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**GLOBAL AND DOMESTIC FACTORS OF  
FINANCIAL CRISES IN EMERGING ECONOMIES:  
LESSONS FROM THE EAST ASIAN EPISODES (1997-1999)**

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## ABSTRACT

This paper suggests that a new approach is needed in order to identify the causes of the East Asian financial crises and that this new approach might be fruitful in reassessing the analyses and theories of financial crises in emerging economies.

The first part of the paper presents a new empirical analysis of the state of fundamentals in East Asia before the crises. It suggests that the relevant fundamentals were both non-conventional and “intermediate” (or not “bad” enough to trigger the crises by themselves). Fundamentals were also different from those preceding previous turmoils in the 1990s, such as the ERM crisis in 1992-1993 and the Mexican crisis in 1994-1995.

The second part highlights that existing theoretical models of currency crises miss some important points. Even second generation models, which stress self-fulfilling expectations and which acknowledge that crises might appear against the backdrop of non-conventional and intermediate fundamentals, explain only the role of fundamentals in relation to private expectations. But they do not explain how can it be that a shift in private agents’ expectations turns out into a financial crisis.

The third part suggests that the current process of globalization exacerbates failures in international capital markets and impinges upon capital flows and the pace and order of financial liberalization in emerging economies, increasing therefore uncertainty and rendering large domestic vulnerabilities. It also highlights how financial globalization was related to the East Asian crises.

The main conclusion is that intermediate non-conventional fundamentals, shifts in private agents’ expectations and financial globalization were arguably the main factors of the East Asian crisis. Therefore, in order to prevent future financial crises, governments in emerging economies should try to exit crises zones through improving their fundamentals, to proceed carefully with financial liberalization, to implement some kind of capital controls and to urge for the establishment of a new global financial architecture.

*Keywords:* currency and financial crises, East Asia, financial liberalization, models of currency crises, economic and financial globalization.

*JEL Classification:* F30, F32, F33, F43, G15.

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## Introduction

The East Asian crises (1997-1999) have been the third severe episode of financial crises in the current decade. After the ERM crisis in 1992-1993 and the Mexican crisis in 1994-1995, the East Asian crises erupted in 1997 and brought about immediately a large controversy about their causes. Some experts have highlighted the importance of unsound fundamentals in causing the East Asian crises. Some others have stated that a financial panic triggered such crises. Let us note that the former strand of thought sticks to an explanation of crises from a domestic point of view, while the latter approaches the issue from the point of view of the functioning of the international financial system. This paper suggests, first, that the fundamentals identified by many analysts are not the most important ones when explaining East Asian vulnerability; and second, that the dichotomy between fundamentals and financial panic as causes of crises is, in fact, a false one. We believe that it is necessary to study both the domestic deficiencies that permit the success of speculative attacks, and the international context which facilitates the existence of such attacks.

In our empirical analysis of the macroeconomic situation of the East Asian countries affected by the financial crises (Indonesia, Malaysia, the Philippines, South Korea and Thailand), we find out that these economies featured sound conventional fundamentals in a favorable international environment. However, this group of countries also recorded some non-conventional deficiencies. A premature and indiscriminate financial liberalization and a weak supervisory framework contributed to the entry of massive capital inflows which, in turn, led to three types of economic deficiencies: increasing balance of payments constraints, the appearance of financial fragilities, and productive problems reflected in an asset bubble and in a decrease in investment efficiency. However, these factors did not seem to be “bad” enough to trigger the crises by themselves. Besides, if we compare the East Asian crises to previous episodes we can conclude that there were substantial differences between them: the ERM crisis was the result of excessively tight monetary policies; the Mexican crisis was associated to overconsumption problems; and the East Asian episodes were mainly related to overinvestment. Thus, as fundamentals were both “not-so-bad” and new relative to previous turmoils, the East Asian crises were not predicted.

As to the theoretical analysis, we firstly survey some of the existing models of financial crises and, secondly, we assess if those models fit to the empirical analysis of the East Asian episode. First generation models view crises as the unavoidable and predictable result of the incompatibility between economic policies. We will see that East Asian crises can not be explained by this kind of models. Second generation models view crises as the consequence of self-fulfilling expectations, so that crises are contingent and non-predictable phenomena. Though every concrete second generation model misses some part

of the reality of the East Asian episode, they explain how the East Asian crises happened despite that fundamentals were not as “bad” as to trigger a crisis by themselves, and that despite they were different to those considered as dangerous following previous crises. Finally, contagion models show that a crisis in one country may be the cause of crises in other countries. Contagion (at least some kinds of contagion) can partially explain the spreading of the initial Thai crisis to the rest of the region.

The severity of the East Asian financial crises has renewed the interest on the impact of financial globalization in emerging economies. Moreover, second generation models suggest that the prevailing international financial system permits the self-fulfilling character of expectations. Therefore, we study how the current financial globalization process brings about an increase in the vulnerability of emerging markets to crises. Such vulnerability arises from two different (albeit sometimes related) channels. First, globalization enhances the inherent failures of capital markets, leading to an increase in uncertainty. Second, globalization impinges upon the pace and order of domestic financial liberalization of emerging markets and facilitates the massive flow of capital to such markets, leading to domestic financial vulnerabilities. The East Asian countries suffered an increase in financial vulnerabilities through both channels. Therefore, these vulnerabilities, resulting from financial globalization, together with “intermediate” fundamentals and to a shift in private expectations, led to the East Asian financial crises.

The paper is organized as follows. Section I presents what we think is, in some important ways, a new empirical analysis of the East Asian crises. It shows the non-conventional fundamentals which made the East Asian countries prone to a financial crisis, and it analyzes the similarities and differences between the East Asian crises and previous turmoils in the 1990s. Section II reviews the literature on theoretical models of currency crises and assesses the explanatory and predictive capacity of those models in the case of the East Asian experience. Section III deals with the main features of the current process of financial globalization and suggests that such process leads to an increase in international uncertainty and domestic financial fragility, and ultimately, to a growing vulnerability of emerging markets to crises. Furthermore, it shows the usefulness of such analysis for understanding the causes of the East Asian crises. Finally, references include a large list of what we believe is the main literature (books, articles, working papers and typescript documents) on the East Asian crisis, the theoretical models of currency crises, and the effects of financial globalization on emerging markets. A statistical appendix can be found at the end of the paper, with some of the main relevant data.

Although this is a collective work which has been reviewed, in its integrity, by the three authors, we decided to distribute earlier drafts in the following way: initial writing of section I was made by Pablo Bustelo; Clara García wrote the first draft of section II; and Iliana Olivie was in charge of section III.

We sincerely hope that this paper might be useful as a modest contribution to the ongoing academic debate on the analysis and prevention of financial crises in emerging economies. Researchers are kindly requested to send to us their eventual comments.

Madrid, October 1999

# I. THE EAST ASIAN FINANCIAL CRISES (1997-1999): A NEW ANALYSIS<sup>1</sup>

## A. Features and Development of the Crises

### A.1. Main features of the crises

Despite somewhat alarming developments in 1996 in some of the later-troubled economies<sup>2</sup>, the East Asian financial crises (note the use of plural) in 1997-1999 were unanimously unpredicted. Academic specialists on currency crises, financial analysts, debt-rating agencies, and even the International Monetary Fund (IMF) and the Asian Development Bank (ADB), failed to predict not only the crises but also any kind of major economic or financial disturbance<sup>3</sup>. This was understandable to a certain extent. In fact, the background in 1990-1996 of the later distressed Asian economies (Indonesia, Malaysia, the Philippines, South Korea and Thailand, Asia-5 thereafter) featured generally sound conventional macroeconomic fundamentals<sup>4</sup>: high savings and investment rates, robust growth, moderate inflation, fiscal surpluses or low deficits, limited public debts, substantial foreign exchange reserves, and apparently sustainable high net capital inflows.

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<sup>1</sup> Analyses of the crises can be found in several books: Agénor *et al.* (eds.) (1999), Hunter and Kaufman (eds.) (1999), Jackson (ed.) (1998), Jomo (ed.) (1998), Lee (1998), and McLeod and Garnaut (eds.) (1998). Recent important papers are Corbett and Vines (1999), Chowdury (1999), Das (1999), Glick (1998), Griffith-Jones *et al.* (1999) and McKibbin and Martin (1998). See previous references in Bustelo (1998 and 1999).

<sup>2</sup> See, for instance, the 1997 Report of the Bank of International Settlements (BIS, 1997), which stated, however, that these developments were not an indicator of a full-fledged crisis.

<sup>3</sup> A notable exception was Korean economist Park Yung-chul. See Park (1996).

<sup>4</sup> Kaminsky *et al.* (1998) review many empirical studies on fundamentals which have featured unsoundness before episodes of financial crisis. They consider that ten of such fundamentals are relevant: international reserves, real exchange rate, domestic credit, credit to the public sector, domestic inflation and, to a lesser extent, trade balance, export performance, money growth, real GDP growth and the fiscal deficit. Just one of these ten “conventional” fundamentals (credit growth) was unsound in every East Asian country before the crises erupted. Other three (real exchange rate, trade balance and export performance) were unsound in some East Asian countries before the crises. Nevertheless, non-conventional fundamentals, such as investment efficiency, short-term external debt as a percentage of foreign exchange reserves, and the rise of bank credit to GDP, were far from sound (see below).



The international economic and financial environment was also benign: reasonable growth in the advanced economies (except Japan in 1997), low interest rates in developed countries (especially in Japan), high growth in international trade, and stability in world commodity markets. The crises came then as a total surprise. Also unanticipated were their deep impact and their prolonged duration.

The East Asian turmoils have been also heterogeneous. On the one hand, Southeast Asia has suffered from a balance-of-payments crisis<sup>5</sup>, although with distinctive features respective to similar episodes in the past, such as the European Exchange Rate Mechanism's crisis in 1992-1993 and the Mexican crisis in 1994-1995 (see a comparison in section I.C below). Southeast Asia's crises featured also several important distinctions between each of the countries concerned<sup>6</sup>. On the other hand, South Korea's economy did not suffer initially from a balance-of-payments crisis but only from liquidity problems of domestic banks and companies (and not from severe currency overvaluation and/or a high current account deficit), which were associated with overinvestment and excessive external debt accumulation, but finally had to face also sharp international solvency difficulties.

Besides, the East Asian crises have been tremendously controversial, both as respect to the explanations offered by analysts and specialists and as regards to the solutions implemented by the IMF in Thailand, Indonesia and South Korea or, against the tide, by Malaysia.

Moreover, due to the importance of East Asia in the world economy, the global impact of its crises was significant. For instance, the world was on the brink of a global recession in mid-1998, while several other developing and transitional regions (Brazil, Argentina and Russia) were affected and most of the developed economies are still suffering from the trade impact of the East Asian crises. The regional impact of the crises was of course more pronounced. The Asia-5 economies have witnessed stockmarkets' plunges and exchange rates' collapses (from mid-1997 to mid-1998), widespread financial sector difficulties (which are still severe), protracted declines in economic activity (in 1998 and early 1999), and a sharp increase in unemployment and poverty.

#### *A.2. Development: a chronology of the crises*

In mid-May 1997, a massive attack on the Thai baht and the Filipino peso was launched. Thailand (with the help of Singapore) intervened selling US dollars, while the Philippines increased its interest rate. On 2 July the baht was allowed to

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<sup>5</sup> A result of large currency overvaluations and/or massive current account deficits.

<sup>6</sup> For instance, Malaysia did not feature a large currency real appreciation, while Indonesia did not suffer from a high current account deficit.

float (it devaluated by 18%) and the Thai government asked the IMF for “technical assistance”. This was the trigger of the subsequent currency crises in East Asia. A generalized floating of the currencies occurred in less than six months: Philippines (11 July), Malaysia (14 July), Singapore (17 July), Indonesia (14 August), Taiwan (18 October) and South Korea (16 December).

Before giving up on defending the exchange rate pegs, central banks tried several measures to reduce the pressure: massive selling of US dollars, widening of the ranges of currency movements, increasing overnight borrowing rates and liquidity reserve requirements, restricting lending windows, swap restrictions, opening of bond markets to foreigners, etc.

On 24 July a new currency meltdown occurred. In late-July Thailand called in the IMF, which unveiled a rescue package of US\$ 17.2 billion on 11 August. During August, Malaysia limited swap transactions in ringgits and banned short-selling of stocks (the latter was scrapped, after much criticism, on 4 September).

On 8 October, Indonesia asked the IMF for assistance. In late-October, after the floating of the New Taiwan dollar, speculative attacks on Hong Kong’s stockmarket and currency board redoubled. In 23-24 October, the Hang Seng index had lost 23.3% of its value in just four days. This provoked a “minicrash” in Wall Street: on 27 October, the Dow Jones lost 7.2% and trading was temporarily suspended. On 31 October, the IMF announced its rescue program to Indonesia, which involved US\$ 38 billion (later augmented to US\$ 41 billion).

After widening the won trading band from +/-2.25% to +/-10%, on 21 November South Korea announced it would also seek a rescue package from the IMF. After the endorsement of the Vancouver APEC summit on 26 November (as the leading institution leading with the Asian turmoils), the IMF unveiled its program for South Korea on 3 December (for an unprecedented amount of US\$ 57 billion).

However, difficulties in South Korea continued to grow. On 10 December, Seoul announced that its foreign exchange reserves had diminished from US\$ 30.5 billion at end-October to US\$ 23.9 billion in early-December, of which only US\$6 billion were “usable”. Moreover, it stated that its short-term foreign debt (previously of US\$ 63 billion) amounted in fact to US\$ 100 billion.

Pressures on the currencies continued, despite the IMF interventions. The Indonesian rupiah surpassed the 5,000 mark to the US dollar on 12 December (2,682 on 13 August). The Korean won depreciated from 979 to the US dollar on 7 November to 1,710 on 12 December and 1,995 on 23 December. The Philippine peso reached 39.77 to the US dollar on 17 December (35.61 on 1 October).

This was surely related to the strong criticism directed to the IMF-sponsored programs, which involved measures such as a sharp fiscal and monetary

tightening, closure of troubled banks, reduction of subsidies, deregulation of monopolies and opening up of the financial system. This policy-mix was interpreted as to have recession-inducing effects.

In early 1998, runs on the currencies continued (the rupiah surpassed 10,000 on 8 January and 12,000 on 22 January). On 21 May, President Suharto resigned. In June, after the yen reached an 8-year low of 139 to the US dollar, the US and Japan intervened to strengthen the Japanese currency, mainly for fears that, if allowed to depreciate further, China might have envisaged to devalue the renminbi.

In July, the Asian contagion accelerated Russia's difficulties. Despite a IMF agreement with Moscow on 13 July, the ruble was floated on 17 August (a depreciation of 50% followed), while Russia declared a 90-day moratorium on the repayment of its foreign debt.

In early September, Malaysian authorities, departing from IMF prescriptions, applied currency and stockmarket controls and pegged the ringgit to the dollar at an exchange rate of 3.8. Meanwhile, the crisis spread to Latin America. On 10 September, Brazil's stockmarket plunged, while the Mexican peso depreciated.

On 29 September, the US Federal Reserve, fearing a global recession, decreased its interest rates. Meanwhile, Japan unveiled a fiscal stimulus to revive its economy. On 1 October, Tokyo announced the "Miyazawa Plan", a rescue package of US\$ 30 billion for the ailing East Asian developing economies.

As a result of these developments, the crises provoked large currency depreciations, enormous stockmarket plunges and an outright (and also unpredicted in late 1997) recession in 1998 (table I.1).

**Table I.1. GDP changes in Asia-5, 1996-1998**

	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1998f*</b>
Indonesia	8.0	5.0	-13.7	2.0
Malaysia	8.6	7.8	-6.8	2.5
Philippines	5.7	5.1	-0.5	3.8
South Korea	7.1	5.5	-5.8	3.5
Thailand	6.7	-0.3	-8.0	0.0

\* IMF forecasts in December 1997

Source: IMF.

## **B. The Background: The East Asian Economies in 1990-1996**

### *B.1. Generally sound macroeconomic conditions*

All the East Asian developing economies featured in 1990-1996 both domestic and foreign sound macroeconomic conditions.

On the domestic front, they had low public deficits - or even budget balances or surpluses (table 1.1 in the appendix); low public debts (table 1.2); moderate inflation (table 1.3); high savings and investment rates (over 30% of GDP in Asia-5, except in the Philippines) (table 1.4); robust GDP growth (8% in 1986-1996) (table 1.5); high and apparently sustainable (seen as “benign” as they financed investment rather than consumption) net capital inflows (6% of GDP in 1990-1996) (table 1.6); and low unemployment (table 1.7).

Internationally, interest rates in the US and especially in Japan were low (table 1.8); GDP growth was reasonably high in the advanced economies (except Japan) (table 1.9); world commodity markets were stable (table 1.10); and world trade growth averaged 6% in 1990-1996 (table 1.11).

As a conclusion, “none of the macroeconomic fundamentals suggested that a crisis of the magnitude that occurred was imminent in Asia” (Glick, 1998, p. 10).

### *B.2. Weaknesses: the seeds and the onset of the crises*

Despite this apparently comfortable domestic and international macroeconomic environment, which contrasted, in several aspects, to those of some Western European countries before 1992-1993 (Spain, Italy, United Kingdom, Ireland, and the Nordic economies) and of Mexico before 1994-1995, virtually all Asia-5 economies presented simultaneously several weaknesses.

#### *High capital inflows*

The East Asian economies undertook, since the early 1990s, a process of rapid financial liberalization, including both domestic deregulation and capital-account opening. As regards to domestic deregulation, barriers to entry in the financial sector were eliminated while old and new financial institutions obtained more freedom in their borrowing and lending decisions (these measures increased the number of financial institutions and their range of activities); restrictions on corporate debt financing were lifted; and regulatory controls over interest rates and loans were loosened, in benefit of a more market-based monetary and credit policy. According to capital-account opening, virtually all restrictions on cross-border borrowing were eliminated.

Financial deregulation and opening contributed to high capital inflows (see again table 1.6), which were also the result of low interest rates in the advanced economies (especially in Japan) and, domestically, to the high-growth and high-yield environment, and the stability of the nominal exchange rates

### *Balance-of-payments constraints*

High capital inflows led to currency real appreciation (table 1.12). The rise of the US dollar (table 1.13) since the spring of 1995, respective to the Japanese yen (and most European currencies), also contributed to this appreciation, as the Asian countries had a dollar-pegged exchange rate regime. From 1990 to the spring of 1997, real effective exchange rates (REERs) increased 30% in Hong Kong, 23% in the Philippines, 19% in Malaysia, 18% in Singapore, 12% in Thailand, 8% in Indonesia, but *decreased* 14% in South Korea and 10% in Taiwan (Corsetti, Pesenti and Roubini, 1998)<sup>7</sup>.

The appreciation of Asia-5 currencies contributed to an important slowdown in merchandise exports and, subsequently, to an increase in current account deficits, which therefore stemmed mainly from large trade imbalances, especially in Thailand and Malaysia.

The loss of competitiveness due to currencies' real appreciation, together with the entry of low-cost producers (such as China) in international sectors displaying global excess supply, with a glut in semiconductors, and with the reduction in import propensities of growth in advanced economies in 1994-1995, provoked a slowdown in exports (table 1.14). Moreover, as the value of the US dollar increased from 85 yen in June 1995 to 127 yen in April 1997 and to 135 yen in December 1997, Japanese direct investment in the area and its market for Asian products contracted (this was also due to Japan's recession), while Japan increased its competitiveness outside Asia respective to its regional competitors (mainly South Korea, Taiwan, Singapore and Malaysia). In 1996 the growth rate of total exports decreased markedly in Thailand, South Korea and Malaysia. However, Indonesia and the Philippines suffered a less important decline.

