

Globalisation, Trade Liberalisation and Growth

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To be presented at the UNECA/GATE Conference on Economic, Social and Environmental Consequences of the Liberalization of Trade in North Africa and the Middle East in Rabat, Morocco, October 19 and 20 2007.

My objectives in this presentation are twofold.

[1] To provide some general *comments* on the theory and empirical analysis of the links between trade liberalisation and growth. These comments will also provide context for:

[2] A discussion of work-in-progress examining whether an economic crisis at the time of trade liberalisation has implications for post-liberalisation growth.

Comments (in note form)

Openness

- Openness is multidimensional involving trade in goods and services; factor flows (portfolio investment, FDI, permanent and temporary migration of workers); movement of technology, information and ideas
- Evidence that more open economies grow faster – controversial
- Controversy not about “open versus closed”, but about “which dimensions of openness are important?”
- International markets provide opportunities for all countries – how best to take advantage of them?
- Answer will depend on time and place. Lessons from other countries’ experiences

Trade Liberalisation

- Represents an increase in openness
- Trade liberalisation also multidimensional – formal trade barriers, NTBs, marketing boards, exchange controls etc.
- Requires a broader measure than the traditional tariffs or quotas used in trade models

- Strong case to be made that most trade regimes were too restrictive in the 50s, 60s and 70s.
- Evidence of benefits from trade liberalisation in the 80s
- Changing international environment since then. Globalisation and the opening of the formerly planned economies.

Growth Effects of Trade Liberalisation

- Resource reallocation – relative prices
- Factor accumulation – physical and human capital
- Total factor productivity
- Long run growth dependent on technology transfers and spillovers
- Limited evidence on individual channels of technology transfer

Timing of Trade Liberalisation

- Rarely the outcome of a routine review of policy
- Frequently undertaken at a time of economic (and often political) crisis
- Is an economic crisis a good or a bad time to liberalise?
- Does the extent and nature of the crisis affect growth performance post-liberalisation?

Trade Liberalisation, Economic Crises and Growth

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Abstract

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1. Introduction

Following the widespread adoption of import substitution policies in the 1950s and 1960s most developing countries have since shifted towards more open trade policies. There are various reasons for this including: 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) that frequently required trade liberalisation as part of a package of reforms when agreeing to loans³. Despite this shift towards greater openness, recent experience and evidence suggests that the trade reforms may not have been as successful as many anticipated (Winters, 2004). Explanations for this lie in 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. While a crisis may be necessary to trigger reforms in some cases, it could be an unfortunate time to undertake trade reforms, if for example it mitigates the expected supply responses, resulting in a limited impact of reforms on output growth.

In this paper we examine whether the extent and type of economic crisis in the liberalising country at the time of liberalisation affects the relationship between trade reforms and post-liberalisation growth. We consider five crisis indicators commonly used in the literature (output fall, inflation increase, exchange rate depreciation, increased external debt to export ratio and increased current account deficit), which we are 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 both their “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 indicates lower growth and an external crisis higher growth relative to the non-crisis regime.

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. While not arguing that there is a systematic relationship between inward orientation and growth, they argue 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).

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 effects of trade liberalisation are well known⁴. The immediate impact is likely to be negative as resources become redundant in areas of comparative disadvantage. But their reallocation into areas of comparative advantage will see a rise in the growth rate in the short 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.

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

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).

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).

(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.

Although this 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.

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.

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. 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.

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

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).

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 markets being lost to foreign competitors. Such an outcome is likely to make it politically difficult to sustain reforms as well as limiting their impact. 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 to receive funds 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 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 IFIs¹⁴. 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.

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).

¹⁴ 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.

3. Data, Methodology and Results

The starting point for our empirical analysis is an equation similar to the initial regression estimated by GMW (2002)¹⁵:

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

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)¹⁶, and is a broad measure.

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

¹⁵ There are two major differences between (1) and the 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.

¹⁶ 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; (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.

