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Sequencing of reforms, financial globalization, and macroeconomic vulnerability[☆]

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ABSTRACT

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I use a large cross country data set and panel probit analysis to investigate the way in which the interaction between trade and financial openness affect the probability of external crises. This analysis is related to debate on the adequate sequencing of reform. I also investigate the role played by current account and fiscal imbalances, contagion, international reserves holdings, and the exchange rate regime as possible determinants of external crises. The results indicate that relaxing capital controls increases the likelihood of a country experiencing a sudden stop. Moreover, the results suggest that “financial liberalization first” strategies increase the degree of vulnerability to external crises. This is particularly the case if this strategy is pursued with pegged exchange rates and if it results in large current account imbalances. *J. Japanese Int. Economies* 23 (2) (2009) 131–148. The Anderson School of Management, University of California, Los Angeles, CA, USA; National Bureau of Economic Research, Cambridge, MA, USA.

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1. Introduction

During the 1990s a large number of emerging and transition economies implemented profound market-oriented economic reforms. State owned enterprises were privatized, fiscal imbalances were tackled, trade barriers were lowered, and in many countries capital controls were eliminated. In the economic literature these economic policies are known, somewhat misleadingly, as the “Washington Consensus.”¹

During the early stages of this process a number of authors became concerned with the “sequencing of reform.”² They argued that the order in which markets were deregulated mattered, and that liberalizing capital restrictions too early could be very costly. Many of these analysts were worried about the effects of a premature opening of the capital account on the (real) exchange rate and on international competitiveness. In particular, they pointed out that if restrictions on capital mobility were lifted “too soon,” the country in question would be flooded with short term capital. This would result in an appreciation of the currency and reduce profitability in the exports’ sector; in some countries it could also generate a short term real estate boom. The main danger, they argued, was that this increase in capital flows would be transitory, and that at some point foreign investors (and speculators) would withdraw from the country, generating a “sudden stop” and a costly crisis.

As the 1990s unfolded a growing number of policy makers dismissed this apprehensions about sequencing. Reforms were undertaken rapidly and almost simultaneously, and many countries relaxed capital controls during the early stages of the process. For some time this strategy seemed to work, as many countries experienced an acceleration in growth. In the second half of the 1990s and early 2000s, however, growth was replaced by a succession of deep and traumatic crises. In December 1994, the Mexican Peso collapsed and was devalued by more than 50%. In 1997, when the emerging world was beginning to recover from Mexico’s “Tequila” crisis, the East Asian crises erupted, and it was followed by the Russian devaluation in 1998 and the failure of the investment firm *Long Term Capital Management*. In 1999 Brazil’s real was devalued; in 2000 Turkey faced an external crisis; the Argentine peso collapsed in 2001, after 10 years of one-to-one parity with the U.S. dollar; and in 2002 Uruguay went through a deep balance of payments crisis. In many of these countries – as well as in those affected by “contagion” – output declined and unemployment increased significantly.

During the early 2000s, and partially as a result of these crises, an increasing number of analysts began to criticize the Washington Consensus and the market oriented reforms. Nobel laureate Joseph E. Stiglitz was, perhaps, the most forceful of the critics. In his 2002 book *Globalization and Its Discontent*, Stiglitz argues that globalization policies and market reforms have the potential of doing a lot of good, if undertaken properly and if they incorporate the characteristics of each individual country. The problem, according to Stiglitz, is that globalization was not pushed carefully or fairly. On the contrary, according to him, during the 1990s and early 2000s reform policies were implemented too fast, in the wrong sequence, and often using inadequate – or plainly wrong – economic analysis. Three interrelated policy issues were at the center of Stiglitz’s and other criticisms of globalization and the Washington Consensus: (1) in designing reform packages during the 1990s, crucial aspects of the sequencing and pace of reform were ignored. As a result, in many countries reform was implemented too fast – Stiglitz prefers gradualism – and in the wrong order.³ (2) Advocating (and imposing) financial liberalization was a huge mistake. According to Stiglitz freer capital mobility encourages speculation and increases the probability of external crises, including sudden stops of capital inflows. And (3), the IMF involvement in the East Asian and Argentinean crises was a disaster that made things worse rather than better.⁴

In this paper I use a large cross country data set to investigate whether, as posited by some authors, an increase in the degree of financial openness affects the likelihood that a country experiences

¹ See, for example, Williamson (1990) and Rodrik (2006).

² See Edwards (1990) and Funke (1993).

³ Questions related to the sequencing of reform were first addressed by Mckinnon (1973). The subject was revived in the early 1980s by Edwards (1984). Both of these authors argued that the most adequate sequencing implied postponing the opening of the financial account.

⁴ Criticism of the Washington Consensus can also be found in Rodrik (2006).

an external crisis. In particular, I investigate if a liberalization process undertaken in the “wrong order” – that is, one characterized by an early relaxation of capital controls – increases a country’s vulnerability to a crisis. More specifically, I use variance component probit analysis to analyze how different variables affect the probability of countries being subject to sudden stops of capital inflows. I also consider the role played by current account and fiscal imbalances, contagion, international reserves holdings, and the exchange rate regime on the probability of an external crisis. Throughout the paper I define “crisis” as a major and abrupt decline in (net) capital inflows, or “sudden stop.”

The rest of the paper is organized as follows: In Section 2 I discuss some policy issues related to the sequencing of economic reform. In Section 3 I develop an empirical model for analyzing the extent to which financial globalization and trade openness, among other variables, have affected the probability of an external crisis. More specifically, I investigate the way in which different combinations of trade and financial openness affect the estimated probability of a sudden stop of capital inflows. In Section 4 I provide some concluding remarks. There is also a [Data Appendix](#). The paper differs from previous work on the subject – including from some of my own previous efforts – in several respects: first, I use a new measure of the degree of financial openness constructed from data collected by the Fraser Institute since 1975. Second, I use a data set that includes a larger number of countries and years than those used in previous works. And third, and perhaps more important, I address questions related to the effects of alternative sequencings of economic reform on macroeconomic vulnerability.

2. Financial and trade liberalization in the 1990s and 2000s: How much? How fast? In which sequence?

2.1. Trade and financial liberalization in the 1990s

During the 1990s and early 2000s there was an unprecedented move towards trade and financial liberalization throughout the world. Country after country reduced import tariffs and quantitative trade restrictions, and lifted controls on capital mobility. [Table 1](#) presents data on average import tar-

Table 1
Average import tariffs and index of capital mobility.