As a result, current account deficits (as a percentage of GDP or exports) reached considerable high levels in Malaysia and Thailand, but they were also sizable in the Philippines and South Korea (table 1.15). Only Indonesia had a reasonable current account deficit. On the contrary, Singapore, Taiwan and China had current account surpluses.

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<sup>7</sup> Other estimates indicate real appreciations in all five economies (see table 1.12). For instance, for the World Bank (1999: table 2.5), real exchange rates increased, from June 1995 to June 1997, 20.0% in the Philippines, 16.1% in Thailand, 14.0% in Indonesia, 9.3% in Malaysia, and 2.5% in Korea.

### *Declining efficiency of investment*

Financial deregulation and large capital inflows led to a boom in bank credit to the private sector (table 1.16). The large increase in bank lending contributed to overinvestment, which was already underway (table 1.17).

Overinvestment, together with important increases in unit labor costs, provoked a decline in capital profitability and investment efficiency in several manufacturing sectors in the early 1990s. This decline is shown in three facts: (1) the investment rate rose from 1986-1990 to 1991-95 while average GDP growth decreased from around 10% in 1986-1990 to around 8% in 1991-1995 (see country-by-country data in table 1.17); (2) the incremental capital output ratio (ICOR) increased in manufacturing sectors (table 1.18). For instance, from 1987-92 to 1993-96, the ICOR increased in Malaysia, Thailand and South Korea; and (3) returns on assets, according to estimates from Claessens, Djankov and Lang (1998: table 1), diminished, in the corporate sector, from 1992 to 1996, 2.6 percentage points in Thailand, 2.1 points in Indonesia, 0.8 points in South Korea and 0.4 points in Malaysia. Only the Philippines featured an increase (2.0 points).

### *Increased financial fragility*

As a result of the indiscriminate and under-regulated liberalization, financial institutions entered new areas of business and domestic firms became free to borrow both domestically and abroad. As a result, the quality of risk-assessment was reduced, while foreign exposure (to both interest and exchange rate risk) increased, due to the liberalization of the capital account, to the interest rate differential, and to the pegged currency (which virtually eliminated the perceived exchange risk). Foreign borrowing in short-term funds denominated in foreign currencies contributed, along with increased competition in the domestic banking sector, to an excessive bank lending on a long-term basis (and in domestic currency). As a result, balance sheets in banks and other financial institutions featured a growing maturity and currency mismatch between liabilities (borrowing) and assets (lending). In the case of bank borrowing, obtaining capital from abroad (at low interest rates on a short-term basis) to lend in the domestic market (at high interest rates on a long-term basis) was profitable and therefore contributed, besides to the aforementioned maturity mismatch between liabilities and assets, to a substantial short-term foreign debt. In the case of bank lending, due to increased competition in the domestic market, most banks tended to direct their loans to the stock market and to commercial and residential property, and thus contributed to create an asset bubble in those sectors. For instance, low rental yields in office buildings in central business districts reflected the boom in real estate. Moreover, stock indexes in the property sector rose more than general stock indexes. Banks behave quite rationally, as lending to consumption was not profitable due to high private savings and as lending to manufacturing was affected by declining returns.

Financial liberalization proceeded in a context of inadequate governmental regulation and prudential supervision (Singh, 1998). Low capital adequacy limits and high legal lending limits contributed to bank overlending (or to firms' overborrowing), while limited disclosure requirements and inadequate asset classification systems disguised the extent of problems related to non-performing loans.

As regards to the domestic financial fragility, East Asian banks and non-bank financial institutions (NBFIs) managed their risk inadequately. Excessive risk-taking was a result of the real or perceived financial insurance they had from the government (the so-called moral hazard), the entry of NBFIs in new and unknown areas of business, their high foreign exposure (which increased both their interest rate and exchange rate risks), and their practice of widespread collateralized lending. As a result, many banks were undercapitalized<sup>8</sup>.

Financial liberalization in a context of inadequate regulation and prudential supervision was the main factor explaining this behavior. Indicators of this financial fragility were:

- overlending: the change in bank lending to the private sector as a proportion of GDP (see again table 1.16);
- high foreign exposure: foreign liabilities of domestic banks as a proportion of GDP (table 1.19), and also as a proportion of M2 or as a percentage of assets (see World Bank, 1999a: table 2.2);
- high real estate exposure: percentage of banks loans directed to the property market (table 1.20);
- inadequate bank sheets: rate of non-performing loans (table 1.21).

East Asian manufacturing firms had an easy access to credit. As a result, they were highly leveraged (table 1.22) Both borrowing respective to investment and debt respective to equity were abnormally high. Moreover, there was also a declining capital efficiency and a falling profitability of investment.

Both banks and firms were also overindebted in foreign short-term liabilities, while the change in foreign exchange reserves was not matching the latter. Indicators are short-term debt as a proportion of total debt (table 1.23); short-term debt as a proportion of foreign exchange reserves (table 1.24), which measures the external liquidity; and the ratio of broad money (M2) to foreign exchange reserves (table 1.25), which is a proxy for the potential demand for foreign currency by holders of domestic currency.

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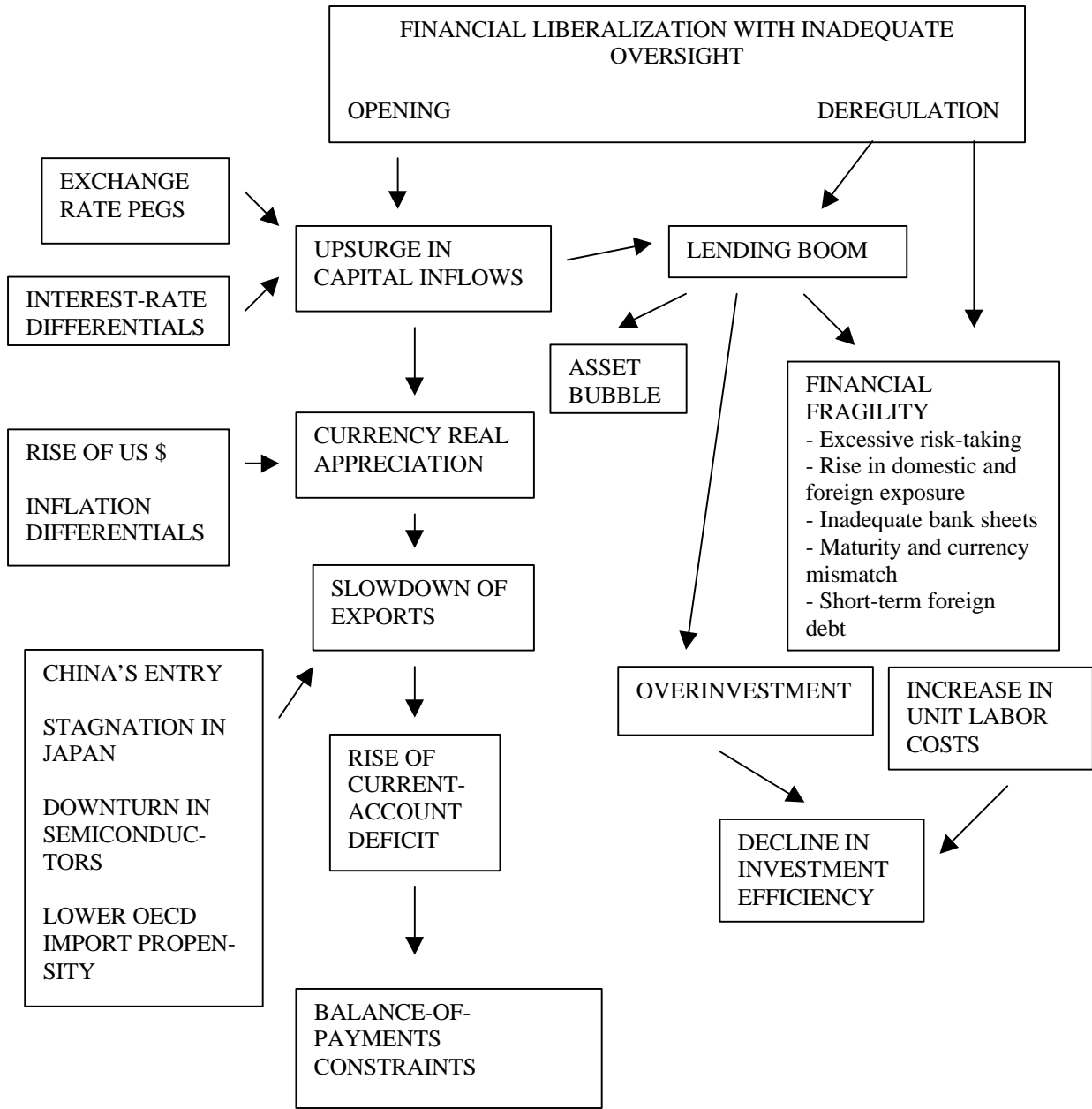
<sup>8</sup> However, banks' capital-asset ratios were at the end of 1996 between 6% and 14% and between 15% and 18% in the Philippines, according to Corsetti, Pesenti and Roubini (1998).

## *Summary*

In short, the essential process which led to rising vulnerabilities in East Asia might be summarized as follows (see also the figure in page 17):

- financial liberalization contributed, along with interest rate differentials and the exchange rate pegs, to substantial net capital inflows (US\$ 220 billion in Asia-5 in 1990-1996), most of which were short-term bank loans or portfolio investments;
- high net capital inflows provoked a currency real appreciation, due also to differentials in inflation rates and to the US dollar rise, which led to slowing exports. Exports were also affected by a cyclical overproduction in semiconductors (which affected mainly South Korea and Malaysia), by the stagnation of the Japanese economy, and by the entry of low-cost producers (there was a shift of regional trade advantages towards China). Slowing exports contributed to an increase of current account deficits, which rose 1 to 2 points of GDP in 1995-1996 in the later troubled Asian economies;
- the upsurge in capital inflows, together with financial deregulation, provoked also an overextension in bank lending, which created an asset bubble, a reduction in asset quality, and greater laxity in risk-assessment in borrowing and lending decisions. Overlending contributed to overinvestment by private firms, which, as a result, faced a decline in capital profitability and investment efficiency;
- financial deregulation increased fragilities in the domestic financial sector: excessive risk-taking, high domestic and foreign exposure, inadequate bank sheets, maturity and currency mismatch between borrowing and lending, and short-term external debt (also by private firms).





### *The onset of the crises*

Two main factors aggravated the situation in 1996 and early 1997. First, an increased financial fragility, due to growing domestic vulnerabilities in both banks and firms, combined with an overindebtedness in foreign liabilities (mostly short-term, private, denominated in foreign currencies and unhedged). Second, a slight macroeconomic worsening in 1996 and early 1997, due to slowing exports and declining profitability, which led, for instance, to several important bankruptcies in South Korea in the first half of 1997.

As regards to financial fragility, foreign liabilities of deposit money banks reached at the end of 1996 (as a proportion of GDP) 27% in Thailand, 17% in the Philippines and 9% in South Korea (a substantial increase from 11%, 6% and 4%, respectively, at the end of 1993). Moreover, debt-to-equity ratios in the corporate sector raised from 1995 to 1996 in Malaysia, the Philippines and Thailand (see again table 1.19). Furthermore, short-term foreign debt (as a proportion of international reserves) increased markedly in Thailand, Malaysia and South Korea between June 1994 and June 1997, according to Radelet and Sachs (1999).

Concerning the cyclical downturn, a slight macroeconomic worsening became apparent in 1996, related especially to a slowdown in export growth and to a deterioration in the current account. Moreover, in 1996 and early 1997, the bubble in the real estate sector burst in Thailand and there was also a decrease in stockmarkets' indexes in Thailand and South Korea (table 1.26). This contributed to the aforementioned bankruptcies in South Korea during the first half of 1997.

However, with insight, a soft landing, through slowing domestic demand and depreciating gradually the currency, would have been possible. Currency appreciation was smaller than in pre-crisis Mexico (Palma, 1998) and also than in several Latin American economies at the time (Radelet and Sachs, 1998). Exports were still rising in 1996 (except in Thailand) at considerable, although declining, rates. The current account deficit was high only in Malaysia, Thailand and the Philippines, but not in Indonesia and South Korea.

The increased financial and macroeconomic vulnerabilities in 1996 and early 1997 certainly aggravated some unsound features of the Asia-5 economies. Nevertheless, as already mentioned, even this aggravation could have been corrected in the absence of the speculative attacks on the currencies and the stockmarkets that took place since June 1997. The reversal of capital flows was very substantial (table 1.27).

## **C. A New Kind of Crises**

### *C.1. Financial crises in the post-Bretton Woods period*

Financial crises are defined here in a narrow sense. They should include, at least, four main elements: (1) a significant and unwanted depreciation of the currency; (2) a large drop in stockmarket indexes; (3) serious difficulties in the domestic financial system; and (4) a reversal of GDP growth, towards much lower positive rates or to negative rates.

Since the collapse of the Bretton Woods system in the early 1970s, several financial crises, especially in emerging economies, have erupted in:

- the Southern Cone of Latin America (Argentina, Chile and Uruguay) in 1981-82;
- virtually all Latin America, during the debt crisis in 1982-1990;
- Western Europe, as the Exchange Rate Mechanism (ERM) of the European Monetary System (EMS) suffered a turmoil and a breakup in 1992-1993;
- Mexico, in 1994-1995;
- East Asia, in 1997-1999.

An important feature was that all post-Bretton Woods crises were preceded by an upsurge in net private capital inflows. Capital flows were attracted in all cases by three main pull-factors. First, important interest rate differentials between capital-importing economies and capital-exporting countries. However, in the Southern Cone, Western Europe (Italy, Spain and the UK) and Mexico, the differential was related to tight monetary policy in the capital-recipient countries, while, in Latin America and East Asia, it was mainly due to very low international interest rates. Second, financial market deregulation and capital-account opening. Third, an exchange rate policy aimed at maintaining stability in the nominal exchange rate.

The nature (composition, maturity and borrowers) of those flows was nevertheless different in each case (table I.2).

**Table I.2. Composition, maturity and borrowers in upsurges of capital inflows since the late-1970s.**

	<b>Composition</b>	<b>Maturity</b>	<b>Borrowers</b>
Southern Cone	Individual bank lending	Short-term	Private
Latin America	Syndicated bank loans	Medium-term	Public
Western Europe	Portfolio investments	Short-term	Private
Mexico	Portfolio investments	Short-term	Private/Public
East Asia	Bank lending	Short-term	Private

Source: Author.

In all cases, massive capital inflows led to two alternative or combined effects:

a) if not sterilized (causing then an increase in the domestic-currency monetary base), to currency nominal appreciations and a worsening of external payments (a rise in the current account deficit and in the foreign debt). The change in the real exchange rate towards greater appreciation, due also to inflationary pressures, tended to attract even more capital flows;

b) if sterilized (in order to maintain unchanged the monetary supply), central banks had to issue domestic debt, which in turn increased domestic interest rates and the fiscal deficit. Normally, the central banks tended to use the domestic currency obtained by the issue to acquire foreign exchange in international markets. The increase in both interest rates and foreign exchange reserves attracted more capital inflows, as the interest-rate differential tended to rise and as the increase in reserves assured the stability of the exchange rate.

This process seemed to create a virtuous circle of long-lasting increases in capital inflows. However, these inflows normally contributed to currency real appreciations (and, therefore, to balance-of-payments constraints), to an overextension in bank lending, and to financial difficulties: a rapid increase in asset prices (that is, a bubble in the non-tradable sector); a decline in the quality of assets; and a greater laxity in risk-assessment by domestic banks and other financial institutions. Therefore, large capital inflows were related in all cases (except in the ERM episode) to banking crises (IMF, 1998).

However, developing countries handled capital inflows in different ways. In general terms, possible responses to massive capital inflows can be described as follows (Reinhart and Reinhart, 1998):

1. **STERILIZATION:** central banks engage in open market operations (and/or they impose higher reserve requirements in the banking system or they shift government deposits to the central bank) to offset some (of all) of the monetary expansion associated with the higher reserves, as they accumulate foreign exchange reserves to avoid some (of all) of the ensuing currency nominal appreciation. Open market operations include selling of treasury bills or central bank paper. As a result, the predictability of the near-term value of the currency, together with higher interest rates, lead to an increase in the volume of short-term capital inflows. It should be noted that central banks tend to prefer open market operations, as higher reserve requirements increase the burden on the banking sector and provoke some financial disintermediation.

2. **EXCHANGE-RATE POLICIES:** a devaluation of the currency (a measure which is normally rejected as it has adverse effects on inflation) or, at least, a higher exchange rate flexibility.

3. **FISCAL POLICIES:** in order to lower aggregate demand, governments may choose to tighten fiscal policies, but this choice may collide with long-term needs for infrastructure development in low-income countries.

4. **CAPITAL-ACCOUNT MEASURES:** such as taxing short-term inflows, improving prudential regulation on cross-border borrowing, or liberalizing capital outflows.

The empirical evidence tends to suggest that developing countries, in order to avoid some of the adverse impacts of maintaining the currency peg, choose sterilization. Moreover, the comparison of several Latin American economies before the Asian crises leads to several conclusions: (1) sterilization of capital inflows should avoid the issue of large short-term government debt, especially if denominated in foreign currency (Chile versus Mexico); (2) flexibility on exchange rate policies is better than credibility, even if it provokes a somewhat higher inflation (Eichengreen and Fishlow, 1998), as pegged currencies tend to lead to currency real appreciation and have moreover a limited usefulness over time to fight inflation (Chile versus Mexico and Argentina); (3) the use of capital controls on short-term capital inflows is, at least temporarily, useful (again Chile versus Mexico and Argentina); (4) some fiscal restraint might be necessary (*idem*).

Table I.3 summarizes policy responses to large capital inflows in several Latin American economies in 1994 and in Thailand in 1996.

**Table I.3. Policy responses to large capital inflows in several Latin American economies in 1994 and in Thailand in 1996**

	<b>Mexico94</b>	<b>Chile94</b>	<b>Argentina94</b>	<b>Thailand96</b>
Fiscal restraint	NO	YES	NO	YES
Currency revaluation	NO	YES	NO	NO
More ER variability	NO	YES	NO	NO
Sterilization	YES	YES	NO	YES
Capital controls	NO	YES	NO	YES
Lib. of capital outflows	YES	YES	NO	YES
More trade liberalization	YES	NO	NO	YES

Source: Reinhart and Reinhart, 1998, table 4.10, p. 122.

The three main episodes of financial crises in the 1990s (the ERM crisis of 1992-1993; the Mexican crisis of 1994-1995; and the East Asian crises of 1997-1999) deserve special attention.

All were preceded by an upsurge in capital inflows, due to rapid financial openings, exchange-rate pegs, and interest-rate differentials. Capital inflows contributed to a currency real appreciation and/or to an overextension in bank lending.

The three 1990s episodes share some similarities. First, they have been related, much more than previous episodes, to the growing globalization of the world economy<sup>9</sup>, especially as regards to the trend towards higher capital mobility (e.g., increase in inflows and vulnerability to sharp reversals). Second, the ERM and Mexican crises have inspired the so-called second-generation models of currency crises, which, describing the turmoils mainly as self-fulfilling events, prevail in the current theoretical literature and seem also to explain partially the East Asian crises (see section II of this paper).

