CRISES AND GROWTH:
A LATIN AMERICAN PERSPECTIVE

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ABSTRACT

In this paper I use historical data to analyze the relationship between crises and growth in Latin America. I calculate by how much the region's GDP per capita has been reduced as a consequence of the recurrence of external crises. I also analyze the determinants of major balance of payments crises. The main conclusion is that it is unlikely that Latin America will, on average, experience a major improvement in long run growth in the future. It is possible that some countries will make progress in catching up with the advanced nations. This, however, will not be the norm; most Latin American countries are likely to fall further behind in relation to the Asian countries and other emerging nations. Not everything, however, is grim. My analysis also suggests that fewer Latin America countries will be subject to the type of catastrophic crises that affected the region in the past. Latin America's future will be one of "No crises and modest growth."

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I. **Introduction**

During the last 35 years Latin America's economic performance has been mediocre. Per capita GDP growth averaged 1.01% during 1970-2004; during 1982-2004 it merely averaged 0.51%; and during the first five years of the 21st century, annual per capita GDP growth was only 0.88%. Compare this with Asia's GDP growth per capita: 2.95% in 1970-2004; 2.99% during 1982-2004; and 2.78% during 2000-2004 (See Table 1 for some detailed comparisons).[1] But low GDP growth has not been Latin America's only economic predicament since 1970. The region also experienced numerous balance of payments crises that resulted in abrupt contractions in output, skyrocketing unemployment, and major social dislocations. In addition, social conditions have not improved in a significant way during the last three decades; poverty continues to be widespread, and income distribution is very unequal.[2] It is not an exaggeration to say that Latin America's modern economic history has been one of *crises, modest growth, inequality, and poverty*.

During the late 1980s and early 1990s most Latin American countries embarked on market-oriented reforms. These programs were based on efforts to reduce fiscal imbalances and inflation, deregulate investment, reduce import restrictions and import duties, develop domestic capital markets, and privatize public enterprises.[3] These reforms, which were known as the "Washington Consensus," bore fruit on the macroeconomic front. Inflation declined and credit became available to large masses of consumers. In most countries growth accelerated in the years following the reforms, and in some – Argentina, Chile and Peru – GDP growth increased drastically. Throughout most of the region the first half of the 1990s was a period of hope and high expectations.[4]

In most countries, however, progress was short lived. The use of pegged exchange rates to bring down inflation resulted in real exchange rate overvaluation and in

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[1] These numbers for "Latin America" refer to Latin America proper and exclude the Caribbean countries. When these are included, however, the resulting rate of growth is somewhat higher, but the overall message does not change. The Asian data refer to all of Asia. If the analysis is restricted to the so-called "Asian Tigers", the contrast with Latin America is even more marked.
[2] See, for example, the essays in Edwards (2007b), especially Prados de la Escosura (2007). See, also, World Bank (2003).
[3] See, Williamson (1990).
[4] For an analysis of the early reforms see Edwards (1995). On Latin America's growth see Loayza et al (2005).

a decline in exports' competitiveness. In addition, neither productivity growth, nor investment rates increased sufficiently as to sustain GDP growth over the longer run. During the second half of the 1990s and early 2000s hope was replaced by a succession of deep and traumatic crises. In December 1994, and after a year of political upheaval that included the Chiapas uprising and the assassination of the PRI's presidential candidate, the Mexican Peso collapsed and was devalued by more than 60%. The Mexican crisis generated a wave of "contagion" through the region, testing the strength of the reformed economies. Capital flows into Latin America declined, and the cost of borrowing internationally (as measured by the spread paid by Latin American bonds over and above the yield on U.S. Treasuries), increased significantly. Argentina, a country that had chosen a fixed exchange rate regime and a currency board, was particularly affected by what came to be known as the "tequila effect."

By mid 1997, when the region was beginning to recover from the Mexican crisis, the world was shocked by the eruption of severe crises throughout South East Asia. Thailand was the first to collapse, followed by Indonesia, the Philippines, Malaysia, and South Korea. Although Latin America had limited trade and financial exposure to South East Asia, it was still subject to contagion. In mid 1998 the global financial system was affected by two new crises, and contagion rippled throughout the world. In August the Russian ruble collapsed, and in September the failure of the investment firm *Long Term Capital Management*, exposed the fragilities of the global financial system. Following these crises, capital flows to the emerging countries declined significantly, forcing many Latin American nations to implement severe macroeconomic adjustments.[5]

A number of countries experienced balance of payment crises: Brazil in 1999, Argentina in 2001, Uruguay in 2002, and the Dominican Republic in 2003. Growth declined throughout the region, unemployment increased and social conditions deteriorated. As a result of these economic setbacks, frustration erupted, and the public grew increasingly skeptical about the merits of globalization and market orientation. In election after election voters turned to the left, electing Presidents that were clearly critical of the Washington Consensus. Although these new leaders were quite different among themselves, they all argued that the region needed to increase spending in social

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[5] See Calvo (1999).

programs, and make an effort to reduce inequality. In some countries -- Bolivia, Ecuador and Venezuela – the new political leaders announced policies that would undo many of the reforms of the 1990s. Some of these policies included the nationalization of industries, and rapid increase in the extent of government controls.

In this paper I use historical data to analyze the relationship between crises and growth in Latin America. More specifically, I calculate by how much the region's GDP per capita has been reduced as a consequence of the recurrence of external crises. I also analyze the determinants of major balance of payments crises, and, at the light of these historical results, I discuss the region's economic future.

The main conclusion of this paper is that it is unlikely that in the future Latin America will, on average, experience a major improvement in long run growth. It is possible that some countries will do relatively well, and will make progress in catching up with the advanced nations. This, however, will not be the norm; most Latin American countries are likely to fall further behind in relation to the Asian countries and other emerging nations. Not everything, however, is grim. My analysis also suggests that in the years to come fewer Latin America countries will be subject to the type of catastrophic and very costly currency crises that affected the region in the past. It is very likely that Latin America's future will be one of "No crises and very modest growth."

The paper is organized as follows: In Section II I use a two-equation empirical model to investigate the determinants of long term growth, and to analyze the way in which recurrent external crises have affected growth dynamics. My results indicate that external crises have been very costly for the average Latin America country: 7% of GDP per decade. In Section III I go one step further, and I use variance component probit models to investigate the forces behind these external crises. My findings suggest that they have been the result of both misguided domestic policies as well as external shocks. In Section IV I discuss the future of the Latin American economies at the light of the results presented in the paper. Finally, in Section V I offer some concluding remarks. The paper also has a Data Appendix.

Before proceeding further, it is important to emphasize that Latin America and the Caribbean is a large a region, composed of over thirty diverse countries. This means that any study that focuses on "the average" or "typical" Latin American nation will tend to

oversimplify some important aspects of reality. On the other hand, by focusing on Latin America as a group I am able to concentrate on some of the structural and institutional features that are common to most countries in the region. In order to provide as much texture as possible to the analysis, throughout the paper I make an effort to discuss a number of country specific experiences and cases.

II. External Crises and Growth in Latin America: An Empirical Investigation

For a long time Latin America has had a reputation of being a crisis-prone region. The first balance of payments crises erupted in the 1820s, during the early years of Independence. Since then the Latin American currencies have been repeatedly devalued, and debts have been repudiated on several occasions.[6] Some memorable modern (post 1970) crises include the Mexican crises of 1976, 1982 and 1994; the Chilean crisis of 1982; the Brazilian crisis of 1999; the Argentine crises of 1989 and 2001, and the Uruguayan crisis of 2002. In spite of the massive recurrence of crises during the last four decades, there has been no effort in the literature to systematically quantify the cost – in terms of growth or other variables -- of these episodes of acute instability.