		Mean tariff (%)				Financial openness index (1 through 10)			
		All years	1985	1995	2004	All years	1985	1995	2004
Industrial	Mean	5.686	7.886	6.639	2.633	6.773	5.542	8.246	7.517
	St. Dev.	3.4	2.6	1.3	1.7	2.6	3.0	1.6	1.0
	Obs.	231.0	22.0	23.0	24.0	240.0	24.0	24.0	24.0
Latin American and Caribbean	Mean	17.895	34.248	12.695	10.716	4.533	2.360	5.940	5.720
	St. Dev.	13.5	17.4	3.5	6.1	3.1	2.8	2.9	2.2
	Obs.	200.0	21.0	21.0	25.0	249.0	25.0	25.0	25.0
Asia	Mean	20.591	33.907	29.423	10.153	2.975	2.500	3.638	3.447
	St. Dev.	21.8	31.5	24.3	6.9	2.8	3.4	3.2	2.3
	Obs.	140.0	14.0	13.0	17.0	162.0	16.0	16.0	17.0
Africa	Mean	19.470	27.540	24.336	14.932	1.885	0.567	1.468	3.494
	St. Dev.	9.5	11.3	7.6	5.9	2.4	1.2	2.3	2.4
	Obs.	233.0	25.0	25.0	31.0	307.0	30.0	31.0	32.0
Middle East	Mean	13.539	15.433	15.300	11.311	3.413	1.500	2.770	5.190
	St. Dev.	10.1	13.3	8.3	6.3	3.0	1.6	2.5	2.7
	Obs.	64.0	9.0	6.0	9.0	100.0	10.0	10.0	10.0
Eastern Europe	Mean	9.359	20.100	10.330	7.372	3.625	0.000	4.950	5.595
	St. Dev.	6.7	9.2	6.3	5.1	3.0	0.0	2.3	1.8
	Obs.	90.0	2.0	10.0	18.0	134.0	10.0	14.0	19.0
World	Mean	14.628	24.015	16.381	9.668	3.870	2.293	4.517	5.102
	St. Dev.	13.3	19.1	12.9	6.8	3.2	3.0	3.4	2.5
	Obs.	968.0	94.0	98.0	126.0	1209.0	116.0	122.0	129.0

Source: Fraser Institute.

iffs – measured in percentage terms – and an index of capital mobility for 6 regions for 1985–2004, computed by the Fraser Institute. This capital mobility index goes from 1 to 10, with larger numbers denoting a greater degree of financial openness. The data in this table are eloquent, and show that both trade and capital controls have declined significantly in every region in the world. Average import tariffs declined by 49% between 1985 and 2004. Tariff rates were reduced by 68% in the advanced countries, 56% in Latin America and the Caribbean, 64% in Asia, 33% in Africa, and only 4% in the Middle East.⁵ The final three columns in this table also confirm that the degree of financial openness was much higher in 2004 than in 1985. The pattern of financial liberalization, however, has differed across regions. In Africa, the Middle East and Eastern Europe financial liberalization proceeded through 2004. In the Industrial nations, Latin America and Asia financial openness “peaked” in 1995; between 1995 and 2004 the index of financial openness declined slightly, indicating a small readjustment of regulations on cross border capital movements.

Ideally, one would want to have detailed data for a large number of countries and years that would distinguish between controls on capital outflows and capital inflows. This would allow researchers to deal with more granular and textured issues, including issues that are germane to efforts to reduce capital inflows’ pressure on real exchange rates. Unfortunately, these types of data are not readily available for a large number of countries and/or years. The IMF only started distinguishing between controls on inflows and outflows in 1996, and researchers that have attempted to go back in time and construct more detailed indexes have concentrated on a small number of nations. Johnston and Tamirisa (1998) pioneered the attempt to build disaggregated data on restrictions on inflows and outflows. Their analysis, however, dealt with one year only (1996) and 45 countries. Other efforts to calculate the extent of restrictions on inflows include Edison and Warnock (2003). Their index refers to the stock market only, and is constructed as the ratios of market capitalization of “investible” securities to total market capitalization. For an exhaustive discussion on measurement issues, including on the difficulties of providing separate long time series for inflows and outflows and a large number of countries, see Miniane (2004); see also the discussion and computations in Chinn and Ito (2006). As with most measures of capital mobility, the Fraser Institute Index used in this paper and summarized in Table 1, does not make a distinction between controls on inflows and outflows. As argued above, constructing such an index for a large number of countries and a long period of time, continues to be a challenge for future research.

2.2. *The sequencing of liberalization*

For a long time economists have argued about the appropriate sequencing and speed of economic reform. During most of the 1980s – that is, before the massive push towards reform – the generally agreed view on sequencing was: (1) Trade liberalization should be gradual and buttressed with substantial foreign aid. (2) An effort should be made to minimize the unemployment consequences of reform. (3) In countries with very high inflation, fiscal imbalances should be dealt with very early on in the reform process. (4) Financial reform requires the creation of modern supervisory and regulatory agencies. And (5), the capital account should be liberalized at the very end of the process, and only once the economy has been able to expand successfully its export sector.⁶

In the early 1990s the issue of speed and sequencing became central in analyses on how to design a reform strategy for the former communist countries. In discussing the problems faced by Czechoslovakia during the early period of its transition, Vaclav Klaus pointed out that one of the main problems was deciding on “sequencing as regards domestic institutional and price measures on the one hand, and liberalization of foreign trade and rate of exchange on the other” (Klaus, 1990, p. 18).

Interestingly, this emphasis on speed and sequencing has a long history in policy discussions. In fact, since the beginning of the economics profession, it has been dealt with over and over again.

⁵ Ideally one would also want information on non-tariff restrictions. These data, however, are difficult to find for a large number of countries and years. The Fraser Institute, for instance, has only data for some years since 1995; these shorter time series support the idea of a massive increase in the degree of trade openness.

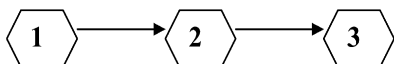
⁶ See Edwards (1984) for an early discussion on these issues.

Adam Smith, for example, argued in *The Wealth of Nations* that determining the appropriate sequencing was a difficult issue that involved, primarily, political considerations. Moreover, Smith supported gradualism, on the grounds that cold-turkey liberalization would result in a significant increase in unemployment. Consider the following quote from *The Wealth of Nations*: “[t]o open the colony trade all at once... , might not only occasion some transitory inconvenience, but a great permanent loss... [T]he sudden loss of employment... , might alone be felt very sensibly” (Smith, 1976, vol. II, ch. VII, pt. III, p. 120).

Sometime during the early 1990s the received wisdom on sequencing and speed began to be challenged by the IMF and U.S. Treasury. Increasingly they called for an early and rapid opening of the financial account. A number of authors and policy makers – including Vaclav Klaus – argued that politically this was the only way to move forward. Otherwise, the argument went, reform opponents would successfully block liberalization efforts. In 1995, IMF official Manuel Guitián said, “There does not seem to be an a priori reason why the two accounts [current and capital] could not be opened up simultaneously... [A] strong case can be made in support of rapid and decisive liberalization in capital transactions” (Guitián, 1995 pp. 85–86).