### *C.2. The ERM crisis (1992-1993)*

The crisis in 1992-1993 of Exchange Rate Mechanism (ERM) of the European Monetary System (EMS) was a new kind of financial turmoil. In contrast with the Latin American episodes of the late-1970s and the 1980s, the European crisis was, to a great extent, a self-fulfilling event (see section II.B below). As Krugman (1997) suggested, “the European countries attacked in 1992 and 1993 did not fit the [first-generation] canonical crisis model at all”. Governments retained access to foreign capital, so they did not have to monetize their public deficits. Therefore, later-troubled economies did not feature an exceptionally rapid growth of domestic

<sup>9</sup> For an analysis of the links between globalization and financial crises, see Kahler, ed. (1998), Bustelo and Olivie (1999) and section III of this paper.

credit nor they had *a priori* limitations on foreign exchange reserves. Moreover, they had low and stable inflation rates both before and after the crisis. The ERM crisis was virtually unanticipated by financial markets: interest differentials against deposits in the later targeted currencies did not begin to widen until August 1992, only one month before the breakup of the system.

The results of the ERM crisis are very well known: the exit of the Italian lira and of the British pound from the EMS in September 1992; recurrent speculative attacks against the French franc in late 1992 and in 1993; and several devaluations of the Spanish peseta, the Portuguese escudo and the Irish punt from September 1992 to July 1993. Finally, on early August 1993, the size of currency bands in the EMS was widened from 4.5% (+/- 2.25%) to 30% (+/- 15%), epitomizing the collapse of an entire exchange-rate system of pegged currencies (Buiter, Corsetti and Pesenti, 1998).

The crisis reflected the inherent weakness of national anti-inflationary policies based on pegging the exchange rate and the vulnerability of the policy-makers' commitment to exchange rate stability. It has been explained as a result of some policy-induced weak fundamentals in the EMS zone since the late 1980s but especially following Germany's reunification, and as a product of massive speculative attacks against several currencies in the area.

Since 1987, several high-growth and high-inflation economies (such as Italy, Spain and the UK) had pursued tight monetary policies to contain prices' increases, creating large interest-rate differentials with the rest of Europe (particularly Germany) and with the US. This attracted large capital flows, which appreciated the currencies and provoked large current account deficits.

Moreover, in the aftermath of its reunification Germany undertook large fiscal transfers to its Eastern region, which fueled domestic demand, increased the budget deficit and created inflationary pressures (wages had also featured an upward trend, following monetary unification). In order to keep inflation at bay, the Bundesbank, sticking to its traditional tight monetary policy, raised interest rates at a time when other European countries (and also the US and Japan) had to lower their rates to get out of recession. In mid-July 1992, Germany's monetary authorities increased the discount rate from 8% to 8.75%, in a context of declining rates in the US and Japan (average short-term rates in 1992 were 9.4%, 4.1% and 3.4%, respectively). Germany attracted substantial capital flows (especially from the US, as the interest rates differential surpassed 500 basis points) which appreciated the D-Mark (it reached a historical high rate towards the dollar during the summer).

The D-Mark appreciation should have provoked in other EMS-member countries either an exchange rate realignment (a devaluation) or further deflation-oriented policies, both to regain competitiveness. However, policy makers in Italy, the UK,

Ireland, Spain and Portugal, confronted to high unemployment and pressured to engage in expansionary policies, decided to maintain the pegs they had with the D-mark, mainly for fears of the domestic inflation cost of the eventual realignment, and refused to increase sharply their interest rates.

After the first Danish referendum (which rejected the Maastricht treaty) and with uncertain expectations regarding the French consultation, speculative pressures on the lira and the pound increased during the summer. In early September, Italy decided to increase its discount rate, while the Bank of England opted to accumulate foreign exchange reserves. After the Finnish markka (which had a peg with the Ecu) was floated on 8 September and despite a slight decrease in German interest rates, the sterling and the lira withdrew from the EMS on 16 September, while the peseta was devalued by 5%. Pressures mounted on the franc, the peseta and the escudo. The latter were both devalued again by 6% on 22 November, amidst the floating of the Swedish and, later, the Norwegian kronas (which also had a peg with the Ecu). In January 1993, the Irish punt was devalued by 10%. Germany reduced its interest rates in February, March and April to defuse tensions, but in May both the peseta and the escudo were devalued by another 6.5%. Finally, on 2 August 1993, the size of the currency bands in the EMS widened from 4.5% to 30%, putting an end therefore to the previous system.

In short, the ERM crisis might be explained by the following main factors.

First, pegged currencies featured substantial real appreciations following the upwards movement of the D-Mark, due to higher interest rates in Germany in a context of slow growth in the US and Japan;

Second, relatively loose fiscal policies and tight monetary policies in several European countries before the crisis were counterproductive. Inflationary pressures precluded fiscal stimuli while relatively high domestic interest rates were maintained in order to fight inflation and especially to attract the foreign capital needed to finance the current account deficit. Large capital inflows, spurred also by capital account opening after the Single Act, contributed to currency real appreciations while high interest rates discouraged investment and job creation. When the crisis began in mid-1992, "other European countries pegging to the Mark found themselves obliged to match the tight monetary policy without the fiscal expansion [of Germany]; thus they were pushed into recession" (Krugman, 1997).

Third, massive speculative attacks (Bartolini and Prati, 1998) on the pound, lira, punt, escudo and peseta, on the ground that, in the aforementioned context, those currencies could have been defended only through a very sharp monetary contraction, which policy makers rejected on domestic political and economic considerations.



Therefore, the ERM crisis was in fact a result of pegged exchange rates, appreciated currencies, financial liberalization and herding behavior by international capital markets. These four features were to be found later also in the Mexican and the East Asian crises.

### C.3. *The Mexican crisis (1994-1995)*

Similarly to several European economies in 1992, Mexico was not suffering from especially adverse conventional fundamentals in the early 1990s (and more precisely in 1994, see Sachs *et al.*, 1996a). It featured a low public deficit (only 0.5% of GDP in 1994<sup>10</sup>); a reasonable inflation rate (at least by Mexican standards) of 8% in 1993 and 7% in 1994; and a consistent monetary policy (the growth of M1/GDP was only 1.1% per year in 1992-94).

However, the Mexican economy had also several important weaknesses (Calvo and Mendoza, 1996; Espinosa and Russell, 1996; Palma, 1998):

- a large current account deficit (6.8% of GDP in 1993; 8% of GDP in 1994, which amounted to 38% of exports), due to an important peso overvaluation and to a decreasing savings rate. According to Palma (1998), the peso appreciated in real terms almost 62% between 1987 and 1994. In the two years preceding the crisis, the currency appreciated, in real terms, 13.1% (Esquivel and Larraín, 1998)<sup>11</sup>. The appreciation was a result of the currency peg, some inflation differential with the US (3 percentage points in the tradable sector in 1990-93), and the large capital inflows that the country received (US \$91 billion in 1990-93, many of them with short-term maturities - only 13% was in the form of direct investment in 1993). The private savings rate declined from 26.1% in 1984-90 to 13.8% in 1991-93, while the investment rate increased from 16.5% to 19.5% (Palma, 1998). As a result, the current account deficit rose from US\$ 14.6 billion in 1991 to US\$ 28.8 billion in 1994;
- a substantial short-term private and public foreign indebtedness, mainly dollar-denominated, as a result of the issue of foreign debt instruments by private financial and manufacturing companies and of government dollar-indexed bonds (*tesobonos*). This was the result of the need to finance the external deficit but also of an indiscriminate and premature capital account opening;
- an inadequate regulation and supervision of the domestic financial system, which had been recently liberalized. Liberalization included, as in East Asia in 1990-96, measures directed to reduce reserve requirements, to increase

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<sup>10</sup> Although this figure might be higher (to perhaps 4% of GDP) if funds raised and lent by state and development banks are included. However, Mexico had budget surpluses from 1990 to 1993.

<sup>11</sup> This appreciation was roughly similar of that of Southeast Asia in the 24 months preceding the 1997 crisis: 17.7% in the Philippines, 15.5% in Thailand, 12.8% in Malaysia, and 12.1% in Indonesia, although much larger than that of South Korea (4.4%), according to Esquivel and Larraín (1999).

access to offshore borrowing and to remove restrictions on corporate debt financing and barriers to entry in the financial system. Inadequate oversight provoked excessively risky bank loans (bank credit, as percentage of GDP, doubled between 1990 and 1994) and growing asymmetries in maturity and currency structures between foreign borrowings and domestic loans;

- a high vulnerability to reversals in capital flows, following the aforementioned features and the six-step increase in US Fed funds rates during 1994 (from 3.0% in January to 5.5% in late-November). In fact, net transfer of resources from abroad declined from US\$22 billion in 1993 to *minus* US\$ 2 billion in 1995 and to *minus* US\$13 billion in 1996, a swing equivalent to 10% of GDP (Palma, 1998);
- political instability, following the Chiapas rebellion in January 1994 and the assassination of presidential candidate Luis Donaldo Colosio in March, in a context of an election year;

However, those weaknesses were not necessarily conducive to the currency crisis which unfolded later on. Self-fulfilling attacks by international investors (see the mechanics of this behavior in section II.B below) were in fact the main trigger of the Mexican crisis. As a result of speculative selling on the peso, foreign exchange reserves declined from US\$29 billion in January 1994 to US\$ 16 billion in April-October and to only US\$6 billion in December. Finally, on 22 December, Mexico allowed the peso to float freely. The currency lost 40% of its value between 20 December 1994 and 15 January 1995. A protracted recession followed, as GDP fell 7% in 1995 and as the unemployment rate increased from 4% to 7%.

#### *C.4. A comparison of the three crises*

An interesting prolongation of the previous analyses is to compare the East Asian crises with the ERM and Mexican turmoils<sup>12</sup>. In all three episodes, financial liberalizations, currency pegs and interest-rate differentials led to high capital inflows. As already described, the entry of large amounts of foreign capital exacerbated balance-of-payments constraints, lending booms and financial sector fragilities. Nevertheless, the three episodes were essentially different.

The European battered economies in 1993 featured much lower GDP growth and investment and savings rates than East Asia before 1997. They had also much higher unemployment rates. Besides, in the ERM case interest rates in Germany were high, while in 1996-97 US and Japanese rates were low. Fiscal policies were relatively loose in pre-1993 Europe while East Asia featured virtually balanced budgets. Monetary policy was tighter in the UK, Italy, Spain, Portugal and Ireland in 1992 than in Malaysia, Thailand or Indonesia in 1996 or than in South Korea in

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<sup>12</sup> Krugman (1997) compares the three crises. Esquivel and Larraín (1999), Hale (1998), Kregel (1998), Ortiz (1998) and Palma (1998) deal with the Mexican and East Asian crises.

1997. The European countries did not present dangerous levels of short-term private foreign debt.

Turning now to the common features of the ERM and East Asian crises, these were pegged exchange rates, substantial real currency appreciation, low inflation rates (although they were higher in some European countries), large current account deficits (7% of GDP in Spain in 1992; 8% in Malaysia and Thailand in 1996, although only 2% in South Korea in 1997), previous rapid financial liberalizations, and adverse effects from herding and speculative behavior in international capital markets.

Despite striking similarities<sup>13</sup>, the East Asian crises were essentially different from the Mexican turmoil three years before. To begin with, Mexico was in 1994 in the midst of an exchange rate-based stabilization program, which was the main reason why the nominal exchange rate was stable. Moreover, the government undertook, since the early 1990s, a widespread privatization process. Furthermore, a speculative boom in the stockmarket was under way. All these factors, combined with very low interest rates in the US, attracted considerable capital flows to Mexico (which amounted to 10% of GDP in 1993).

If one compares Mexico in 1994 with Thailand in 1996 (Hale, 1998), other differences in the pre-crisis economic environment were the following:

- savings and investment rates: 10% and 25%, respectively, in Mexico, and 35% and 44%, respectively, in Thailand;
- foreign exchange reserves: as a percentage of the current account deficit, they represented 95% in Mexico and 300% in Thailand;
- composition of foreign capital inflows: mainly portfolio investment in Mexico, and mainly bank loans in Thailand;
- inflation rates: 12.9% in Mexico (1990-1993) and 5.5% in Thailand (1994-1996);
- external environment: high interest rates in the US in 1994; low interest rates in Japan and other advanced economies in 1996;
- political situation: instability in Mexico; stability in Thailand.

Table I.4 summarizes the comparison between the three financial crises.

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<sup>13</sup> Large current account deficits, significant currency real appreciation, and lending booms. However, current account deficits were a result of private overconsumption in Mexico and of private overinvestment in East Asia.

**Table I.4. A comparison between the ERM, Mexican and East Asian crises**

	<b>ERM</b>	<b>MEXICO</b>	<b>EAST ASIA</b>
International int. rates	High*	Low	Low
Fiscal policy	Loose	Cautious	Cautious
Monetary policy	Tight	Tight	Cautious
Exchange rate	Pegged	Pegged	Pegged
Real appreciation	Yes	Yes	Yes
Inflation rate	Low	Low	Low
Investment rate	Low	Low	High
Savings rate	Low	Low	High
Current account deficit	High	High	High**
Short-term foreign debt	No	Yes	Yes
Financial liberalization	Yes	Yes	Yes
Financial panic	Yes	Yes	Yes
Political stability	Yes	No	Yes

Notes: \*: Germany's rates; \*\*: Except South Korea and, to a lesser extent, Indonesia.

Source: Author.

The main conclusion of this section might be laid out as follows. The main currency crises in the 1990s were related to previous high net capital inflows, due to financial opening, interest-rate differentials and exchange-rate pegs. However, the ERM crisis was a result of excessively strict monetary policies firstly in the European periphery and later in Germany; the Mexican crisis was associated to a decline in the private savings rate (that is, to overconsumption); and the East Asian crises were related to private overinvestment.

Nevertheless, it is fair to conclude that none of those problems should have necessarily been conducive to a full-fledged currency crisis. Some other factors need to be explored, such as the behavior of international capital markets and the impact of the recent trends in financial globalization (see sections II and III below).

## **II. Theoretical Models of Currency Crises and their Applicability to East Asia**

### **A. First Generation Models**

First generation models appeared with an article published by Paul Krugman in 1979. Krugman's article was inspired in a previous model (Salant and Henderson, 1978) which explained why and when the government reserves of an exhaustible resource, whose price has been fixed, are depleted. Krugman, in turn, explained why and when the foreign currency reserves, given a fixed exchange rate regime, are depleted. The resemblance between both models is obvious: while Salant and Henderson (1978) study the behavior of the reserves of an exhaustible resource when there is a fixed price for such resource, Krugman (1979) studies the behavior of foreign currency reserves when there is a fixed exchange rate regime (when the foreign currency price is fixed). Krugman (1979) considered, as we see below, that crises are the consequence of financing the public deficit through an expansionary monetary policy.

Other first generation models are the following: Flood and Garber (1984) developed a linear model with the aim of estimating the exact timing of the speculative attack and of the consequent depletion of reserves. Connolly and Taylor (1984) calculated the timing of a collapse when there is a crawling peg regime. Their main contribution was the study of the behavior of prices of nontradeable goods before the collapse of the exchange rate regime: the currency appreciates and the current account deteriorates before the collapse. Dooley (1997) presented a first generation model in which the fundamentals that lead to the crisis are different to those included in previous models. Dooley, contrary to the previous first generation models, considered that crises are the consequence of the mismatch between the amount of reserves that the central bank holds and the amount of liabilities guaranteed by the government.

It is important to explain why all these models are joined together in the same group. Although there is consensus in the specialized literature about exactly what models are first generation models, it seems adequate to intend to give a definition of what we consider a first generation model. We believe that the main features of a first generation model is that it considers that financial crises are unavoidable and predictable phenomena, and that they are consequence of the incompatibility of some economic policies with others. According to this definition, Krugman's model and those of his followers, are first generation models, as crises in those models are the unavoidable and predictable consequence of the incompatibility of fiscal and monetary policies with the exchange rate policy. Dooley's model is also a first generation model, as it presents crises as the consequence of the incompatibility of a contractive credit policy with the public insurance of national residents' liabilities. If we had considered exclusively the policy incompatibility

showed in Krugman (1979), we would have excluded Dooley's (1997) model, which is a good example of the efforts that can be made in order to widen the explanatory (and even predictive) capacity of first generation models.

### *A.1. The first model*

The first model was presented by Paul Krugman in 1979. As we have already said, it was based in Salant and Henderson (1978). Such model presents the following explanation: fixing the price of an exhaustible resource (e.g. gold) forces the authority to defend such price through selling gold, and the sale of gold would end up in the depletion of gold reserves. Before the total depletion of reserves, private agents perceive that the maintenance of the fixed price is not possible and that after the depletion of reserves the gold price would rise discretely. As a consequence, they buy the remaining reserves of gold, before its price rises. Thus, a speculative attack advances the depletion of gold reserves, that otherwise would be reached progressively.

Krugman's model consists in applying Salant and Henderson's model to the currency market. While in the latter the government fixes the price of gold, in the former the government fixes the price of the foreign currency. Krugman defines a balance of payment crisis as the moment in which "the government is no longer able to defend a fixed parity because of the constraints on its actions" (Krugman, 1979, p. 311). Such crisis occurs because fiscal and monetary policies are incompatible with the maintenance of the fixed exchange rate. Let us study carefully such incompatibility.

The model is based in the following assumptions<sup>14</sup>:

1. There is purchasing power parity, and international prices are constant and equal to one, so that the national price level equals the exchange rate, and expected inflation ( $p$ ) equals expected devaluation ( $s$ );
2. There are two financial assets, domestic money ( $M$ ) and foreign money ( $F$ ), and while domestic agents distribute their wealth between both assets according to their inflation expectations ( $p$ ), foreign agents have no access to domestic money;
3. The monetary authorities can only defend the fixed parity through intervention in the currency market;
4. Money supply increases are exclusively settled by the public sector's financing needs, and not by an increase in the credit given by the monetary authorities to the banking system<sup>15</sup>;

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<sup>14</sup> There are more assumptions that we do not specify in the text. Those we include are the most relevant ones so as to make the explanation of the model understandable.

<sup>15</sup> Krugman admits this possibility but does not include it in his model. In any of both cases (the increase of money supply in order to finance public deficit or to

5. The only way of financing public deficit is precisely turning to the central bank, and not, for example, issuing public debt;
6. Speculators' forward-looking behavior is "sophisticated". Thus, there is perfect foresight, which implies that  $p = \Delta P/P$ .

Let us see what happens under these assumptions when the government implements a fixed exchange rate regime and bears a budget deficit at the same time. On the one hand, according to assumption number 5, the public deficit must be financed by issuing money, that is, by an increase in money supply. On the other hand, while private agents believe in the maintenance of the fixed parity the expected devaluation and the expected inflation (that are identical, according to assumption number 1) equal zero. Being expected inflation equal to zero, according to assumption number 2, the proportion of wealth that domestic agents want to keep in domestic money (M) and the proportion they want to keep in foreign money (F) remain constant. Thus, on the one hand, money supply is rising, due to the public sector's financing needs, and on the other hand, money demand is constant. Private domestic agents will exchange the money supply excess for foreign currency in the central bank in order to preserve the proportion of wealth in domestic and foreign money (M and F) they had chosen for the given expected inflation. In consequence, the central bank loses reserves.

If such fiscal and monetary policies persist, there will be a time in which foreign currency reserves are depleted. But before reserves are totally depleted, there is a speculative attack against the domestic currency. Why is it so? In order to understand it, let us see what would happen if there was no speculative attack. The depletion of reserves would be reached progressively, as we have just explained. When reserves are exhausted, increases in money supply can not be exchanged for foreign currency in the central bank anymore, so that "portfolio balance begins to determine the price level instead of the money supply" (Krugman, 1979, p. 319). The price level will immediately begin to rise.