In this Section I use a two-equation empirical model and a large cross country data set to investigate the way in which external crises affect GDP growth. I concentrate on two types of external crises: (a) *Sudden stops* of capital inflows, and (b) large *current account* reversals. The data are for 1970-2004 and, for comparison purposes, cover all countries in the world for which there is information. A *sudden stop* is defined as a reduction in net capital inflows of at least 5% of GDP in one year.[7] A *current account reversal,* on the other hand, is defined as a reduction in the current account deficit of at least 4% of GDP in one year (see the Data Appendix for details).[8]

In Table 2 I present tabulations on the incidence of sudden stops for the period under study; Table 3 contains data on the incidence of current account reversals. In both Tables I have considered six groups of countries – industrial, Latin America and

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[6] See Marichal (1989) for early episodes of external crises and currency collapses.

[7] To qualify as a sudden stop episode, the country in question must have been a net importer of capital in the previous year. In order to check for the robustness of the results, I also used two alternative definitions of sudden stops, which considered a reduction in inflows of 3 and 7% of GDP in one year.

[8] I also used an alternative definition. The qualitative nature of the results discussed below, were not affected by the precise definition of reversals or sudden stops. See Edwards (2007).

Caribbean, Asia, Africa, Middle East and North Africa, and Eastern Europe. Each Table also includes a Pearson test for equality of incidence across groups of countries. As may be seen, the total historical incidence of sudden stops has been 4.6%. Different groups of countries, however, have experienced very different realities, with the incidence being highest in Eastern Europe and the Middle East and lowest in the industrial nations. Table 3 indicates that the aggregate incidence of current account reversals rate has been 10.4%; Africa and Latin America have had the highest incidence at 16% and 13% respectively, and the industrial countries have had the lowest incidence at 2.5%.

Sudden stops and current account reversals are highly related phenomena. There is no reason, however, for their relationship to be exactly one-to-one. Indeed, because of changes in international reserves, it is possible that a country that suffers a sudden stop in capital inflows does not experience at the same time a current account reversal. For the complete sample 46.8% of countries subject to a sudden stop also faced a current account reversal. At the same time, 22.8% of those with current account reversals also experienced (in the same year) a sudden stop of capital inflows. For every one of the regions, as well as for the complete sample, Pearson χ^2 tests suggest that although there are observed differences across these phenomena, the two are statistically related.

II.1 The Empirical Model

The point of departure of the empirical analysis is a two-equation formulation of the *dynamics* of real GDP per capita growth of country j in period t. Equation (1) is a long run GDP growth equation, similar to those estimated in the new growth empirical literature; equation (2) captures the growth dynamics process.[9]

(1) $g_j^* = \alpha x_j + \beta z_j + \gamma s_j + \varepsilon_j$

(2) $\Delta g_{jt} = \lambda (g_j^* - g_{jt-1}) + \varphi v_{jt} + \gamma u_{jt} + \xi_{jt}$

Equation (1) relates long term per capita GDP growth to structural variables (x_j), policy variables (z_j), and institutional variables (s_j). The error term is assumed to be

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[9] This formulation is based on Edwards and Levy Yeyati (2005).

heteroskedastic. In equation (2), g_{jt} is the rate of growth of per capita GDP in country j in period t. The terms v_{jt} and u_{jt} are shocks, assumed to have zero mean, finite variance and to be uncorrelated among them. More specifically, v_{jt} is assumed to be an external *terms of trade shock*, while u_{jt} captures other shocks, including *sudden stops* and *current account reversals*. ξ_{tj} is an error term, which is assumed to be heteroskedastic. λ, φ, and γ are parameters that determine the particular characteristics of the growth process. Equation (2) -- which has the form of an equilibrium correction model (ECM) --, states that the actual rate of growth in period t will deviate from the long run rate of growth due to the existence of three types of shocks. Over time, however, the actual rate of growth will tend to converge towards it long run value, with the rate of convergence given by λ. The main interest from the perspective of the current paper is the effect of *sudden stops* and *current account reversals* on growth; that is, whether coefficient γ is significantly negative. In the estimation of equation (2), I used dummy variables for sudden stops and reversals.

The system (1) - (2) was estimated using a two step procedure. In the first step I estimate the long run growth equation (1) using a cross-country data set. These first stage estimates are then used to generate long-run predicted growth rates to replace g_j^*, in the equilibrium error correction model (2), with the predicted value of long term growth. In the second step, I estimated equation (2) using a GLS random effects procedure for unbalanced panels.[10] The data set used covers 103 countries, for the 1970-2004 period; not every country has data for every year, however. See the Data Appendix for exact data definition and data sources.

II.2 The Long Term Growth Equation

In estimating equation (1) for long run per capita growth, I follow the by now standard literature on growth, as summarized by Durlauf et al (2005) and Weil (2005). The data set covers 103 countries, and most variables are defined as averages for 1970-2004. For some covariates, however, data are only available for a shorter period. See the Data Appendix for details.

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[10] When fixed effects were used the results were very similar.

Over long periods of time, economic growth is the result of the combination of three fundamental factors: the accumulation of both physical capital and human capital, improvements in the utilization of the labor force, and total factor productivity (TFP) growth. As argued by Acemoglu et al (2005), among others, TFP growth and the efficiency of capital accumulation depend on institutional variables, including the protection of property rights, the independence of the judiciary, and the level of corruption. A society where property rights are protected for the population at large will generally devote more time and effort to innovating, accumulating capital, improving efficiency and increasing productivity.[11] In this institutional framework it is important that property rights are protected for *all citizens*, and not only for the elite. In that regard, a greater degree of democracy will tend to encourage efficiency and productivity growth (Acemoglu et al 2005). In the same vein, a society with an independent and efficient judiciary system will be able to solve conflicts among parties in an efficient way, without negatively affecting the innovative process. In countries where corruption is low, the private sector will be able to devote more time and effort to activities that generate greater efficiency and innovation. On the contrary, in nations where the degree of corruption is high, private sector representatives will tend to devote a significant amount of time to bribe public sector officials and to finding ways of getting around regulations and restrictions.

In the specification of the long run growth equation (1), the following *traditional covariates*, which have been used in the standard growth literature, were included:[12] (1) the log of initial (1974) GDP per capita. (2) The ratio of gross investment to GDP, as a proxy for the accumulation of physical capital. (3) The coverage of secondary education, as a proxy for human capital accumulation. (4) The degree of openness of the economy to international trade. This variable is measured as the fitted value from a gravity model of bilateral trade.[13] (5) The ratio of government consumption to GDP, as a proxy for the size of the public sector. In addition to these standard variables, the following covariates

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[11] However, if property rights protection is limited to the elite, innovation and productivity growth will not be encouraged.

[12] See, for example, Durlauf et al (2005) and Weil (2005).

[13] As Aizenman and Noy (2006) 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).

that reflect a country's *macroeconomic policy* stance and *economic structure* were included: (6) Average rate of inflation over the period under study. (7) The volatility of inflation, measured as the standard deviation of the rate of change of the CPI. (8) The volatility of the (logarithm of the) terms of trade. And, (9) the volatility of the (bilateral) real exchange rate index (RER).[14]

Finally, a set of covariates that capture the strength of a country's *institutions* were included in the estimation of equation (1) (since these variables are highly collinear, they were introduced into the analysis one at the time): (10) An index that measures the degree of protection of property rights. The higher the value of this index, the stronger is the protection of property rights. (11) An index that measures the "rule of law" in each country. A higher value of the index reflects a greater respect for the rule of law. A limitation of this index is that it is only available since 1996. (12) An index that measures the extent to which a country is able to "control corruption." The source is the ICRG; a higher value of the index means a stricter control of corrupted practices and, thus, a lower level of corruption. (13) An index that measures the degree of "law and order" in each country. A higher value of the index reflects a greater respect for law and order. (14) An index that measures the degree of independence of the judiciary in each country. As before, a higher value of the index reflects a greater degree of independence. And, (15) an index that measures the strength of democratic institutions in each country (See the Data Appendix for details).