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

$\Delta \ln y$	1	2	3	4	5	6
$\ln y_{60}$	-0.005 (-3.18)***	-0.005 (-3.12)***				
INV/GDP	0.26 (10.42)***	0.23 (9.20)***	0.27 (7.73)***	0.26 (7.45)***	0.21 (7.35)***	0.20 (6.95)***
$\Delta \ln POP$	-0.54 (-3.39)***	-0.55 (-3.43)***	-0.67 (-1.87)*	-0.74 (-2.03)**	-0.36 (-1.36)	-0.28 (-1.06)
SYR_{60}	0.005 (2.07)**	0.008 (0.31)				
$\Delta \ln TTI$	0.02 (1.92)*	0.02 (1.83)*	0.02 (2.31)**	0.019 (2.22)**		
LIB		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***
R^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.

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 percentage decline in per capita GDP (ΔOUT), the inflation rate¹⁷ (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 of these variables represents a specific aspect of an economic crisis. Individually they are informative, but will be more so if they can be used collectively 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 analysis¹⁸. The first factor accounts for as much of the variability in the data as possible, and each succeeding factor accounts for as much of the remaining variability as possible. We implement the factor analysis procedure using the original data on our five crisis variables and employing the maximum likelihood factor method. 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 the CAD and the 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

¹⁷ 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.

¹⁸ 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.

indicator of its external dimension. But clearly inferences made from these interpretations should be treated with caution.

Table 2: Rotated Factor Loadings

	<i>Factor 1 [INT]</i>	<i>Factor 2 [EXT]</i>
<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,

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

where X_{jit} is the value of indicator j in country i in period t , \bar{X}_{jit} is the average of this indicator 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, at the time of liberalisation, the value of this indicator was half a standard deviation above its average over the previous five years. Given the way that the indicators are defined, higher values indicate a deeper crisis.

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 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 subsequent growth¹⁹. 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 (i.e. two-regime) equation is given by

¹⁹ Many studies that use these standardised scores create dummy variables representing crisis with the dummy equal to one if the country is in crisis. Whether a country is in crisis is determined by imposing some threshold value (usually 1.5 or 2) on the standardised score.

$$\Delta \ln y_{i,t} = \beta_4 \Delta \ln POP_{i,t} + \beta_5 \left(\frac{INV}{GDP} \right)_{i,t} + \delta_1 LIB_{i,t} I(CRISIS_{jilib} \leq \lambda) + \delta_2 LIB_{i,t} (CRISIS_{jilib} > \lambda) + v_i + \eta_t + \Delta \epsilon_{i,t} \quad (2)$$

Here the observations are divided into two regimes depending upon whether the value of the crisis indicator is smaller or larger than the estimated threshold, λ . The impact of liberalisation on growth will be given by δ_1 for observations in the low (“non-crisis”) regime ($CRISIS_{jilib} \leq \lambda$) and by δ_2 for observations in the high (“crisis”) regime ($CRISIS_{jilib} > \lambda$). To estimate the equation 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 on the threshold that it must be positive²⁰. 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 test²¹.

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).

The results for a single threshold for each indicator are presented in Table 3A. Despite the variety of indicators used, broad patterns of results can be discerned. First, there is at least one

²⁰ 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. Exceptions are noted below.

²¹ The bootstrap distribution of the test statistic was computed using 1000 replications of the procedure proposed in Hansen (1999).

significant crisis threshold for all indicators²². Second, trade liberalisation raises growth in all 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 below 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 the view that trade liberalisation may ease external constraints. These issues are investigated further in the short run analysis of the next section. Similar outcomes occur in the single threshold results for our two composite indicators. 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.

Table 3B: Endogenous Threshold Results

	1	2	3
<i>INV / GDP</i>	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)
<i>LIB(N, N)</i>	0.025 (4.52)***	0.025 (4.52)***	0.020 (3.97)***
<i>LIB(N, I)</i>	0.009 (1.49)	0.009 (1.49)	
<i>LIB(E, N)</i>	0.033 (6.23)***	0.033 (6.34)***	0.032 (6.13)***
<i>LIB(E, I)</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
<i>p-value</i>	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).

