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Real Effects of Financial Crises in Latin America

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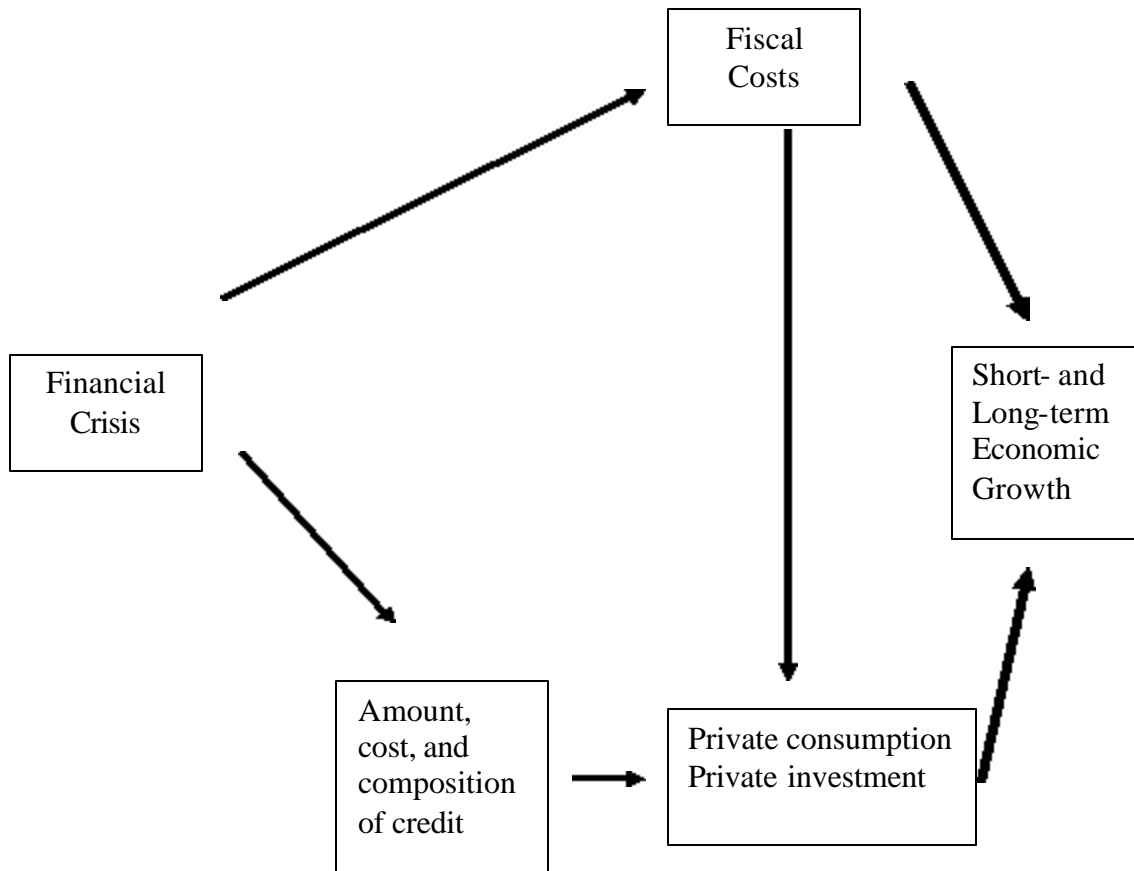Universidad Nacional de La Plata

Introduction

Financial crises have become part of the economic landscape around the world and in Latin America in particular. Substantial effort is being nowadays devoted to understand and prevent crises, but less work has been advanced on their economic consequences. The conventional wisdom has been that crises inflict profound and lasting, harmful effects throughout the economy, yet only fragmentary evidence is available. This chapter is aimed to fill this void by bringing forward an integrated analysis of the different channels through which financial crises can hit the economy, providing in each case a basic conceptual framework, a succinct review of the existing international evidence, and some new results with an emphasis in Latin American and Caribbean nations.

The structure of the chapter will be as follows: In Section 1, some introductory definitions regarding the elusive concept of financial crisis are provided; the effects on the banking system's balance sheet will be the subject of Section 2, with an emphasis on four recent Latin American crises. This analysis will set the ground for subsequent work. Section 3 will present evidence on crisis-related fiscal costs and their effectiveness. Section 4 will go over the short- and medium-term macroeconomic effects, with Section 5 devoted to long-term economic growth. Some conclusions and lessons close.

Before proceeding it might be helpful to visualize the link between financial crises and economic performance:

Financial crisis and its economic consequences

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                            ┌──────────┐
                            │ Fiscal   │
                            │ Costs    │
                            └──────────┘
                        ↗                ↘
                                          ┌──────────────┐
┌──────────┐                              │ Short- and   │
│Financial │                              │ Long-term    │
│Crisis    │                              │ Economic     │
└──────────┘                              │ Growth       │
          ↘                               └──────────────┘
            ┌──────────────┐   ┌───────────────────┐
            │ Amount,      │   │ Private consumption│
            │ cost, and    │ → │ Private investment │
            │ composition  │   └───────────────────┘
            │ of credit    │
            └──────────────┘
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Regardless of the origin of the crisis, once in motion, it gives rise to fiscal costs associated to bailout policies and to changes in the overall structure of the commercial banking system with direct effect on private expenditure. These public and private channels jointly cause the rate of economic growth to vary. [1]

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[1] Of course, financial crises are typically accompanied by a host of other phenomena, such as productive adverse shocks, inflation, currency devaluations, cuts in international credit, revision of economic

Section 1: Defining financial crises

Some methodological pitfalls come up at the moment of establishing what a crisis is and how long and pervasive its effects are. This is a sensitive matter from a public point of view, once such costs are crucial for the design of anti-crisis policies and its benefit-cost evaluation.

Defining a financial crisis is a tricky matter. As in any industry, situations of distress in which some individual firms have difficulties in meeting regulatory requirements, or are even closed, can occur at times without being automatically labelled as a large-scale crisis prone to disrupt the normal working of the economy.[2] Therefore, letting aside the arbitrariness of any precise definition, for the goal of this chapter, a systemic crisis is an event characterized by one or more of the following: massive withdrawals of deposits, deposit freezes, fiscal measures of any sort directed at rescuing banking sector stakeholders, or where banks' balance sheets are put under considerable strain. For practical purposes, we have employed, unless specified otherwise, the financial crises database assembled by Caprio and Klingebiel (2003), who define a systemic financial crisis as a case in which much or all of bank capital is exhausted.

Equally problematic is to estimate the severity and length of the crisis. In principle, after identifying the variables of interest, one should compare their actual values during the crisis with the pre-crisis trend. In part due to data limitations, previous studies have often used a three-year window, and this chapter will stick to that convention for the most part. However, crises are usually preceded by abnormal economic conditions –as a matter of

expectations, and so on. This implies that isolating the pure real effects of the financial crisis turns out to be a challenging task.
[2] Unless specified, financial crisis will be understood as a banking crisis. Adopting a broader perspective, the concept should also comprise problems reaching capital markets and institutional investors. However, difficulties here do not propagate to the real sector in the way they do with troubled banks. The main difference is that a stock market fall reflects itself into lower security prices without reducing the external financing for the private sector –equity contracts have an infinite duration and market debt generally holds a longer maturity than bank debt. Besides, lenders demand a fixed rate of return on debt, while they have only a residual right in share contracts. Thus, an adverse shock will put the firm on the verge of bankruptcy under debt financing but not under share financing.

fact, no crisis is an exogenous and sudden event, but it is incubated by the very dynamics of the economy. In some cases, credit and productive booms develop in the run-up of the crisis. In others, a prolonged slowdown can gradually deteriorate the perceived solvency and profitability of financial and non-financial firms, becoming the catalyst of the crisis. Comparing against a boom (downturn) will overestimate (underestimate) the crisis-induced fall. An alternative is to widen the window to ten years, as will be done when assessing the macroeconomic effects.

Furthermore, it is hard to assert when a crisis is over. Employing the standard procedure of tying the dating of the crisis to the activity level evolution might sometimes be misleading. As far as the financial crisis can be just one manifestation of other economic disequilibria, the return to the previous growth rate or even the same per capita GDP observed before the crisis is too strong an ending criterion. For instance, it could the case that the financial crisis subsides relatively fast, judging by the normalization of banking indicators, but the country does not recover the previous GDP trend for a long time due to negative structural break caused by a negative and permanent productive shock independent of the financial crisis. Under these circumstances, the macroeconomic criterion would be flawed, and a more comprehensive classification procedure embodying both macroeconomic and bank-level data would be advisable. Unfortunately, bank accounting is not fully reliable around a crisis, forcing analysts to turn to macroeconomic figures.

Section 2: Banking balance sheet effects from financial crises

Before they propagate to the rest of the economy, financial crises translates into perceptible changes in the very balance sheets of banks. This section will describe the micro-level dynamics of four Latin American crises: Argentina (2001), Brazil (1999), Chile (1998), Colombia (1998), Mexico (1998), Peru (1998) and Uruguay (2002). Even

though the extent of the banking problems differ across these cases, a common feature is that they all display some or all of the features usually associated with a financial crisis.[3]

2.1 A first look at selected bank indicators

International evidence from 32 crisis in 1980-1995 is offered by Demirguc-Kunt et al. (2001), who conclude that accounting indicators of profitability and asset quality get worse as a consequence of the crisis, but they return to earlier levels two years later, while net worth is not directly affected. Henceforth, bank-level data suggests that crises have the mild and temporary effect that they encounter in macrœconomic data, a topic to be dealt with in Section 3.