The basic regressions results are in Table 4, where the z-statistics were obtained using robust standard errors (in all of the equations regional dummy variables were also included, but not reported). [15] All of the coefficients have the expected signs and the vast majority of them are significant at conventional levels. Moreover, the regressions in Table 4 explain approximately two thirds of the long run cross country variability in growth. These results support the main implications of the new theories of growth, and confirm previous findings by a large number of authors, including Barro and Sala-i-Martin (1995), Edwards (1992, 1998), Weil (2005), and the works discussed in

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[14] A bilateral RER rate index was used because it is available for a larger number of countries. When a multilateral RER index was used, the results were very similar to those reported in this Section.

[15] In some regressions, not reported here due to space considerations, I computed the standard errors by clustering observations by region; the results were similar to those reported here.

Acemoglu et al (2005) and Durlauf et al (2005). The coefficient of initial GDP per capita is significantly negative, indicating that there is conditional convergence. The results also indicate that both physical and human capital accumulation are important sources of growth. Higher government consumption tends to reduce long term growth. Higher average inflation and higher inflation volatility reduce growth, as do higher terms of trade volatility and higher real exchange rate volatility.

The estimated coefficients of the institutional variables in Table 4 tell a robust story. Countries with stronger institutions – economic, judicial, and political – tend to have a better growth performance over long periods of time than countries with weak institutions. For example, according to these results countries that are able to control corruption better grow faster than countries unable to control corruption; likewise, countries that have a more independent judiciary, stronger law and order, and stronger protection of property rights grow faster than nations that have problems in these institutional areas.[16]

In order to assess the relative importance of the different variables in these regressions I computed standardized beta coefficients that measure by how much the dependent variable changes, if the independent variables increase by one standard deviation.[17] The results obtained are quite revealing: in every regressions the institutional variables have the highest standardized betas, confirming that the story of long term growth differentials across countries is fundamentally – although not exclusively – a story of weak institutions.

The results presented in Table 4 provide important clues for understanding Latin America's mediocre growth performance over the years. During 1970-2004 the nations of Latin America did poorly in every one of the categories of growth determinants: capital accumulation was very low, educational achievements lagged behind those of other regions, inflation was very high and volatile, and institutions were very weak and

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[16] As a number of authors have discussed, these types of regressions have a series of limitation, including the fact that the number of potential independent variables exceed the number of observations, and that there are likely to be endogeneity problems. See Durlauf (2005). I used a number of these regressions using instrumental variables. The results, however, were not very different from those reported here. More important, there made no significant difference in the estimation of the dynamic of growth equation (2).

[17] These coefficients are not reported here due to space considerations.

inefficient (See Table A.1 in the appendix).[18] An important question, and one that I address in some detail in Section IV of this paper, refers to the way in which these determinants of long term growth are likely to evolve in Latin America during the next 10 to 15 years.

II.3 The Growth Dynamics Equation

Table 5 presents the results from the second step estimation of the growth dynamics equation (2). I use the fitted values from the estimates for long run GDP per capita growth reported in equation (4.7) in Table 4 to construct a proxy for the trend rate of growth g_j^*. When alternative specifications for computing the long run growth equation were used, the results were very similar to those reported in Table 5.[19]

The estimated coefficient of $(g_j^* - g_{jt})$ is, as expected, positive, significant, and smaller than one. The point estimates are on the high side -- between 0.74 and 0.76 --, indicating that, on average, deviations between long run trend growth and actual growth get eliminated rather quickly. For instance, according to equation (5.1), after 3 years approximately 86% of a unitary shock to real GDP growth per capita will be eliminated. As expected, the estimated coefficients of the terms of trade shock are always positive, and statistically significant, indicating that an improvement (deterioration) in the terms of trade results in a short run acceleration (de-acceleration) in the rate of growth of real per capita GDP. As may be seen from equations (5.1) and (5.2), the coefficient of the current account reversals variable is significantly negative, indicating that reversals result in a deceleration of growth. In equation (5.1) the point estimate is -1.99; with other things given, a current account reversal has resulted in almost a 2% reduction in short term growth, on average. The results in equation (5.3) refer to sudden stops. They show that the estimated coefficient of the sudden stop indicator is negative, with a point estimate –0.80. This suggests that while sudden stops have also have a negative effect on per capita growth, their impact on growth has not been as severe as the impact of current account reversal episodes.

The results in equation (5.2), where both the current account reversals and the sudden stop dummies are included, are particularly interesting: while the reversal

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[18] See, for example, Edwards (1995) and Naim (1994).
[19]   They are available on request.

dummy continue to be significantly negative, the coefficient for the sudden stop dummy is not significant. This suggests that what is costly – in terms of lower GDP per capita growth – is not a sudden stop per se; what reduces growth is the adjustment that accompanies a current account reversal. This is an important finding, since it suggests that countries that experience a sudden stop, but are able to avoid – through the de-accumulation of international reserves – an abrupt and major adjustment in their current account will not face a significant decline in growth.[20]

Table 6 contains results from the estimation of equation (2) for the Latin American and Caribbean countries only. At a general level these estimates are similar to those for the complete sample: all coefficients are significant and have the expected signs. There are however, two important differences: first, the coefficient of the growth gap $(g_j^* - g_{jt})$ is much smaller for the Latin American nations, indicating that deviations of short term growth from trend growth take longer to be eliminated. Second, and more important, the point estimates of the *reversal* and *sudden stop* variables are significantly higher for the Latin American countries than for the complete sample. For instance, according to equation (6.1) abrupt and large current account reversals have been associated, on average, with a contemporaneous decline in real per capita GDP growth of 3.6%.

The estimates in Tables 5 and 6 were obtained when the current account reversal and sudden stop variables were introduced contemporaneously into the growth dynamics regressions. When lagged values of these indicators were added to these regressions, their coefficients were not significantly different from zero.

II.4 Extensions and Robustness

I performed standard robustness tests. These included estimating the equations for alternative time periods, and alternative data sets. I also considered alternative specifications, and included additional variables that (potentially) capture other external shocks. In order to deal with possible endogeneity problems I estimated the dynamic of growth equation using a simultaneous equations procedure.

(A) Alternative Samples: I estimated equation (2) for the dynamics of growth for alternative time periods and groups of countries. The results obtained were very similar

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[20] In Subsection II.4 I address issues related to (potential) endogeneity.

to those presented above, and confirm that both current account reversals and sudden stops have been costly in terms of lower rates of growth: for the complete sample the point estimate of the current account reversal was in the vicinity of -2.0; for the Latin American sample it was approximately -3.5.

(B) Additional External Shocks: In the basic regressions presented in Tables 5 and 6 I only included two shocks' covariates: external crises and terms of trade shocks. It is possible, of course, that other shocks affect GDP's growth dynamic. In Table 7 I report growth regression results when two additional shocks are included: (a) a dummy that takes the value of one if during that year the country has been at war, and zero otherwise (See the Data Appendix for details and data sources). And (b) a global financial shock, defined as the deviation of U.S. real interest rates from its long term average (See the Data Appendix). As may be seen, the coefficients of the two new shocks are negative as expected. They are significantly so for the complete sample (equation 7.1); interestingly, for the complete sample the estimated coefficient of current account reversals is larger, in absolute terms, than that of wars.[21] This puts in context the magnitude of the costs associated with external sector crises. Notice that for Latin America (equation 7.2), the coefficient of the wars dummy is negative but not significant. More important for this paper, the estimated coefficient of the current account reversal is not affected in a significant way by this alternative specification.