²² A significant second threshold was found for the EXT indicator. Note that 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 the literature.

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). Our first step is to use the two independently estimated thresholds to construct four separate liberalisation dummy variables, each reflecting one of the four possible circumstances 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 in the second column of Table 3B. The strongest growth effects arise when the EXT indicator is above its threshold ($LIB(E,N)$ is significantly different from $LIB(N,N)$ and $LIB(N,I)$, but not $LIB(E,I)$). 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. In view of the apparent importance of the EXT indicator, our second step is use the estimated threshold on EXT to divide the sample into two regimes (i.e. EXT above the threshold or not at the time of liberalisation) and then to 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. There is no significant threshold in the high regime.

4. Short-Run Impacts of Liberalisation on Growth [Incomplete]

The preceding section made no distinctions among post-liberalisation periods. Yet, 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 examine whether this type of relationship also holds for our sample. We then consider whether the role that crises play in the relationship between liberalisation and growth is relevant to both the short and long runs. To capture both the short-run and long-run effects of liberalisation on growth we first estimate,

$$\Delta \ln y_{i,t} = \beta_4 \Delta \ln POP_{i,t} + \beta_5 \left(\frac{INV}{GDP} \right)_{i,t} + \delta LIB_{i,t} + \phi_j \sum_{j=0}^3 [LIB + J]_{i,t} + \nu_i + \eta_t + \Delta \varepsilon_{i,t} \quad (3)$$

This equation includes alongside the liberalisation dummy described above four additional liberalisation dummies each corresponding to a single year; the year of liberalisation

($LIB + 0$) and each of the subsequent three years. 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 LIB are very similar to those in the corresponding regression in Table 1. The estimates for the post-liberalisation dummies indicate that growth is significantly lower than the post-liberalisation average in the year of liberalisation, but 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. We replicate the J-curve effects found previously.

The remainder of Table 4A examines how these results are modified by a crisis at the time of liberalisation. We again employ the threshold regression, where now the two-regime (single threshold) model is represented by,

$$\begin{aligned} \Delta \ln y_{i,t} = & \beta_4 \Delta \ln POP_{i,t} + \beta_5 \left(\frac{INV}{GDP} \right)_{i,t} + (\delta_1 LIB_{i,t} + \sum_{j=0}^3 \phi_{1,j} LIB + j_{i,t}) I(CRISIS_{i,LIB} \leq \lambda) + \\ & (\delta_2 LIB_{i,t} + \sum_{j=0}^3 \phi_{2,j} LIB + j_{i,t}) I(CRISIS_{i,LIB} > \lambda) + v_i + \eta_t + \Delta \varepsilon_{i,t} \end{aligned} \quad (4)$$

The results indicate that in the majority of cases we can reject the linear model in favour of the threshold model²³. First we observe that the introduction of post-liberalisation dummies leads to a significant second threshold for three indicators. The single thresholds and the lower values of the double thresholds are similar to the thresholds reported in Table 3A, except for XR where both estimated thresholds are much larger. We begin by considering the long run coefficients. The estimated coefficients in the lowest regimes in Table 4A are not too dissimilar from the corresponding coefficients in Table 3A. Of the indicators with two thresholds, only INF has coefficients in its upper regimes that significantly differ from each other. Otherwise the coefficients on the upper regime(s) in 4A are the same or higher than in 3A, with the same three indicators having lower coefficients and the other two having higher coefficients in the crisis regimes in each case. The difference here is the U-shaped pattern for INF.