To start, it is worth noticing that only in the Argentine and Uruguayan crises an apparent bank run took place, while, in the other episodes, deposits did not appear to deviate much from their previous trajectory:

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[3] In fact, the Argentine crisis is the only one included in the Caprio and Klingebiel's database.

Real deposits (Quarter crisis = 100)

Quarter (Crisis=0)	Argentina	Brazil	Colombia	Peru	Chile	Mexico	Uruguay
-10	114	76	76	73	88	69	78
-9	116	77	75	78	89	68	83
-8	115	80	75	82	90	68	84
-7	119	80	83	86	95	70	86
-6	122	86	79	89	96	97	86
-5	123	90	80	92	94	95	90
-4	120	91	95	94	94	95	94
-3	119	95	106	98	93	99	99
-2	119	96	100	100	93	97	103
-1	110	98	99	102	95	99	111
0	100	100	100	100	100	100	100
+1	104	99	115	107	99	97	92
+2	83	97	111	111	98	98	98
+3	81	97	111	112	104	99	94
+4	79	94	109	116	101	101	86
+5	81	93	116	116	102	101	83
+6	87	92	115	116	98	109	.
+7	90	95	113	114	99	104	.
+8	.	94	110	113	100	102	.
+9	.	95	122	109	105	95	.
+10	.	96	127	108	102	96	.

Regardless of the intermediation volume, balance sheets have been altered by the crisis. To assess the changes around the crisis, the three years before and the four years after were examined in the Brazilian, Colombian, Chilean, Mexican, andPeruvian crises, which began in the first quarter of 1999 (Brazil) and the third quarter (Colombia, Chile,

Mexico, and Peru). For Argentina, given the shorter period available, the three post-crisis periods are the first semester of 2002, the second semester of 2002, and the first quarter of 2003. Finally, for Uruguay, the only post-crisis period available comprises the second and third quarter of 2002. In the light of the small number of cases under scrutiny, it becomes somewhat daring to draw definite stylized facts, although a few common features come out from the aggregate balance sheet of the banking system, as displayed in Table [ ] along with other relevant ratios:

(a) Profitability indicators decline in all countries with the exception of Brazil and Mexico, but they gradually recover but still staying well below pre-crisis levels;

(b) Overhead costs diminish;

(c) In Colombia and Peru, loan and deposit implicit interest rates go down, as does the spread. In Argentina and Brazil, they are more unstable and show no clear trend;

(d) Loan loss provisions increase in all countries as a result of the deteriorated quality of the loan portfolio;

(e) The share of dollar-denominated liabilities clearly falls in the Argentine financial system after the compulsory pesoification of bank balance sheets, but this is not the case of Peru and Brazil;

(f) The exposure to the public sector from the assets side increases in the four countries under analysis. Here it must be borne in mind that this can be partly due to the contraction of the credit to the private sector and not necessarily to the net increase of credit to the government. In order to test this statistical effect, a regression was carried out to explain the public sector exposure in terms of the fiscal balance and the rate of growth of the credit to the private sector, yielding confirmatory results:

Dependent variable: Public debt to total banking assets

Explanatory variable	Estimated

	Coefficient
Fiscal balance to GDP (lagged)	-3.649**
Growth rate of credit to the private sector (lagged)	-0.204***
Constant	0.261***
Observations	158
F (p-value)	18.47 (0.000)
Method	Pooled OLS
R-squared	0.136

* significant at 10%, ** significant at 5%, *** significant at 1%.

(g) The ratio of loans to the private sector to total assets is lower in the aftermath of the crisis, although the declining trend seem to precede the outburst; and

(h) With the exception of Brazil, national private banks lose market share to foreign and state-owned banks.

Balance sheet effects of financial crises

Return on Equity

	t-3	t-2	t-1	t=0	t+1	t+2	t+3	t+4
Argentina	2.9%	-2.5%	3.8%	-15.6%	-81.3%	-50.3%	-18.8%	
Brazil	-7.4%	14.2%	-3.9%	21.4%	8.9%	8.7%	-0.1%	19.1%
Colombia	12.1%	12.7%	5.6%	-22.9%	-21.1%	-16.8%	7.1%	12.7%
Peru	21.8%	18.1%	10.3%	6.1%	3.0%	3.0%	6.1%	7.4%
Chile	4.2%	5.1%	3.1%	2.3%	2.7%	2.0%	3.2%	3.1%
Mexico	-8.9%	-3.2%	7.1%	-3.6%	13.2%	13.6%	11.1%	11.2%
Uruguay	6.5%	-2.9%	-21.5%	-55.4%	-1734.0%			

Interest rate spread

	t-3	t-2	t-1	t=0	t+1	t+2	t+3	t+4
Argentina	10.7%	11.2%	12.5%	14.4%	6.9%	0.9%	6.6%	
Brazil	4.3%	5.1%	6.9%	23.5%	10.5%	9.5%	9.1%	18.6%
Colombia	13.3%	13.2%	11.3%	9.6%	8.7%	8.3%	9.0%	9.1%
Peru	13.2%	12.1%	10.4%	8.8%	8.5%	8.0%	7.8%	8.4%
Chile	5.0%	5.4%	4.8%	4.4%	4.6%	4.7%	5.2%	5.7%
Mexico	-15.0%	-5.5%	-2.5%	-6.8%	-6.7%	-2.7%	-1.4%	1.5%
Uruguay	2.1%	0.1%	-8.0%	-12.7%	-94.1%			

Financial Intermediation Margin

	t-3	t-2	t-1	t=0	t+1	t+2	t+3	t+4
Argentina	4.3%	4.3%	4.6%	3.7%	13.0%	2.0%	-0.5%	
Brazil	4.4%	4.2%	4.2%	4.6%	5.3%	4.8%	4.8%	5.1%
Colombia	11.1%	11.2%	11.0%	9.9%	9.2%	9.2%	9.6%	9.5%
Peru	7.8%	7.4%	6.7%	5.7%	5.3%	5.0%	5.3%	5.5%
Chile	3.4%	3.2%	2.8%	2.8%	3.0%	2.5%	2.5%	2.4%
Mexico	5.1%	4.4%	5.0%	5.1%	6.1%	5.3%	5.6%	4.6%
Uruguay	3.9%	3.3%	2.0%	0.1%	-22.8%			

Leverage

	t-3	t-2	t-1	t=0	t+1	t+2	t+3	t+4
Argentina	9.2	10.0	9.2	7.6	7.1	6.7	7.0	
Brazil	9.3	10.7	10.9	10.0	9.5	9.4	9.3	9.7
Colombia	7.5	7.1	7.5	8.1	8.7	9.2	9.5	9.9
Peru	11.5	11.6	11.9	11.7	11.1	10.5	10.0	9.9
Chile	6.0	5.7	4.8	5.1	4.7	4.2	4.1	4.3
Mexico	15.1	14.2	11.3	12.3	10.7	9.7	9.4	9.3
Uruguay	6.7	7.2	10.4	14.4	32.0			

Foreign-currency liabilities to total liabilities

	t-3	t-2	t-1	t=0	t+1	t+2	t+3	t+4
Argentina	66.5%	68.7%	70.1%	72.0%	35.9%	33.6%	29.1%	
Brazil	11.9%	11.6%	12.8%	13.1%	13.3%	13.7%	14.4%	15.1%
Colombia	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Peru	66.2%	68.2%	71.3%	73.8%	74.6%	75.3%	75.0%	73.1%
Chile	21.3%	20.0%	21.3%	22.5%	24.3%	26.5%	28.7%	31.8%
Mexico	8.2%	16.1%	23.7%					
Uruguay	84.8%	87.0%	88.3%	89.1%	88.1%			

Foreign-currency assets to total assets

	t-3	t-2	t-1	t=0	t+1	t+2	t+3	t+4
Argentina	67.88%	69.53%	69.19%	71.19%	35.14%	34.55%	31.78%	
Brazil	15.8%	16.0%	16.3%	17.2%	18.1%	18.5%	21.0%	21.3%
Colombia								
Peru	46.2%	49.3%	53.1%	56.6%	57.4%	61.8%	73.9%	74.3%
Chile	23.3%	22.6%	24.9%	25.2%	26.7%	29.2%	31.2%	32.8%
Mexico	9.2%	13.7%	17.6%					
Uruguay	69.7%	72.2%	75.8%	75.1%	75.5%			

Source: Own calculations based on the IADB database and national regulatory agencies.

Balance sheet effects of financial crises (cont.)