(C) Endogeneity: A possible shortcoming of the results presented in Tables 5 and 6 above is that they may subject to an endogeneity bias. In order to investigate this possibility I re-estimated equation (2) using the two-step procedure suggested by Maddala (1983) and Keshk (2003) for systems where one of the endogenous variables is dichotomous. [22] The results obtained, are reported in Tables 8 both for the complete sample and the Latin American countries only. In the estimation the following instruments were used: contemporaneous and one period lagged terms of trade changes; the proportion of countries in each region (excluding the country in question) subject to a sudden and large decline of net capital inflows, lagged one period; world real interest rates lagged one and two periods; and a two-period lagged dummy that takes the value of

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[21] Notice, however, that there may be a potential endogenity problem with the wars variable. See the discussion below and the results on Table 8 that tackle potential endogeneity issues.

[22] See also Heckman (1978) and Amemiya (1978).

one if there was a war in the country's territory. As may be seen from Table 8 the main results reported above are confirmed: external crises, and in particular, current account reversals, have been very costly in the world in general (equation 8.1), and in Latin America in particular (equation 8.2). Indeed, the point estimates of the current account reversals' coefficient are quite similar to those reported in Tables 5 and 6.

III. **What Determines External Crises?**

The results in Section II may be summarized as follows: (a) Long term growth is the result of four broadly defined forces: capital accumulation (both physical and human), policies that promote stability and efficiency, structural variables, and the strength of institutions. And (b), external crises have been extremely costly in Latin America (and other regions, for that matter), and have resulted in significant reductions in GDP growth rates, relative to their long term trend. In light of these results, a natural follow-up question is: What are the determinants of external crises? Why are some countries more prone to experiencing sudden stops and current account reversals than others? These questions are addressed in this Section, where I estimate a series of variance component probit regressions on the probability of external crises.

III.1 *The Empirical Model*

Consider the following variance component probit model for the probability of a sudden stop or current account reversal crisis:

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(3) \qquad y_{tj} \;=\; \begin{cases} 1, & \text{if } y_{tj}^{*} > 0, \\[2em] 0, & \text{otherwise.} \end{cases}
$$

$$
(4) \qquad y_{tj}^{*} \;=\; \alpha\omega_{tj} + \varepsilon_{tj}.
$$

Variable y_{tj} is a dummy variable that takes a value of one if country j in period t experienced a current account reversal (or a sudden stop), and zero if the country in

question did not experience a crises. According to equation (3), whether the country experiences a crisis is assumed to be the result of an unobserved latent variable y_{tj}^*. y_{tj}^*, in turn, is assumed to depend linearly on vector ω_{tj}. The error term ε_{tj} is given by a variance component model: $\varepsilon_{tj} = \nu_j + \mu_{tj}$. ν_j is iid with zero mean and variance σ_ν^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 versions of the model in equations (3) and (4).

One of the advantages of probit models is that they are highly non-linear; the marginal effect of any independent variable on the probability is conditional on the values of *all* covariates. This means that if the value of one of the independent variables changes, the marginal effect of all of them will also change. Denoting the (normal) cumulative probability distribution by Φ, then the probit model is defined by:

$$(5) \qquad \Pr(y_{jt} \neq 0 \mid \omega_{jt}) = \Phi(\alpha \omega_{jt})$$

The marginal effect of a particular variable z_1 on the probability may be calculated as the slope of the probability function, evaluated at a specific set of values of the covariates $\omega_{jt}s$. Assume that the estimated probit coefficient of z_1 is α_1, and that we want to evaluate the marginal effect of z_1 at a point where covariates have values captured by vector $\tilde{\omega}$. In this case, the marginal effect of z_1 (evaluated at $\tilde{\omega}$) is given by:

$$(6) \qquad \frac{\partial \Phi}{\partial z_1} = \Phi'(\alpha \tilde{\omega}) \alpha_1.$$

Equation (4) may be used to evaluate how a change in particular variable – a "large" current account deficit, say – affects the probability of a crisis, under alternative values of $\tilde{\omega}$.

III.2 Specification

In determining the specification of this probit model I followed the literature on external crises, devaluations, sudden stops, and current account reversals.[23] In the base-case specification I included the following covariates, all of which are available for a large number of countries and years:[24]

- The ratio of the current account deficit to GDP, lagged one period.
- The lagged ratio of the country's fiscal deficit relative to GDP.
- The country's net international investment position relative to GDP. This indicator measures the difference between foreign assets held by nationals (government and private sector) and domestic assets held by foreigners, relative to GDP. A negative number indicates that the country in question has a negative *net external position*, or in common language is a "net debtor." This indicator was constructed from data provided by Lane and Milesi-Ferreti (2006). The coefficient of this variable is expected to be negative in the estimation of the probit equations.
- The lagged value of an index that measures the effect of "contagion." This contagion index is defined as the relative occurrence of capital flow contractions in each country's "reference group." The reference group, in turn, is defined for most countries as their region. 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. The contagion variable is calculated, for each year, as the percentage of countries, in the relevant group, that experienced a contraction in net capital inflows of at least 3% of GDP. 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

[23] See, for example, Calvo et al (2004), Glick and Hutchison (2005), Edwards (2004a, 2004b), and Frankel and Cavallo (2004). See also Eichengreen et al (2006).
[24] See, for example, Frankel and Rose (1996), Milesi-Ferreti and Razin (2000) and Edwards (2002).

similar country experiences a capital flow contraction, capital flows to the country in question will tend to decline, increasing the likelihood of a crisis.[25]

- 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.

- 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 that takes the value of one if that particular country has a flexible exchange rate regime, and zero otherwise. The classification of exchange rate regimes is based on de facto information, as compiled by Levy-Yeyati and Sturzenegger (2003).

- Foreign direct investment (FDI) relative to GDP. This variable measures the composition of capital inflows. To the extent that FDI represents a longer term commitment than portfolio capital flows, it is expected that its coefficient will be negative.

- A measure of the degree of ease/tightness of monetary policy, lagged one year. This variable is calculated as the difference between the rate of growth of domestic credit and nominal GDP (lagged one period). The higher (lower) the value of this variable, the easier (tighter) is monetary policy.

- International reserves as a proportion of the country's total external liabilities. This indicator was constructed from data provided by Lane and Milesi-Ferreti (2006). To the extent that a high level of international reserves is seen as an insurance policy, the coefficient of this variable is expected to be negative in the estimation of the probit equations.

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[25] As before, there are six groups. Five of them are strictly regional – Latin America, Asia, Middle East and North Africa, Eastern and Central Europe, and Africa --, while the sixth refers to "advanced" nations and, thus, covers more than a region.

III.3 Results

The basic results are in Tables 9 and 10, for current account reversals and sudden stops respectively. As may be seen, most estimated coefficients are significant at conventional levels, and the vast majority has the expected sign.

These estimates indicate that a higher current account deficit increases the probability of a crisis. Higher fiscal deficits increase the probability of a crisis, and higher net external assets reduce this probability. The results also confirm the presence of a "contagion" effect, and indicate that an improvement in the terms of trade reduces the probability of both a reversal and a sudden stop. Improvements in the terms of trade reduce the probability, while an increase in world (real) interest rates decreases the likelihood of a crisis.