According to assumption number 6 (perfect foresight), the increase in the price level turns immediately into an increase in expected inflation ( $p$ ). Such increase in the expected inflation reduces the proportion of wealth that private domestic agents are willing to keep in domestic money. Thus, the money demand falls and the price level (that equals the exchange rate, according to assumption number 1) rises by a discrete amount. Hence, inflation and devaluation come about after the depletion of reserves in absence of an speculative attack.

While private agents believe that reserves are not going to be exhausted, and that the fixed parity can be maintained, inflation expectations remain zero, so that money demand does not change. But there is a moment in which private agents

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finance the banking system's needs), the money supply increase would have identical consequences in this model.

realize that reserves are decreasing, that such losses would lead to the exhaustion of reserves, that such exhaustion would produce inflation and devaluation, and that such inflation and devaluation would bring about losses for those private domestic agents that keep part of their wealth in domestic money. In such a moment, expected inflation rises, money demand decreases, and domestic currency is exchanged for foreign currency so as to avoid the losses that the foreseen depletion of reserves would bring about. Hence, a speculative attack is under way.

This model, apart from explaining why a speculative attack occurs before the total exhaustion of reserves, indicates the exact time of the attack. Nevertheless, this matter is more thoroughly studied in subsequent models. Krugman (1979) just explains that the attack comes about whenever the price level that would be reached after the depletion of reserves equals the fixed price. In other words, when the exchange rate that is expected to prevail after the abandonment of the fixed parity equals the fixed exchange rate, there is a speculative attack. Being this way, there is no discrete jump neither of prices nor of the exchange rate, so that there are no losses for private domestic agents. The bigger the amount of reserves in the central bank, the later the timing of the speculative attack.

Hitherto, it has been assumed that government policy is not uncertain, so that private agents know what amount of reserves is the central bank inclined to use for the defense of the fixed rate. Krugman also studies the case in which there is no such certainty. In this case private agents know that the central bank is determined to use an amount of reserves ( $R_1$ ) but they do not know if it will use another amount ( $R_2$ ). It is also assumed that once the central bank has begun to use  $R_2$ , it is inclined to use the whole amount of  $R_2$ . In the case of a speculative attack against  $R_1$ , if the central bank decides to use  $R_2$ , the collapse of the currency may be avoided. Nevertheless, as private agents know that the central bank is determined to deplete the whole  $R_2$ , there may be a second speculative attack. Hence, if there is uncertainty about the amount of reserves that can be used for the defense of the fixed parity, there may be a succession of speculative attacks.

Summing up, public deficit theoretically could be financed through increasing the money supply (monetization) or through wasting currency reserves. The main idea of Krugman's model is that, if there is a fixed parity, even when the deficit is financed through an expansive monetary policy, reserves will be lost. This is so because private agents have an optimum portfolio composition, so that they exchange the excess of money supply (produced by the money supply increase, being money demand constant) for foreign currency in the central bank. If fiscal and monetary policies (public deficit and expansive monetary policy) persist, there would be a time in which reserves would be depleted. Private investors advance such depletion through a speculative attack that allows them to avoid the losses that otherwise they would suffer because of the collapse of the exchange rate



regime and the consequent devaluation. When the attack depletes the international reserves, the authorities can no longer defend nor maintain the fixed parity.

### *A.2. Other first generation models*

We are now going to study some variations of the first model. It is important to note that we do not have the aim of listing or explaining here all first generation models, but to give some examples of the work that other authors have developed in this area of study.

Many of the variations on Krugman's model are very similar to it. Both the variables (public deficit, increasing money supply...) and the mechanisms that lead to the crisis (financing of deficit that brings about the loss of reserves) are mainly the same in these models and in Krugman's one. Nevertheless, they may differ from the first model in various things: in the mathematical method used, in the main objective of the study, in the behavior of domestic credit, in the prevailing exchange rate regime, etc. Apart from these variations, that are more or less loyal to the first model, there are some other attempts to explain financial crisis in which the variables and the mechanisms that lead to the crisis are different from the previous models. In any case, as we have already stated, all of them coincide in that crises are the unavoidable and thus predictable consequence of the impossibility of maintaining a certain combination of economic policies. Nevertheless, some of the contributions reviewed here include, apart from the first generation model in which we focus our attention, other models that should normally not be included in this group of models, as we note below.

Flood and Garber (1984) present two models, following Krugman (1979). We focus our study in the first one, which estimates the exact time of the collapse, under the assumption, already made by Krugman, that there is perfect foresight.

The first model in Flood and Garber (1984) is based in the following assumptions<sup>16</sup>:

1. Money supply (M) equals the book value of international reserves (R) plus domestic credit given by the central bank (D). So that  $M = R + D$ ;
2. Domestic credit (D) grows at a constant rate (m);
3. There is perfect foresight.

This model does not specify if such domestic credit growth rate is determined by the public sector's financing needs. In any case, when the exchange rate is fixed, the government has to prevent domestic credit growth (D) becoming an increase in money supply (M). If money supply grew, given that money demand is constant

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<sup>16</sup> As we did for Krugman, we only list the assumptions that are more important for understanding the model.

(because it is determined by the exchange rate, which is constant), a money demand-supply gap would arise, so that the domestic currency would lose value. In order to avoid such loss of the domestic currency's value it is necessary to prevent the money supply from growing by sterilizing the domestic credit growth ( $\Delta D = m$ ) with an equivalent reduction in international reserves ( $\Delta R = -m$ ). It is obvious, thus, that while domestic credit keeps growing, reserves will be lost at the constant rate  $m$ , so that there will be a moment in which international reserves are exhausted ( $R = 0$ ). In such moment, according to assumption number 1, money supply equals domestic credit ( $M = D$ ), so that it is not possible anymore to prevent the increases in domestic credit turning into increases in money supply. Therefore, the fixed parity has to be abandoned.

The collapse of the exchange regime, as in Krugman (1979), does not come along when foreign exchange reserves progressively reach a minimum (usually zero). Instead, a speculative attack advances the collapse. Private agents foresee the collapse and its consequences (the discrete jump of prices and of the exchange rate), so that they demand foreign currency in order to avoid the losses such jump of the exchange rate would bring about for them. Flood and Garber define the shadow floating exchange rate as "the floating rate which would materialize if the fixed exchange rate collapsed at any given time" (Flood and Garber, 1984, p. 4). The moment of the attack is when this shadow floating rate equals the fixed exchange rate. When the shadow rate is higher than the fixed rate, private agents compete for the profits of buying foreign currency before the collapse (before the price of the foreign currency increases), so that the attack is advanced. When, on the contrary, the shadow exchange rate is lower than the fixed rate, private agents win nothing by buying foreign currency (as it would be cheaper if the fixed parity is abandoned), so that there is no speculative attack. In sum, as Krugman (1979) indicated in other words, the attack comes whenever the shadow floating exchange rate equals the fixed exchange rate. The higher international reserves are, and the lower domestic credit growth ( $m$ ) is, the later the attack comes<sup>17</sup>.

Connolly and Taylor (1984) develop a model in which, instead of a fixed exchange rate regime, there is a crawling peg regime. A crawling peg regime consists in that the monetary authorities preannounce a constant rate of change for the exchange rate. "A fixed exchange rate is a specific case of an active crawling peg where the preannounced rate of change in the exchange rate is zero" (Connolly and Taylor, 1984, p. 194).

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<sup>17</sup> There is a second part of the model that studies the case in which the floating exchange rate includes an arbitrary positive constant that is only known in the moment of the attack. They conclude that the higher such constant, the sooner the attack. Hence, they conclude that the solution to the floating rate depends not only on fundamentals, but also on the arbitrary behavior of speculators. Therefore, such part would not be included in first generation models.

The main assumptions of the model are the following<sup>18</sup>:

1. Money supply (M) equals international reserves (R) plus domestic credit (C in this model). So that  $M = R + C$ ;
2. Private agents have access to two financial assets: domestic currency (M) and foreign currency (F). The proportion of wealth they will keep in each currency depends on the exchange rate;
3. The exchange rate grows at a constant rate  $g$ , preannounced by the monetary authorities;
4. Domestic credit grows at a rate  $g + e$ .

Given such a depreciation rate, private agents preserve their portfolio balance by increasing the domestic money demand at a pace  $g$ . When  $e$  is not zero, but a positive constant, this is to say, when domestic credit growth is higher than the exchange rate growth<sup>19</sup>, the rate of money demand growth ( $g$ ) is not enough as to absorb all the money supply growth ( $g + e$ ). As in previous models, in order to avoid the effects on the exchange rate of the money demand-supply gap, it is necessary to loose international reserves, according to the central bank balance sheet, showed in assumption number 1. In other words, reserves must decrease at a pace  $e$  ( $\Delta R = -e$ ) in order to sterilize partially the domestic credit growth ( $\Delta C = g + e$ ), so that the money supply increases at the same pace that money demand ( $\Delta M = g$ ).

Before international reserves are totally depleted, there is a speculative attack against the domestic currency. With such attack, as we have already studied in the previous models, private agents avoid the losses that the depletion of reserves and the consequent discrete jump of prices and of the exchange rate would bring about. Following this model, the attack comes sooner the greater the sensitivity of money demand respective to the expected inflation, the greater the difference between domestic credit growth and the exchange rate growth (the greater  $e$ ), and the smaller initial stock of international reserves relative to domestic credit.

This model also studies the behavior of relative prices during the crawling peg regime. For such analysis they assume, as Krugman (1979), that the government finances its expenditures exclusively through the creation of money. Their conclusion is that there is a rise of the price of nontraded goods relative to traded goods whenever  $e > 0$  (whenever the domestic credit growth rate exceeds the currency depreciation rate). Such rise is dramatically reversed at the moment of

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<sup>18</sup> Once again, we only list the assumptions that we consider necessary for understanding this brief explanation of the model.

<sup>19</sup> Note that this is always the case in the previously explained models, in which the exchange rate growth was zero (using the notation of this model,  $g = 0$ ), and the domestic credit growth rate was  $m > 0$  (in the notation of this model,  $e = m > 0$ ).

the collapse of the crawling peg. The increasing relative price of nontraded goods to traded goods during the peg may bring about the worsening of the current account<sup>20</sup>.

The last model we study in this section differs quite a lot from the other first generation models, especially in the fundamentals that cause the crises. If we think that it can be placed here is because it coincides with the others in that there is an economic policy conflict that leads to a worsening of the economic fundamentals, and that private agents are informed and rational (not as in second generation models, as we see below), so that their expectations depend on such worsening of fundamentals. The conflict of economic policies that Dooley presents consists in the following: the government on the one hand implements a restrictive credit policy with the aim of holding reserves as a form of self-insurance; and on the other hand it guarantees the financial liabilities of domestic residents. Both objectives depend on the same economic policy instrument: the management of international reserves. Let us see all this more carefully.

Three conditions must be met for a financial crisis to occur following this model: the government must have positive reserves; it must be believable in its commitment to use them for insuring the residents' liabilities; private investors must have access to those transactions that may produce insured losses. The process that leads to a crisis consists in the following: firstly it is necessary that a binding constraint is relaxed so that the central bank can accumulate assets<sup>21</sup>. Thus, the two first conditions we have mentioned can be met (the central bank accumulates reserves and these are enough as to believe in the governments insurance to residents). Once the central bank has enough assets and that the insurance policy is credible, expected returns on insured assets rise for a predictable time period. Such increase in profitability, all together with financial liberalization and with a slackly regulated banking system, attracts foreign capital. While insured assets have no risk, there are no incentives for a speculative attack. But when insured liabilities equal international reserves, the expected profitability of assets fall, as there is risk of the central bank's default. Therefore, investors exchange their assets for foreign currency in order to avoid the losses they would suffer if the resident borrower did not pay and the central bank could not pay either. Hence, there is a speculative attack that depletes international reserves.

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<sup>20</sup> A final part of the article (Connolly and Taylor, 1984, p. 204) studies the case in which there are no incompatibilities between economic policies, but the economy is subject to a real external shock (e.g. a hurricane). Their conclusion is that if the shock does not deplete all the international reserves, the collapse of the exchange rate regime does not occur.

<sup>21</sup> The author gives an example of the relaxation of a binding constraint: the reduction of international interest rates in 1989. Such reduction lowered the price of external debt of developing countries, which implied a capital gain that could be set aside for insuring the residents' liabilities.

Summing up, the first economic policy objective is fulfilled by accumulating reserves. Such accumulation of international reserves plus the insurance to the residents' liabilities attracts foreign capital to the country in question. Once reserves equal the insured liabilities, investors foresee a possible government default. Hence they suddenly remove their credit to the country through a speculative attack.

Dooley considers that a fixed exchange rate regime is not a necessary condition for crisis to happen, but that it helps by assuring that the government is more likely to honor its contingent liabilities rather than using inflation or default to reduce their value. Another important conclusion of this model is that, in a context of financial liberalization, scarce regulation in the banking sector, and institutional guarantees, rapid growth of credit from the banks to the private sector may serve as an indicator of a future banking crisis, and a consequent financial crisis.

### *A.3. Evaluation of first generation models*

First generation models show how certain incompatibilities between economic policies provoke the worsening of fundamentals, and how such worsening of fundamentals warn the investors about possible losses, thus bringing about a speculative attack. Let us see some theoretical advantages of these models, as well as the main critiques they have received. We will also review if the empirical studies about first generation models support or not the theory.

From a macroeconomic perspective, an obvious advantage of these models is that they attempt to find a causal explanation for financial crisis. This is, they do not confine themselves to describe the economic context that increases the probability of a crisis (as second generation models do, see below), but they try to find the economic context that causes a crisis. Hence, they pretend not only to serve as an *ex post* explanation of crises, but also to be able to explain them *ex ante*, that is, to predict them. This attempt is, of course, laudable. But we must note that maybe it is just an attempt. We consider that it may not be possible to elaborate a simple model that can explain and predict phenomena as complex and uneven as financial crisis have proved to be.

From a microeconomic perspective, they have the advantage that they show that a rational behavior of private agents can transform small changes in fundamentals into massive attacks and severe crises. Dooley states that first generation models (and thus, also his model) teach "the important lesson that rational economic behavior driven by fundamentals that evolve smoothly over time can involve dramatic attacks (...) and changes in regimes that seem to be unrelated to contemporaneous changes in fundamentals" (Dooley, 1997, p. 5).

Obstfeld states that “models in the spirit of Krugman (1979) provide elegant parables of how rational financial markets respond to unsustainable macroeconomic policies. The models ignore, however, the policy options available to authorities and the ways in which the marginal costs of exercising these options are balanced” (Obstfeld, 1994, p. 196). Actually, first generation models depict a too mechanical government behavior. In fact, governments have other options apart from sterilizing domestic credit growth with international reserves losses (or from setting aside all its international reserves for insuring liabilities, as in the case of Dooley). Second generation models acknowledge such fact and turn the government into an optimizing agent (see below).

Likewise, Lahiri and Végh (1997) point out that governments are able to control their reserves through their control of money demand. That is, they do not think that governments accept passively that money demand stays constant while international reserves are being lost. They develop a model in which the government pays an interest rate to commercial banks’ reserves, and in which variations in such rate imply variations in the deposits interest rate. Thus, if the government rises the interest rate of banks’ reserves, the banks will rise the interest rate of deposits, so that money demand will rise. Hence, the money demand-supply gap (that, following Krugman, 1979, arises from the increase in money supply, and that brings about the exchange of domestic currency for foreign currency, and the consequent loss of international reserves) is avoided. This model defends, in other words, that an expansive monetary policy plus a fixed parity are not a sufficient condition for a financial crisis to occur.

Apart from the behavior of the government when defending the peg, there are other elements in first generation models which are not realistic. For example, Flood *et al.* (1996) observe that governments do not permit the sudden and discrete loss of reserves that, following first generation models, occurs in the moment of the attack. In some cases, as in Mexico in 1994, reserve losses were sterilized in order to avoid a sudden fall in the monetary base. Secondly, if reserve losses are in fact sterilized in the moment of the attack (e.g. by buying bonds) first generation models are inconsistent with the perfect foresight assumption. This is so because if reserve losses are going to be sterilized in the moment of the attack, the shadow exchange rate is always higher than the fixed exchange rate. Hence, the attack would be immediate to the implementation of the fixed parity regime.

Let us now study the empirical evidence in favor and against these models. There are many empirical studies that intend to know how economic variables (and sometimes also political or institutional variables) behave before financial crises erupt. If regularities in the behavior of some variables are found, such regularities could be used as indicators of the proximity of a crisis. We do not seek to take all the existing studies into account. Instead, we have made a selection of some of

the most quoted<sup>22</sup>. We do not seek either to go deeply into the details of such studies (the different methodologies used, the different ways in which they define a crisis, etc.) but just to display their main results.

For first generation models (leaving aside Dooley, 1997) to be supported by empirical evidence it would be necessary that those regularities previous to the crises are: (1) small amount of foreign currency reserves and the loss of foreign currency reserves; (2) public deficit; (3) credit to the public sector; and (4) domestic credit growth relative to money demand growth (a money demand-supply gap). For assessing the empirical support to the model of Connolly and Taylor (1984) it would be also necessary to observe if there is (5) currency real appreciation (a fall in price competitiveness) and (6) current account deficit before the crises. For Dooley's model to have empirical support it is necessary that there are institutional guarantees, financial liberalization, weak banking regulation, net capital inflows, and credit expansion before the crises.

The studies coincide in that financial crises arise when (1) international reserves are low (in absolute terms or relative to a measure of broad money, usually M2). We must note that studies say that, before crises, reserves are low, but most of them say nothing about if reserves are also decreasing, as it is supposed to happen according to first generation models. Esquivel and Larraín (1998) are an exception: they study the annual evolution of reserves respective to GDP and conclude that when such ratio falls the probability of a crisis rises. As regards to (2) public deficit, there is less empirical support for such variable than for low international reserves. Anyway, the results of Kaminsky *et al.* (1998) provide some support for it. (3) Credit to the public sector receive ample support as an indicator of currency crises. Finally, regarding to (4) domestic credit relative to money demand, there is no consensus: Frankel and Rose (1996) consider that crises happen when, *inter alia*, there is a high level of domestic credit; on the contrary Kruger *et al.* (1998) consider that domestic credit is not a significant variable. Kaminsky *et al.* (1998) find that domestic credit growth relative to money demand (measured as the evolution of the money demand-supply gap) is not usually tested in empirical studies, so it is difficult to conclude anything about this variable.

Regarding to variables related to the country competitiveness, many studies agree in that there is (5) an appreciation of the currency before financial crises. On the contrary, not every study give the same importance to (6) current account deficits: for example, Sachs *et al.* (1996b) and Kruger *et al.* (1998) conclude that it is not a significant variable, while Esquivel and Larraín (1998) consider that it is. Kaminsky

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<sup>22</sup> Specifically, we take into account (for this and also for the other sections) the following studies: Sachs *et al.* (1996b); Frankel and Rose (1996); Glick and Rose (1998); Esquivel and Larraín (1998); Kruger *et al.* (1998); and Kaminsky *et al.* (1998), which examines 25 previous empirical studies.

*et al.* (1998) conclude that there is not enough empirical support for such variable<sup>23</sup>.

Thus, though there are some elements in first generation models that have empirical support (a low level of international reserves or currency real appreciation), there are others, such as current account deficits, that do not. “There is no clear relationship between crises typical of emerging markets and “the” fundamentals because first generation models focus on the wrong set of fundamentals” (Dooley, 1997, p. 7). Let us see if Dooley’s fundamentals are more supported than the conventional ones. Credit expansion is widely supported by empirical studies (Sachs *et al.*, 1996; Kruger *et al.*, 1998; Kaminsky *et al.*, 1998<sup>24</sup>). Institutional guarantees, financial liberalization, banking regulation and net capital inflows are not sufficiently tested so as to obtain any conclusion. Anyway, it is observable that all the crises reviewed in section I of this paper were preceded by net capital inflows favored by financial liberalization.