In the mid-1990s the U.S. government began pressuring the East Asian nations to liberalize their financial account restrictions and to allow capital to move more freely. Policy makers and academics in most of Asia became extremely concerned about these recommendations. They raised two main issues: On the one hand, they argued that – as had been the case in a number of Latin American countries during the early 1980s – liberalizing the financial account would result in massive real exchange rate appreciation. This was against the decades-old policy of maintaining a highly competitive real exchange rate as a way of encouraging exports. The second concern was based on a vulnerability argument: an open financial account could make the East Asian nations more vulnerable to abrupt declines in capital inflows. If this were to happen, the region would incur in severe adjustment costs and high unemployment, and could even end up with a smaller export sector.⁷

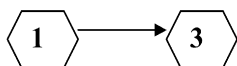
The sequencing of reform discussion may be illustrated with the assistance of Table 2, where there are four combinations of financial and trade integration with the rest of the world. The conventional “trade liberalization first” sequencing is given by a (gradual) move from Box 1, to Box 2, and eventually to Box 3:



The “early financial integration” sequence, which has been criticized by Stiglitz and others, has two variants. The “financial liberalization first” mode:



The second variant corresponds to a faster and simultaneous trade and financial opening:



Notice that Box 4 in Table 2 – a box characterized by a low degree of openness to trade in goods and a high degree of financial openness – characterizes the main features of the “capital account first”

Table 2

Configurations of trade and financial openness and alternative sequencings of reform.

	Closed trade account	Open trade account
Closed financial account	1	2
Open financial account	4	3

Note: See texts for details.

⁷ See, for example, Park and Park (1995).

liberalization process. Another way of putting it is that countries that followed the “conventional wisdom” sequencing of opening trade in goods first and delaying financial openness, will never find themselves in Box 4.

During the last two decades the following countries have had, during one point or another, a relatively closed trade account (average tariffs in excess of 25%) and a relatively open financial account (Fraser index of capital mobility higher than 6): Costa Rica, Egypt, Guatemala, Jordan, Kenya, Mauritius, Panama, Paraguay, the Philippines, Slovak Republic, Uruguay, and Venezuela.⁸ When alternative measures of financial integration are used – such as an index based on the sum of external assets and liabilities – a similar list of countries with a relatively high level of tariffs and high degree of financial openness is obtained. As pointed out, in terms of the typology in Table 2, these countries are in Box 4, a box that belongs to the criticized “early financial reform” sequencing.

Many of the Latin American countries that suffered major external crises during the 1990s and 2000s – including Argentina, Mexico, and Uruguay – had opened their financial accounts early and rapidly. This contrasted with the case of Chile and Colombia, two countries that maintained some controls on capital flows – and in particular on capital inflows – and did not default on their debts during the 1980s.⁹ An interesting question, and one that I address in Section 3 of this paper, is whether countries whose policies are characterized by Box 4 in Table 2 have faced a higher probability of experiencing a sudden stop of capital inflows than countries with other configurations of capital and financial openness.

3. Globalization, sequencing and crises: an empirical investigation

In this section I investigate whether the degree of globalization affects the probability of a country experiencing a sudden stop of capital inflows. I am particularly interested in analyzing the way in which alternative combinations of financial and trade openness affect the likelihood of a sudden stop crisis. This analysis will shed some light on the sequencing of reform debate, as well as on the validity of some of the criticisms of the so-called Washington Consensus. I am also interested in investigating the way in which capital mobility affects the role played by other variables – including external imbalances and the degree of flexibility of the nominal exchange rate – in determining the probability of a sudden stop.

3.1. The empirical model

The point of departure is a variance component probit model given by Eqs. (1) and (2):

$$y_{tj} = \begin{cases} 1, & \text{if } y_{tj}^* > 0, \\ 0, & \text{otherwise,} \end{cases} \quad (1)$$

$$y_{tj}^* = \alpha\omega_{tj} + \varepsilon_{tj}. \quad (2)$$

Variable y_{tj} is a dummy variable that takes a value of one if country j in period t experienced a sudden stop crisis (as defined below), and zero if the country in question did not experience a sudden stop. According to Eq. (1), whether the country experiences a sudden stop is the result of an unobserved latent variable y_{tj}^* , assumed to depend linearly on vector ω_{tj} , which includes a number of economic, structural and policy characteristics of each economy, such as the degree of openness, external and domestic imbalances and others. The error term ε_{tj} is given by a variance component model: $\varepsilon_{tj} = v_j + \mu_{tj}$. v_j is i.i.d. with zero mean and variance σ_v^2 ; μ_{tj} is normally distributed with zero mean and variance $\sigma_\mu^2 = 1$. In addition to the random effects model, I also estimated fixed effects and basic probit versions of the probit model in Eqs. (1) and (2).¹⁰

⁸ In order to be in this list a country has to have had, at least for one year, trade and financial indicators in excess of the thresholds presented above.

⁹ On the Latin American reforms and crises see Edwards (2007b). Some countries introduced controls on capital inflows in the 2000s, including Thailand and Brazil.

¹⁰ In the “basic probit” estimation, the error term is assumed to have the standard characteristics.

Table 3
Incidence of sudden stops, 1970–2004.

	No sudden stop	Sudden stop
Industrial	94.07	5.93
Latin American and Caribbean	93.02	6.98
Asia	94.36	5.64
Africa	93.91	6.09
Middle East	85.53	14.47
Eastern Europe	91.82	8.18
World	93.24	6.76
Number of observations	1627	
Pearson:		
Uncorrected chi2(5)	8.6919	
Design-based F(5, 8130)	1.7373	
P-value	0.1224	

3.2. Specification and variable definition

I define a “sudden stop” episode as an abrupt and major reduction in net capital inflows to a country that, up to that time, had been receiving large volumes of foreign capital. More specifically, I imposed the following requirements for an episode to qualify as a “sudden stop” crisis: (1) the country must have received an inflow of capital (relative to GDP) larger than its region’s third quartile during the two years prior to the “sudden stop.” That is, prior to the sudden stop incident the country in question must have been a high recipient of foreign capital. And (2), net capital inflows must have declined by at least 3% of GDP in one year. Table 3 contains data on the incidence of sudden stops for the period 1970–2004 for six regions as well as for the world as a whole. In the econometric analysis I use a one year window, where data for the year following a sudden stop episode are set as “missing.” The main purpose of this window is to avoid double counting sudden stop episodes that are stretched over multiple years. However, when the analysis was performed on the raw data, without a window, the results were similar to those reported here (see Section 3.6 for details).

In specifying the model I follow the literature on external crises, devaluations, sudden stops, and current account reversals.¹¹ In the base-case specification I included the following covariates, all of which are available for a large number of countries and years:

- The ratio of the current account deficit to GDP, lagged one period. This allows me to investigate whether the “current account matters” when it comes to crises.
- The lagged ratio of the country’s fiscal deficit relative to GDP.
- The lagged value of an index that measures “contagion.” This index is defined as the relative occurrence of a contraction in capital flows in each country’s “reference group.” The reference group, in turn, is defined for most countries as their region. As in Table 3 there are five geographical regions: Latin America, Asia, North Africa and the Middle East, Africa and Eastern and Central Europe. The advanced countries belong to a group of their own. In this calculation data for the country in question are excluded. The coefficient of this “contagion” variable in the probit equation is expected to be positive, reflecting the fact that when a similar country experiences a capital flow contraction, capital flows to the country in question will tend to decline, increasing the likelihood of a sudden stop.
- Percentage change in the terms of trade (defined as the ratio of export prices to import prices), with a one year lag. Improved terms of trade are expected to lower the probability of a crisis; its coefficient should be negative.

¹¹ See, for example, Calvo et al. (2004), Glick and Hutchison (2005), Edwards (2002, 2004a, 2004b), Frankel and Cavallo (2004), Eichengreen et al. (2006), Frankel and Rose (1996), and Milesi-Ferretti and Razin (2000).