These results show that countries with a flexible exchange rate regime have a lower probability of experiencing a current account reversal or a sudden stop. The regressions in Tables 9-10 also indicate that the composition of capital flows matter: higher FDI (as a proportion of GDP) reduces the probability of a crisis. Interestingly, a higher stock of international reserves does not reduce the likelihood of experiencing a crisis.

In order to gain further insights into the way in which the different covariates affect the probability of a crisis, I computed *marginal effects* of the different variables, and I evaluated them for different values of the covariates vector. Four results stand up from this exercise:[26]

- Most of the marginal effects are quite small.
- The largest marginal effect (in absolute terms) corresponds to the flexible exchange rate variable. For the average country, moving from a pegged to a flexible exchange rate reduces the probability of a crisis between 2 and 4 percentage points.
- The marginal effect of contagion varies according to the value of the current account deficit. The higher the deficit, the higher the marginal effect of contagion.

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[26] These marginal effects are not reported here due to space considerations. They are available on request.

- The marginal effect of flexible rates becomes more negative – that is, the benefit of adopting a flexible rate increases --, for larger current account deficits.

The estimation results reported in Tables 8 and 9 help explain why Latin America has been so prone to crises. As is pointed out in Section IV of this paper, until very recently, most countries of the Latin American region had done very poorly in most determinants of external crises: current account and fiscal deficits were very high, FDI was low, monetary policy was loose, and the majority of countries had (and defended) pegged nominal exchange rates (See Table 11).

IV. <u>Reflections on Latin America's Future</u>

The analysis presented in the preceding Sections has identified the most important factors that affect economic growth, and the variables that determine the probability of a country experiencing current account reversals and sudden stops of capital inflows. At the light of these results, an important question refers to Latin America's economic future: Is the region likely to continue suffering recurrent crises and mediocre growth? Or, on the contrary, will things change for the better, with growth picking up, and crises subsiding?

I first discuss *long term growth*: In spite of the reforms implemented in the 1990s, most Latin American countries have failed to make significant progress in most areas that, according to academic research (including the results in Section II of this paper), affect long term growth. In fact, improvements have only been achieved in three areas: (a) macroeconomic instability has declined (i.e. inflation has declined and has become less volatile); (b) the extent of democracy has improved; and (c) openness to international trade has increased. From a comparative perspective, however, the Latin American countries continue to lag behind the Asian and advanced nations with respect to both macroeconomic stability and openness (See the data in Table A.1).

What is troublesome is that there has been very little or no progress on the other – and, as it turns out, more important -- determinants of long term growth. The rate of investment has not increased since the early 2000s (in fact it is almost the same as in the

1970s); human capital accumulation – measured by the quality of education -- continues to be deplorable; and the quality of institutions is low and has not exhibit significant improvements. Moreover, according to a new data set on objectively measured indicators of efficiency, collected by the World Bank, the vast majority of the Latin American countries do very poorly in variable such as the number of days it takes to start a business, the efficiency of bankruptcy procedures, flexibility of employment, number of shareholders suits, and red tape for exporting, among others (See, www.doingbusiness.org).[27]

The low quality of Latin America's educational system deserves especial attention in any discussion on prospects for long term growth. According to a number of international studies the Latin American countries are at the bottom of the world when it comes to education – and in particular when it comes to mathematics and science. For instance, according to the PISA tests administered by the OECD in 2003, Brazilian students ranked last in mathematics, among 40 countries. In the same tests Mexico was in the 37th position and Uruguay, the best ranked Latin American country, came in 35th out of 40 countries. The Latin American students did particularly poorly in the "problem solving" part of these tests. This reflects the old-fashioned nature of the region's educational systems, where memorizing and learning by heart are still emphasized. Sadly, results are not much better in reading ability; again, the Latin America nations were at the bottom of the 40 country sample.[28] According to the prestigious *Trends in International Mathematics and Science Study* (TIMSS), in 2003 Chile's eighth graders ranked 39th out of 44 nations in mathematics; in science they did only slightly better, ranking 37th. Interestingly, many of the nations that performed better than Chile in these standardized tests have a lower income per capita. Latin American universities don't do any better. According to *The Times of London* 2004 survey, not a single Latin American university is ranked among the top 200 in the world. This contrasts sharply with China and India, two countries with several world class universities, especially in science and

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[27] A possible objection of the results in table 4 is that the institutional variables are measured as "subjective indexes." The Doing Business data are objective, in the sense that they use actual measures on the cost of doing business in different countries. These Doing Business data are available for a few years only, and thus cannot be used in time series or panel regressions.

[28] See, www.pisa.oecd.org

engineering. Thailand, Turkey, and Singapore also have first rate universities in the sciences, including biotechnology.

This discussion suggests that for long term growth to take off in the years to come, the Latin American nations will need to make significant progress in almost every area that affects economic performance. In particular, very significant improvements will need to be achieved in the area of institutional strength (remember that the standardized coefficients analysis discussed in Section II indicate that institutional strength is the single most important determinant of long term growth). In my view, however, it is unlikely that this will happen across the board. Indeed, the fact that the vast majority of the countries in the region have failed to move forward in these areas during the last 20 years, suggests that there is very little political will to tackle these impediments to growth. Moreover, recent elections of populist or quasi-populist Presidents in an increasingly large number of countries suggests that in some nations there is likely to be some backtracking on the basic (and mild) reforms of the 1990s; indeed, the political landscape of the region suggests that the road ahead doesn't look very auspicious when it comes either to economic or institutional reforms. Of course, economic performance also affects politics. The fact that growth (and employment creation) has been so mediocre since the early 1990s explains, at least partially, why Latin American voters have elected populist politicians during the last few years.

In my view, the most likely scenario in the next 10 to 15 years is one where Latin America, as a group, slowly falls further behind other regions in the world – Asia and Eastern Europe – in terms of efficiency, quality of education, and institutional strength. The result of this, of course, is that growth itself will very likely continue to be mediocre. And, if growth remains low, the creation of well paying jobs will continue to lag behind, and social conditions will not improve significantly.

This doesn't mean, of course, that every country in the region will struggle and retrogress. Indeed, it is highly likely that a handful of nations – Chile, the Dominican Republic, El Salvador, among others – will be able to press forward with further reforms and institutional strengthening, and in this way they will be able to move further towards prosperity. This, however, is likely to be the exception rather than the norm.

I now turn to the determinants of *external crises*. In contrast with long term growth, almost every country in the Latin American region has made dramatic progress in this area. Current account deficits have declined significantly, fiscal imbalances have been reduced, the net external position has improved, monetary policy has become restrained, and the majority of the countries have adopted flexible exchange rates. Table 11 shows the evolution between 1984 and 2004 of some of the most important variables that determine the probability of experiencing an external crisis

The evolution of these indicators suggests quite clearly that the probability of crises – either current account reversals or sudden stops – has declined sharply. To the extent that progress in these areas is maintained in the years to come – and I believe that it will be maintained – the likelihood that a "typical" Latin American country will experience in the future a major external collapse, similar to the Mexican crisis of 1994-95, or the Argentine crisis of 2001, is very low.

This decline in the probability of experiencing a crisis has very important implications for the region's economic well being. Indeed, the regressions in Section II indicate that, on average, and with other things given, each current account reversal crisis in Latin America reduced growth by 3.6 percentage points in that same year. Over a generation, the accumulated difference in GDP per capita between a country that has no crises and one that has 1.3 crises per decade can be very substantial (1.3 crises per decade is the average for the region for 1970-2004). The actual long run gap between GDP per capita in a no-crises country and GDP per capita in a crises country will depend on the trend rate of growth itself, and the number of current account reversal crises experience by the country in question. As an illustration, consider the case of a country with a long run trend growth rate of GDP per capita of 1%, and 1.3 external crises per decade. The accumulated cost, in terms of GDP per capita for a generation is 16% of GDP. That is, after 25 years the "typical country" will have a GDP per capita 16% lower than that of a country with no crises. See Figure 1 for simulation results; I have assumed that there are no crises during the first ten years. As may be seen from this Figure, after 25 years (a generation) the gap in GDP per capita between a country with no crises and the "typical" country is very substantial.