We may conclude that there are very few variables which are sufficiently tested and considered significant by empirical studies. The ones related to first generation models are reserves relative to M2, real exchange rates, some measure of competitiveness (though not the current account deficit) and credit expansion (relevant only in Dooley’s model). The lack of consensus regarding most variables arises from the fact that the methodology used is not homogeneous, nor the definition of crises. If instead of assessing the empirical validity of theoretical models by comparing them to the empirical studies, we assess it by comparing them to the most well known crises of the last decades, the results are less general but much more conclusive, as we study in section II.D.

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<sup>23</sup> Kaminsky *et al.* (1998) gather many empirical studies in order to see which are the most studied indicators of crises, and which of them have resulted to be more significant in such studies. (1) 10 studies conclude that international reserves (relative to GDP, or M2, etc.) are statistically significant, out of 11 studies that tested such variable. (2) 3 out of 5 consider that public deficit is a significant variable. (3) 3 out of 3 consider that credit to the public sector is significant. (4) 1 out of 1 consider that the money demand-supply gap is significant. (5) 10 out of 12 consider that the evolution of the real exchange rate is significant. (6) Just 2 out of 6 consider that current account balance is significant.

<sup>24</sup> 5 out of 7 studies reviewed in Kaminsky *et al.* (1998) consider that credit growth is significant.



## **B. Second Generation Models**

The first second generation model dates from the mid 1980s (Obstfeld, 1986), but most of them appeared after the European ERM crisis in 1992-93 and the Mexican crisis in 1994-95, as experts observed that first generation models did not explain those new crises. They consider that the variables those models usually take into account are not the most outstanding ones in the new crises, and that the mechanisms they describe are too rigid.

First, we study the main features of second generation models that are already shown in Obstfeld's 1986 model, and that are summarized in his prototype model of 1996. In these two models, crises are a consequence of self-fulfilling expectations, through a feedback process between the cost for the government of maintaining a fixed exchange rate and the devaluation expectations of private agents. Second, we summarize some models in which some concrete cases of feedback and self-fulfillment are described.

It is difficult to know what is that awards homogeneity to this group of models, given that there are many and very different models that the specialized literature use to call with such name. It could be that the distinction between first and second generation models relied on a chronological criterion: first generation models would be those firstly elaborated, and second generation models would be those that came afterwards, especially since the European crisis in 1992-93. But we consider that there may be some other criteria of classification. We have already said that we define as first generation models those models which consider that crises are the unavoidable and predictable consequence of the incompatibility between economic policies. Therefore, we consider that second generation models are those that see crises as the consequence of self-fulfilling expectations, so that crises are contingent and non-predictable phenomena.

### *B.1. General contributions of second generation models*

We consider that there are two basic concepts in second generation models: self-fulfillment and multiple equilibria. We explain them carefully and show two models in which these concepts are presented.

These models consider that the collapse of a fixed exchange rate regime is not the unavoidable result of an economic process, but a political choice: devaluation depends on the solution to a government's optimization problem in which the benefits and costs of maintaining the fixed exchange rate are compared. First generation models, as we have studied, consider that the government has no alternative to defend the parity, apart from losing international reserves. Second generation models, instead, consider (explicitly or not) that there are more ways of defending the fixed exchange rate (e.g. borrowing reserves from other countries, rising interest rates, implementing some exchange controls...). But these policies

may bring forth costs of maintaining the parity by worsening the state of fundamentals (e.g. unemployment, current account deficit, increase of public debt's price...). The higher these costs are, in comparison to the costs of abandoning the fixed parity, the lower is the confidence private agents have in the government's commitment to maintain its exchange rate policy, and the higher is the probability of a devaluation.

In these models, the speculative attack, and the consequent devaluation, occur when the market considers that the government is going to abandon the fixed parity as a result of solving its optimization problem. That is, the attack occurs when private agents perceive that the costs of maintaining the parity are too high relative to the costs of abandoning it. An important insight of second generation models is that the costs of maintaining the peg depend, in turn, on expectations. "Speculative anticipations depend on conjectured government responses, which depend, in turn, on how price changes, *that are themselves fueled by expectations*, affect the government's economic and political positions" (Obstfeld, 1994, p. 190). In other words: devaluation expectations bring forth changes in fundamentals, which rise the costs of maintaining the fixed exchange rate. Such rise of costs provoke an increase in devaluation expectations, so that a feedback between expectations and costs of maintaining the fixed parity goes on until the speculative attack occurs.

It is important to note that the origin of the process is not the mismanagement of economic policy, but the expectations of private agents. So the government decision of letting the currency float (or not) depends ultimately on private expectations, which means that expectations are self-fulfilling. If private agents expect that a devaluation will happen, it is more expensive to defend the parity, and finally a devaluation comes about; and if, on the contrary, they expect that a devaluation will not happen, the government is able to maintain the fixed exchange rate. So that, according to these models there are crises that "need not have occurred, but that they occur because market participants expect them to" (Obstfeld, 1994, p. 190).

Depending on how private expectations are, there is one exchange rate or other, both in equilibrium. Hence, there are several possible equilibria, and which one is the resulting one depends on expectations. Obstfeld (1996), Cole and Kehoe (1996 and 1998), and Chang and Velasco (1998), *inter alia*, note that the existence of multiple equilibria depends on fundamentals. If fundamentals are very good (e.g. there is no unemployment, nor public or trade deficit, nor liquidity problems in the banking system...), there are hardly costs of defending a peg, so that there is no feedback between costs and expectations. If, on the contrary, fundamentals are very bad (as in Krugman, 1979) there is no possible equilibrium without devaluation, so that such devaluation is unavoidable. Thus, multiple equilibrium arises for a range of intermediate fundamentals.

Obstfeld (1986) and his prototype model (Obstfeld, 1996) show the two main concepts of second generation models (self-fulfillment and multiple equilibrium) without using concrete fundamentals<sup>25</sup>. Obstfeld (1986), starting from Flood and Garber (1984), note that it is not reasonable to assume that private agents expect fiscal and monetary policies to remain unchanged after the collapse of the exchange rate regime (as first generation models implicitly assume); and prove that removing such assumption from the model, multiple equilibrium arises (crisis does not occur necessarily even when the shadow exchange rate exceeds the fixed exchange rate) and expectations are self-fulfilling. The prototype model in Obstfeld (1996) also shows that devaluation expectations can provoke a successful speculative attack against the domestic currency, that is, that expectations are self-fulfilling. Likewise, it explains that multiple equilibria depends on whether fundamentals are placed in an intermediate range of values or not.

### *B.2. Some second generation models*

The models we summarize in this section show concrete situations in which there is multiple equilibria, and in which devaluation expectations are self-fulfilling. As we did for first generation models, we should note that the models presented here are just some examples of this kind of models.

Obstfeld (1994) presents two of these models. They show, respectively, the role of the nominal interest rate and the growth of wages in the feedback process. Let us study both cases separately. In the first model the main idea is that an increase in the nominal interest rate, provoked by devaluation expectations, rises the price of public debt, so that devaluation expectations increase even more. Under a flexible exchange rate regime, the government, on the one hand, would use the currency depreciation in order to compensate the effects on the price of public debt of the nominal interest rate rise. Therefore, there is a function of the depreciation rate respective to the interest rate. Private agents, on the other hand, rise their depreciation expectations when the interest rate grows. Hence, there is another function of the depreciation rate respective to the interest rate. The author represents graphically both functions and observes that their intersection gives place to more than one equilibrium. This is, there is not a unique pair (depreciation rate, interest rate) that satisfies the government and the private agents, but two or more. This indicates that there may be an equilibrium with a lower interest rate and a lower depreciation, and another with a higher interest rate and a higher depreciation. If, instead of a floating exchange rate regime, there is a fixed parity the transition from one equilibrium to another is produced by a speculative attack against the domestic currency.

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<sup>25</sup> Other models, as we see below, use concrete fundamentals such as public debt, unemployment, banking system liquidity... for explaining the existence of multiple equilibria and the role of private expectations.

Obstfeld (1996) states that there are other examples of self-fulfillment which depend on the evolution of nominal interest rates. An increase in interest rates may, apart from rising the cost of servicing public debt, put financial intermediaries under pressure, or redistribute income in a way that the government find undesirable. In any of these cases, the cost of maintaining the peg, and thus the devaluation expectations, increase, so that a speculative attack is under way.

The second model in Obstfeld (1994) analyzes the influence of the growth of wages on the devaluation rate. In this case, devaluation expectations lead to an increase in the growth of wages and, consequently, to a loss of trade competitiveness. Hence, output growth and employment may be eroded, so that the cost of maintaining a peg, and thus devaluation expectations, rise. As in the previous case, the author represents graphically the model with the aim of finding the equilibrium between the private agents' function and the government's function. As before, there is multiple equilibria, and which one is the resulting equilibrium depends on private expectations.

The objective in Cole and Kehoe (1996 and 1998) is to assess "the values of government debt and the debt's maturity structure under which financial crises brought on by a loss of confidence in the government can arise" (Cole and Kehoe, 1998, p. i). Such objective indicates that crises in these models arise as a consequence of self-fulfilling expectations in a context of multiple equilibria, and that there is a certain state of fundamentals (in this case: certain amount of public debt and its maturity) that allows the existence of multiple equilibria. These authors call "crisis zone" to such state of fundamentals that open the doors to self-fulfillment.

The conclusions of the models are that: the crisis zone shrinks if the government is able to reduce its debt or to lengthen its debt's maturity, so that the government will try to attain any of such things in order to exit the crisis zone and avoid being at the mercy of self-fulfilling expectations. Besides, those prevention measures (which consist in increasing the cost of devaluation) may be counterproductive if they do not imply exiting the crisis zone, this is, if they do not eliminate the possibility of a crisis, because they increase the severity of the crisis. The conclusion that seems more relevant for our analysis is that the fundamentals that allow self-fulfillment are, as in one of Obstfeld's models, certain levels of public debt and its maturity structure.

Calvo (1998a) considers that the main fundamental that allows for the appearance of multiple equilibria and self-fulfillment is, instead, the banking system's vulnerability<sup>26</sup>, which springs from a combination of certain policy measures meant for compensating country risk with massive capital inflows. In the same article the

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<sup>26</sup> Especially the mismatch between the maturities of assets and liabilities of commercial banks.

author shows that the current account deficit is not as relevant as financial variables in permitting a self-fulfilling financial crisis. The reasoning he develops is the following:

Firstly, he states that sovereignty leads to financial vulnerability (concretely to a mismatch between the maturity of assets and liabilities of commercial banks). Why is this so? There is uncertainty about the commitment of a government to maintain its policies. Such uncertainty implies risk when investing in the country or when lending money for investment projects in the country (such risk is called country risk). Insurance markets are incapable of embracing the whole risk that uncertainty brings about for investors. Therefore, governments try to compensate such risk excess, not included in interest rates, by offering subsidies to investments and to capital inflows or by imposing controls to the outflow of capital. Institutional guarantees are an example of the risk compensation mechanisms this model refers to. Such institutional guarantees usually provoke that commercial banks lend capital for illiquid investments. This idea is well explained in Calvo (1996, p. 7): “if depositors believe that the central bank will operate as lender of last resort, they will have little incentive to monitor the quality and characteristics of bank loans. In particular, they will not be concerned by the existence of a mismatch of maturity whereby loans exhibit longer maturity than deposits”.

Secondly, a massive inflow of capital also leads to financial vulnerability. Foreign capital increases vulnerability of the banking system because on the one hand, foreign capital is usually short-term<sup>27</sup>; and on the other hand, foreign capital allows the existence of more funds for lending to long-term investment projects. Besides, private agents expect capital inflow to be temporary and the economy to return sooner or later to its initial state. Hence, as private agents are conscious of the system’s vulnerability to the reversal of funds, expectations of a banking crisis increase. Such banking crisis would bring along a currency crisis because of institutional guarantees offered by the central bank to commercial banks. Moreover, herding<sup>28</sup> (Calvo and Mendoza, 1998) implies that investors do not gather much information about the country’s fundamentals, but they tend to follow market’s rumors, so that crises are more probable.

We consider that the most interesting insight in this model is that the fundamentals it considers as relevant are financial fundamentals. Crises, following Calvo, may arise without a current account or public deficit. The economic problems that allow self-fulfilling expectations are financial (mainly the mismatch between the maturity

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<sup>27</sup> In section III we will justify such statement by explaining that financial globalization shortens the maturities of flows to emerging markets. Besides, there is another model (Calvo, 1998b) which considers that even if capital inflows are foreign direct investment they may lead to self-fulfilling crises. Shortness of maturities just increase the probability of such crises.

<sup>28</sup> Herding behavior is more thoroughly treated in section III.

of commercial banks' assets and liabilities), and they have their origin in government sovereignty (because of the uncertainty it implies) and capital inflows.

Chang and Velasco (1998) present a model in which, as in the one we have just summarized, financial system's illiquidity<sup>29</sup> is the main problem. Likewise, they show how the inflow of foreign capital (especially if it is short-term) and financial market liberalization increase the banking system's vulnerability to a change of private agents' expectations. Finally they show that if a fixed exchange rate exists and if the central bank acts as a lender of last resort, a banking crisis leads to a currency crisis.

As in the previous model, commercial banks act as maturity transformers, which increases the population's welfare, but which also opens the door to self-fulfilling banking crises. As in the other models (Obstfeld, 1994; Cole and Kehoe, 1996 and 1998; Calvo, 1998a), not very good fundamentals (in this case, the financial system's illiquidity) are necessary for multiple equilibria and self-fulfilling crises to occur, and it is not possible to predict which equilibrium is the one that is going to result.

The receipt of foreign capital rises the banking system's vulnerability through two ways. Firstly, through the attitude of foreign lenders. They may decide, individually and rationally, not to roll over their credit because they expect the other lenders not to do so and, consequently, they expect a banking crisis to happen (expectations of a banking crisis provokes a banking crisis). Secondly, through the maturity of the external debt. The shorter the maturity of the debt the higher the probability of a bank run, as it is easier for lenders not to roll over their loans. And the bigger the amount of external debt, the higher the banking system's vulnerability, only if such big amount is mainly composed of short-term capital.

Also financial liberalization rises the banking system's vulnerability. Chang and Velasco (1998) take into consideration two specific liberalization policies: the decrease of reserve requirements to commercial banks and the increase of competition in the banking sector. Both measures rise welfare but makes a self-fulfilling crisis more probable.

Finally, they show that, under a fixed exchange rate and with a central bank which acts as a lender of last resort, the banking crisis turns into a currency crisis. This is so because when deposits are retired, the central bank supplies emergency loans to the commercial banks, which may deplete its international reserves. Hence, the banking crisis is avoided, but the country suffers a currency crisis. If, on the contrary, there was not a fixed exchange rate but a currency board, the central

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<sup>29</sup> They define illiquidity as the "situation in which the financial system's potential short-term obligations exceed the liquidation value of its assets" (Chang and Velasco, 1998, p.3).

bank would not act as a lender of last resort. Thus, the banking crisis would bring about the bankruptcy of many commercial banks, but the parity would survive.

### *B.3. Evaluation of second generation models*

Let us see, as we did for first generation models, some theoretical advantages and disadvantages of these models, as well as the empirical support they have.

An advantage of these models is that they present a general mechanism through which crises may be originated. Hence, their explanatory capacity, if we take them as a whole, do not rely on very concrete variables, but in a general mechanism which may be refilled with many concrete fundamentals, and thus may be applied to a wide range of crises. This is, second generation models offer an explanation that do not depend on the variables included in concrete models (although, of course, concrete models include concrete variables: interest rates or public debt or financial fragility). Instead, first generation models offer an explanation which is too rigid and too mechanical, and which relies on too concrete variables. Nevertheless, the width of second generation models may be an inconvenient, as they lose the precision that first generation models have: they explain a theoretical idea (that crises are self-fulfilling) without determining precisely what must go on in the domestic and/or international economy for crises to occur.

Second generation models explain that there are multiple possible equilibria, given certain fundamentals. But they do not go deeper into which factors provoke the change in expectations that lead to a crisis: “in these models (...) the treatment of speculators is far less meticulous than the treatment of policymakers” (Drazen, 1998, p. 3). In order to widen the explanatory capacity of second generation models it would be necessary to turn expectations into an endogenous variable of models. While expectations are not endogenous it is not possible to know *a priori* which equilibrium is going to turn out. Hence, these models are not predictive, which is an obvious disadvantage. “How useful is a model with multiple equilibria – a model that can explain different outcomes for the same fundamentals in the environment?” (Cole and Kehoe, 1996, p. 329).

We consider that second generation models are “better” than first generation models because they may be used for explaining a wider range of crisis, but that they are “worse” because they do not even try to be predictive. Second generation models win width and lose precision.

While first generation models put the blame on governments, second generation models put it on private agents behavior. Therefore, it could be said that another disadvantage of second generation models is that they free governments from the responsibility of avoiding currency crises, that they forgive policymakers for the financial crises that occur. However, policymakers still have a responsibility: to avoid multiple equilibria, to exit the crisis zone.

Finally, remember that second generation models consider that crises depend on the governments' choice, and that such choice, in turn, depends on the costs of maintaining the fixed parity relative to those of abandoning it. Flood and Marion (1996) consider that it is not always true that increasing the costs of a default reduce its probability. They study the model presented by Obstfeld in 1994 about wages growth, and conclude that "raising the cost of devaluation may make a crisis more likely" (Flood and Marion, 1996, p. 1).

Let us now see if the empirical literature about financial crises support what second generation models hold. While according to first generation models the evolution of international reserves is crucial for predicting crises, second generation models stress the importance of many other variables for the government's decision to abandon or not the fixed parity. They coincide in the existence of an optimizing government, multiple equilibria and self-fulfillment, but they differ in which are those other variables that may serve as indicators of the proximity of a crisis.

For instance, the first model in Obstfeld (1994) considers that interest rates rise before crises as a consequence of devaluation expectations, and that such rise in interest rates bring about an increase in the cost of servicing public debt, and finally the decision of abandoning the peg. Obstfeld also considers that the increase in interest rates may end up provoking a crises through other channels different from public debt, as through pressures on financial intermediaries, or through an undesirable redistribution of income. There is not much empirical support for interest rates rising before crises. In Kaminsky *et al.* (1998) it is shown that there are not many studies which assess the behavior of such variable. The same occurs with public debt. Therefore, there is not much empirical support for this model<sup>30</sup>.

Obstfeld's second model (1994) has more empirical support. It argues that the expectation of a devaluation brings about higher wages, which may lead to a decrease in competitiveness, and thus in output growth and employment. The authorities' concerns about competitiveness, output and employment finally provoke the abandonment of the peg. Frankel and Rose (1996) and Esquivel and Larraín (1998) consider that output growth diminishes before currency crises. Likewise, Kaminsky *et al.* (1998) show that much of the empirical literature about crises display that same result. Regarding unemployment, there are also some empirical studies which consider that it may serve as an indicator of financial crises. The behavior of wages is not usually analyzed in these kind of empirical

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<sup>30</sup> Nevertheless, if, instead of taking into account for this assessment the general empirical studies, we took into consideration more specific ones (those focused in a concrete financial crisis) we may conclude that this model in Obstfeld (1994) explains quite well what happened in Mexico in 1994. See section II.D.



literature. And about competitiveness we should repeat what we said above: the evolution of real exchange rates as indicator of currency crises has much empirical support. On the contrary, the evolution of the current account balance has not such support<sup>31</sup>.