Loan loss provisions to total loans

	t-3	t-2	t-1	t=0	t+1	t+2	t+3	t+4
Argentina	8.3%	10.4%	10.9%	12.9%	18.9%	29.6%	32.2%	
Brazil	2.1%	2.0%	3.9%	3.7%	3.3%	4.1%	6.4%	6.9%
Colombia	2.2%	2.3%	2.2%	2.9%	4.2%	5.4%	6.6%	
Peru	4.2%	4.5%	4.9%	6.4%	7.9%	10.1%	12.8%	12.4%
Chile	1.8%	1.7%	1.7%	1.8%	2.4%	2.8%	2.8%	2.7%
Mexico	3.0%	4.4%	6.7%	6.5%	7.3%	6.8%	6.2%	6.0%
Uruguay	4.5%	5.7%	7.1%	7.9%	7.4%			

Loans to private sector to assets

	t-3	t-2	t-1	t=0	t+1	t+2	t+3	t+4
Argentina	43.8%	40.2%	37.8%	40.5%	26.6%	19.8%	18.2%	
Brazil	35.3%	34.5%	31.3%	31.3%	30.8%	31.0%	30.6%	29.3%
Colombia	66.6%	66.2%	66.7%	66.6%	64.8%	58.6%	55.2%	52.7%
Peru	58.8%	60.5%	61.3%	63.7%	59.3%	57.9%	59.4%	59.0%
Chile	52.2%	49.8%	47.2%	50.2%	46.4%	41.9%	38.6%	36.3%
Mexico	67.2%	69.5%	73.6%	68.8%	67.2%	66.1%	63.8%	56.8%
Uruguay	52.3%	52.2%	49.1%	49.0%	55.2%			

Public debt to assets

	t-3	t-2	t-1	t=0	t+1	t+2	t+3	t+4
Argentina	21.5%	24.8%	26.0%	30.1%	53.1%	57.0%	55.9%	
Brazil	23.7%	27.1%	23.2%	23.7%	27.3%	27.2%	27.4%	27.8%
Colombia	8.9%	10.6%	12.5%	12.9%	13.6%	15.1%	20.0%	23.8%
Peru	3.4%	5.2%	4.9%	6.4%	7.1%	8.1%	9.6%	10.3%
Chile	0.8%	1.5%	1.6%	1.0%	1.8%	1.2%	1.2%	1.6%
Mexico	28.1%	40.3%	47.0%	46.2%	47.9%	51.4%	51.0%	47.6%
Uruguay	7.0%	5.3%	5.0%	6.0%	8.5%			

Deposits in public banks

	t-3	t-2	t-1	t=0	t+1	t+2	t+3	t+4
Argentina	34.2%	33.3%	32.8%	32.4%	35.6%	42.4%	44.3%	
Brazil	60.6%	57.9%	53.6%	52.3%	52.3%	51.7%	46.6%	46.1%
Colombia	16.1%	13.7%	15.1%	15.5%	17.0%	18.7%	18.7%	18.2%
Peru	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Chile	15.8%	15.0%	14.7%	13.4%	13.4%	14.1%	12.7%	12.9%
Mexico								
Uruguay	41.5%	38.9%	36.4%	38.3%	44.1%			

Deposits in foreign banks

	t-3	t-2	t-1	t=0	t+1	t+2	t+3	t+4
Argentina	44.3%	47.4%	48.9%	50.4%	49.6%	42.1%	40.4%	
Brazil	8.1%	12.1%	15.0%	15.7%	16.2%	17.1%	20.4%	20.2%
Colombia	10.9%	12.1%	15.2%	18.0%	19.1%	19.0%	19.3%	17.1%
Peru	26.5%	28.4%	29.4%	32.7%	36.9%	52.5%	54.3%	53.3%
Chile	20.6%	28.5%	32.2%	34.8%	39.1%	43.7%	44.3%	45.6%
Mexico								
Uruguay	58.5%	61.1%	63.6%	61.7%	55.9%			

Source: Own calculations based on the IADB database and national regulatory agencies.

2.2 Financial crisis and financial fragility

The fragility of the financial system in Latin America is a recurrent issue. By definition, banking systems collapse because their banks are inherently fragile. What has been much less looked at is how financial fragility evolves over time as the crisis builds up and unravels, what explains financial fragility in the post-crisis period, and whether it influences the pace of growth of bank activity. The prior is that a timely, orderly and efficient crisis resolution process should reduce financial fragility, paving the way for a restoration of the normal flow of deposits and credit. However, this does not appear to be always the case, as inferred from some recent Latin American experiences.

2.2.1 The Z-index

This section starts by discussing the properties of the so-called Z-index as a widely accepted measure of financial fragility (see De Nicoló et al. (2003a,b)). The Z-index is akin to the *inverse* probability of insolvency and equals (ROA + W)/S, where ROA is the return to assets, W is the capital-assets ratio, and S is the standard deviation of ROA. Here risk can take the form of lower efficiency (lower ROA), higher leverage (lower W), and higher volatility (higher S). In a related interpretation, Levy Yeyati and Micco (2003) argue that the square of the Z-index equals the probability that a negative return on assets wipes out completely the net worth to assets, thus triggering bank's default.

The Z-index shown below was constructed from aggregate figures of each national banking system. Inspecting the four Latin American cases listed earlier, and recalling that a high Z value reflects low financial fragility, it comes out that financial fragility rose after the crisis in Argentina, , Colombia and Uruguay; diminished in Mexico and Chile, and meandered around earlier values in Brazil and Peru. Therefore, no single conclusion can be drawn. It is worth noting, nonetheless, that when financial fragility worsens, this deterioration tends to occur both before and after the crisis, and does not display any sign of reversion even after several years of the outbreak.

Z-index

	t-3	t-2	t-1	t=0	t+1	t+2	t+3	t+4
Argentina	46.5	16.2	38.9	8.8	0.5	1.5	2.1	.
Brazil	.	7.1	7.8	9.3	11.1	11.6	4.5	11.0
Colombia	.	27.4	29.1	2.9	2.4	3.9	8.0	18.5
Peru	.	51.2	33.6	35.9	36.2	73.1	46.1	31.7
Chile	.	57.3	108.9	102.9	184.4	127.6	156.9	185.1
Mexico	.	6.5	16.4	14.5	9.6	22.8	29.7	17.4
Uruguay	19.6	13.7	4.7	1.1	-2.1	.	.	.

2.2.2 What is behind the Z-index?

As explained, the Z-index is a simple but powerful measure of the inverse of the probability of bank insolvency, that is, the lower Z, the higher the probability of bank default. In this sense, it could be used as an early warning test of financial crisis and as a monitoring tool in their aftermath. [4] Using quarterly information for 1996-2002 (and the first quarter of 2003 for Argentina), it is shown here which bank and macroeconomic variables tend to affect such probability.

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[4] The shortcoming of the subsequent analysis -besides the fact that it is not based on fully specified model but on simple correlations- is that it measures financial fragility on an ex-post basis –once it is realized- rather than on an ex-ante basis –before it is realized. Clearly, regulators and analysts should concentrate on the latter so as to prevent and anticipate difficulties and run stress tests to evaluate the sensitivity of the banking system to changes in key systemic variables..

Since balance sheet variables are usually highly correlated to each other, a multivariate regression is unlikely to shed light on the determinants of the Z-index owing to the presence of multicollinearity. Consequently, simple pairwise correlations are instead presented in the next table:

Pairwise correlation of Z-index with selected bank indicators
Data for Argentina, Brazil, Colombia, Chile, Mexico, Peru and Uruguay, 1996-2002

Variable	Correlation with Z-index
Lagged Z	0.782***
Interest rate spread	-0.301**
Deposit interest rate	-0.315***
Government assets to total assets	-0.374***
Overhead expenses to total	-0.638***
Deposit share of foreign banks	0.164**
Deposit share of public banks	-0.38***

* significant at 10%, ** significant at 5%, *** significant at 1%.

The correlation coefficients –that can range between –1 and 1- are all statistically significant, lending some support to the following remarks:

(i) The Z-index has a high autocorrelation, indicating that it takes time to remove financial fragility;

(ii) Both the interest rate spread and the deposit interest rate increase financial fragility by encouraging bank's risk-taking. It is worth noting that, while a higher spread should boost bank returns and possible its capital, it has a greater effect on volatility. These observations reinforce the need to maintain a stable financial context –conducive to low interest rates- and a strict regulatory framework –to inhibit moral hazard on the part of financial intermediaries-;

(iii) Financial fragility increases with the proportion of government debt in hands of banks. Bank exposure to public assets is undoubtedly one of the more debatable banking

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[7] This is consistent with previous contributions in the banking literature. See for instance La Porta et al. (2002) and Berger et al. (2003).

issues in the region. For one, exceeding some reasonable level, lending to the government goes against the very nature of the bank firm, which specializes in alleviating informational barriers that preclude private firms and consumers from getting credit – lending to the government often implies null screening and monitoring skills except for a good overview of the macroeconomic context. Given its seemingly superior repayment capacity and the willingness to pay higher returns, public assets tend to crowd out loans to the private sector. This attractive risk-return combination encourages bank moral hazard, which may end up being poorly supervised and punished by the regulator due to its own conflict of interest –under limited political independency of the regulator, the treasure will induce the regulator to overlook the riskiness of public assets in order to keep a fluid access to bank financing. This perverse incentive mechanisms suggests that, at least in Latin America, public bonds and loans are certainly not risk-free assets as in industrial countries and hence deserve a more symmetric regulatory treatment vis-à-vis private portfolios;

(iv) As expected, financial fragility is positively correlated to administrative costs. Besides its direct incidence on lower returns, it must be borne in mind that cost-inefficiency puts an upward pressure on interest rate spreads;

(v) The share of deposits in hands of foreign and public banks have countervailing effects on fragility, with the former reducing fragility and the second amplifying it.[7] Decomposing the Z-index for foreign and public banks, it was found that foreign banks present better individual indicators:

Variable	Foreign banks	Public banks
ROA	-0.3%	-3.6%
Capital to Assets	13.6%	9.1%

Standard deviation of ROA	1.4%	5.7%

(vi) In light of the acute impact of currency mismatches in some recent crisis, it is worth discussing the statistical relationship of the proportion of liabilities and assets in foreign currency with the Z-index. [10] On the plus side, under credible and stable exchange rates regimes, foreign currency exposures contribute to reduce loan and deposit interest rates and to stretch the maturity of bank liabilities. But on the minus side, currency mismatches are a catalyst of solvency problems in the banking and the nonfinancial sector if an exchange rate crisis takes place. Since the negative effect is more prone to arise in highly dollarized economies, the correlation between dollar-denominated assets, liabilities, and the Z-index was separately run for Argentina, Peru and Uruguay, and for Brazil, Chile, Colombia and Mexico, with this outcome:

Variable	Argentina, Peru and Uruguay	Brazil, Chile, Colombia and Mexico
Dollar-denominated liabilities to total liabilities	0.726	0.634
Dollar-denominated assets to total assets	0.186	0.216
Correlation of dollarized liabilities and Z-index	0.03	-0.014
Correlation of dollarized assets and Z-index	0.76***	0.783***

* Correlations significant at 10%, ** significant at 5%, *** significant at 1%.