V. <u>Concluding Remarks</u>

In this paper I have used historical data to analyze the relationship between crises and growth in Latin America. I used econometric estimates to calculate by how much the region's GDP per capita has been reduced as a consequence of the recurrence of external crises. I also used variance component probit models to analyze the determinants of major balance of payments crises. At the light of these historical results, I discussed the region's economic future.

The main conclusion of this paper is that it is unlikely that in the future – by this I mean next decade and a half, or so -- Latin America will, on average, experience a major improvement in long run growth. The reason for this is that most countries in the region show no political willingness to embark on the reforms required to strengthen their institutions – including, in particular, the protection of property rights, the rule of law, corruption controls and the efficiency and independence of the judiciary. In fact, the recent election of populist Presidents in a number of countries suggests that the region has no political appetite for further efficiency-enhancing and institutional-strengthening reforms. Indeed, a number of new leaders have indicated that they will undo many of the reforms that were undertaken during the 1990s.

Backtracking and lack of reforms will not be universal. It is possible, of course, that some countries will do relatively well, and will make progress in catching up with the advanced nations – Chile and El Salvador are particularly promising cases. This, however, will not be the norm; most Latin American countries are likely to fall further behind in relation to the Asian countries and other emerging nations.

Not everything, however, is grim. The econometric analysis presented in this paper also suggests that in the years to come fewer Latin America countries will be subject to the type of catastrophic and very costly currency crises that affected the region in the past. These crises cost the Latin American countries close to 16% of GDP over a generation. In recent years, most nations have greatly improved their macroeconomic policies. External debts have declined, current account and fiscal deficits are in check, FDI has increased, monetary policy has been restrained, and most nations have adopted some version of flexible exchange rates. Every one of these measures has reduced the likelihood of major crises.

Once these results on long term growth and crises are put together a simple, and yet powerful, conclusion emerges: it is very likely that Latin America's future will be one of "No crises, and modest growth."
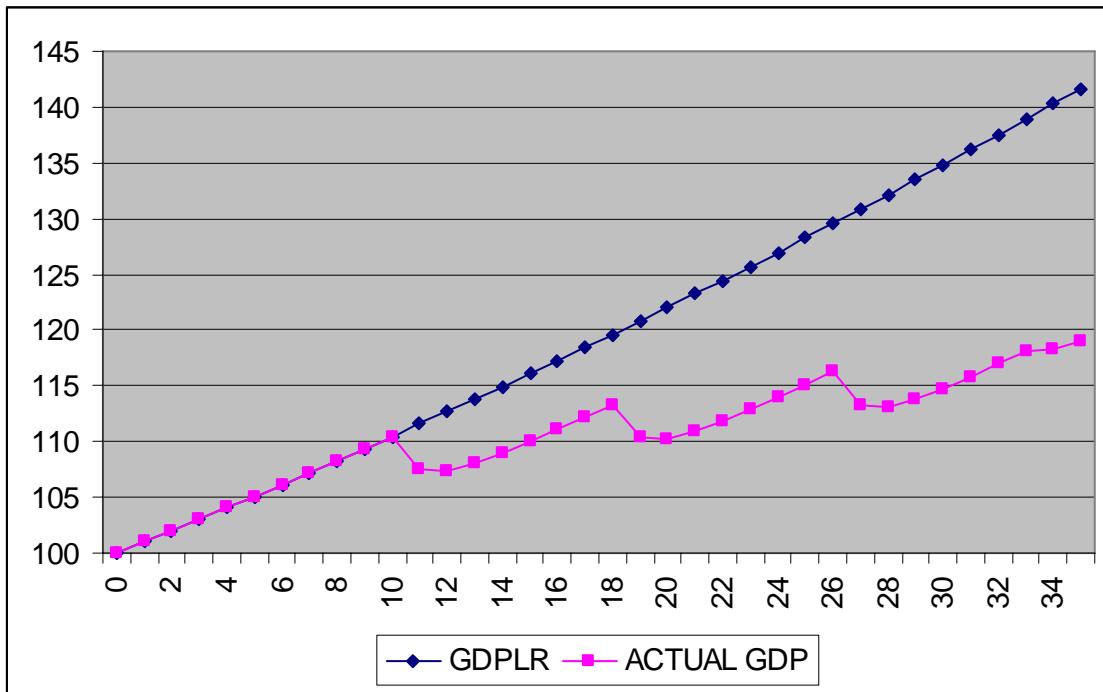
Figure 1: GDP per capita Simulations, with and without current account reversal crises

Table 1
Per Capita GDP Growth in Latin America, 1970-2004:
A Comparative Perspective*

	1970-2004	1982-2004	2000-2004
Latin America and Caribbean	1.48	1.10	1.08
Latin America	1.01	0.51	0.88
Asia	2.95	2.99	2.78
Asian Tigers + China + India	4.93	4.81	4.40
Asian Tigers	4.83	4.44	3.69
World	1.76	1.54	2.50
Industrialized Countries	2.29	1.97	1.80

*:Cross-Country Average per capita GDP growth. For sources, see Data Appendix.

Table 2
Incidence of Sudden Stops, 1970-2004

	No sudden stop	Sudden stop
Industrial Countries	96.23	3.77
Latin American and Caribbean	95.62	4.38
Asia	97.74	2.26
Africa	94.61	5.39
Middle East	92.16	7.84
Eastern Europe	92.31	7.69
Total	95.45	4.55
Observations	2240	
Pearson		
Uncorrected chi2 (5)	10.073	
Design-based F(5, 11195)	2.014	
P-value	0.073	

Table 3
Incidence of Current Account Reversals, 1970-2004

	No Reversal	Reversal
Industrial Countries	97.54	2.46
Latin American and Caribbean	86.86	13.14
Asia	91.70	8.30
Africa	83.82	16.18
Middle East	86.93	13.07
Eastern Europe	92.31	7.69
Total	89.64	10.36
Observations	2240	
Pearson		
Uncorrected chi2 (5)	70.692	
Design-based F(5, 11195)	14.132	
P-value	0.000	