²³ Given the set-up of the regression model a test of the significance of the threshold is equivalent to testing

$$\delta_1 + \sum_{j=0}^3 \phi_{1,j} = \delta_2 + \sum_{j=0}^3 \phi_{2,j}.$$

Table 4A: Endogenous Threshold Results

	<i>Linear</i>	<i>Crisis Variables</i>				
		OUT	INF	<i>XR</i>	<i>DEBT</i>	CAD
<i>INV / GDP</i>	0.20 (6.75)***	0.19 (6.04)***	0.20 (6.12)***	0.20 (6.88)***	0.23 (7.20)***	0.21 (6.10)***
$\Delta \ln POP$	-0.30 (-1.12)	-0.35 (-1.25)	-0.21 (-0.75)	-0.39 (-1.46)	-0.36 (-1.03)	-0.53 (-1.76)*
<i>LIB1</i>	0.029 (7.13)***	0.039 (7.26)***	0.049 (8.37)***	0.034 (6.07)***	0.025 (4.36)***	0.035 (5.57)***
<i>LIB2</i>		0.037 (5.47)***	0.022 (4.33)***	0.028 (4.49)***	0.053 (5.16)***	0.050 (4.79)***
<i>LIB3</i>		0.036 (5.02)***	0.035 (3.85)***	0.028 (5.02)***		
<i>LIB1 + 0</i>	-0.022 (-2.73)***	-0.005 (-0.67)	-0.031 (-2.30)**	-0.004 (-0.60)	-0.009 (-1.53)	-0.023 (-3.12)***
<i>LIB2 + 0</i>		-0.043 (-3.18)***	-0.016 (-2.24)**	-0.031 (-3.36)***	-0.010 (-0.30)	0.012 (0.84)
<i>LIB3 + 0</i>		-0.117 (-4.48)***	-0.059 (-2.75)***	-0.023 (-2.25)**		
<i>LIB1 + 1</i>	0.001 (0.17)	0.007 (0.96)	-0.007 (-0.75)	0.003 (0.40)	0.0005 (0.08)	-0.006 (-0.75)
<i>LIB2 + 1</i>		-0.021 (-1.43)	-0.001 (-0.09)	-0.042 (-2.38)**	-0.019 (-0.39)	0.004 (0.25)
<i>LIB3 + 1</i>		-0.023 (-1.30)	0.010 (0.54)	0.002 (0.24)		
<i>LIB1 + 2</i>	0.003 (0.62)	0.004 (0.61)	-0.008 (-1.26)	-0.008 (-1.21)	-0.005 (-0.82)	-0.0003 (-0.05)
<i>LIB2 + 2</i>		-0.007 (-0.63)	0.002 (0.27)	-0.022 (-2.36)**	-0.0001 (-0.01)	-0.002 (-0.14)
<i>LIB3 + 2</i>		-0.013 (-0.97)	0.018 (0.92)	0.010 (1.44)		
<i>LIB1 + 3</i>	0.021 (4.32)***	0.018 (3.05)***	0.012 (1.75)*	0.006 (1.10)	0.010 (1.66)*	0.010 (1.60)
<i>LIB2 + 3</i>		-0.008 (-0.50)	0.014 (1.75)*	-0.019 (-1.51)	0.003 (0.19)	0.009 (0.59)
<i>LIB3 + 3</i>		0.027 (2.19)**	0.028 (1.76)*	0.027 (3.46)***		
λ_1		0.13 (69 th)	0.09 (54 th)	1.11 (44 th)	1.38 (88 th)	1.01 (88 th)
λ_2		0.83 (85 th)	1.61 (89 th)	1.4 (54 th)		
<i>p-value</i>		0.083*	0.09*	0.06*	0.02**	0.09*
Observations	2619	2494	2458	2384	1890	1961
F	13.31***	11.61***	11.37***	12.54***	8.91***	8.34***
R^2	0.30	0.30	0.30	0.30	0.24	0.25

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).

When we turn to the short run coefficients, we observe consistent patterns in their signs across crisis indicators. Compared to the (post-liberalisation) long run, growth is (a) the same or

lower in the liberalisation year; (b) the same in the first two post-liberalisation years²⁴; and (c) the same or higher in the third post-liberalisation year. The J-curve effect remains present for all but one indicator (DEBT), and tends to be stronger in a crisis for the growth-reducing indicators but weaker in a crisis for the growth-enhancing indicators. The magnitudes of these effects are also interesting. Negative growth in the liberalisation year is predicted for countries in the high crisis regimes by both the OUT and INF indicators.

