (1994)
21. Dominican Republic (1992)
22. Ecuador (1991)
23. Egypt (1995)
24. El Salvador (1991)
25. Ethiopia (1996)
26. Gambia (1985)
27. Georgia (1996)
28. Ghana (1985)
29. Guatemala (1988)
30. Guinea-Bissau (1987)
31. Guyana (1988)
32. Honduras (1991)
33. Hungary (1990)
34. Indonesia (1970)
35. Ireland (1966)
36. Israel (1985)
37. Jamaica (1962 and 1989)
38. Japan (1964)
39. Kenya (1963 and 1993)
40. Republic of Korea (1968)
41. Kyrgyz Republic (1994)
42. Latvia (1993)
43. Lithuania (1993)
44. Macedonia (1994)
45. Madagascar (1996)
46. Mali (1988)
47. Mauritania (1995)
48. Mexico (1986)
49. Moldova (1994)
50. Morocco (1984)
51. Mozambique (1995)
52. Nepal (1991)
53. New Zealand (1986)
54. Nicaragua (1991)
55. Niger (1994)
56. Pakistan (2001)
57. Panama (1996)
58. Paraguay (1989)
59. Peru (1991)
60. Philippines (1988)
61. Poland (1992)
62. Romania (1992)
63. Sierra Leone (2001)
64. Singapore (1965)
65. Slovak Republic (1991)
66. South Africa (1991)
67. Sri Lanka (1977 and 1991)
68. Tajikistan (1996)
69. Tanzania (1995)
70. Trinidad and Tobago (1992)
71. Tunisia (1989)
72. Turkey (1989)
73. Uganda (1988)
74. Venezuela (1989 and 1996)
75. Zambia (1993)

Summary Statistics

<i>Variable</i>	<i>Observations</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>Minimum</i>	<i>Maximum</i>
$\Delta \ln y$	2766	0.014	0.055	-0.593	0.221
y_{60}	2194	6.79	1.19	4.52	9.28
INV / GDP	2620	0.21	0.08	-0.06	0.60
$\Delta \ln POP$	2766	0.020	0.011	-0.028	0.060
$\Delta \ln TTI$	1364	-0.010	0.147	-1.844	1.986
SYR_{60}	2148	0.540	0.626	0.003	2.69
$CRISIS_{LIB}$					
-- OUT	2633	-0.210	0.829	-1.764	1.739
-- INF	2597	0.160	0.872	-1.475	1.760
-- XR	2500	1.04	0.744	-1.271	1.789
-- $DEBT$	1967	-0.063	1.054	-1.773	1.735
-- CAD	2042	-0.2518	0.954	-1.735	1.586

Notes: While the mean and standard deviations of the crisis variables are zero and one respectively, there is no reason to suppose that the mean of the variables at the time of liberalisation should be zero. Interestingly, for three of the five crisis variables (per capita output growth, the ratio of debt to exports and the current account balance) the mean of the crisis variable at liberalisation is negative, indicating that performance according to these measures was better than average.