- Lagged international real interest rates, proxied by real U.S. 10 year Treasuries. As [Eichengreen \(2001\)](#) has argued, a decline in world liquidity – captured by higher international real interest rates – will tend to increase the probability of an external crisis. If this is indeed the case, the coefficient of this variable will be positive.
- A dummy variable for each region. In some of the regressions, instead of the regional dummies I included dummy variables for advanced countries.
- A dummy variable that takes the value of one if that particular country has a de facto flexible exchange rate regime, and zero otherwise. The classification of exchange rate regimes is taken from the updated data set developed by [Levy Yeyati and Sturzenegger \(2005\)](#).
- International reserves as a proportion of the country's total external liabilities. This indicator was constructed from data provided by [Lane and Milesi-Ferretti \(2007\)](#). To the extent that a high level of international reserves held by the central bank is seen as an insurance policy, the coefficient of this variable is expected to be negative in the estimation of the probit equations.

As a way of capturing alternative openness scenarios, I included the following variables into the probit analysis¹²:

- A variable that measures whether the financial account is open. This variable, which I call *Cap_Open*, takes the value of one if in any given year a financial openness index constructed on the bases of the Fraser Institute indicator takes a value equal or higher than 6, in a scale from 1 to 10. This value of 6 corresponds to the 25th percentile of the financial openness index.
- A variable that measures whether the trade account is open in any given year. This variable, which I call *Trade_Open*, takes the value of one if the average tariff in that year and country is equal or lower than 10%. This value corresponds to the 25th percentile of the average tariff calculated by the Fraser Institute for 1985–2004; that is, only 25% of the country-year observations have values lower than 10% (see [Data Appendix](#)). Notice that a country may have “closed” trade – that is, import tariffs in excess of 10% – and still develop (very) large current account deficits.

In Section 3.6, on extensions, I report and discuss results obtained when additional covariates, including the degree of dollarization of the economy and liabilities mismatches in the banking sector, are included in the analysis.

3.3. Basic results

The basic results from the probit estimates are presented in [Table 4](#), where as customary, I report the marginal effects of each independent variable on the probability of a sudden stop, evaluated at the mean values of the covariates. For presentation purposes in this table I do not present the marginal effects of the regional dummies; none of them, however, was significant, indicating that once economics variables are taken into account, regional or geographical considerations do not play an important role. At the bottom of each column I also present the estimated probability of a sudden stop, also evaluated at the mean values of the covariates. This is an important variable, which will become the center of much of the analysis that follows.

As may be seen, most estimated coefficients have the expected signs and the majority of them are significant at conventional levels. The following aspects of the results are worth discussing: (a) countries with large (lagged) current account deficits face a higher probability of a crisis. The point estimate of the marginal effect of the (lagged) current account deficit is rather small, however – about one half of one percent. (b) There is evidence of contagion. A higher incidence of capital flows contractions in the region increases the probability of a sudden stop. (c) Higher world interest rates – that is lower global liquidity – increases the probability of a crisis. (d) With other things given, having a flexible exchange rate reduces the probability of a financial crunch. Moreover, the marginal effect of the flexible exchange rate regime is rather large, at approximately (minus) 2 percentage points.

¹² I am not aware of any study that has attempted to deal with sequencing issues with a methodology similar to the one used in this paper.

Table 4
Marginal effects and predicted probabilities of sudden stops.

	(4.1)	(4.2)	(4.3)
Financial openness	0.0382 (2.36)**	0.0421 (2.21)**	0.0460 (2.75)***
Trade openness	0.0070 (0.48)	0.0100 (0.55)	0.0199 (1.25)
Contagion	0.0010 (2.01)**	0.0009 (1.53)	0.0010 (2.03)**
Terms of trade change	0.0004 (1.05)	0.0000 (0.09)	−0.0001 (0.16)
World interest rate	0.0068 (2.46)**	0.0080 (2.36)**	0.0051 (1.94)*
Flexible	−0.0153 (1.56)	−0.0216 (1.81)*	−0.0207 (2.06)**
Public sector deficit	0.0007 (0.68)	0.0026 (2.05)**	–
International reserves (% total external liabilities)	0.0004 (1.38)	−0.0001 (0.32)	–
Current account deficit (% of GDP)	0.0065 (5.90)***	–	0.0072 (6.97)***
Predicted probability	0.0317	0.0433	0.0384
Number of observations	1295	1295	1627
Number of countries	93	93	113

Note: Absolute value of z statistics are reported in parentheses. Regional dummies included, but not reported.

*** Significant at 1%.

** Significant at 5%.

* Significant at 10%.

(e) The estimation reported in column (4.1) in Table 4 suggests that after controlling for the current account deficit, the public sector deficit plays no role in determining the likelihood of a crisis. However, as may be seen in column (4.2), once the current account variable is excluded, the public sector deficits have a positive effect on the probability. That is, a marginal increase in the government deficit that is not reflected in an external (current account) imbalance has no effect on the probability of a crisis. (f) Interestingly, and perhaps surprisingly, with other things given, neither changes in the terms of trade nor the stock of international reserves appear to affect the likelihood of a sudden stop.

From this paper's perspective the most important results are related to the coefficients of the two openness variables. As may be seen, the coefficient of the financial openness dummy is significantly positive in the three regressions; moreover, the point estimates of the marginal effects are rather large, suggesting that with other variables given (and at their mean values), moving from a “closed” to an “open” financial account increases the probability of a sudden stop by approximately 4 percentage points. The results in Table 4 also show that the coefficient of the trade openness variable is always positive; the values of the z-statistics, however, are low. Only in one of the three regressions they exceed one, and in none of them they are significant at the 10% level. Aizenman and Noy (2004) have argued that financial and trade openness are highly correlated across countries and time. This correlation may explain the low degree of significance of the trade openness variable.

The results reported at the bottom of Table 4 show that, when all the covariates are at their mean values, the estimated probabilities of a sudden stop are on the low side, ranging from 3.2% to 4.2%. In the sub-sections that follow I investigate how these estimated probabilities – and the marginal effects – change when the probability functions are evaluated at alternative values of the covariates and, in particular, when they are evaluated for different configurations of trade and financial openness.

3.4. Probabilities of sudden stops under alternative configurations of trade and financial openness: a preliminary exercise on the sequencing issue

An important property of probit models is that marginal effects and estimated probabilities are conditional on the values of *all* covariates. This means that if the value of one of the independent

Table 5

Estimated probabilities of a sudden stops under alternative configurations of financial and trade openness (computations based on Eq. (4.3)).