TO BE COMPLETED

5. Main Conclusions [Tentative]

1. Trade liberalisation appears to increase economic growth [in the long run].
2. An economic crisis at the time of liberalisation appears to influence the growth effects of liberalisation.
3. An internal crisis (as exemplified by above threshold declines in output or increases in inflation) tends to reduce (but not reverse) the growth effects of liberalisation.
4. An internal crisis (as exemplified by above threshold increases in the debt to exports ratio of the current account deficit) tends to amplify the growth effects of liberalisation.
5. In the short run there is a J-curve pattern to growth post liberalisation. Compared to the post-liberalisation average, growth is lower in the year of liberalisation, and higher three years later.
6. Compared with the absence of a crisis at the time of liberalisation, the J-curve effect tends to be stronger for a liberalisation under an internal crisis, and weaker for a liberalisation under an external crisis.

References

- Alesina, A., Ardagna, S. and F. Trebbi, 2006. Who adjusts and when? On the political economy of reforms. NBER Working Paper no. 12049, NBER.
- Baldwin, Robert E., 2003. Openness and growth: What's the empirical relationship? In *Challenges to Globalization: Analyzing the Economics*, Robert E. Baldwin and L. Alan Winters (eds) (Chicago, University of Chicago Press).
- Barro, R. and J. Lee (2001)
- Ben-David, Dan, 1993. Equalizing exchange: Trade liberalization and income convergence. *Quarterly Journal of Economics*, 108, 653-679.

²⁴ The two exceptions are lower growth in the middle regime for the exchange rate indicator.

- Bhagwati, Jagdish, 1978. *Foreign Trade Regimes and Economic Development*. Cambridge, MA, Ballinger Press.
- Bruno, Michael, 1996. *Deep Crisis and Reform: What Have We Learned?* Washington: DC, World Bank.
- Bruno, Michael and William Easterly, 1996. Inflation's children: Tales of crises that beget reforms. *American Economic Review Papers and Proceedings*, 86, 213-217.
- Campos, Nauro, F., Hsiao, Cheng and Jeffrey B. Nugent. Crises, What crises? IZA Discussion Paper no. 2217, Institute for the Study of Labour, Bonn.
- Chang, Roberto, Kaltani, Linda and Norman Loayza, 2005. Openness can be good for growth: The role of policy complementarities. Policy Research Working Paper no. 3763. The World Bank.
- Cline, William, 2004. Trade policy and global poverty. International Institute of Economics, Washington, DC.
- Collier, Paul, 1993. Higgledy-piggledy liberalisation. *The World Economy*, 16, 503-12.
- Dollar, David, 1992. Outward-oriented developing economies really do grow more rapidly: Evidence from 95 LDCs, 1976-85. *Economic Development and Cultural Change*, 40, 523-544.
- Dornbusch, Rudiger, 1992. The case for trade liberalisation in developing countries. *Journal of Economic Literature*, 31, 1358-1393.
- Drazen, A. and William Easterly, 2001. Do crises induce reform? Simple empirical tests of conventional wisdom. *Economics and Politics*, 13, 129-158.
- Drazen, A. and V. Grilli, 1993. The benefit of crises for economic reforms. *American Economic Review*, 83, 598-607.
- Frankel, Jeffrey and D. Romer, 1999. Does trade cause growth? *American Economic Review*, 89, 379-399.
- Greenaway, David, 1993. Liberalising foreign trade through rose tinted glasses. *Economic Journal*, 103, 208-223.
- Greenaway, David, 1998. Does trade liberalisation promote economic development? *Scottish Journal of Political Economy*, 45, 491-511.
- Greenaway, David and Richard Kneller, 2007. Firm Heterogeneity, Exporting and FDI. *Economic Journal*, 117, F134-161.
- Greenaway, David, Leybourne, Steve and David Sapsford, 1997. Modelling growth (and liberalisation) using smooth transitions analysis. *Economic Inquiry*, 35, 798-814.