Cole and Kehoe (1996 and 1998) present a model in which the fundamentals that open the door to self-fulfilling crises are public debt and its maturity structure. We have just noted that there are not enough studies about the behavior of public debt before crises as to be conclusive. The same happens with the maturity structure of public debt.

Calvo's model we have analyzed (Calvo, 1998a) consider that crises may result from a fragile banking system, which transform short-term foreign capital inflows into long-term domestic loans, leaning on subsidies or guarantees. The problem showed in Chang and Velasco (1998) is very similar to that in Calvo (1998a): short-term capital inflows end up causing illiquidity problems in the banking system. There are not many studies in which short-term capital inflows are analyzed. Instead, credit growth is highly supported by empirical evidence, as we saw for Dooley (1997)<sup>32</sup>. Thus, once more, results are not very conclusive<sup>33</sup>.

Hitherto, we have assessed if, according to several empirical studies, the variables included in second generation models may serve as indicators of the proximity of a crisis. The empirical relevance of multiple equilibria and self-fulfillment is much more difficult to assess. It would be necessary to find indicators which showed private expectations of devaluation, and the causal link between shifts in such expectations and a rise in the cost of maintaining the peg and the political decision of abandoning it.

There are no indicators of such kind in the empirical literature about financial crises. Anyway, there are some attempts of showing the existence of self-fulfillment: Eichengreen *et al.* (1995) consider that their findings are evidence of the existence of self-fulfillment. Those findings are that many crises were not linked to the mechanism shown in first generation models; that some crises were not preceded or followed by changes in economic policies, so that it could not be said that crises were produced by private agents correctly anticipating an

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<sup>31</sup> Anyway, we should note that more specific studies conclude that this model is useful for explaining the European crisis in 1992-93. See section II.D.

<sup>32</sup> 1 out of 1 studies in Kaminsky *et al.* (1998) find that real interest rates are significant. 1 out of 1 consider that public debt is significant. 5 out of 8 consider that real GDP growth or level is significant. 2 out of 3 consider that employment/unemployment is significant. 1 out of 2 consider that short-term capital inflows are significant. 5 out of 7 consider that credit growth is significant.

<sup>33</sup> Nevertheless, these two models, according to more specific studies, help to understand what happened in East Asia in 1997. See section II.D.

unavoidable collapse; and that crises happened without anticipation of the market. These arguments obviously provide evidence against first generation models, but prove neither the shift in private expectations nor its link to financial crises. Thus, they do not prove the existence of self-fulfillment<sup>34</sup>.

As we noted regarding to first generation models, empirical studies offer results which are not very conclusive. The variables most tested and most significant related to second generation models are output, some measure of competitiveness (different from the current account evolution), and credit expansion.

<b>FIRST GENERATION MODELS</b>	<b>SECOND GENERATION MODELS</b>
Crises are unavoidable	Crises are contingent
Crises are predictable	Crises are unpredictable
Private expectations advance the crises	Private expectations are self-fulfilling (so that they cause the crises)
Bad fundamentals cause the crises	Bad fundamentals permit self-fulfillment
The government's policies lead to bad fundamentals	The government chooses between policies given certain fundamentals

### **C. Contagion Models**

It is empirically observed (Glick and Rose, 1998; Sachs *et al.*, 1996; Kruger *et al.*, 1998) that when a financial crisis happens, it is common that other crisis occur in a short period of time, and usually in the same geographic area. That was the case in the European crisis in 1992-93, in the Mexico crisis in 1994, and in the East Asian crisis in 1997 (Glick and Rose, 1998).

There are several theoretical studies about such fact<sup>35</sup>. It is important to note, before summarizing some contagion models, that not always that crises coincide in time, there has been contagion. How can this be? Following Drazen, we consider there is contagion when “a currency crisis itself in one country makes a currency crisis (or currency weakness in another country) more likely” (Drazen, 1998, p. 5). Being so, when there are crises that coincide in time (and maybe also in region) but which origins are an external common factor, instead of being one crisis the origin of the other, there has been no contagion. Crises contemporaneous in time “may be due to a common cause, for instance policies undertaken by industrial countries which have similar effects on emerging markets”. Those crises are provoked by “*monsoonal effects*, defined as major

<sup>34</sup> Anyway, some specific studies prove the existence of self-fulfillment in some concrete crises. See section II.D.

<sup>35</sup> See Gerlach and Smets (1994); Masson (1998); and Drazen (1998).

economic shifts in industrial countries that trigger crises in emerging markets” (Masson, 1998, p. 4-5). He refers specifically to changes in international interest rates and/or exchange rates of industrial economies’ currencies, which may provoke an outflow of funds from many emerging markets maybe in the same year, and maybe in the same geographical area, giving the image that there had been a contagion between countries. Obviously, crises brought about by monsoonal effects may be included in the first or in the second generation group, depending on the same criteria we used before. If the external shock provokes a change in fundamentals which, in turn, leads to the crisis, a first generation model could be developed in order to explain such monsoonal effect. On the contrary, if the external shock provokes a change in expectations which turn to be self-fulfilling, a second generation model would be more explicative.

Why do we separate the analysis of contagion from the other models? Can not we include contagion in any of the two generations of models? The fact seems to be that there are some contagion models that would more or less fit in first generation models, as the crises they study are unavoidable crises caused by the worsening of fundamentals, and others that would fit in second generation models, as the crises they study are contingent crises caused by self-fulfilling expectations.

### *C.1. Different kinds of contagion*

Let us return to Drazen’s definition. It said, in other words, that there is contagion when the first cause of a currency crisis, or speculative pressures on a currency, is the currency crisis of another country. We must note, nevertheless, that the crisis in the country firstly affected is not the only cause of the second country’s crisis. Between such first crisis and the second one, a worsening of fundamentals and/or changes in private expectations must occur for the crisis in the second country to happen. This is, the first crisis by itself can not trigger a crisis in another country. It triggers, instead, certain mechanisms that directly cause such second crisis. Depending on whether the first crisis leads to a worsening of fundamentals in the second country, or to a change in expectations, Masson (1998) distinguishes between spillovers and pure contagion.

About spillovers Masson says that “a crisis in one emerging market may affect the macroeconomic fundamentals in other emerging market” (Masson, 1998, p. 4), and thus provoke a crisis in such other markets. A crisis in one country may affect the fundamentals of a second country through two different ways. Firstly, through trade linkages between both countries: the devaluation in one country leads to a loss of competitiveness in its trading partners, and consequently to trade deficit and declining reserves in such countries. Gerlach and Smets (1994) formalize this possibility. Starting from Flood and Garber (1984), they assume that there are two countries and that both of them have excessive domestic credit creation (as the country in Flood and Garber, 1984, and other first generation models). The collapse of one of the exchange rate regimes accelerates the collapse of the

second exchange rate (it accelerates an unavoidable collapse, as those in first generation models). Nevertheless, they also conclude that even when the second country's parity is sustainable (this is, a crisis need not occur), contagion may happen.

Following Gerlach and Smets (1994) the mechanism that leads to a crisis in the second country is the following: the devaluation of the first currency brings about, on the one hand, a reduction in the price of the first country's goods in the second country. Hence the second country's price level falls. On the other hand, since it is assumed that wages are not flexible, the second country loses competitiveness. Both effects provoke deflationary pressures on wages and output that reduce the money demand. Hence, domestic credit growth generates a higher excess of money supply, that private agents exchange for foreign currency, reducing thus the international reserves. The higher the trade integration between both countries, the lower the wage flexibility, and the lower the trade integration between both countries and the country to which currency their currencies are pegged, the stronger are the contagion effects.

The second way through which fundamentals may be worsened as a consequence of a crisis in another country, is via financial markets: a third country liquidate its positions in one country in order to cover the losses that the crisis in the first country has brought about.

Can we consider these crises as first generation crises or as second generation crises? The answer to this question is not clear. Anyway, we believe that the worsening of fundamentals, may, on the one hand, lead by itself to an unavoidable crisis, in which case, a first generation model could be useful to explain contagion (as in Gerlach and Smets, 1994). Such worsening of fundamentals may, on the other hand, simply put the country into what Cole and Kehoe (1996 and 1998) call the crisis zone. This is, the worsening of fundamentals may just open the door to self-fulfilling expectations, which would be the direct cause of the crisis in the second country.

"A crisis in one country may conceivably trigger a crisis elsewhere for reasons unexplained by macroeconomic fundamentals, perhaps because it leads to shifts in market sentiment or changes the interpretation given to existing information" (Masson, 1998, p. 4). In such case there is pure contagion. The currency crisis that occurs in one country does not provoke any change in the other countries' fundamentals, but it changes the assessment of such fundamentals or the risk tolerance of investors. Hence, private expectations change, leading to a self-fulfilling crisis. Masson (1998) formalizes this possibility in a balance of payments model, which shows that for a certain range of fundamentals there is multiple equilibria. Such range is determined by external debt, reserves and the trade balance. Vulnerability to contagion is greater "when there is a large (floating rate) debt, when reserves are low, and when the trade balance is in deficit" (Masson,

1998, p. 13).

Pure contagion may be inscribed, thus, in the second generation models literature, as it considers that there is multiple equilibria and that crises are contingent and consequence of self-fulfilling expectations. Likewise, for multiple equilibria to exist, and hence for pure contagion to happen, fundamentals must be inscribed in a medium quality range.

Such sort of contagion is compatible with many microeconomic theories about private behavior in financial markets. Jumps between equilibria, and thus pure contagion, are possible because of e.g. the existence of herding (Calvo and Mendoza, 1998) and information cascades (Bikhchandani, *et al.*, 1992). Some of these mechanisms, related to asymmetric information, are analyzed in section III.

Drazen (1998) identifies another kind of contagion, which he names political contagion. In his model a crisis depends on a political decision which depends, in turn, on political factors. Other models (in particular, most second generation models) also consider that crises depend on the government decision. But, as we studied above, such decision depends on the costs of maintaining a peg, which in most second generation models are economic costs (e.g., in Obstfeld, 1994, the cost that a rising interest rate implies for facing the service of public debt). In Drazen (1998) such costs are not economic, but political: abandoning the fixed exchange rate implies giving up the benefits of belonging to a “club” (e.g. a political-economic integration project) in which the condition of membership is precisely the fixed exchange rate. Therefore, political contagion occurs as follows: when a member of the club suffers a currency crisis and is forced to abandon the fixed parity, the value of membership decreases, especially if such country was particularly important for the existence of the club. Thus, expectations that private agents assign to a devaluation in the rest of the members, rise, increasing the probability of contagion. Political contagion may be considered a spillover if political parameters (more precisely, the political value of belonging to a “club”) are considered as fundamentals. Otherwise political contagion is clearly a concrete case of pure contagion.

### *C.2. Evaluation of contagion models*

We have seen that second generation models do not explain the causes of jumps from one equilibrium to another: “it is usual to consider jumps between equilibria as being stochastic” (Masson, 1998, p. 13). Why do expectations change? What causes those jumps between equilibria? An advantage of some contagion models is that they give an answer to these questions. The answer, according to pure contagion theory, is that it is a crisis in another country which provokes a shift in expectations, and finally a financial crisis in the country in question.

There is some empirical support for the existence of contagion. Regarding spillovers, Glick and Rose (1998) provide an empirical study in which trade links between countries explain the spread of a crisis along regional lines better than macroeconomic factors do. And regarding pure contagion, Esquivel and Larraín (1998), Eichengreen *et al.* (1996), and Kruger *et al.* (1998) present studies in which regional contagion not related to fundamentals is a significant variable. Sachs *et al.* provides a model in which contagion occurs in countries with bad fundamentals (low international reserves, real exchange rate appreciation and banking fragility measured by lending booms), and argue that the “tequila hangover” fits in such model.

#### **D. Explanatory and Predictive Capacity of Theoretical Models: the East Asian Crises**

In this section we have the aim of assessing the utility of theoretical models for explaining and predicting financial crises, according to the most important crises of the last decades (those reviewed in section I), and especially to the East Asian episode. In order to do so, we will study if the models studied are consistent with the empirical analysis done in section I.

##### *D.1. First generation models*

Despite the fact that first generation models are not completely supported by empirical evidence, it would be unfair to discard their explanatory capacity for some financial crises. In other words, it may be that some variables which are not significant in empirical studies (for instance, current account deficits), or which are not even thoroughly tested (e.g. the money demand-supply gap), are useful for explaining some particular crises.

Thus, first generation models explain quite well Latin America's crises during the 1980s. Latin American countries were engaged in expansionary monetary policies in order to finance their public deficits. Moreover, they suffered from a real appreciation of their domestic currencies and also from a current account deterioration, due to such appreciation and to the surge in consumption. Hitherto, first generation models are consistent with what happened in Latin America. But the models do not explain that the surge in consumption was prompted by excessive commercial bank lending, which, in its turn, was provoked by foreign capital inflows (in this case in the shape of syndicated bank loans to the public sector), financial liberalization, lack of banking supervision and official deposit guarantees. Therefore, these models are missing the role of financial variables (such as financial liberalization, capital inflows, or banking intermediation) when explaining the Latin American crises.

First generation models are not useful for understanding the East Asian crises. And of course they could not have been useful for predicting them. The East Asian

countries, as we explained in section I, did not suffer from public deficits, so they did not need to issue money in order to finance such deficits. Hence, there was not a money demand-supply gap which could end up at the depletion of reserves. The only fact in which the models and the East Asian crises coincide is in the real appreciation of the currency previous to the collapse of the exchange rate regime. Dooley's (1997) model, though, explains more of the East Asian crises than the mainstream first generation models, as it substitutes conventional fundamentals for financial fundamentals, such as financial liberalization, weak regulation of the banking system, massive capital inflows and credit expansion. We saw above that all these variables played a role in the generation of the East Asian crises.

It seems obvious that with the knowledge provided by first generation models, leaving aside Dooley (1997), it could not have been possible to predict the East Asian crises, as these crises were produced by mechanisms different from the monetization of public deficits. Anyway, in order to assess whether new first generation models, such as Dooley (1997) are consistent with reality, we should study if the East Asian crises were predictable (though with different indicators than those provided by first generation models) and unavoidable (though for different reasons than those provided by first generation models). Were East Asian crises predictable and unavoidable? Firstly, East Asian crises were not predicted. Nevertheless, this does not mean necessarily that they could not have been predicted. About the predictability of crises see below, where we conclude that the East Asian crises were contingent, and thus not predictable, but that there are some important arguments against such conclusion<sup>36</sup>. Secondly, East Asian crises were not unavoidable: a soft landing could have been possible in the absence of financial panic, as discussed in section I of this paper.

#### *D.2. Second generation models*

As we have studied above, there are many different second generation models, though with a common spirit. Let us see if the crises described in section I, and especially the East Asian crises, can be explained with any of them, or at least fit in the general model, in the general spirit of these models.

We have seen that Obstfeld (1994) provides two models. In the first one the main fundamental which opens the door to self-fulfillment is the rise of public debt's price (through a rise of interest rates). The models by Cole and Kehoe (1996 and 1998) also consider that it is public debt, and especially its maturity structure, which leads speculators to expect a devaluation, and thus to attack the currency of the country in question.

There are many authors who consider that a public debt model, such as these two models, explains much of what happened in Mexico in 1994-95. Mexico had short-

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<sup>36</sup> See Kaminsky (1998).

term private and public debt. The most relevant fundamental in Mexico was not the amount of debt it had (that was not so big relative to international standards), but the maturity structure of its debt. Following Cole and Kehoe (1996) Mexico's public debt (its amount and especially its maturity) put the country in a crisis zone. Mexico finally suffered self-fulfilling speculative attacks: "the fear of a government default led to the inability of the government to issue new debt, which in turn seemed about to confirm the fears of a default" (Cole and Kehoe, 1998, p. 2). Nevertheless, there are some elements of the Mexican crisis which these models have not explained, mainly financial factors, such as the role of financial liberalization, weak banking regulation, capital inflows and credit expansion.

Self-fulfilling expectations, in the case of East Asia, can not have surged from the expectation that the government would devalue in order to lower the public debt's price, because East Asian countries did not have a high amount of public debt. Instead, their debt was mainly private. Nevertheless, the East Asian case coincide with what was described in Cole and Kehoe (1996 and 1998) because foreign debt was a short-term one. External debt was not public but it was in short-term liabilities. "We think that a version of our model that incorporates a private banking system with explicit or implicit government-provided insurance to the foreign lenders could account for these [East Asian] crises" (Cole and Kehoe, 1998, p. 32).

Obstfeld's second model consider that it is the loss of output and employment (through the loss of competitiveness, provoked, in its turn, by a rise of wages) which permits self-fulfilling expectations.

Following the empirical study in section I, it seems that such model explains much of what happened in Europe in 1992-93. Some countries in Europe suffered a recession (slow growth and unemployment) which was in part the result of maintaining a fixed exchange rate: the appreciation of the German Mark led to the appreciation of these countries' currencies, which brought about a loss in competitiveness and the deterioration of the current account. Finally, there were massive speculative attacks that provoked devaluations in the affected countries. As argued in section I, such attacks were excessive respective to the real lack of soundness in European fundamentals. The crises may have been avoided with a realignment of the currencies. This description matches quite well with Obstfeld's model. Nevertheless, as for the crises in Latin America in 1982 and in Mexico in 1994, some parts of the empirical explanation are missing in the theoretical model. Again the model does not include some relevant financial variables.

The East Asian countries did not have low output growth rates nor unemployment problems, so that the self-fulfilling expectations could not have arisen from such problems. Only a slightly macroeconomic worsening became apparent in 1996, related to a large extent to a loss in competitiveness. The loss of competitiveness was not brought about by a rise in wages, as in Obstfeld's model, but by the



appreciation of the currency and some other factors discussed in section I. Thus, although the model is not totally consistent with the East Asian crises, they coincide in that a deterioration of the current account may open the door to the speculative attacks that lead to the crisis.

We saw above that Calvo (1998a) and Chang and Velasco (1998) consider that financial vulnerability is the main problem that leads to a self-fulfilling crisis. Such models fit better with what we studied in section I about the East Asian crises. These models and the empirical evidence coincide in that: before the crisis there is a massive capital inflow; rapid financial liberalization has a role in the generation of crises as it permits such capital inflow and the mismanagement of funds; capital inflows are mainly short-term; banks act as maturity transformers by borrowing on a short-term basis and lending on a long-term basis; illiquidity increases vulnerability to crises, which finally occur because of a financial panic. Nevertheless, on the one hand, these models consider that banking crises occur before currency crises, a sequence which did not fit with what happened in East Asia, where the currency crises happened previously. On the other hand, they lack many of the relevant variables of the East Asian crises. Maybe an extension of these models (including for instance, among other things, current account deterioration) would be more explicative of the East Asian crises.

In short, each second generation model includes some explanation of how certain bad fundamentals in East Asia may have opened the door to self-fulfilling crises. But none of them is able to give a complete view of reality. More precisely, even the last two models that we have seen, which seem to get closer to what happened in East Asia, are sticking exclusively to financial domestic variables, thus leaving out the trade-related aspects of the East Asian crises (already shown in section I), and the explanation of how the international financial system allows for massive capital flows to emerging markets and for self-fulfilling speculative attacks (which is analyzed in section III).

Hitherto, we have just assessed the coincidence between the variables included as bad fundamentals in some second generation models and some of the variables found to be relevant in the empirical study of section I. But what about the general features of second generation models? What about their spirit? There are some studies (Jeanne, 1997; Cole and Kehoe, 1996) which estimate theoretical models in concrete cases (the French franc crisis in 1992-93, and the Mexican crisis in 1994-95, respectively), and conclude that there is evidence of multiple equilibria and self-fulfillment in such cases. What about the East Asian crises? Was there a self-fulfillment of expectations? As argued in section I, a soft landing would have been possible in the absence of speculative attacks. In other words, the East Asian crises were contingent, as there were no fundamentals which, by themselves, could have led irremediably to the crises. It was financial panic (caused by the entry of the East Asian economies in a "crisis zone") which finally provoked the crises, as second generation models describe. Nevertheless a

further analysis of the shift in expectations and the causal link between such shift and the crises is necessary. Being the East Asian crises contingent, they could not have been predicted. Nevertheless, the predictability of crises is discussed below.