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[10] Note that currency mismatches are in general small, but bank solvency does not depend entirely on the currency denomination of its loans but on the currency mismatch of the ultimate borrowers (firms, families and the government).

According to the table, mild dollarization is positively correlated with lower fragility, but high dollarization has no clear effect.

(vii) High bank liquidity is closely associated to lower financial fragility, implying that the profit-reducing effect is outweighed by the stability-enhancing effect. Logically, keeping money out of the loan market defies the very social function of financial intermediaries. However, liquidity hoarding could be a helpful bank policy in the transition towards a more solid system;

The degree of financial fragility depends not only on the risk-taking behavior of banks but also on macroeconomic conditions –actually, in Latin America, it is likely that macroeconomic forces have had more weight on bank performance than bank-level policies in some periods of time. Dipping into the macroeconomic roots of the Z-index, a regression was performed with the following results:

Dependent variable: Z-index

Explanatory variable	Estimated Coefficient
GDP growth rate (lagged)	135.55*
Inflation rate (lagged)	-192.47***
Variance of the nominal exchange rate	-14.76***
Real exchange rate	-0.014**
Deposits to GDP	65.78***

Constant	15.78***
Observations	129
F (p-value)	10.92 (0.000)
Method	Pooled OLS
R-squared	0.183

* significant at 10%, ** significant at 5%, *** significant at 1%.

Focusing on the coefficients that are statistically significant, the estimation shows that financial fragility goes up with:

(i) The inflation rate and the nominal exchange rate volatility, which have deleterious effects on the stability of relative prices and thus on some borrowers' repayment capacity;

(ii) The real exchange rate, whose effect runs primarily through balance sheet effects on currency-mismatched borrowers, including the very banks and the state; and

(iii) Financial deepening, as proxied by the ratio of deposits to GDP, reduces financial fragility, as it is usually associated with lower transaction costs, lower interest rates and a more stable macroeconomic context.[11,12]

2.2.3 Financial fragility and credit to the private sector

One interesting question at this point has to do with the determinants of the variation of the credit to the private sector in Latin American crisis countries. This question might become even more relevant once credit shocks are to be transmitted to the real sector, as discussed later on. The following table shows the result of a regression analysis explaining the growth rate of credit to the private sector:

Dependent variable: Growth rate of real credit to the private sector

Explanatory variable	(1)	(2)

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[11] To deal with the potential reverse causality of the Z-index to deposits, this variable was instrumented with the deposit interest rate and the fiscal surplus. It must be mentioned that this stability-enhancing effect has been at times challenged by some scholars that highlight the risks posed by rapid financial deepening in poorly supervised banking systems (see for instance Krugman (1998) and Kaminsky and Reinhardt (1999)).

[12] When using country fixed effects, deposits to GDP and GDP growth remain significant, but the remaining variables lose explanatory power.

Lagged Z-index	0.263**	0.289***
Deposit growth rate		0.571***
Fixed investment growth rate (lagged)	0.105**	0.054*
Fiscal balance to GDP	-0.131	-0.071
Interest rate on loans	-0.005	-0.057*
Constant	-0.006	-0.01
No. Observations	129	129
Method	Pooled OLS	Pooled OLS
F-test (p-value)	2.76 (0.006)	11.80 (0.000)
R-squared	0.155	0.51

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%.
T-statistics computed using robust standard errors.
Crisis variables are dummies with value 1 for the four quarters post-crisis, 0 otherwise.
Regressions include country dummies.

According to the first column, financial fragility limits credit growth. This could be either a consequence of depositors exerting market discipline and thus rationing funds to a distressed financial system or a conservative response on the part of banks to a delicate situation in which new loan extensions can widen maturity mismatches and overall risk. To deal with this issue, the deposit growth rate appears in Column (2), displaying a positive and significant sign without altering much the estimated coefficient on the Z-index. This means that, after controlling for the behavior of depositors, the level of financial fragility slows down the credit growth rate by way of the own decision of the banking sector of curtailing loan growth rather than to the financing constraint imposed by the depositors. Besides, the almost unchanged coefficient on the Z-index after including deposit growth unveils some lack of market discipline by depositors, clashing against some pieces of evidence to this hypothesis. [13]

The investment growth rate –instrumented by its first lag- is a proxy for the demand for credit. The positive coefficient indicates that credit demand factors are also relevant –this will be picked up later when considering the existence of a credit crunch on economic activity. The fiscal surplus, which is intended to capture crowding-out effects on the

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[13] See Demirguc-Kunt and Huizinga (2001) for an international sample of countries, Martinez Peria and Schmukler (1998) for Latin American countries, and Arena (2003) for Latin American and Asian countries.

private sector, is not significant, as it is the loan interest rate in the first column –in the second one, it is significant at a 10% level with the negative expected sign.

3. Fiscal costs of financial crises

Systemic financial crises are especially damaging once they not only provoke the liquidation of many financial institutions but they spill over credit-dependent firms and families that will likely be pushed towards financial distress or even bankruptcy. Another widely mentioned argument in favor of crisis containment is that crisis can take a toll on the normal functioning of the payments system, depriving firms from the required level of liquidity to conduct their businesses and afford their working capital. This concern departs from the modern focus of the finance literature on the assets side of the banks and the impact of credit constraints on firms' and consumers' activity. The liquidity view stresses the impediments to make payments through the banking system credited to the payer's cash deposits (without the need of additional bank loans), forcing firms to rely on cash transactions or even to undo certain operations. As a matter of fact, since credit and payments problems are to a great extent two sides of the same coin, it is difficult to separate the effects of financial crises that operate through the assets side of the balance sheet from those working through the liabilities side.[14]

This widespread effect provides the rationale for some degree of government intervention to bailout banks and depositors and thus mitigate the economy-wide consequences.
This section will describe the possible policy tools, the quantification of the associated costs, why these costs vary across different episodes, and whether the intervention facilitates a softer landing vis-à-vis the no intervention scenario or instead creates new problems of their own.

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[14] There is no much hard evidence to rely on about the consequences of liquidity shortages, though. Commander et al. (2000) study the growth of barter in Russia –where liquidity problems were in motion even before the August 1998 crisis- exploiting a questionnaire among Russian firms carried out in late 1998, but they find no significant effect of the share of non-monetary on total transactions –a proxy for liquidity problems- on sales growth.

Governments have at their disposal several crisis resolution tools, including the liquidity support to and the recapitalization of insolvent institutions, insurance schemes for depositors and other bank creditors, deposit freezes, regulatory and supervisory forbearance for financial institutions, setup of asset management companies to absorb and recover nonperfoming loans, and debt relief programs for distressed borrowers.

Not all of these instruments cause a direct, pecuniary budgetary cost –for instance, forbearance and deposit freezes do not imply any monetary transfer by themselves. But it is apparent that there are fiscal and quasi-fiscal expenditures involved in rehabilitating the financial system.[15] Figure [ ] shows the fiscal costs of banking crises in 40 episodes in the 1980s and 1990s, using data from Honohan and Klingebiel (2000)):

Fiscal costs of financial crises

Country	In percentage of GDP
Argentina 1980-82	55,1
Argentina 1995	0,5
Brazil 1994-96	13,2
Chile 1981-83	41,2
Colombia 1982-87	5,0
Ecuador 1996-	13,0
Mexico 1994-	19,3
Paraguay 1995-	5,1
Uruguay 1981-84	31,2
Venezuela	22,0
Other developing countries (20 cases)	11,2
Developed countries (10 cases)	8,2

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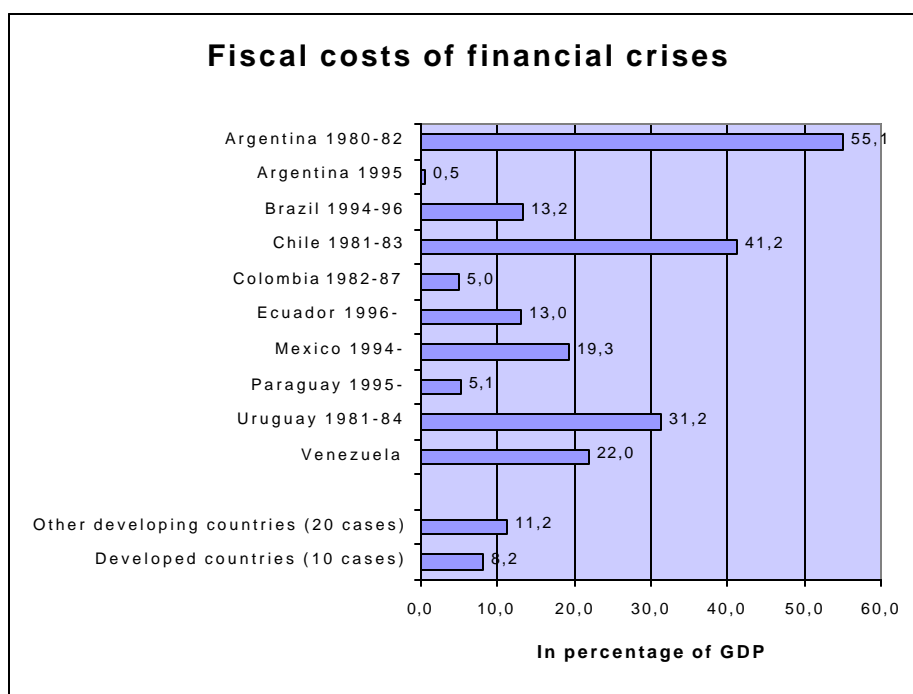
[15] Quasi-fiscal costs are those not fully reflected in the Treasury budget, because they are directly financed by the Central Bank.