- Greenaway, David, Morgan, Wyn and Peter Wright, 1998. Trade reform, adjustment and growth: What does the evidence tell us? *Economic Journal*, 108, 1547-1561.
- Greenaway, David, Morgan, Wyn and Peter Wright, 2002. Trade liberalisation and growth in developing countries. *Journal of Development Economics*, 67, 229-244.
- Greenaway, David and David Sapsford, 1994. What does liberalisation do for exports and growth? *Weltwirtschaftliches Archiv*, 130, 152-174.
- Hansen, B. E., 1999. Threshold Effects in Non-Dynamic Panels: Estimation, Testing and Inference. *Journal of Econometrics*, 93, 345-368.
- Kline, Paul, 1994. *An Easy Guide to Factor Analysis*. London, Routledge.
- Krueger, Anne O., 1978. *Foreign Trade Regimes and Economic Liberalisation*. Lexington, MA, Ballinger.
- Krueger, Anne O., 1997. Trade policy and economic development: How we learn. *American Economic Review*, 87, 2-21.
- Krueger, Anne O., 1998. Why trade liberalisation is good for growth. *Economic Journal*, 108, 1513-1522.
- Lee, Jong-Wha, 1995. Capital goods imports and long-run growth. *Journal of Development Economics*, 48, 19-110.
- Little, Ian, Scitovsky, T. and M. Scott, 1970. *Industry and Trade in Some Developing Countries: A Comparative Study*. Cambridge, Oxford University Press.
- Lora, E., 1998. What makes reforms likely? Timing and sequencing of structural reforms in Latin America. Working Paper no. 424, Inter-American Development Bank.
- Maurer, Rainer, 1998. *Economic Growth and International Trade with Capital Goods: Theories and Empirical Evidence*. Tübingen, Kiel University.
- Morrissey, Oliver, 1995. The political economy of trade liberalisation: A framework and application to Pakistan. *Pakistan Journal of Applied Economics*, 11, 95-112.
- Papageorgiou, D., Michaely, M. and A. Choksi, 1991. *Liberalising Foreign Trade*. Oxford, Basil Blackwell.
- Pritchett, L., 2001. Where Has All the Education Gone? *World Bank Economic Review*, 15, 367-391.
- Rodríguez, F. and D. Rodrik, 2000. Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence. In Bernanke, B. and K. S. Rogoff (eds.) *NBER Macroeconomics Annual 2000*, Cambridge: MA, MIT Press.
- Rodrik, Dani, 1989a. Credibility of trade reform: A policy-maker's guide. *The World Economy*, 1, 1-16.

- Rodrik, Dani, 1989b. Promises, promises: Credible policy reform via signalling. *Economic Journal*, 99, 756-772.
- Rodrik, Dani, 1992. The limits of trade policy reform in developing countries. *Journal of Economic Perspectives*, 6, 87-105.
- Rodrik, Dani, 1995. Getting interventions right: How South Korea and Taiwan grew rich. *Economic Policy*, 20, 55-107.
- Rodrik, Dani, 1996. Understanding economic policy reform. *Journal of Economic Literature*, 34, 9-41.
- Rodrik, Dani, 1999. *The New Global Economy and Developing Countries: Making Openness Work*. Washington, DC, Overseas Development Council.
- Sachs, Jeffrey and Andrew Warner, 1995. Economic reform and the process of global integration. *Brookings Papers on Economic Activity*, 1, 1-118.
- Salinas, Gonzalo and Ataman Aksoy, 2006. Growth before and after trade liberalization. World Bank Policy Research Working Paper no. 4062, The World Bank, Washington, DC.
- Tornell, A., 1998. Reform from within. Mimeo, UCLA.
- Wacziarg, Romain and K. Welch, 2003. Trade liberalization and growth: New evidence. NBER Working Paper no. 10152, NBER.
- Wagner, J., 2007. Exports and Productivity: A Survey of the Evidence from Firm Level Data. *The World Economy*, 30, 60-82.
- Winters, Alan, 2004. Trade liberalisation and economic performance: An overview. *Economic Journal*, 114, F4-F21.

Appendix

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.