	Closed trade account	Open trade account
Closed financial account	0.022	0.037
Open financial account	0.068	0.094

Note: In computing these probabilities (most) other covariates were set at their mean values. The computation was done for a typical Latin American country. See the text for details.

variables changes, the overall estimated probability – and of, the estimated marginal effect of *all covariates* for that matter – will also change. Denoting the (normal) cumulative probability distribution by Φ , the probit model is defined by:

$$\Pr(y_{jt} \neq 0 \mid \omega_{jt}) = \Phi(\alpha\omega_{jt}). \quad (3)$$

The marginal effect of covariate z_1 is calculated as the slope of the probability function, evaluated at a specific set of values of the covariates ω_{jt} s. If the estimated probit coefficient of z_1 is α_1 , and we want to evaluate the marginal effect of z_1 at a point where covariates have values captured by vector $\tilde{\omega}$, the marginal effect of z_1 (evaluated at $\tilde{\omega}$) is given by

$$\frac{\partial \Phi}{\partial z_1} = \Phi'(\alpha\tilde{\omega})\alpha_1. \quad (4)$$

In order to provide some insights into the sequencing issue, I use the estimates from column (4.3) in Table 4 to compute the probabilities of experiencing a sudden stop for the four configurations of financial and trade openness that appear in Table 2 (in performing this exercise the values of the other covariates have been maintained at their means).¹³ That is, in terms of Eq. (3) above, I consider four alternative vectors $\tilde{\omega}$ in the computation of the overall estimated probabilities presented in Table 5. Each of these four vectors corresponds to a different combination of trade openness and financial openness. For example, the estimates for the “Closed Trade Account – Closed Financial Account” box (with a calculated probability of a sudden stop of 0.022) was estimated by evaluating Eq. (3) when the *Cap_Open* variable takes a value of zero, and the *Trade_Open* variable also takes a value of zero; in this calculation all other covariates take their mean value. Likewise, the estimated probability “Closed Trade Account – Open Financial Account” box (0.068) was obtained by evaluating Eq. (3) when the *Cap_Open* variable takes a value of one, and the *Trade_Open* variable also takes a value of zero.

The results obtained for the estimated overall probabilities of a sudden stop crisis are presented in Table 5, where robust standard errors were used to compute the z-statistics. A first reaction to these computations is that in all four possible combinations of trade and financial openness the estimated probabilities are on the low side. Even in the highest case the estimated probability is lower than 0.10. Second, and as expected from the estimates reported above, these results show that the highest probability of facing a sudden stop is obtained when both the trade and financial accounts are open. This result, however, has to be interpreted with caution, for at least two reasons: First, the coefficients of the trade openness indicator in the probit equations were estimated in a rather imprecise way (the z-statistic for the trade openness variable in column (4.3)). Second, the probability estimates in Table 5 were obtained by evaluating the probability function *at the mean values* of all other covariates. This, however, is a somewhat artificial exercise, as it is highly unlikely that countries that have very different configurations of trade and financial openness – and/or follow different sequences of reform – will face the same values of other covariates. Indeed, the concern about the “financial liberalization first” sequence is that it will result in a very large and unsustainable current account deficit; moreover, it has been argued that this sequence is particularly risky in the presence of pegged exchange rates. In the sub-section that follows I address this issue by evaluating the sudden stop probability function under two alternative scenarios that include different current account deficits and exchange rate regimes.

¹³ The reason for choosing Eq. (4.3) for this exercise is that it provides the tightest estimate of the effect of trade openness on the probability of a sudden stop.

3.5. The role of current account imbalances and the exchange rate regime in the sequencing debate

Authors that favor a gradual liberalization course, where the financial account is opened towards the end of the process, and only after trade liberalization has been consolidated, have argued that that particular sequence avoids very large current account deficits.¹⁴ Moreover, and as pointed out above, critics of early financial liberalization have been particularly concerned about the rigidities imposed by fixed exchange rates. Indeed, many of the major crises of the 1990s and 2000s – including the Mexican crisis of 1994, the East Asian crises of 1997–1998, the 1998 Russian crisis and the 2001 Argentine currency collapse – took place in countries that had built very large current account deficits – in the order of 6% to 8% of GDP – and had pegged or rigid exchange rates. In order to analyze the roles played by both of these variables, in this section I report results for estimated probabilities of sudden stops under two alternative scenarios in terms of the configuration of trade and financial openness, current account balances, and exchange rate regime. (For the actual methodology used, remember the discussion on Eqs. (3) and (4), and the explanation on how the results in Table 5 were obtained.) The two cases under consideration are:

- *Scenario A*: A country with a fixed exchange rate regime moves from a “closed–closed” situation to an “open financial–closed trade” configuration; that is, it moves from Box 1 to Box 4 in Table 2. In addition, I assume that in the process of opening up financially the country develops a large current account deficit (8% of GDP). In that regard, in this scenario the estimated probability of a crisis is computed by evaluating the probit function when the flexible exchange rate dummy takes a value of zero, and the current account variable takes a value of 0.08. This scenario, then, reflects a “financial liberalization first” sequencing that is accompanied by the development of a large current account imbalance, under fixed exchange rates.
- *Scenario B*: Gradual transition from a “closed–closed” configuration to an “open–open” one. I further assume that during the liberalization process the country adopts a flexible exchange rate regime and that, due to the gradualism of the process, it is able to maintain the current account deficit at “reasonable” levels (3.5% of GDP). This means that in this scenario the estimated probability of a crisis is estimated by evaluating the probability function in Eq. (3) when the flexible exchange rate dummy takes a value of one, and the current account variable takes a value of 0.035. In terms of Table 2, this scenario corresponds to a gradual move from Box 1 to Box 3.¹⁵

I use the estimates from column (4.3) in Table 4 for evaluating the probabilities under these two scenarios. Under both Scenarios A and B the initial conditions are characterized by closed trade and financial accounts. As may be seen from Table 5, in this case the estimated probability of a sudden stop crisis is 0.022. The estimated probabilities of experiencing a sudden stop crisis under the two alternative sequencing Scenarios described above are:

- *Scenario A* (abrupt “financial account first” strategy): Estimated probability of experiencing a sudden stop: 0.133.
- *Scenario B* (gradual “financial account last” strategy): Estimated probability of a sudden stop: 0.062.

As may be seen, under both scenarios the overall estimated probability of a sudden stop increases relative to the “closed–closed” initial condition. However, it increases significantly more (from 0.022 to 0.133) under Scenario A than under Scenario B (from 0.022 to 0.062). These results suggest, quite strongly, that both the exchange rate regime and the evolution of the current account deficit are key variables for determining the likelihood of a capital inflows crunch. In particular, maintaining the current account deficit within limits during a reform process reduces a country’s vulnerability very

¹⁴ Stiglitz (2002).

¹⁵ The “gradualism” aspect of this scenario is built into the assumption that the current account deficit does not explode, and remains within sustainable levels. This is indeed a feature of gradual liberalizations (see Edwards, 2002).

Table 6

Marginal effects and predicted probabilities of sudden stops: alternative indicators and samples.