Fiscal costs are sizable, and Latin America stands out among other country groups: on average, these costs amounted to 20.6% of GDP, against 11.2% and 8.2% in other developing countries and in industrial countries, respectively. Of course, the most relevant test to judge the benefits of the government intervention lies in how it helped the country to cope with the duration and depth of the crisis. Honohan and Klingebiel (2000) demonstrate that neither the output loss nor the recovery time are influenced by the host of policy tools mentioned above, and even one of them (the liquidity support to banks by the monetary authority) heightens the output loss and retards the recovery. [16]

The following graph displays, for 38 crisis, the relationship between fiscal costs and GDP growth performance (measured by the change in the annual GDP growth rate between the three years after and before the crisis) , where it is apparent that they are negatively correlated –the correlation coefficient is –0.51 and it is statistically significant at 1%:

Fiscal costs and change in GDP growth rate
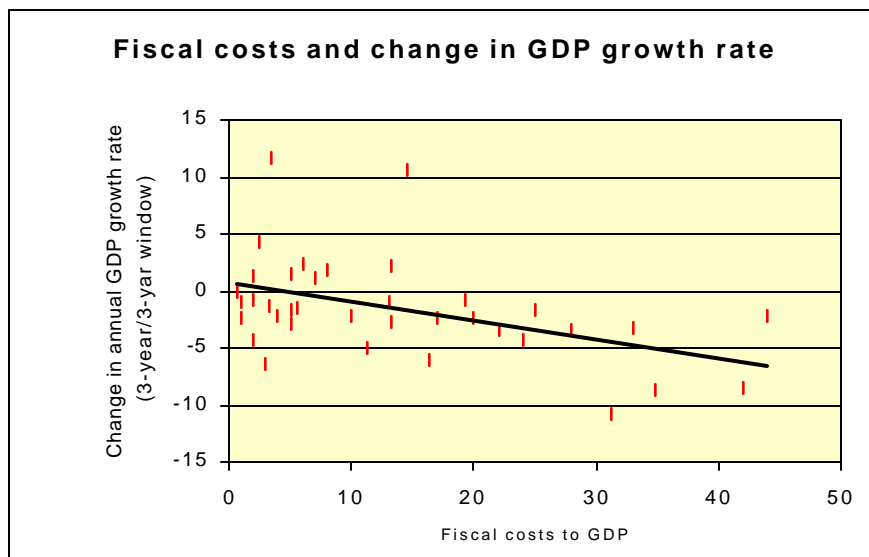
This correlation poses a serious doubt about the effectiveness of fiscal interventions to smooth the crisis effects, since, according to the graph, the more governments spend to control the crisis, the deeper is the productive slump. However, the causality can go

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[16] Dziobek and Pazarbasioglu (1997) reach the same conclusion regarding liquidity support after looking at

either way, as fiscal costs depend on the intensity of the crisis and the latter can be influenced by the crisis policies put in motion. A simultaneous estimation of both equations is the proper tool to deal with this problem. A number of two- and three-stage least squares regressions were run, but results (not reported here) were highly unstable and sensitive to the set of additional control variables. Nevertheless, in none of such regressions it was found that fiscal costs were able to improve the growth performance.[17]

Anyway, one should be cautious at the time of giving a categorical verdict on the link between fiscal costs and the real effects of a crisis. First of all, saying that the government measures are unable to diminish the social costs of the crisis is not the same as proving that such social costs would have been lower without any public action whatsoever. Markets do not work properly whenever uncertainty, panic, and pessimism takes over the private sector decision-making process, and so the fact that the government is willing to intervene might encourage more optimistic expectations and ameliorate the typical coordination problems among private agents. This would require counterfactual evidence showing that crisis countries with totally passive governments perform better, everything else equal, than those with active anti-crisis policies., but it is difficult to find cases in which the government was fully prescident. [21] A related historical episode is the Great Depression in the U.S. beginning in the late 1920s, where the Federal Reserve was blamed of the crisis depth because it refused to inject enough liquidity to the system, but even this case remains controversial. In any event, from Honohan and Klingebiel's database, it is observed that the only countries not pursuing massive rescue packages (over a total of 40 cases) were Argentina 1995, Phillipines 1998-present, and Turkey

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the speed and success of bank restructuring packages in crisis countries.

[17] Additionally, the regressions show that fiscal costs are also a function of the country's development status: governments in developing countries spend more than others. Similar results emerge when replacing developing for Latin American countries. This likely reflect inefficiency and corruption factors. In fact, when an index of rule of law (see Kaufman et al. (2003)) is included instead of the developing country variable, the positive and statistically significant sign still holds.

[21] As someone put it in reference to deposit insurance, there are two types of countries: those that have deposit insurance and know it, and those that have deposit insurance and do not know it yet.

1982-1985, where the fiscal costs amounted to 0.5%, 0.5% and 2.5% of GDP, respectively. However, the corresponding GDP dips were 11.9, 7.5, and 0 percentage points. These values are below the average for the whole sample, which reinforces the idea that fiscal intervention is endogenous: governments always intervene when crises are profound and prone to get out of handunder a totally private sector-led crisis resolution.. Based on this observation, the hypothesis that public policies are effective in containing large-scale crisis should not be rejected without further investigation.

Letting aside the issue raised in the previous paragraph, the evidence at hand does not seem favorable to public interventions in the face of a financial crisis. Even in the case that these policies turn out to smooth the downturn in the short run, it is debatable whether the long-lasting effects are positive as: (a) Money issuance might boost inflation; (b) Government intervention does not completely eliminate the social costs from a crisis but mainly redistribute such costs across social groups and over time. Intersectoral transfers induced by public policies may alter income distribution, potentially causing social unrest and conflicts between winners and losers; (c) Domestic and external debt issuance may increase the future tax burden on the private sector, distorting consumption and investment decisions; and (d) Public bailouts may exacerbate bank's and borrowers' moral hazard in the future, once agents anticipate that they will not bear the cost of their opportunistic actions. Thus, by inducing excessive risk-taking, bailouts can be the catalyst of a new financial crisis.[22] These forces can most likely hamper long-term growth prospects.

4. Financial crisis and short-run economic growth

After having noticing that credit can be seriously affected in the wake of a financial crisis, the question that arises immediately relates to the actual impact of credit on

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[22] This is a recurrent, yet unresolved issue, at the national and international level. One application of it is the study of the consequences of a deposit insurance system which, although it encourages public confidence in the financial sector, it relaxes market discipline, thus threatening systemic stability.

aggregate demand and economic growth. This section will tackle this question by going over the theory and the international evidence and by taking a closer look to four recent crises in Latin America.

4.1 Theoretical links between financial crises and private expenditure

The standard, frictionless optimization model of a representative individual contends that people save in order to smooth consumption over time and across possible events, and firms invest until the marginal productivity of capital equals the cost of capital. Under this paradigm of perfect financial markets, financial crises would not be in fact crises because consumption and investment decisions would not be changed. A model like this, in which individual have access to unbounded credit to fill any desired temporary gap between income and expenditure, allows to reach the maximum possible level of well-being. However, it is a well-established fact that financial markets suffer at least three imperfections: intermediation costs, informational problems, and taxes. To start, external sources of funds (debt and shares) are more expensive than internal sources due to the costs involved in the financial intermediation business.[23] Furthermore, lenders have less information than borrowers concerning the ability and willingness to pay. To counterbalance this informational asymmetry, lenders cover themselves by requiring higher rates of return or directly denying financing to some people (see Bebczuk (2003) for a textbook presentation). For the same reasons, it is difficult to purchase insurance against any negative shock, turning uncertainty a crucial variable to determine how much to spend and save. When these real-world features are internalized, it is easy to draw a connection between financial crisis and saving and investment decisions, which can be classified into four channels:

(a) Availability of credit and transaction balances

Demirguc-Kunt and Detragiache (1998) empirically claim that the second, negative effect prevails and show that the presence of deposit insurance raises the probability of a financial crisis.

Financial crises are frequently accompanied by a lower volume of credit. This is mostly explained by information-related issues as, due to the reigning uncertainty and the bleak economic prospects, it becomes harder to distinguish good from bad projects (adverse selection) and it is more tempting to take riskier projects or even to refuse debt repayment (moral hazard). Lacking reliable information on the ability of each bank to pay back and knowing that only the first in line will get the money, depositors prefer to run against all banks. This forces banks to cut credit, but in an uneven fashion across borrowers. Younger and smaller firms tend to be the major victims, owing to their opacity and lack of reputation and diversification.[24,25] Besides, banks are more willing to lend to companies that post some collateral and partially use internal funds, since these are signals of expected good behavior. With the rise of interest rates and the declining sales that come with financial crises, the ability of firms to convey such signals is markedly restricted, bringing about less credit at higher costs and shorter maturities. In sum, credit-dependent firms and families can likely see their expenditure reduced in what it is known as a financial constraint;[26]

The lack of liquidity that can follow a financial crisis is another disruptive effect on the level of activity. As highlighted in the Introduction to Section 3, the malfunctioning of the payments system can be a serious obstacle for daily transactions. Although most of the literature is concentrated in the credit channel rather than the payments channel, the latter should not be overlooked.[27]

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[23] Of course, these costs are outweighed by the benefits delivered by the financial system in terms of evaluation and control of borrowers, risk diversification activities, and economies of scale vis-à-vis the case of individual management of savings.