### *D.3. Contagion*

Leaving aside first and second generation models, we may assess if there was contagion between countries. It is obvious that many crises have coincided in a short period of time, even beyond the East Asian borders. Theoretically it could be that there was no contagion (through spillovers or pure contagion) between countries, but just monsoonal effects. Though, the only external shock that could have affected all the economies at a time was the appreciation of the dollar relative to the yen, given that the East Asian countries had pegs with the dollar, and given the large extent of their trade with the U.S. and Japan. Apart from such fact, the international economic and financial environment was favorable for the East Asian countries (see section I). Besides, the appreciation of the dollar began to occur at least two years before the crises, while trade patterns were quite different across the East Asian countries (Masson, 1998). Thus, although it is necessary to study this matter more thoroughly, we conclude that monsoonal effects were not the main explanation for crises happening in many countries in the same period of time.

Therefore there must have been spillovers or pure contagion. Theoretically, spillovers via trade and via financial markets may have happened between East Asian countries. It is not easy to assess empirically if it has been so. It seems that trade spillovers can not have been very significant for the following reasons: currency crises occurred in a very short period of time, so that there was virtually no time between one crisis and another for an important change in fundamentals to happen (Masson, 1998, p. 19, considers that competitiveness spillovers were small until November 1997); a big part of the decrease in competitiveness of Malaysia and South Korea is explained by the features of the international market of semiconductors, and not by the devaluation in Thailand; Indonesia did not even show a remarkable worsening of its current account or exports before its crisis. "The trade magnitudes are probably still too small to explain contagion beginning in Thailand, even when both bilateral trade and third-market trade are included" (Drazen, 1998, p. 8).

What about pure contagion? We said, following Masson (1998), that pure contagion occurs when a crisis in a second country results from a change in the investors' perception of fundamentals, or from a change in their risk tolerance. This explanation of contagion seems more plausible for the East Asian case, as fundamentals in many of those countries had been the same for years, and it was not until the Thai crisis erupted that investors realized that other East Asian countries also had financial and current account problems. Nevertheless, such explanation of contagion has the disadvantage that it is residual. This is, if the

coincidence of crises can not be explained by fundamentals nor by monsoonal effects, it is said that there has been pure contagion. But it would be necessary to demonstrate the shift in the investors' perception of fundamentals and the causal relationship between such shift and the crises.

#### *D.4. Utility of theoretical models*

According to what we have studied, how useful are financial crises models? Are they useful for explaining and/or predicting financial crises? Regarding the explanatory capacity of models, we have seen that models always miss some part of reality. This does not mean necessarily that theoretical models (or financial crises models in particular) are useless for explaining reality. Simplicity (and hence the omission of some variables) is an inherent feature of theoretical models, thanks to which they are understandable and thus useful. Models are more simple than the processes or aspects from the real world which they represent. Otherwise, models would be as complex as reality and equally not understandable (Gordon, 1991).

Regarding financial crises models, we have seen that, though all the models lack some elements of reality, they are useful for explaining it. Theory always shows, at least, a starting point from which it is easier to broach the study of a complex empirical process, as financial crises always are. All the models studied here, by pointing out some variables and mechanisms, contribute to identify which may have been the problems that in such or such case led to a crisis. Thus, first generation models provide useful insights about how to explain the Latin American crises of 1982. Second generation models focused on short-term public debt are useful to understand the Mexican crisis of 1994; those focused on growth and unemployment related to competitiveness are useful for explaining the European crises of 1992-93. And models focused on financial vulnerabilities help to understand the East Asian crises of 1997-98.

Anyway, albeit simple, theoretical models should not omit transcendental issues. The European and the Mexican crises revealed that crises could emerge from a shift in expectations, and that, therefore, first generation models do not serve as a general model for explaining crises<sup>37</sup>. Hence, second generation models arose in order to widen the explanatory capacity of financial crises models, by including self-fulfilling expectations. But we consider that models of financial crises are still missing something transcendental.

First, generation models and even second generation models do not explain how can it be that a small shift in fundamentals or a crisis in a neighboring country may bring about a shift in expectations capable of provoking crises as severe as the

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<sup>37</sup> Though first generation models may not serve as a general explanation of financial crises, crises as explained by those models may still occur.

East Asian crises. The answer to such question is found in the international financial system. "The financial system may act as a multiplier mechanism, implying a much greater social cost than that consistent with the change in fundamentals" (Chang and Velasco, 1998, p. 31). Financial crises models, hitherto, explain the role of fundamentals, this is, they offer a domestic view of the existence of crises (in first generation models "bad" fundamentals cause a crisis; in second generation models "bad" fundamentals make the crisis possible). They do not explain, instead, the role of the international context that allows the step from fundamentals to crises.

This is not the place for entering in such area of study. Anyway, let us give an example of how the international financial market acts as the complementary element of fundamentals when explaining a crisis. Asymmetric information, which is an inherent feature of the current international financial system, brings about herding behavior, which makes investors follow rumors more than thoroughly gathered information about fundamentals, thus permitting the step from a small shift of fundamentals (or even just a shift in the perception of fundamentals an important investor has) to a massive speculative attack and a crisis. In section III we study more carefully the mechanisms through which the prevailing financial system (and more precisely, financial globalization) increases the probability of crises to erupt.

Summing up, we conclude that theoretical models provide many elements which help to understand financial crises. Thus, they are useful for explaining (albeit partially) why and how do financial crises surge. Nevertheless, their explanatory capacity would be widened if models took into account the role of the international financial system in originating a financial crisis.

Let us study now the predictive capacity of financial crises models. We have seen, on the one hand, that first generation models have not proved to be very useful for predicting financial crises. Despite the fact that they intend to be predictive, they have not served for predicting any of the financial crises of the 1990s, which emerged for reasons different to those explained in first generation models. On the other hand, second generation models do not even intend to be predictive, as they see crises as the result of a shift in expectations and they do not explain what is it that produces such shift. Hence, financial crises models are not predictive.

We have seen that there are multiple studies which try to build indicators useful for predicting crises (for instance, Kaminsky *et al.*, 1998). Such indicators are based on empirical evidence. That is, the experts take into consideration the regularities observed empirically in order to build the predictive indicator. Each new crisis teaches something about what fundamentals (and/or what international financial system) may lead to a crisis. Such lessons should be embodied in the indicators of

crises<sup>38</sup>. What role do theoretical models play in the construction of predictive indicators? On the one hand, by showing how crises may occur, they indicate a starting point for the search of empirical regularities (e.g. if theoretically it is shown that public deficits may lead to a crisis, it is necessary to test its significance). On the other hand, theoretical models provide the explanation of why some empirical regularities are found. This is, the models are the economic general rule which explains the observed link between such variable and a crisis<sup>39</sup>.

Therefore, it seems that neither empirical studies nor theoretical models are completely useless for predicting crises, as they offer, respectively, the knowledge of what goes on or may be going on before a financial crisis erupts. Nevertheless, we consider that these indicators of crises can only warn of the possibility of a financial crisis, but not predict them. At least not yet. As we have seen (and we will see in section III), financial crises depend on many kinds of variables (from purely economic, as monetization, to psychological, as herding behavior), and there are no indicators which consider them all<sup>40</sup>. It is necessary for theory to evolve in order to provide new insights useful for the construction of more predictive indicators. Maybe even then, it will not be possible to predict all crises, as financial crises are historical phenomena (in the same sense that wars or revolutions are historical phenomena, this is, complex and unique). Being financial crises historical phenomena, they are determined by economic, political, psychological factors (which may be taken into consideration in models or predictive indicators), but also by factors which a researcher would never take into account and that therefore are considered hazardous<sup>41</sup>.

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<sup>38</sup> Nevertheless, given that each crisis might be different to the previous ones, the resulting indicators would never be useful for predicting every new crisis, but just those similar to a preceding one.

<sup>39</sup> About the necessity of general rules for explaining empirically observed relationships between variables see Gordon (1991).

<sup>40</sup> Some efforts have been made in this path. See Kaminsky and Schmukler (1999).

<sup>41</sup> For an analysis of causation in history see Carr (1961).

### **III. Financial Globalization and Financial Crises in Emerging Economies: The Case of East Asia**

#### **A. Financial Globalization and Emerging Economies: Features and Causes**

As already mentioned, the purpose of section III is to highlight the financial vulnerabilities an emerging economy can incur in because of its integration in international financial markets. For this reason, we have limited our study of the economic globalization process to a descriptive overview of financial globalization and its implications for emerging countries. We will first analyze the current process of economic globalization from a comparative perspective, that is, relative to the first wave of globalization which took place between the end of the last century and 1914. Secondly, we will study the main characteristics of the integration of emerging markets in world financial markets and the factors behind this phenomenon.

##### *A.1. The two waves of economic globalization from a comparative perspective*

Economic globalization is not a new phenomenon. There was a former globalization process that began at the end of the last century and that was suddenly stopped by the First World War. According to Baldwin and Martin (1999), there are superficial similarities but fundamental differences between those two waves of globalization. Both processes have the same magnitude, that is, they are similar with regards to volumes of trade or financial flows. However, there are some important qualitative differences between both waves that we will now review.

In relation to trade integration, both waves are similar. Before the First World War, there was an accelerated increase in international trade. Imports grew at 3.5% per year in the second half of the 19th Century and until 1914, while GDP growth reached a 2.7% annual rate during the same period (IMF, 1997). The proportion of exports relative to the world GDP reached a maximum in 1913 that was not attained again until 1970. As to the second wave of globalization, the degree of trade integration (measured by the ratio of trade to production) has doubled in the last 50 years (IMF, 1997). Both waves of globalization were mainly promoted by a process of trade liberalization, through a reduction in tariffs. In what concerns the first era, the corn law was abolished in 1846 and the Cobden-Chevalier treaty was signed by France and the United Kingdom in 1860. Regarding the second era, the GATT (now WTO) was created after the Second World War in order to steadily eliminate international trade barriers. However, there are two important differences between both processes. In the first place, the product composition of trade has changed: there is a higher share of industrial products and a lower proportion of raw materials traded in the current wave. This fact is mainly a consequence of the increase in intra-industrial and intra-firm trade. Secondly, the share of developing

countries in manufactured exports has increased in the second wave of globalization (relative to the first wave). According to Bhaduri (1998), until 1970 developing countries accounted for less than 5% of total manufactured exports, while in 1993 this figure increased to 22%. Nevertheless, we must note that these manufactured exports from developing countries were concentrated in a small number of countries, while the least developed countries kept on exporting raw materials.

There has been an accelerated process of financial internationalization in the last three decades. For instance, the total stock of all financial assets traded in global markets rose from US\$ 5,000 billion in 1980 to US\$ 35,000 billion in 1992 (Eatwell, 1996). However, according to Baldwin and Martin (1999), both financial globalization waves have been quantitatively similar and, for some countries, the levels recorded before the First World War have not been reached yet, at least with regards to capital flows (table 3.1.<sup>42</sup>). Nevertheless, there are two elements that distinguish both eras of financial globalization. Firstly, the composition of flows has changed: the proportion of FDI flows was higher in the first wave of globalization (35% of net capital outflows); while, in the current process, the weight of short-term flows is increasingly important, especially in emerging markets (the share of FDI net capital outflows has fallen to approximately 3.5% of total net capital outflows). Secondly, the destination of flows has changed. In the first wave, savings in the North were invested as FDI in developing countries (from mother countries to their respective colonies). In the current financial internationalization process, a high proportion of FDI flows goes from and to developed countries, with the exception of a small share that goes from industrialized countries to some emerging economies (table 3.2.).

Taking into account the purpose of this study, we are not going to analyze the evolution of migration processes in depth. However, we think that it is important to underline that migration is the most obvious difference between the two waves of globalization. These differences are both quantitative (volume of total migration) and qualitative (change of direction). The period 1880-1914 was characterized by massive movements of human capital. These movements were from European countries to America and Oceania. Still, in the second wave of globalization, there is just one important recipient country, that is, the United States, and total flows

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<sup>42</sup> In Table 3.1., the volume of capital flows is measured by the value of national current accounts which is, by definition, a measure of the nation's net capital inflow or outflow. This measure does not accurately reflect the total volume of capital flows (this would be measured by the sum of capital inflows and capital outflows in each country). However, as there is little empirical evidence on the features of the first globalization era, we will use those data to have an approximate idea of the degree of financial internationalization in each wave from a comparative perspective.

account for just 4% of human capital flows recorded in the first wave (Baldwin and Martin, 1999).

## *A.2. The inclusion of emerging markets in the current process of financial globalization*

### A.2.1. Characteristics

One good measure of financial globalization is the volume of capital flows. So we will study the volume of cross-border capital flows to the Third World and also their destination and composition. Moreover, we will briefly analyze the financial derivatives markets and their relative importance in emerging economies.

There has been an important increase in all types of cross-border flows in the last three decades, with special emphasis during the eighties. As for FDI, annual flows represented 2% of world capital formation in 1985, a percentage that rose to 5% in 1995. FDI stock, as a proportion to gross world product, grew from 6% in 1985 to 10% in 1995. Cross-border transactions in financial assets represented less than 10% of GDP in Japan, the US and Germany in 1980. In the early 1990s, they reached 80% of GDP in Japan, 135% in the US and 170% in Germany (Bustelo and Olivé, 1999). Finally, regarding foreign exchange trading, there was an increase from a daily US\$ 15 billion in 1973 to US\$ 1.3 trillion in 1995 (Eatwell, 1996).

Apart from the great increase in all type of cross-border flows, during the nineties there has also been a sudden rise in capital flows to emerging economies. Total net private capital flows to emerging markets in the 1990-96 period soared to US\$ 1,055 billion, more than seven times the amount they received over the 1973-1981 period (Das, 1998). We will now take a closer look at the features of these capital flows. As to their composition, we shall underline two basic features. On the one hand, there has been a shift from public to private flows, compared to previous decades. In 1996 private capital flows accounted for more than 100% of total net flows, whereas at the end of the eighties they represented less than 50% (López-Mejía, 1999). On the other hand, the nineties decade is characterized by the surge of FDI and portfolio investment (particularly the latter) whereas the seventies and the eighties were characterized by the flows of "other investments" (mainly bank loans) to developing countries. As shown in table 3.3., the total amount of net portfolio investment in developing countries increased more than 30 times in the period 1978-1997. In the same period, there was an 800% increase in net direct investment while net other investment decreased from US\$ 30.5 billion in the period 1978-82 to US\$ 26.7 billion in 1990-1997.

As to their destination, there are two remarkable elements in such flows to the Third World. On the one hand, there is a concentration of capital flows in some emerging economies, mainly Latin America and Asia. Both regions together



accounted for 85% and 95% of net private capital flows to all developing countries in 1990 and 1996<sup>43</sup>, respectively (table 3.4.). Moreover, they accounted for 74% of total net private capital flows to emerging markets in 1990 and 82% in 1996 (Das, 1998). On the other hand, there was a switch of flows from Latin America to Asia in the period 1993-1995. As shown in table 3.4., in 1993, Latin America received around 40% of total net private capital flows while Asia accounted for 36% of the same amount. In 1995, those figures had moved to 26% and 62%, respectively. This was a consequence of the Mexican currency crisis of 1994 and the resulting Tequila effect. This shift of flows also led to different capital inflows profiles in both regions: short-term debt stopped growing in Latin America and increased in Asia (Rodrik and Velasco, 1999).

Another good indicator of the degree of financial globalization is the size and evolution of the financial derivatives markets. The origin of derivative products (options, futures and swaps) dates from the beginning of the 1970s, when the Bretton Woods system collapsed. The management of the exchange rate risk was then privatized and the private sector had to create new tools to handle with it. The increase in the volume of capital traded through the use of derivatives during the 1980s and the 1990s is striking. The notional principal outstanding in financial derivatives rose to US\$ 56,500 billion in 1995 from US\$ 1,000 billion in 1986 (Eatwell, 1996). The reason why the size of these markets is a good indicator of financial globalization is that derivative products have a cross-border feature. For instance, 51.22% of the notional value of OTC<sup>44</sup> (over-the-counter) derivative products in March 1995 (US\$ 47.5 trillion) were cross-border products (Garber, 1998). Besides, most of these OTC cross-border transactions occurred between industrial countries (Garber, 1998). The same phenomenon is recorded in organized markets of financial derivatives: in 1991, 77% of the most relevant derivative instruments were traded in North America and Europe. This percentage rose to 86% in 1998. Although Asia's participation in this kind of transactions slightly increased in the mid-1990s (it rose from 23% in 1993 and 1994 to 25% in 1995), it quickly fell to lower levels than the ones recorded at the beginning of the decade (13% in 1998) (BIS, 1999)<sup>45</sup>. Thus, we can conclude that the only relevant indicator of financial integration between industrialized countries and the Third World is the increase in financial flows from developed to emerging countries.

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<sup>43</sup> We have consciously selected the 1996 figure (instead of 1997 or the average of the period) in order to show the evolution of net private capital flows in the period of time that goes from the end of the Latin American debt crisis to the beginning of the East Asian crises.

<sup>44</sup> Over-the-counter derivative products refer to the legal selling of derivatives which are not listed in the official stock exchange lists.

<sup>45</sup> This information is extracted from the BIS *69<sup>th</sup> Annual Report*, table VII.6. In this table, Asia includes Australia and New Zealand, thus the participation of the ASEAN-4 countries plus South Korea in the derivative markets is probably much lower.

### A.2.2. Factors

The factors behind the sharp increase of financial flows from developed countries to emerging economies have been commonly classified in push and pull factors (Das, 1998). Push factors are those circumstances that made developed countries savings seek for investment projects in emerging countries or elsewhere (mainly other developed countries). Pull factors are those particularities of emerging economies that made these markets attractive to foreign capital.

We have identified three major push factors. In the first place, there was a process of financial liberalization in most developed countries that started in the seventies. The United States, Canada, Germany, Switzerland and the United Kingdom liberalized their financial systems in the seventies. Those countries were followed by Japan (1980) and other European countries, that is, France, Italy, Spain and Portugal in the beginning of the nineties. Moreover, the already mentioned collapse of the Bretton Woods system stimulated foreign exchange trading and the creation of derivative instruments. Secondly, the fall in economic growth in OECD countries during the first half of the decade led to a reduction in profitable investment opportunities in industrialized countries. Thus, these countries increased their capital exports to other regions, mainly emerging markets (Das, 1998). The third push factor is the growing importance of institutional investors (mutual funds, pension funds, hedge funds, insurance companies) which have promoted capital outflows in developed countries, according to López-Mejía (1999). These investors saw in the emerging countries the opportunity to diversify their portfolios and to take advantage of the interest rate differential relative to OECD countries' interest rates.

There were also some characteristics of the emerging countries that made them more attractive for industrialized countries in the beginning of the nineties. In the first place, as already shown in section I of this paper, emerging countries also featured a process of financial liberalization. López-Mejía (1999) identifies two other factors that stimulated capital inflows in those economies: the improvement of creditworthiness as a result of external debt restructuring and better macroeconomic indicators as a consequence of stabilization and adjustment programs in emerging economies. However, those two factors could explain the reasons behind capital inflows in Latin America, but not in Asia and we have already seen that, as an average, from 1990 to 1997, Asian emerging economies received a higher proportion of capital flows than Latin America (table 3.4.). Still, it is true that emerging economies as a whole presented sound macroeconomic indicators at the beginning of the decade. The number of emerging market countries with Moody's credit ratings rose from 11 in 1989 to 52 in 1997 (Das, 1998).