	(6.1)	(6.2)	(6.3)	(6.4)	(6.5)	(6.6)
Current account deficit (% of GDP)	0.007 (7.30) ^{***}	0.0069 (4.36) ^{***}	0.0073 (7.27) ^{***}	0.0065 (7.45) ^{***}	0.0080 (5.31) ^{***}	0.0058 (3.33) ^{***}
Contagion	0.0011 (2.22) ^{**}	0.0012 (2.31) ^{**}	0.0012 (2.29) ^{**}	0.0011 (2.25) ^{***}	0.0016 (1.96) ^{**}	0.0009 (0.86)
Terms of trade change	-0.0002 (0.72)	-0.0003 (0.79)	-0.0001 (0.38)	-0.0003 (0.92)	-0.0005 (0.70)	-0.0006 (0.52)
World interest rate	0.0045 (1.76) [*]	0.0057 (2.18) ^{**}	0.0055 (2.04) ^{**}	0.0050 (1.93) [*]	0.0015 (0.27)	0.0010 (0.13)
Flexible	-0.0188 (1.90) [*]	-0.024 (2.36) ^{**}	-0.0218 (2.17) ^{**}	-0.0143 (1.39)	-0.0250 (1.42)	0.0018 (0.08)
Financial openness	0.0434 (2.76) ^{***}	-	-	0.0372 (2.53) ^{**}	0.0405 (1.68) [*]	0.0597 (2.03) ^{**}
Trade openness	0.0188 (1.21)	-	-	-	0.0063 (0.27)	0.0115 (0.47)
Financial openness (index w/missing)	-	0.0379 (1.95) [*]	-	-	-	-
Trade openness (index w/missing)	-	0.021 (1.11)	-	-	-	-
Financial openness (continuous index)	-	-	0.0067 (2.97) ^{***}	-	-	-
Trade openness (continuous index)	-	-	-0.0006 (1.07)	-	-	-
(Export + imports)/GDP	-	-	-	0.0004 (3.33) ^{***}	-	-
Dollarization	-	-	-	-	-0.0140 (0.29)	0.0198 (0.36)
Mismatch	-	-	-	-	-	-0.0041 (0.35)
Predicted probability	0.0393	0.0218	0.0395	0.0409	0.0575	0.0595
Number of observations	1745	955	1627	1741	797	505
Number of countries	113	95	113	113	83	50

Note: Absolute value of z statistics are reported in parentheses. Regional dummies included, but not reported.

*** Significant at 1%.

** Significant at 5%.

* Significant at 10%.

significantly. Likewise, adopting a flexible rate regime reduces the risk of a crisis in an important way.

Another important result is that according to this exercise, under Scenario A the country in question is more vulnerable to external shocks than under Scenario B.¹⁶ For example, the marginal effect of world real interest rates shocks is twice as large under Scenario A as under Scenario B: 0.014 vs 0.007. Notice, however, that under both scenarios these probabilities are still low in absolute terms.

3.6. Extensions, robustness, instrumental variables, and future work

In this section I investigate the robustness of the results and I discuss directions for future research. I also present results obtained using instrumental variables probit estimates. In dealing with robustness I focus on the definition of both the sudden stop indicator and of the openness indexes.

3.6.1. Extensions and robustness

The results reported above were obtained when the sudden stops indicator was defined using a one year window. This means that the observation corresponding to the year immediately following a

¹⁶ The marginal effects under these alternative scenarios are not reported fully due to space considerations. However, they are available from the author on request.

sudden stop episode was set as missing. However, one could alternatively define the episodes without using a window. The results obtained when this is done are presented in column 1 of Table 6, where as before I report the marginal effects (as in previous tables, and due to space considerations, I do not show those for the regional dummies; once more, however, none of them was significant). As may be seen, the estimated marginal effects are not very different from those discussed above and presented in Table 4; moreover, the overall message from the previous results is maintained.

An important question is whether the results discussed here are driven by the way in which the two openness indicators were defined. In order to investigate this possibility I estimated the variance component probit model using two alternative sets of indicators for openness: (a) I excluded (that is, I set to “missing”) observations where either the Fraser Institute financial openness index or average tariff variable took intermediate values. That is, in constructing this alternative index I set the capital open indicator equal to one if the index is greater than 6 and zero if its value is smaller than 3; all observations with an index value in between these two values were set to “missing.” Likewise, for the trade openness index, I set to “missing” all observations with import tariffs in between 11 and 20 percent. The results obtained when these alternative indexes of openness were used are reported in column 2 of Table 6. (b) As additional measures of integration to the world economy I used continuous indexes of financial openness and tariff averages computed on the bases of the Fraser Institute data (remember that the indexes used in the regressions discussed above were 0–1). I called these variable *Tariff* and *Financial Op*; a higher value of *Tariff* indicates a lower degree of trade openness, while a higher value of *Financial Op* captures a higher degree of financial openness. These results (presented in column 3 of Table 6) tend to support those reported above. The coefficient of trade openness is negative, but not significant at conventional levels; that of financial openness is significantly positive. It is important to notice, however, that in this case the marginal effect – computed at mean values of all covariates – is very small: a unitary increase in the financial openness index raises the probability of a sudden stop by less than one tenth of one percent.

In order to explore further the role of trade openness, I replaced the tariffs-based indicator with the more traditional “exports plus imports, over GDP” ratio. The results obtained are in column 4, Table 6. As may be seen, these results strengthened our previous findings. Notice that the overall predicted probability continues to be very low.

Some authors have argued that the extent of dollarization of an economy – including mismatches between dollar denominated assets and liabilities in the banking and corporate sectors – play an important role in determining its vulnerability to crises.¹⁷ In order to investigate this issue I added two dollarization-related variables to the estimation (a shortcoming of this exercise, however, is that the dollarization data are available for a relatively smaller set of countries): (a) the ratio dollarized deposits to total deposits in the banking sector. This variable is called *Dollar_Deposits*, and was obtained from Levy Yeyati (2006). And, (b) an index of currency mismatches constructed by Eichengreen et al. (2005). This index, however, is not available as a time series. In the results reported below I make the assumption that countries had the same degree of mismatch for the 1985–2004 period. Because of this, the results obtained when the Eichengreen, Hausmann and Panizza index was used should be interpreted with extreme care.

The results obtained are in columns 5 and 6 of Table 6. As may be seen, the coefficients of these dollarization-related variables are not significant at conventional levels. This suggests that, with other things given, the degree of dollarization does not affect in an important way a country’s vulnerability to a sudden stop. It is important to notice, however, that this *does not mean* that dollarization plays no role in crisis episodes. Indeed, it is possible that the *costs* associated with sudden stop crises are higher in dollarized nations. This issue, however, is beyond the scope of this paper.

3.6.2. Instrumental variables

It is possible, although in my view unlikely, that the analysis presented in the preceding sections is subject to endogeneity. In particular, under certain circumstances capital restrictions (and maybe, even trade restrictions) may be increased as a result of the perception that a sudden stop will occur

¹⁷ See, for example, Eichengreen et al. (2005).

Table 7
Marginal effects and predicted probabilities of sudden stops: IV estimation.

	(7.1)
Financial openness (instrumented)	0.2132 (2.84)***
Mean tariff (instrumented)	0.0257 (1.46)
Current account deficit (% of GDP)	0.0730 (6.44)***
Contagion	0.0104 (1.92)*
World interest rate	0.0389 (1.35)
Terms of trade change	−0.0011 (−0.31)
Flexible	−0.3534 (−3.06)***
Predicted probability	0.0384
Number of observations	1627
Number of countries	113

Note: Absolute value of z statistics is reported in parentheses. For the list of instruments, see the text. Regional dummies included, but not reported.