[24] See Mishkin (1997) on the asymmetric information approach to financial crises, and Kuttner and Mosser (2002) on the role of these factors in the transmission of monetary policies.

[25] Only small firms with lasting lending relationships with a few banks will be able to avoid the loan cut. Such lending relationship provide creditors with valuable financial and, even more importantly, personal information on the borrower, based on which they may decide to keep granting credit to these selected firms (see Petersen and Rajan (1994) for evidence for the U.S. and Bebczuk (2002) for Argentina). By the way, the closing of banks is particularly harmful for borrowers with extended lending relationship, once they cause the destruction of so-called informational capital.

[26] On evidence regarding financial constraints for firms, see Kadapakkam et al. (1998) for developed countries and Galindo and Schiantarelli (2003) for Latin America. As for consumption, see Campbell and Mankiw (1989) for the U.S. and Arreaza (2000) for Latin America.

[27] Of course, the importance of the payments system as a trasnmission channel of financial crisis to the rest of the economy depends on how intensive its use is by firms and families. In countries with scarce use of

(b) Uncertainty

In the volatile environment that characterize financial crises, risk aversion will induce firms to pass up or postpone some investment projects, especially when they involve irreversible costs (see Dixit and Pindyck (1994) for the theoretical rationale and Serven (2002) for cross-country evidence). Likewise, under certain conditions, families will exhibit a precautionary saving behavior, by which they will cut present consumption in order to build a buffer stock to avoid a pronounced fall in future consumption under a bad event (see Deaton (1992) for the theoretical background, and Loayza et al. (2001) for cross-country empirical support).

(c) *Income shocks*

If the crisis happens along with an economic downturn, agents will revise their expenditure plans. Before a temporary income fall, consumers will reduce their saving rate to smooth consumption over time. Forward-looking firms should not modify much their investment activity, as it is presumed that the installation of new capital today aims to satisfy demand in the future, when the shock is over. But a host of studies have shown that firms exhibit excess sensitivity to current economic conditions due to either uncertainty, myopia or financial constraints (see Bebczuk (1999) for evidence related to Latin American countries). When the adverse shock is perceived as permanent, investment and consumption will decrease more than under temporary shocks.

(d) Interest rates

Interest rates tend to rise around financial crises, influencing private sector decisions through: (i) The increase in the cost of capital (be it internal or external funds) diminishes investment activity; (ii) As mentioned earlier, higher interest rates reduce the availability

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financial services and where the underground economy is broadly spread, most transaction will be conducted in cash and the real economy and the banking system will be only weakly connected.

and value of collateral; and (iii) Saving decisions may change, although the interaction of the substitution, income, and wealth effects makes it hard to predict what the final effect will be (see Obstfeld and Rogoff (1996) for a thorough theoretical presentation and some evidence on the low saving sensitivity to interest rates).

While the previous decomposition obeys to the need of having a clear understanding of the various effects at play, it does not mean that one can replicate it at the empirical level, as changes take place simultaneously and are closely interrelated. A profuse literature has investigated the link between abrupt reductions in the flow of credit and the level of activity, with especial reference to crisis episodes. This *credit crunch* strand of macrofinancial research has been lately applied to the Asian meltdown of 1997. Among others, Borensztein and Lee (2000) provide evidence of a credit crunch in Korea, as Ito and Pereira da Silva (1999) do for Thailand and Indonesia, and Chen and Wang (2003) for Taiwan.

Even though it is very popular among analysts to establish a direct relationship from credit to economic activity, the casual link is far from being straightforward and rests on two conditions: (a) Financial markets are not perfect à la Modigliani-Miller in that firms and families are unable to substitute the lost credit with other sources of funding without altering their expenditure plans; and (b) There is excess credit demand making the credit constraint binding. For instance, if actual and expected aggregate demand are weak, there will not be much demand for credit. Likewise, firms may have idle capacity and workers that can be used to increase supply with a minimum need of new funding.

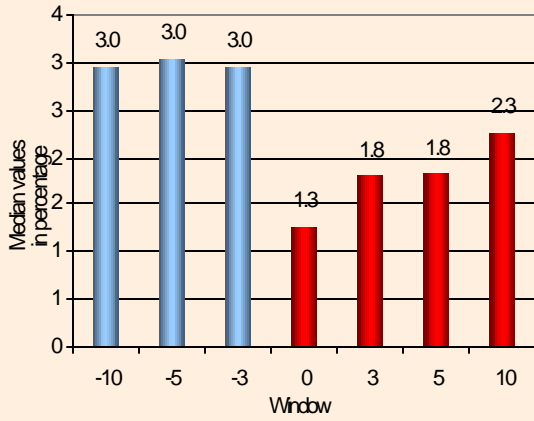**4.2 Describing the macroeconomic effects of financial crises**

Demirguc-Kunt et al. (2001) use a simple econometric procedure to estimate the effects of the crisis in 32 episodes during 1980-1995, by comparing the performance in the crisis year and the three next years with the performance in the previous three-year period. They document that, on average: (1) Just two years after the crisis, the GDP growth rate is back to the previous rate; (2) Credit growth is about 7 percentage points below the pre-

crisis trend even three years after the crisis, defying the presumption that the credit contraction constraints economic growth –this topic will be examined later on; (3) Compared to the three-year pre-crisis period, the inflation and depreciation rates are still 20 percentage points higher in the three years after the crisis; and (4) Fiscal variables and interest rates do not appear to change significantly after the crisis outbreak. In all, these results portrait a rather benign panorama arising from crises. Anyway, as argued in Section 1, this conclusion is conditioned to the window chosen and the variables examined, besides the fact that data come from a set of countries that included both developed and developing countries.

In what follows, crisis effects on selected relevant indicators are revisited focusing on Latin American events in the 1980s and 1990s. To take account of the sensitivity to different window estimations, and depending upon data availability, different possibilities are explored and compared, namely: the year of the crisis and the *three* following years against the average of the (i) three years, (ii) five years, and (iii) ten years before the crisis; the year of the crisis and the *five* following years against the average of the *five* years before the crisis; and the year of the crisis and the *ten* following years against the average of the *ten* years before the crisis.

Starting from a graphical approximation, the median values of selected macroeconomic variables are shown next. Among the non-financial variables, it is observed that the GDP growth is noticeably lower in the aftermath of the crisis, but the growth gap vis-à-vis the pre-crisis scenario tends to shrink as a longer period is under consideration. The fiscal deficit also increases, especially under the 3- and 5-year post-crisis windows. The inflation and investment rates do not seem to change in a clear way. Concerning the financial variables, the rates of growth of both deposits and credit to the private sector fall at all windows, but remain positive, while the ratios of credit and deposit grow over their pre-crisis medians owing to the fact that they continue to grow faster than GDP.
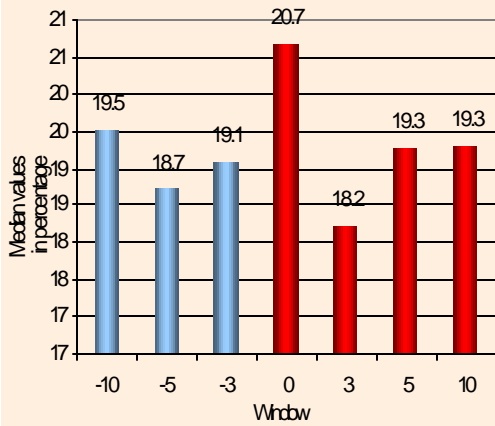
Real GDP growth rate
### in Latin American financial crises

Window	Median value
-10	3.0
-5	3.0
-3	3.0
0	1.3
3	1.8
5	1.8
10	2.3

Median values in percentage

Annual inflation rate
in Latin American financial crises

| Window	Median value
-10	27.0
-5	22.4
-3	18.0
0	15.8
3	20.2
5	20.2
10	20.6

Median values in percentage
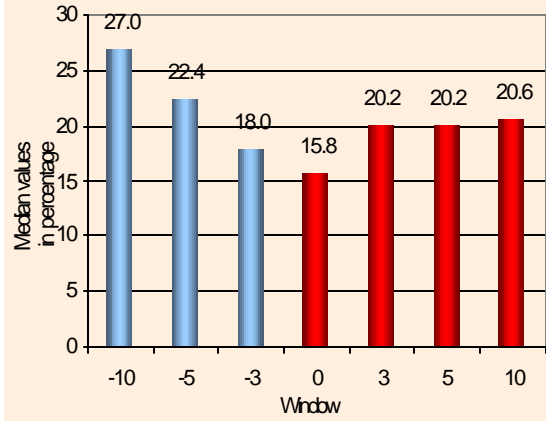
Gross investment to GDP
in Latin American financial crises

Window	Median value
-10	19.5
-5	18.7
-3	19.1
0	20.7
3	18.2
5	19.3
10	19.3

Median values in percentage

Fiscal surplus
in Latin American financial crises

Window	Median value
-10	-1.8
-5	-1.6
-3	-2.2
0	-2.4
3	-2.9
5	-2.0
10	-2.1

Median values in percentage

Credit to GDP
in Latin American financial crises

Deposits to GDP
in Latin American financial crises

Annual growth rate of
credit to the private sector
in Latin American financial crises