Table4
Long Term Growth Equations, 1970-2004

	EQ.1	EQ.2	EQ.3	EQ.4	EQ.5	EQ.6	EQ.7	EQ.8	EQ.9	EQ.10
Initial GDP	-0.6067	-0.5195	-0.6929	-0.6308	-0.7492	-0.6837	-0.7452	-0.7941	-0.4824	-0.5347
	(-4.89) ***	(-3.87) ***	(-5.88) ***	(-5.3) ***	(-6.77) ***	(-5.97) ***	(-5.86) ***	(-5.62) ***	(-3.9) ***	(-4.6) ***
Gov. Con. / GDP	-1.9776	-1.6436	-1.2147	-1.1566	-0.9665	-2.1869	-1.8135	-1.5903	1.1823	0.5369
	(-1.56)	(-1.67) *	(-1.12)	(-1.16)	(-1.04)	(-1.73) *	(-1.79) *	(-1.55)	(1.07)	(0.6)
Gross Inv. / GDP	0.0948	0.0951	0.0693	0.0813	0.0630	0.0799	0.0712	0.0889	0.1052	0.0963
	(2.16) **	(2.22) **	(1.48)	(1.77) *	(1.35)	(1.9) *	(1.71) *	(2.15) **	(2.35) **	(2.21) **
Secondary Education	2.5631	1.0528	1.6628	1.5416	2.2043	1.7256	0.7560	0.8292	2.0959	2.5515
	(3.02) ***	(1.3)	(1.67) *	(1.62)	(2.46) **	(2.24) **	(1.02)	(0.93)	(2.53) **	(3.07) ***
Openness	0.0169	0.0122	0.0091	0.0229	0.0131	0.0146	0.0108	0.0083	0.0171	0.0156
	(2.63) ***	(2.26) **	(1.53)	(1.56)	(2.11) **	(2.38) **	(1.87) *	(1.46)	(2.6) **	(2.44) **
Terms of Trade Volatility	--	-0.0973	--	--	--	--	--	--	--	--
		(-4.35) ***								
Corruption	--	--	0.3024	--	--	--	--	--	--	--
			(1.79) *							
Democracy	--	--	--	0.1015	--	--	--	--	--	--
				(2.72) ***						
Judiciary Independence	--	--	--	--	0.2013	--	--	--	--	--
					(2.21) **					
Law and Order	--	--	--	--	--	0.2348	--	--	--	--
						(2.17) **				
Property Rights	--	--	--	--	--	--	0.5056	--	--	--
							(4.12) ***			
Rule of Law	--	--	--	--	--	--	--	1.0493	--	--
								(3.72) ***		
Inflation	--	--	--	--	--	--	--	--	-0.0044	--
									(-2.7) ***	
RER Volatility	--	--	--	--	--	--	--	--	--	-1.2873
										(-2.15) **
Inflation Volatility	--	--	--	--	--	--	--	--	--	-0.0009
										(-1.78) *
R-2	0.5847	0.672	0.6291	0.6097	0.6394	0.6231	0.6587	0.6552	0.5981	0.611
Number Observations	103	100	92	94	86	97	98	103	101	101

Robust z-statistics are reported in parentheses. Regional dummy variables included, but not reported. *** significant at 1%; ** significant at 5%; * significant at 10%. See the text for details.

Table 5
The Dynamics of Growth, 1970-2004:
GLS, Random Effects Estimates

	Eq. 5.1	Eq. 5.2	Eq. 5.3
Growth Gap	0.756	0.751	0.743
	(26.04) ***	(25.14) ***	(24.62) ***
Change in Terms of Trade	0.087	0.089	0.082
	(11.36) ***	(11.72) ***	(10.86) ***
Reversal	-1.997	-2.059	..
	(-5.47) ***	(-5.56) ***	
Sudden Stop	..	-0.132	-0.805
		(-0.26)	(-1.95)*
R-squared			
whitin	0.4750	0.4764	0.4606
between	0.0775	0.0229	0.0170
overall	0.4441	0.4443	0.4307
Number of observations	2342	2240	2241
Number of groups	94	92	93

Robust z-statistics are reported in parentheses. *** significant at 1%; ** significant at 5%; * significant at 10%.

Table 6
The Dynamics of Growth in Latin America, 1970-2004:
GLS, Random Effects Estimates

	Eq 6.1	Eq 6.2	Eq 6.3
Growth Gap	0.679	0.685	0.654
	(11.85) ***	(11.95) ***	(10.83) ***
Change in Terms of Trade	0.095	0.095	0.080
	(6.56) ***	(6.11) ***	(5.08) ***
Reversal	-3.601	-3.394	..
	(-5.84) ***	(-5.28) ***	
Sudden Stop	..	-1.624	-2.806
		(-1.63)	(-2.72) ***
R-squared			
whitin	0.4320	0.4375	0.3920
between	0.0222	0.0151	0.0173
overall	0.4206	0.4241	0.3780
Number of observations	557	548	548
Number of groups	20	20	20

Robust z-statistics are reported in parentheses. *** significant at 1%; ** significant at 5%; * significant at 10%.

Table 7
The Dynamics of Growth, 1970-2004:
Additional Shock
(***GLS, Random Effects Estimates***)

	Eq 7.1 (Complete Sample)	Eq. 7.2 (Latin America)
Growth Gap	0.765	0.715
	(26.22) ***	(12.41) ***
Change in Terms of Trade	0.085	0.090
	(11.26) ***	(6.51) ***
Reversal	-1.936	-3.535
	(-5.37) ***	(-5.59) ***
Deviation of World Real Interest	-0.155	-0.354
	(-3.73) ***	(-3.51) ***
War Dummy	-0.428	-0.347
	(-2.24) **	(-0.75)
R-squared		
within	0.4794	0.4547
between	0.1877	0.0089
overall	0.4478	0.4420
Number of observations	2341	557
Number of groups	94	20

Robust z-statistics are reported in parentheses. *** significant at 1%; ** significant at 5%; * significant at 10%.

Table 8
The Dynamics of Growth, 1970-2004:
Two-Steps Maddala Procedure

	Eq 8.1 (Complete Sample)	Eq. 8.2 (Latin America)
Growth Gap	0.773	0.831
	(32.2) ***	(8.66) ***
Change in Terms of Trade	0.114	0.173
	(11.26) ***	(4.51) ***
Reversal	-1.709	-4.273
	(-4.16) ***	(-2.76) ***
R square	0.4317	0.3913
Adjusted R square	0.4309	0.3878
Pseudo R square from Probit	0.0687	0.0772
Number of observations	2171	530

Corrected t statistics are reported in parentheses. For list of instruments, see the text. *** significant at 1%; ** significant at 5%; * significant at 10%.

Table 9
Variance Component Probit on the Probability of a Current Account Reversal,
1970-2004

	Eq. 9.1	Eq. 9.2	Eq. 9.3	Eq. 9.4	Eq. 9.5
Contagion	0.009	0.012	0.010	0.012	0.010
	(2.33) **	(2.95) ***	(2.6) ***	(3.05) ***	(2.36) **
Change in Terms Of Trade	0.008	0.020	0.006	0.007	0.009
	(4.78) ***	(6.89) ***	(3.54) ***	(3.64) ***	(5.03) ***
Exchange Rate Regime	-0.127	-0.288	-0.274	-0.194	-0.194
	(-1.27)	(-2.79) ***	(-2.82) ***	(-1.83) *	(-1.72) *
World (Real) Interest Rates	0.039	0.021	0.036	..	..
	(2) **	(1.02)	(1.87) *		
Domestic Credit	0.003	0.002	0.003		
	(2.11) **	(1.26)	(2.21) **		
Current Account	0.092	..	..	0.100	0.131
	(15.49) ***			(14.07) ***	(13.78) ***
Fiscal Deficits	..	0.026	..	..	..
		(3.37) ***			
Net External Assets	..	..	-0.004	..	..
			(-6.31) ***		
International Reserves	..	..	..	0.001	--
				(0.24)	
FDI (Proportion of GDP)	..	..	..	..	-0.065
					(-6.33) ***
σ_ν	0.3116	0.3700	0.2743	0.3500	0.4515
ρ	0.0885	0.1204	0.0700	0.1091	0.1693
Likelihood-ratio test of ρ =0 (p - value)					
Number of observations	2615	2023	2314	2385	2353
Number of groups	146	129	124	124	120

Absolute value of z statistics is reported in parentheses. All repressors are one period lagged. Constant term is included, but not reported. *** significant at 1%; ** significant at 5%; * significant at 10%. ρ is σ^2_ν /(σ^2_ν + 1).