*** Significant at 1%.

* Significant at 10%.

in the future. In order to address this potential endogeneity issue I estimated the probit model using maximum likelihood instrumental variables, procedure suggested by Amemiya (1978).¹⁸ In this estimation I used the two continuous indexes of openness (*Tariff* and *Financial Op*) used in the estimation of column (6.3) in Table 6.¹⁹

In determining the instruments I relied on several findings from the empirical literature on capital controls: (1) Political developments also play an important role in determining the extent of capital restrictions. (2) More advanced countries tend to rely less on capital controls. (3) Distance and geographical location are exogenous determinants of trade flows and openness. Based on these considerations, in the instrumental variables estimation the following instruments were used: a measure of civil liberties, as a proxy for political instability; an index of ethnic fractionalization; lagged change in the terms of trade; the lagged contagion indicator in other regions; lagged current account balance; lagged (real) world interest rates; the log of GDP per capita in 1970; regional dummies; latitude; and an index of predicted trade flows over GDP, calculated using a gravity model.²⁰ The results obtained generally support the findings on the effects of financial openness on the probability of a sudden stop. The covariates have the expected signs and most are significant. The most important result from this paper's perspective is that the coefficient of financial openness is, as in the previously reported estimates, significantly positive; moreover, its point estimate is similar to that obtained when no correction for potential endogeneity was made. On the other hand, in the instrumental variables estimation the coefficient of *Tariff* is not significant at conventional levels.

¹⁸ The identifying restriction is that the number of instruments excluded from the main equation is equal or greater than the number of endogenous variables.

¹⁹ The estimation of IV probits when the endogenous variables are binary is extremely complex. For this reason in this paper I used the continuous indicators discussed above.

²⁰ As Aizenman and Noy (2004) have shown, there is a strong empirical connection between trade openness and the degree of capital mobility. The use of gravity trade equations to generate instruments in panel estimation has been pioneered by Jeff Frankel. See, for example, Frankel and Cavallo (2004).

3.6.3. Future work

The analysis presented above has relied on the nonlinear properties of probits to investigate the way in which different variables – including the degree of trade and financial openness, the exchange rate regime and current account imbalances – interact to determine the probability of a country experiencing a sudden and abrupt decline in capital inflows. An alternative way to deal with this issue – and one that is beyond the scope of this paper – is to introduce in the estimation terms that interact two or more covariates. This specification would provide information on the *cross effect* of one of the covariates on the probability of a sudden stop.²¹ Future work on the subject could indeed investigate the nature of these interactive terms and cross effects. Additionally, future work should focus on trying to determine whether different forms of financial restrictions affect the probability of a crisis in different ways. As pointed out above, a particularly interesting question is whether controls on capital inflows and controls on outflows have the same effect on the probability of a crisis.

Other promising avenues for future work include devising alternative ways of depicting different sequencing scenarios. The approach taken in this paper provides interesting insights, but it is not based on a fully dynamic analysis where different sequences can be identified sharply. Moving in this direction would require constructing new openness indexes that would capture the interplay between trade and financial openness. This would be extremely useful, as it would help policy makers understand the way in which the interplay between trade and capital account openness affect vulnerability. As pointed out earlier, another area of future research is constructing indexes of financial integration that differentiate between controls on outflows and inflows for a large number of countries over many years.

The results reported above deal with the effects of alternative degrees of openness on the probability of a sudden stop crisis. An important question – and one that complements the analysis presented here – has to do with the costs faced by a country once a crisis erupts. In particular, are these costs similar in countries that have followed alternative opening strategies? Or, are these costs different for countries that followed different liberalization sequences? These important questions are beyond the scope of the current paper.

4. Concluding remarks

In this paper I used panel probit and a large cross country data set to investigate whether an increase in the degree of openness – both trade and financial – affects the probability of external crises. I was particularly interested in investigating the way in which the interaction between openness in the trade and capital accounts – the so-called sequencing of reform – affect these probabilities. I also focused on potential roles of current account and fiscal imbalances, contagion, international reserves holdings, and the exchange rate regime as possible determinants of external crises. In the analysis I used new measures of capital account and trade restrictions developed by the Fraser Institute. A main objective of this work is trying to determine whether rapid reforms that open the financial account early on increase a country's degree of vulnerability to crises. The results reported in the preceding pages provide some (preliminary) evidence suggesting that “financial liberalization first” strategies increase the degree of vulnerability to crises. This is particularly the case if these strategies are pursued with pegged exchange rates and if they result in large current account imbalances. Although these results should be interpreted with caution – in particular due to the imperfect nature of the index of capital mobility – they do support the view that “sequencing matters,” a view expressed early on by Mckinnon (1973) and Edwards (1984), and more recently by Stiglitz (2002).

Finally, it is important to emphasize that this paper has dealt with only one aspect of policies aimed at opening an economy. Indeed, I have not addressed issues related to the effects of financial and/or trade liberalization on total factor productivity growth, aggregate growth and/or welfare. At this time, however, there is a considerable body of empirical evidence suggesting that countries that are more open to international trade experience faster total factor productivity growth than countries

²¹ See Edwards (2007a) for an application to external crises.

that restrict trade.²² Whether this is a long term effect, or one that eventually dies off is still the subject of some discussion. There is also evidence that more open economies are able to adjust more rapidly – and less costly – to external shocks.²³ The evidence on the effects of financial openness on growth and overall economic performance, however, is not that clear cut. A challenge for future research is to develop a unified empirical framework that considers the simultaneous effects of financial and trade openness – and the sequencing of reform – including the effects on growth, welfare and vulnerability to crises.

Data Appendix

Variable	Description	Source
Consumer price index (CPI)	Consumer price index	World Development Indicators
Civil liberties	Index civil liberties	Freedom House
Contagion	Relative occurrence of capital flow contractions in each country's "reference group"	Author's construction based on data of financial account (World Development Indicators)
Contagion other regions	Relative occurrence of capital flow contractions in all regions different from each country's "reference group"	Author's construction based on data of financial account (World Development Indicators)
Current account	Current account	World Development Indicators
Dollarization	Financial dollarization, index constructed by	Levy Yeyati (2006)
Exports	Exports	World Development Indicators
External liabilities	External liabilities	Lane and Milesi-Ferretti (2007)
Financial openness	Variable 4E "International capital market controls." The Dummy takes a value 1 if in any given year a financial openness index takes a value in excess of 6, in a scale from 1 to 10. The continuous index is the actual data for each country. Missing data was filled using Stata impute procedure	Gwartney and Lawson (2007)
Fiscal deficit	Fiscal deficit	World Development Indicators
Flexible	Dummy with value 1 if exchange rate regime is flexible and 0 otherwise. Classification based in Levy Yeyati and Sturzenegger de facto exchange rate regimes classification	Levy Yeyati and Sturzenegger (2005)
GDP per capita in 1970	GDP per capita in 1970	World Development Indicators
Gross domestic product (GDP)	Gross domestic product (GDP)	World Development Indicators
Imports	Imports	World Development Indicators
Inflation	Annual change in CPI	Author's construction
International reserves	International reserves	Lane and Milesi-Ferretti (2007)
Mean tariff (openness index)	Variable 4 Aii "Mean tariff rate" (the data, not the index). The Dummy takes a value 1 if the average tariff in that year and country is equal or lower than 10%. The continuous index is the actual data for each country. Missing data was filled using Stata impute procedure	Gwartney and Lawson (2007)
Measure of trade openness	Fitted value from a gravity model of bilateral trade	Author's construction
Mismatch	Currency mismatches constructed by	Eichengreen et al. (2005)
Net capital inflow	Net capital inflow	World Development Indicators

²² Edwards (1998).