Annual growth rate of deposits
in Latin American financial crises
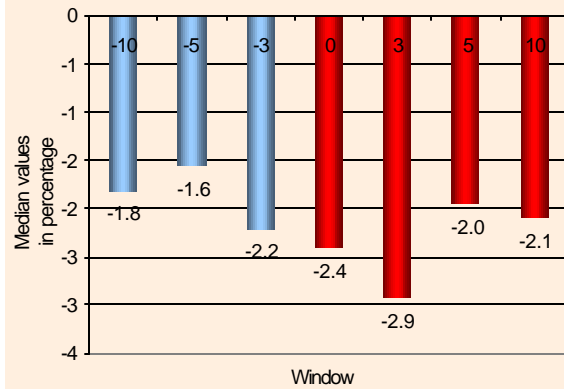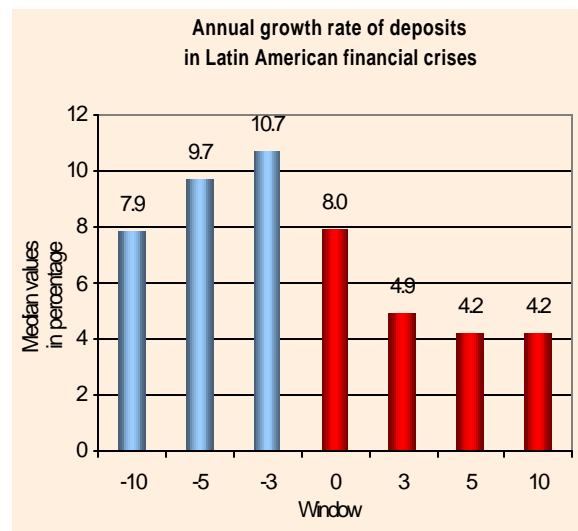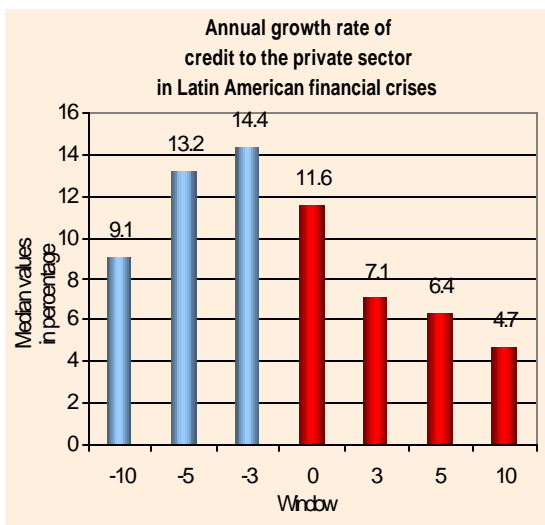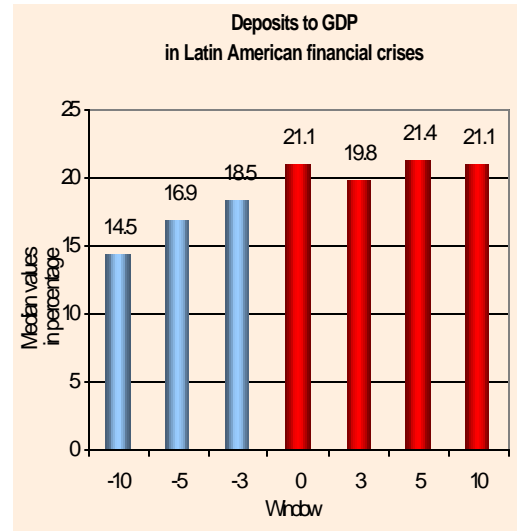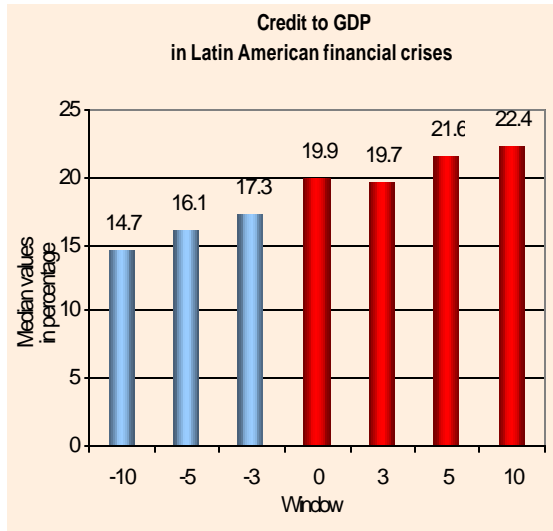
For the sake of obtaining a more representative summary measure, the following procedure is adopted: the average value of each variable in the post-crisis period is regressed against the average value of the same variable in the pre-crisis period, the estimated coefficient reflecting the degree of persistence. For example, a coefficient of 1.09 means that in the post-crisis period the variable of interest is 9% above its pre-crisis level.[28] Coefficients are said to be statistically significant if they differ from 0 (no relationship at all between the pre- and the post-crisis period) and 1 (no change between periods).

The real GDP growth rate appears to be quite affected by the crisis. Under the 3-year/3-year (post- to pre-crisis), it is barely 18.8% of the pre-crisis growth rate –if the pre-crisis rate was 5%, after the crisis it amounts to 0.94%. However, the drop is partially reverted as longer horizons are considered: for instance, with the 3-year/10-year window, it goes down to 33.9% and, with the 10-year/10-year window, to 38%. Despite the decreasing crisis-sensitivity of the economy, the fact that the growth rate in the decade after the crisis stays still below to that in the decade before the crisis suggests that financial crises cause not only a cyclical downturn but also a persistent growth deceleration. The real per capita GDP does not appear to be hurt, as it remains at pre-crisis levels in the short-run and increases mildly in the longer-run –although the lower growth rate negatively affects its trend.[29] The investment rate falls 6.4% in the initial 3-year post-crisis period, returning to preceding levels as time goes by. Private consumption, in turn, increases permanently by 3% to 5% according to the time frame chosen. The inflation rises in the three-year period following the crisis, exceeding for 55.7% the pre-crisis rate, but it later diminishes to levels well below, even though the fiscal balance deteriorates, most likely owing to the fiscal costs of the crisis and the growth rate slowdown.[30] Finally, a post-crisis real

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[28] It is noteworthy that this is not a test of causality but only a stylized description of the data, meaning that the changes in a particular variable cannot be entirely attributed to the crisis. Such casuality analysis requires the inclusion of other influencing variables, as done in other parts of this chapter.

[29] The striking result that per capita GDP is rather stable in spite of the slower rate of growth can be rationalized by recalling that the median annual GDP growth rate in the 3- and 10-year after crisis period was 1.8 and 2.3%, respectively. As far as population growth rates are below those levels, the per capita GDP can still grow.

[30] The finding that the fiscal position worsens at the same time that the inflation rate falls may seem at odds with conventional explanations of the latter. In spite of the close relationship between fiscal policy and inflation, it should be kept in mind that other variables are also central to the determination of the inflation

exchange rate appreciation is observed, which is consistent with stabilization plans under fixed or quasi-fixed nominal exchange rates and inflationary inertia.

As for the financial variables, the real growth rates of credit and deposits stay below those observed before the crisis regardless of the period under inspection, but the effect is higher in the short-run. Nevertheless, as a result of the steeper reduction of GDP, the ratio of deposit and credit to the private sector to GDP strikingly grows over the pre-crisis level, even under the 3-year/3-year window. Finally, Central Bank assets are also lower, which implies that government bailout is not primarily based on direct liquidity support to commercial banks.

Macroeconomic effects of financial crises in Latin America

Variable	Average of year crisis and				
	3 post-crisis years	3 post-crisis years	3 post-crisis years *Against average of*	5 post-crisis years	10 post-crisis years
	3 pre-crisis years	5 pre-crisis years	10 pre-crisis years	5 pre-crisis years	10 pre-crisis years
Macroeconomic variables:					
GDP growth rate	0.188	0.235	0.339	0.254	0.38
Inflation	1.557	0.855	0.523 (ns)	0.572	0.196 (ns)
Real exchange rate	0.765	0.713	0.538	0.871	0.513
Real per capita GDP	0.999	1.025	1.086	1.048	1.171
Private consumption to GDP	1.034	1.037	1.032	1.045	1.05
Gross investment to GDP	0.934	0.971	0.996	0.979	0.996
Fiscal balance to GDP	0.626	0.558	0.716	0.411	0.447
Banking variables:					
Real growth of credit to the private sector	0.163	0.31	0.381	0.249	0.23 (ns)
Private credit to GDP	1.118	1.187	1.326	1.173	1.24
Real growth of deposits	0.303	0.469	0.574	0.374	0.337
Deposits to GDP	1.224	1.327	1.346	1.374	1.423
Central Bank assets to total assets	0.734	0.721	0.676	0.704	0.629

(ns) Statistically not significantly different from 0 and 1.
Methodology explained in the text.

rate, such as the exchange rate policy, the source of financing of the fiscal deficit, the unemployment rate,

4.3 Financial crises, credit and economic growth in the short-run

To address the issue of whether credit availability matters for the level of economic activity, a regression analysis will be performed based on quarterly information from the same Latin American countries of Section 2. The dependent variables is the quarterly rate of growth of GDP:

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and so on.