Table 10
Variance Component Probit on the Probability of a Sudden Stop, 1970-2004

	Eq. 9.1	Eq. 9.2	Eq. 9.3	Eq. 9.4	Eq. 9.5
Contagion	0.008	0.006	0.006	0.004	0.003
	(1.64) *	(1.15)	(1.63)*	(0.86)	(0.59)
Change in Terms Of Trade	0.009	0.002	0.003	0.003	0.004
	(2.38) **	(1.27)	(1.82)*	(1.73) *	(2.1) **
Exchange Rate Regime	-0.243	-0.203	-0.188	-0.141	-0.136
	(-1.78) *	(-1.65)*	(-1.67)*	(-1.07)	(-1.01)
World (Real) Interest Rates	0.031	0.024	--	..	..
	(1.11)	(0.95)			
Domestic Credit	0.002	0.000	--	..	..
	(1.29)	(0.22)			
Current Account	..	..	0.058	0.060	0.070
			(10.11)***	(8.95) ***	(8.79) ***
Fiscal Deficits	0.0160	..	--	..	..
	(1.71) *				
Net External Assets	..	-0.0024	--	..	..
		(-3.25) ***			
International Reserves	..	..	--	0.004	0.005
				(1.61)	(1.98) **
FDI (Proportion of GDP)	..	..	--	..	-0.023
					(-2.62) ***
σ	0.3972	0.4171	0.330	0.3535	0.3914
ρ	0.1363	0.1482	0.125	0.1111	0.1328
Likelihood-ratio test of ρ =0 (p - value)					
Number of Observations	2015	2301	2626	2372	2340
Number of Groups	129	124	147	124	120

Absolute value of z statistics is reported in parentheses. All repressors are one period lagged. Constant term is included, but not reported. *** significant at 1%; ** significant at 5%; * significant at 10%. ρ is $\sigma^2_\nu /(\sigma^2_\nu + 1)$.

Table 11
Evolution of Crises Determinants in Latin America, 1984-1994

	1984	1994	2004
Current account deficit to GDP	4.9%	5.4%	1.1%
NIIP over GDP	-56.5%	-58.8%	-50.5%
Fiscal deficit to GDP	8.7%	2.2%	1.1%
Percentage flexible exchange rates	21.0%	31.6%	41.0%
FDI to GDP	0.3%	3.0%	3.2%
Contagion frequency	25.0%	18.0%	15.0%
Excess supply of credit	6.8%	3.4%	-1.7%

DATA APPENDIX

A.1   Means of Long Term Determinants of Growth (1970-2004)*

	Industrial Countries	Latin America & Caribbean	Asia	Africa	Middle East	Eastern Europe
Gov. Con. / GDP	0.102	0.346	0.146	0.178	0.157	0.406
	(0.05)	(0.28)	(0.03)	(0.11)	(0.10)	(0.26)
Gross Inv. / GDP	23.645	21.243	25.654	19.408	24.320	23.984
	(2.86)	(3.16)	(6.40)	(5.72)	(3.73)	(4.12)
Secondary Education	0.788	0.401	0.365	0.138	0.455	0.550
	(0.12)	(0.16)	(0.16)	(0.13)	(0.19)	(0.23)
Openness	6.612	5.859	15.525	5.724	14.458	2.966
	(11.48)	(6.44)	(31.18)	(6.74)	(9.03)	(2.55)
Terms of Trade Volatility	6.136	14.245	12.663	19.255	17.444	8.935
	(2.09)	(4.51)	(5.40)	(8.53)	(8.28)	(0.47)
Democracy	8.865	3.655	2.841	-1.395	1.019	4.495
	(2.77)	(4.85)	(2.61)	(5.29)	(5.11)	(3.01)
Judiciary Independence	7.849	3.359	5.013	4.341	6.310	5.167
	(1.21)	(1.88)	(1.74)	(1.52)	(1.48)	(0.87)
Law and Order	9.190	4.664	6.004	4.704	7.404	7.056
	(1.04)	(1.33)	(1.94)	(1.98)	(0.80)	(0.34)
Property Rights	7.798	4.368	5.022	4.176	5.575	5.850
	(0.82)	(1.09)	(1.56)	(1.09)	(0.89)	(1.04)
Rule of Law	1.660	-0.204	0.154	-0.572	0.521	0.465
	(0.42)	(0.59)	(0.88)	(0.53)	(0.62)	(0.38)
Inflation	6.732	124.513	7.648	17.760	12.302	34.118
	(4.16)	(221.43)	(2.92)	(15.03)	(15.01)	(19.61)
Inflation Volatility	5.106	338.825	6.080	16.960	14.924	45.962
	(3.86)	(683.21)	(2.32)	(15.32)	(25.57)	(48.81)

*: The figures are means for 1970-2004, or for the longest period for which there are available data.
Standard deviations are reported in parentheses.

A.2   Data definitions and sources

Variable	Description	Source
Consumer Price Index (CPI)	Consumer Price Index	World Development Indicators
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)
Corruption	Corruption index in the International Country Risk Guide (ICRG)	Political Risk Services
Current Account	Current Account	World Development Indicators
Degree of Openness	Fitted value from a gravity model of bilateral trade	Author's construction.
Deviation of U.S. Real Interest Rate	U.S. Real Interest Rate minus U.S. Real Interest Rate average 1970 -2004	Author's construction
Direct Foreign Investment	Direct Foreign Investment	World Development Indicators
Ease/Tightness of Monetary Policy	Difference between the rate of growth of nominal domestic credit and nominal GDP.	Author's construction.
Exchange Rate Regime	Levy Yeyati and Sturzenegger de facto exchange rate regimes classification	Levy Yeyati and Sturzenegger (2003)
External Liabilities	External Liabilities	Lane and Milesi-Ferreti (2006)
Fiscal Deficit	Fiscal Deficit	World Development Indicators
Government Consumption	Government Consumption	World Development Indicators
Gross Domestic Product (GDP)	Gross Domestic Product (GDP)	World Development Indicators
Independence of Judiciary System	Judiciary Independence	Economic Freedom of the World 2006 Annual Report
Inflation	Annual change in CPI	Author's construction.
International Investment Position	Difference between foreign assets held by nationals government and private sector) and domestic assets held by foreigners	Author's construction usingdata from Lane and Milesi-Ferreti (2006).
International Reserves	International Reserves	Lane and Milesi-Ferreti (2006)
Investment	Investment	World Development Indicators
Law and Order	Law and Order	Economic Freedom of the World 2006 Annual Report
Net Capital Inflow	Net Capital Inflow	World Development Indicators
Nominal Domestic Credit	Nominal Domestic Credit	World Development Indicators
Nominal GDP	Nominal GDP	World Development Indicators
Protection of Property Rights	Legal System & Property Rights	Economic Freedom of the World 2006 Annual Report
Real Exchange Rate (RER)	Real Exchange Rate (RER)	World Development Indicators
Reversal	Reduction in the current account deficit of at least 4% of GDP in one year. Initial balance has to be indeed a deficit.	Author's construction based on data of current account deficit (World Development Indicators)
Rule of Law	Rule of Law	Worldwide Governance Indicators, World Bank
Secondary Education	Total gross enrollment ratio for secondary education.	Barro and Lee (2001)

Strength of Democratic Institutions	DEMOC: general openness of political institutions	Polity IV Project database
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
U.S. Real Interest Rate	Treasury Bill minus inflation	International Monetary Fund
Volatility Inflation	Standard deviation of the rate of change of the CPI.	Author's construction.
Volatility RER	Standard deviation of the rate of change of the RER	Author's construction.
Volatility Terms of Trade	Standard deviation of the rate of change of the Terms of trade	Author's construction.
War Dummy	Dummy = 1 if country participate in a any type of conlict during the year. 0 otherwise.	UCDP/PRIO Armed Conflicts Dataset
World Interest Rate	U.S. Real Interest Rate	International Monetary Fund

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