²³ Calvo et al. (2004), Edwards (2004b).

Table 7 (continued)

Variable	Description	Source
No tariff trade barriers	Variable 4Bi “No tariff trade barriers”	“The Economic Freedom of the World Project,” The Fraser Institute
Sudden stop	Reduction of net capital inflows of at least 5% of GDP in one year. The country in question must have received an inflow of capital larger to its region’s third quartile during the previous two years prior to the “sudden stop”	Author’s construction based on data of financial account (World Development Indicators)
Terms of trade	Trade-exports as capacity to import (constant local currency units)	World Development Indicators
World interest rate	Real U.S. 10 year Treasuries (Nominal interest rate minus corresponding inflation)	Author’s construction
Ethnic fractionalization	Probability that two randomly selected people in a country will not belong to the same ethnic group	Weil (2005)
Latitude	Latitude	Weil (2005)

References

- Aizenman, J., Noy, I., 2004. On the two way feedback between financial and trade openness. NBER Working Paper No. 10496.
- Amemiya, T., 1978. The estimation of a simultaneous equation generalized probit model. *Econometrica* 46 (5), 1193–1205.
- Calvo, G.A., Izquierdo, A., Mejia, L.F., 2004. On the empirics of sudden stops: The relevance of balance-sheet effects. NBER Working Paper No. 10520.
- Chinn, M., Ito, H., 2006. Capital account liberalization, institutions, and financial development: Cross country evidence. NBER Working Paper 8967.
- Edison, H.J., Warnock, F.E., 2003. A simple measure of the intensity of capital controls. *J. Empirical Finance* 10 (1–2), 81–103.
- Edwards, S., 1984. The order of liberalization of the external sector in developing countries. In: *Princeton Essays in International Finance* No. 156, New Jersey, International Finance Section, Princeton University, December.
- Edwards, S., 1990. The sequencing of economic reform: Analytical issues and lessons from Latin American experiences. *The World Economy* 13 (1), 1–14.
- Edwards, S., 1998. Openness, productivity and growth: What do we really know? *Econ. J.* 108 (447), 383–398.
- Edwards, S., 2002. Does the current account matter? In: Edwards, S., Frankel, J.A. (Eds.), *Preventing Currency Crises in Emerging Markets*. The University of Chicago Press, pp. 21–69.
- Edwards, S., 2004a. Thirty years of current account imbalances, current account reversals and sudden stops. *IMF Staff Pap. (Special Issue)* 51, 1–49.
- Edwards, S., 2004b. Financial openness, sudden stops and current account reversals. *Amer. Econ. Rev.* 94 (2), 59–64.
- Edwards, S., 2007a. Capital controls, capital flow contractions, and macroeconomic vulnerability. *J. Int. Money Finance* 26 (5), 814–840.
- Edwards, S., 2007b. Crises and growth: A Latin America perspective. *J. Iberian Latin Amer. Econ. History* XXIV (1).
- Eichengreen, B., 2001. Capital account liberalization: What do cross country studies tell us? *World Bank Econ. Rev.* 15 (3), 341–365.
- Eichengreen, B., Hausmann, R., Panizza, U., 2005. The mystery of original sin. In: Eichengreen, B., Hausmann, R. (Eds.), *Other People’s Money: Debt Denomination and Financial Instability in Emerging Market Economies*. University of Chicago Press, Chicago.
- Eichengreen, B., Gupta, P., Mody, A., 2006. Sudden stops and IMF-supported programs. NBER Working Paper No. 12235.
- Frankel, J.A., Cavallo, E.A., 2004. Does openness to trade make countries more vulnerable to sudden stops, or less? Using gravity to establish causality. NBER Working Paper No. 10957.
- Frankel, J.A., Rose, A.K., 1996. Currency crashes in emerging markets: An empirical treatment. *J. Int. Econ.* 41 (3&4), 351–366.
- Funke, M., 1993. Timing and sequencing of reforms: Competing views and the role of credibility. *Kyklos* 46 (3), 337–362.
- Click, R., Hutchison, M., 2005. Capital controls and the exchange rate instability in developing countries. *J. Int. Money Finance* 24 (3), 387–412.
- Guitián, M., 1995. Capital account liberalization: Bringing policy in line with reality. In: Edwards, S. (Ed.), *Capital Controls, Exchange Rates, and Monetary Policy in the World Economy*. Cambridge University Press, New York, pp. 71–92.
- Gwartney, J., Lawson, R., 2007. *Economic Freedom of the World 2007*. The Fraser Institute.
- Johnston, R.B., Tamirisa, N.T., 1998. Why do countries use capital controls. *IMF Working Paper* 98/181.
- Klaus, V., 1990. A perspective on economic transition in Czechoslovakia and Eastern Europe. In: *Proceedings of the World Bank Annual Conference on Development Economics*, pp. 13–18.
- Lane, P.R., Milesi-Ferretti, G.M., 2007. The external wealth of nations part II: Revised and extended estimates of foreign assets and liabilities, 1970–2004. *J. Int. Econ.* 73 (2), 223–250.
- Levy Yeyati, E., 2006. Financial dollarization: Evaluating the consequences. *Econ. Policy* 21 (45), 61–118.
- Levy Yeyati, E., Sturzenegger, F., 2005. Classifying exchange rate regimes: Deeds vs. words. *Europ. Econ. Rev.* 49 (6), 1603–1635.
- Mckinnon, R.I., 1973. *Money and Capital in Economic Development*. The Brookings Institution, Washington, DC.

- Milesi-Ferretti, G.M., Razin, A., 2000. Current account reversals and currency crises: Empirical regularities. In: Krugman, P. (Ed.), *Currency Crises*. The University of Chicago Press, pp. 285–323.
- Miniane, J., 2004. A new set of measurements on capital controls. *IMF Staff Pap.* 51 (2), 276–308.
- Park, Y.C., Park, W.M., 1995. Capital movements, real asset speculation, and macroeconomic adjustment in Korea. In: Edwards, S. (Ed.), *Capital Controls, Exchange Rate, and Monetary Policy in the Open Economy*. Cambridge University Press.
- Rodrik, D., 2006. Goodbye Washington Consensus, Hello Washington Confusion? A review of the World Bank's Economic Growth in the 1990s: Learning from a decade of reform. *J. Econ. Lit.* XLIV (4), 973–987.
- Smith, A., 1976. An inquiry into the nature and causes of the wealth of nations. In: Cannan, E. (Ed.). University of Chicago Press, Chicago, IL.
- Stiglitz, J.E., 2002. *Globalization and Its Discontents*. W.W. Norton, New York.
- Weil, D.N., 2005. *Economic Growth*. Addison-Wesley.
- Williamson, J. (Ed.), 1990. *Latin American Adjustment: How Much has Happened?* Institute for International Economics, Washington, DC.