Dependent variable: GDP growth rate

Explanatory variables	(1)	(2)	(3)
One-quarter lag of change in credit to the private sector to GDP	0.161***	0.12***	0.143***
Two-quarter lag of change in credit to the private sector to GDP	0.109**	0.051	0.136***
One-quarter lag of change in M1 to GDP		0.744	
Two-quarter lag of change in M1 to GDP		1.601***	
Quarterly rate of growth of real M1			0.072***
Nominal exchange rate variance	-0.044**	-0.03	-0.053*
Lagged real exchange rate	4.98	2.19	-7.43
Lagged inflation rate	0.238*	0.215	0.253
Argentine crisis	-0.012	-0.-033	-0.011
Brazilian crisis	0.0049	0.009	0.005
Colombian crisis	-0.034***	-0.051***	-0.034***
Peruvian crisis	-0.048***	-0.027***	-0.049***
Chilean crisis	-0.026	-0.019	-0.026
Mexican crisis	-0.004	-0.0003	-0.0018
Constant	0.015	0.009	0.005
No. observations	162	162	162
Method	Pooled OLS	Pooled OLS	Pooled OLS
F-test (p-value)	4.72 (0.000)	5.15 (0.000)	4.06 (0.000)
R-squared	0.182	0.245	0.22

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%.
T-statistics computed using robust standard errors.
Crisis variables are dummies with value 1 for the four quarters post-crisis, 0 otherwise.
Regressions include country dummies.

After including a set of standard controlling variables, the estimation presented in Column (1) reveals that the growth of the credit to the private sector to GDP at one and

two lags affects positive and significantly the growth rate of the GDP, the fixed investment and the private consumption.[31] Anyway, the quantitative magnitude is relatively low. In order to test whether there exists a transactional balances channel, in Column (2), the change of M1 to GDP at one and two lags was included. The second lag appear to be statistically significant, providing some backing to such hypothesis. As a result of the correlation between bank assets and liabilities, these additional variables alter the estimated coefficients on credit growth. Therefore, in Column (3), they are replaced by the rate of growth of M1 in real terms, which displays a highly significant coefficient.

Section 5: Financial crises and long-run economic growth

One perspective missing until this point is the long-run consequences of crises. A myopic focus on the immediate effects, especially when these appear to be less severe than expected, might convey a sense of undesirable comfort with the existence and recurrence of crises. To assess the long-term effects, an econometric approach will be developed next using annual information for 76 countries over the 1966-2001 period, with crisis ocurring before 1999 –to allow at least a short time for the crisis to develop- according to the Caprio and Klingebiel's database.[32]

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[31] In other regressions (not reported) it was included the standard deviation and the coefficient of variation of the real exchange rate, but such variables turn out to be statistically not significant in all cases.

[32] See Soto (2003) on the advantages of using annual data to explain long-run economic growth.

Long-run growth effects of financial crises, 1971-2000

Variable	(1)	(2)	(3)	(4)
Log of initial income per capita	-0.642***	-0.976***	-0.049	-0.266***
Initial Secondary enrollment	-0.059***	-0.073***	-0.065***	-0.068***
Openness to trade	0.012***	0.0079***	0.0014	-0.002
Goverment Expenditure to GDP	-0.073***	-0.061***	-0.058***	-0.050***
Secondary enrollment	0.059***	0.066***	0.074***	0.074***
Credit to the private sector to GDP	0.017***	0.022***	0.016***	0.021***
Investment rate to GDP			0.179***	0.182***
Financial crisis		-1.069***		-1.032***
Observations	782	782	782	782
Countries	76	76	76	76
Method	GMM-system	GMM-system	GMM-system	GMM-system
Sargan Test	0.997	0.997	0.998	0.998
Second orden correlation	0.105	0.125	0.095	0.081

* significant at 10%, ** significant at 5%, *** significant at 1%.

Widely used controls are included in the regression.[33] Baseline regression (1) shows the positive effect of financial deepening on growth found in many previous studies (see for example Bebczuk (2002)). In the next column, a dummy variable for financial crises is included, taking value 1 during the crisis years following the criterion of Caprio and Klingebiel (1999). This is the main variable of interest, and it displays the expected negative sign at 1% confidence level. The estimated coefficient indicates that financial crises reduce annual long-term growth approximately in one percentage point, demonstrating that these episodes are quite traumatic from a long-term standpoint.

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[33] Dummies for low, middle and high income countries are included but not reported. These variables allow to control for different levels of institutional development. A rule of law index yielded similar results.

Moreover, the inclusion of the crisis variable increases the coefficient on credit to GDP by isolating the negative effect of financial deepening via financial crises.

By introducing the investment rate in regression (3) and (4), it is tested whether financial crises hit the economy through its impact on the volume of investment.[34] Since the coefficient on crisis is virtually unchanged in regression (4), it can be claimed that financial crises decelerate growth via its effects on the productivity of the economy, instead of the more accepted credit story by which crisis-related financial constraints limit investment.[35] Financial crises distort private sector's resource allocation by interfering in the normal decision making process of banks, firms, and families, who are affected by heightened uncertainty, asymmetric information, and coordination problems. Compounding the problem, bailout policies are prone to be also inefficient, while property rights are in some cases violated in the process.

6. Conclusions and lessons

Against the background of the popular perception that financial crises take a heavy toll on the economy, the evidence presented throughout this chapter for Latin American and other countries is less apocalyptic. Financial crises hinder economic growth both in short- and the long-run, but not at the point of causing per capita GDP to drop. Similar results applies for financial intermediation, as real credit and deposits grow at a slower rate after the crisis, but financial deepening, as measured by the ratios to GDP, continue to grow, in spite that in many cases the financial system keep exhibiting an important degree of fragility. One reason for this resiliency of the financial system is that bank instruments have no close substitutes in many countries, and savers, especially the unsophisticated ones, privilege the simplicity of the contract and the existence of an explicit or implicit safety net.

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[34] By the way, it can be noted that the inclusion of the investment rate does not change the estimated coefficient on credit to GDP. This suggests that financial development fosters growth by elevating the productivity rather than the stock of capital. De Gregorio and Guidotti (1995) find a similar result.

Moreover, the credit view, according to which the chief detrimental effect of financial crises runs through the reduction of aggregate expenditure from a credit constraint, is only partially supported by the data, and only in the short-run. Conversely, financial crises are harmful owing to the noise they bring into the normal functioning of the economy in the form of more uncertainty and asymmetric information problems, inadequate government interventions, and the threat to established property rights. These phenomena distort the allocation of resources across sectors and periods of time with negative consequences for long-term growth prospects.

The low sensitivity of economic activity to sudden swings in credit is striking, though. One sensible explanation is that the overall credit-dependency of the non-financial private sector is low. This is especially true in developing countries, which are the most prone to have financial crisis of an important magnitude. A good measure of credit-dependency is the proportion of private fixed capital accumulation financed with bank debt. Bebczuk (2002) shows for a sample of over 40 countries during the 1970-1995 period that this ratio was just 4.3%. In a way, the probability of crisis is internalized in financing decisions within each country. It is not total coincidence that crises are more likely in developing countries with small financial systems: debt dependence will tend to be low if firms and families are aware of the high probability of crisis and the lack of insurance against it.[36]

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[35] Backing this assertion, Easterly and Levine (2001) show that physical and human capital accumulation are quite stable over time by looking at more than 100 countries.

[36] Countries that suffered a crisis in any year in the 1971-2000 crisis had a credit to GDP ratio of 25.2% in 1999 against 45% in non-crisis country.

Data Appendix (to be completed)

Country coverage in Section 4:

Argentina (1980-1982, 1989-1990, 1995, 2001-), Bolivia (1986-88, 1994-), Brazil (1990, 1994-1999), Chile (1976, 1981-86), Colombia (1982-1987), Ecuador (1980-1990, 1996-1997, 1998-2001), El Salvador (1989), Guatemala (1990-2000), Jamaica (1994, 1996-2000), México (1981-1991, 1994-2000) Nicaragua (1989-1996), Panama (1988-1989), Paraguay (1995-2000, 2001-), Peru (1983-1990), Trinidad and Tobago (1982-1993), Uruguay (1981-1984, 2001-), Venezuela (1979-1989, 1994-1995), Australia (1989-1992), Bulgaria (1996-1997), Côte d'Ivoire (1988-1991), Czech Republic (1989-1991), Egypt (Early 1980s, 1991-1995), Finland (1991-1994), France (1994-1995), Ghana (1982-1989, 1997-), Hungary (1991-1995), Indonesia (194-1995), Japan (1991-) Malaysia (1985-1988, 1997-2001), New Zealand (1987-1990), Norway (1990-1993), Phillipines (1983-1987, 1998-), Poland (1992-1995), Senegal (1988-1991), Slovenia (1992-1994), Korea, Rep. of (1997-2002), Spain (1977-1985), Sri Lanka (1989-1993), Sweden (1991-1994), Thailand (1983-1987, 1997-2002) Turkey (1982-1985, 1994) and United States (1988-1991).

Country coverage in Section 5:

Argentina, Australia, Austria, Barbados, Belgium, Bolivia, Botswana, Brazil, Burundi, Cameroon, Canada, Chile, China, Colombia, Congo, Dem. Rep., Congo, Rep., Costa Rica, Cote d'Ivoire, Denmark, Dominican Republic, Ecuador, Egypt, Arab Rep., El Salvador, Fiji, Finland, France, Ghana, Greece, Guatemala, Hungary, Iceland, India, Ireland, Israel, Italy, Jamaica, Japan, Kenya, Korea, Rep., Kuwait, Lesotho, Luxembourg, Madagascar, Malawi, Malaysia, Malta, Mexico, Morocco, Netherlands, New Zealand, Nicaragua, Norway, Pakistan, Paraguay, Peru, Philippines, Portugal, Rwanda, Senegal, Sierra Leone, Singapore, Spain, Sri Lanka, Swaziland, Sweden, Switzerland, Syrian Arab Republic, Thailand, Trinidad and Tobago, Tunisia, Turkey, United Kingdom, Uruguay, Venezuela, Zimbabwe.

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