Apart from push and pull factors, there is one important global factor which is worth mentioning, and which stimulated both interregional flows and capital exports from developed to developing countries: the reduction in communication costs, as a consequence of technological advances. This has improved the capability of both investors and creditors to manage their portfolios and has transformed the way in which financial information is processed (Das, 1998).

## **B. From Financial Globalization to the Increased Risk of Crises in Emerging Markets**

In this section, we focus on one important adverse consequence of financial globalization, that is, the increased vulnerability of emerging countries to financial crises. Conventional theory, on the contrary, states that financial globalization may have some important benefits. Based on the efficient market hypothesis, this strand of thought argues that, through financial liberalization, internationalization of capital has important macroeconomic benefits. In a global financial market, capital will have the opportunity to fly to countries where most productive investments are located. That is, internationalization of capital leads to a better allocation of resources which in the long run will bring about higher economic growth through higher investment.

Empirically, as regards to productive investment, Eatwell (1996) suggests that there is little international market capital integration. In the first place, despite the great volume of international financial flows that the current globalization process has brought about, there have not been substantial changes in net capital flows on a global scale. Secondly, a high proportion of investment worldwide is still being domestically financed instead of internationally financed, as the conventional hypothesis would suggest. Moreover, financial globalization has not been accompanied by higher rates of investment and growth (Eatwell, 1996). According to Felix (1995) investment, as a proportion of GDP, has tended to decrease both in OECD countries and emerging economies during the period 1960-1995, with particular emphasis in the eighties, precisely when international financial liberalization was more pronounced. The only region that seems to have escaped from this tendency is East Asia, where investment has increased steadily since the early sixties.

It seems, then, that the benefits that financial globalization was supposed to bring about, from an orthodox point of view, have not been accomplished. Moreover, there is an heterodox strand of thought which argues that financial globalization may have negative consequences. In the first place, Hermalin and Rose (1999) have underlined the so-called deflationary bias that financial movements can impose on real economies. According to Eatwell (1996), international financial agents can impose a certain behavior on a government. Suppose an economy is benefiting from higher activity, financial agents may expect then a future rise in interest rates. They will react selling their bonds in the market, provoking a rise in

long-term government interest rates (this is a typical case of self-fulfilling process). The consequences will be a rise in fiscal deficit and an increase in the exchange rate, both leading to a decrease in economic activity. Secondly, we think there is a positive relation between financial globalization and an increase in the risk of financial crises in emerging economies. We will try to analyze this hypothesis later on.

### *B.1. From globalization of financial markets to the increase in volatility*

One recurrent academic issue in the last decades has been the debate on the relation between globalization of financial markets and the evolution of volatility. There is no consensus among economists whether globalization of financial markets reduces volatility or not. Volatility of a financial asset is defined by the risk of this asset and is measured by the risk premium which is added to the governmental interest rate. Conventional theory argues that liberalization and internationalization of capital movements lead to a decrease in volatility. As volatility is measured by the risk premium, this means that there should also be a fall in international interest rates (that is, the cost of capital) after the liberalization of capital markets (Stulz, 1999). The reason is that through liberalization, capital suppliers have access to a larger number of possible investments and by diversifying, they can reduce the risk of their portfolio.

However, there is another strand of thought (Hermalin and Rose, 1999) which states that globalization of financial markets exacerbates intrinsic distortions of domestic financial markets which lead to an increase in volatility of financial assets. From this point of view, there are three channels through which these distortions are enhanced: the increase in asymmetric information, the use of derivatives and the role played by institutional investors. We will now analyze more deeply the heterodox hypothesis on financial volatility through the examination of each one of such channels.

#### B.1.1. Asymmetric information

According to Hermalin and Rose (1999), any financial market suffers from an intrinsic problem, that is, asymmetric information<sup>46</sup>. The asymmetry of information simply highlights the fact that information in financial markets is not perfect; that is to say, it is unevenly distributed among agents. For example, in any lending

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<sup>46</sup> In fact, Hermalin and Rose (1999) betray two intrinsic distortions in financial markets: the asymmetry of information and the problem related to the enforcement of contracts. The latter refers to the institutional and legal environment in which the financial contract is signed. If such institutional framework is weak, this will imply a cost for the lender which will be higher the weaker the institutional framework. We have not introduced such concept in our analysis for plot reasons: there is no reason for that problem to be exacerbated in a globalized financial market.

contract, the borrower will always have better information than the lender about the expected returns of the project he wants to borrow for.

Mishkin (1996 and 1998) further develops the asymmetric information issue. From Mishkin's point of view (Mishkin, 1996 and 1998), asymmetric information leads to two major problems: adverse selection and moral hazard. As regards to adverse selection, Mishkin (1996 and 1998) defines it in the following way: "adverse selection is an asymmetric information problem that occurs before the transaction occurs when potential bad credit risks are the ones who most actively seek out a loan" (Mishkin, 1998, p. 2). In other words, lenders with scarce information about the particular conditions of a given economy will supply their funds to those borrowers who offer higher interest rates. As the interest rate reflects the risk of a project, this means that scarcely informed lenders will provide funds for low-quality projects associated to high risk of default. If the returns of the project exceed the cost of the loan, the benefits will be distributed among the lender and the borrower. On the contrary, if the project fails, the losses will be beared exclusively by the lender. This situation leads to the moral hazard problem: the borrower will have little incentive for investing in high-quality projects. As he will not bear the losses in case of default, he will simply choose for his investment the project with higher expected returns, that is the riskier one.

The lack of information derived from the asymmetry of information implies a cost for the lender. The lender then has two options: either he can spend an additional amount of money in order to acquire further information about the expected returns of the borrower's project or he can simply run on a higher risk. In both cases, the increase will be greater the wider the asymmetry of information (Hermalin and Rose, 1999). The lender will normally choose the second option, therefore incurring in a higher risk. The reason why is explained by the free-rider problem. The free-rider issue was first highlighted by Akerlof (1970). This problem arises when an economic agent uses other agents' information in order not to spend his own resources. In many markets, economic agents use market information to judge the quality of potential future purchases. As a consequence, economic agents operating in such markets will have little incentive to invest in further information, as the returns of their investment will be shared by many other agents. The net result will be that there will be little amounts of capital invested in acquiring more information and, thus, the average quality of the products purchased will be lower. In lending markets, this problem would spring up when a certain lender has little information about a determined borrower (or market of borrowers) and decides to follow other lenders decisions, counting on their better information, rather than acquiring his own data<sup>47</sup>. This problem is particularly serious in auction markets rather than in markets involving financial intermediaries.

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<sup>47</sup> This same matter (following other agents' behavior instead of following ones information) is explained by theoretical models about herding (e.g. Calvo and Mendoza, 1998).

In auction markets, such as securities markets, information is more easily outsourced: a potential lender may have access to further information about the quality of a possible borrower through, for instance, the price level of its obligations in the market. On the contrary, lending contracts enhanced through financial intermediaries are private commitments: other potential lenders will not benefit from the information collected by one lender about the quality of the borrower.

As we said before, asymmetric information is exacerbated when the domestic financial market becomes international, according to this heterodox point of view (Hermalin and Rose, 1999). The asymmetry of information widens when the lender and the borrower belong to two very different economies. The lender then has less information about the borrower than he would have if the borrower belonged to the local market. From this point of view, the result is that the volatility associated to financial operations is higher in global markets than in domestic financial markets.

Nonetheless, conventional theory has also analyzed the impact of internationalization of capital flows on the asymmetry of information and has arrived to different conclusions (Stulz, 1999). It has focused on the asymmetry of information in equity markets, where the asymmetry of information is not between lenders and borrowers but between managers and shareholders. The problem arises, like in the lending market, when time comes to raise new funds. Managers have more information than owners about the financial state of the firm and they use this additional information to over-value the expected returns of the project for which they are trying to raise money. This is what is called the agency problem. The reason why managers have incentives to over-value those expected returns is that, even if the project is not as profitable as the owners expect, it will make the firm grow and this will bring reputational benefits for the managers.

From this point of view and contrary to Hermalin and Rose (1999) opinion, Stulz (1999) believes that this problem, instead of being exacerbated through liberalization of capital flows and globalization, is corrected by the internationalization of financial markets. Financial globalization means that there will be more foreign managers and shareholders operating in the domestic market and also that domestic managers and shareholders will operate more intensively in foreign markets. As the number of economic agents increases, competitiveness will also increase and local managers will be forced to improve their management. As a consequence, asymmetric information and transaction costs in general will be lowered. Firstly, competitiveness puts pressure on managers not only to achieve a better performance, but also to achieve a more transparent management: as there will be many more businesses operating in share markets if these are internationalized, there is more information about enterprises and thus asymmetric information is reduced. Secondly, higher competitiveness in the banking sector will lead to a reduction of transaction costs generated by this sector: spreads will be lowered and information will become cheaper.

### B.1.2. Derivatives

According to Hermalin and Rose (1999), the second channel through which volatility in financial markets is widened when such markets become international is the use of derivatives. An increased use of derivatives leads to higher cross-border capital flows (Garber, 1998), thus leading to a rise in the asymmetry of information and therefore in financial volatility.

The mechanism through which derivative instruments bring about higher international capital flows is explained by Garber (1998) through the functioning of several derivatives. One example is how a plain vanilla swap (currency swap) operates. Suppose that an American company in need of new funds decides to sell bonds. Suppose also that, for any reason, the financial cost of selling bonds for this company would be lower in Germany than in the United States. The company then decides to sell bonds in Germany. Nevertheless, German buyers insist on having payments in DM. On the contrary, the American company prefers dollar payments, as its sales are in this currency. To solve the problem, the American company enters a currency swap with an American bank. This is equivalent to a stack of forward exchange contracts. In every bond settlement, the American company will pay a pre-determined amount of dollars to the American bank that will, in turn pay a pre-determined amount of DM to the American company. The company will use those DM to face the bonds settlements. This swap operation allows economic agents to benefit from more advantageous economic conditions in foreign markets. Without the existence of swap contracts, the American company would probably have sold bonds in the American market with a higher cost and no international operation would have been recorded. This is an example of how the development of the derivative markets leads to an increase of international capital flows.

From Garber's (1998) point of view, currency derivatives are not the only type of derivative products that lead to an increase in international capital operations. Other types of derivatives have the same consequence. One example might be an interest rate swap. Suppose that, for any reason, there is an American company willing to obtain a loan in the German market. Suppose, also, that there is a German company wishing to do the same operation in the United States. Nonetheless, the American company can obtain a loan in the American market at a lower cost than the German company. The German company is in the same situation: the cost of obtaining new funds in Germany is lower for the German company than for the American company. For this reason, the two companies will enter an interest rate swap: the German company will get into debt with a German bank for the amount needed by the American company while the latter will sign a loan with an American bank for the amount needed by the German company. The two companies will first exchange the amount of the loan. That is, the American company will deliver dollars to the German company while the German company

will deliver DM to the American company. Moreover, in every settlement, the two companies will swap the payments. In this way, both companies will obtain the funds they need at a lower cost. Without the existence of the interest rate swap, the cost for the American company of contracting a loan in the German market would be higher, and therefore may push the company to raise funds in the domestic market, thus preventing cross-border capital flows. The same applies to the German firm. Therefore, the use of interest rate derivative instruments enhances cross-border capital flows.

Summing up, the use of derivatives (currency-related or not) leads to an increase in cross-border capital flows. According to Hermalin and Rose (1999), the globalization of financial markets, that is the increase in international capital flows, widens the asymmetry of information and thus increases volatility. Therefore, the use of derivative instruments implies an increase in volatility.

### B.1.3. Institutional investors

According to Hermalin and Rose (1999), the third mechanism through which volatility is emphasized in global financial markets is through the role played by institutional investors (hedge funds, pension funds, mutual funds, insurance companies...). Just like it happens with the relation between financial globalization and volatility, there is no academic consensus on whether the role played by institutional investors in financial markets increases volatility or not. The conventional strand of thought has argued that institutional investors' activity in financial markets has permitted a decrease in volatility. The arguments brandished have been mainly three: "Many institutional investors are governed by Prudent Man rules and thus may be attracted to less-risky stocks, greater institutional ownership may imply greater information gathering and smaller information assessment errors and institutional investors are typically viewed as rational (less subject to fads or noise trading) than individual investors" (Sias, 1996, p.13).

On this scope, heterodox economists (Sias, 1996) have stated, on the one hand, that the role played by institutional investors may result in an increase in volatility. This type of financial agents tend to trade larger volumes of capital than individual investors. Thus, their activity in financial markets may result in higher rises or decreases in asset prices. In addition, in spite of their greater information gathering, they might also engage in noise trading. On the other hand, institutional investors might be particularly subject to herding behavior. Firstly, because of the close-knit nature of the institutional community. Secondly as a result of asymmetric incentives, that is, the losses attributable to underperformance are greater than the gains of overperformance. Thirdly, because of their characteristic shorttermism.



#### B.1.4. Empirical evidence and conclusions

We should now try to test the relations between each one of Hermalin and Rose's factors (the asymmetry of information, the use of derivatives and the role played by institutional investors) and the evolution of volatility. However, we cannot test statistically the link between asymmetric information and financial volatility: the first variable is a qualitative one, while the latter is quantitative and the link between both is qualitative. As to the use of derivatives, the same problem arises: the channel through which the use of derivatives affects volatility is through the increase in cross-border flows, and thus in asymmetric information. Therefore, the way to empirically contrast this relation would be, again, to find correlations between the asymmetry of information and volatility. As to the last factor (the role played by institutional investors), we can simply observe the relative weight of institutional investors in financial markets and the evolution of volatility in order to find a relationship between both. Sias (1996) has examined this relationship and has arrived to two basic conclusions. In the first place, higher participation of institutional investors in financial markets is related to higher volatility. Secondly, institutional investors activity precedes increased volatility. The latter observation means that institutional investors provoke an increase in volatility, rather than being attracted by high-risky assets. Moreover, the herd behavior of institutional investors has also been tested (Aitken, 1996). Aitken finds out that institutional investors portfolio assets are highly and positively correlated which is an indicator of herd behavior. Nevertheless, it has also been shown that both derivative products and institutional investors have played a negligible role in the bursting of the Asian crises. As to the markets of derivatives, we have already seen (in section A.2.1.) that those markets are still underdeveloped in emerging economies. As regards to institutional investors, Brown *et al.* (1998) show that there is no empirical evidence to support "the hypothesis that George Soros, or any other hedge fund manager was responsible for the crisis" (Brown *et al.*, 1998, p. 1).

We should then try to find out whether financial globalization provokes an increase in volatility or not, no matter through which mechanisms. As have not found empirical evidence correlating both variables, we will then simply observe the evolution of volatility in the last decades, when financial liberalization has been more pronounced. There is some but little empirical evidence on the evolution of volatility both in developed and emerging economies. According to Eatwell (1996) and with regard to industrialized countries, volatility in exchange rate, bond yield and share markets seems to have been unchanged since the breaking-off of the Bretton Woods system, excluding the 1992-93 period. However, the same author observes a much higher volatility in stock prices in emerging markets than the one that is observed for the same period in developed countries.

Well then, it seems that, concerning emerging markets, Hermalin and Rose's (1999) conclusions on the asymmetry of information in global financial markets

prevail over those maintained by the conventional strand of thought. Moreover, we believe that the reduction of risk through portfolio diversification only applies *ceteris paribus*. In other words, risk diminishes only if a certain amount of resources is spent in order to keep the asymmetry of information at the same level as it was before (in a domestic market). But in a global market, the amount of resources needed to maintain the same level of asymmetry is much higher: there are many more unknown borrowers operating in many more unknown institutional and legal contexts. So, according to FitzGerald (1999), institutional investors prefer to invest small amounts of resources in additional information and choose short-term placements so that they will be able to retire their funds in case of trouble. The net result will probably be a reduction of average volatility when the funds are invested in non-national but “known” markets, that is, intra-American, intra-European or intra-Asian investments. On the contrary, volatility will be higher in inter-zones operations, for instance, American placements in South East Asia.

## *B.2. From financial globalization to the deterioration of banks balance sheets*

### B.2.1. The theory of financial vulnerability

We have analyzed, so far, how globalization of financial markets can lead to an increase in volatility through the increase in the asymmetry of information in international financial markets. In his turn, Mishkin (1996 and 1998) focuses on the same problem but from a domestic point of view. The author builds up a theory linking domestic financial liberalization to financial vulnerabilities through the problems related to the asymmetry of information in financial markets. Mishkin (1996 and 1998) identifies four factors that, in a context of domestic financial liberalization, can contribute to an increase in adverse selection and moral hazard<sup>48</sup> and thus lead to vulnerabilities in the financial domestic system that will be converted, in the last analysis, into a financial crisis. Those four factors are: (1) increases in interest rates; (2) increases in uncertainty; (3) asset market effects on balance sheets; and (4) problems in the banking sector. For the purpose of our analysis we will just focus on one issue of Mishkin’s theory of financial instability, that is, the mechanisms through which those factors lead to a worsening of the adverse selection and moral hazard problems.

As regards to the first factor mentioned above, Mishkin (1998) considers that an increase in interest rates may exacerbate the adverse selection problem, as good borrowers with safe projects will be less likely to borrow because the expected returns of the project might be lower than the increased cost of borrowing. Better borrowers will then abandon the lending market while bad borrowers will keep on searching for credit. Thus, the average quality of the loans will decrease, leading to an increase in financial vulnerability. As for uncertainty (the second factor), the

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<sup>48</sup> Adverse selection and moral hazard concepts have already been explained in section B.1.1.

author states that the emergence of, for instance, political or financial problems, market rumors or market crashes, widen the adverse selection and moral hazard problems as lenders have more difficulties to screen out good from bad borrowers. The third factor is the asset market effect on balance sheets. From Mishkin's point of view, the moral hazard problem weakens when the net worth of borrowers' firms increases and, thus, increases when the net worth of the firms decreases: the lower the net worth of a firm, the stronger the adverse selection and the moral hazard problems. This is so because every time they borrow to invest in a new project, firms are risking their own funds, in addition to the lender's money. Thus, the higher the net worth of a borrower's firm, the higher the proportion of own funds (compared to lender's funds) the firm is risking in every investment. As a result, high net worth firms are more risk-averse while highly leveraged firms are less cautious with their investments, as they are committing, above all, the lender's funds instead of theirs. A factor that may provoke a fall in firms net worth is a stock market decline. The proportion of own funds the companies will be committing in new investment projects will be, then, lower. As a consequence, the borrowers will be less cautious and less risk adverse. They will, therefore, seek for riskier placements and the adverse selection and moral hazard problems will be enhanced in the lending market. The fourth, and last, factor that can lead to an increase in adverse selection and moral hazard in the lending market is the upsurge of problems in the banking sector. The banking system plays an important role in producing information, both in industrial countries and emerging markets. A decline in the banking activity and thus in intermediation will cut their information-producing activity in the system thus leading to an increase in asymmetric information and therefore, in adverse selection and moral hazard.

Mishkin (1996 and 1998) states that the emergence of any of these four factors may lead to an increase in financial vulnerability. Moreover, in addition to the direct effect of any of those factors in adverse selection and moral hazard, combined effects of two or more of those factors may appear. For instance, an increase in uncertainty can lead to a stock market decline, thus provoking a fall in firms net value and, therefore, an increase in moral hazard.

#### B.2.2. An application to the East Asian crises

The same author (Mishkin, 1999) has applied his theory of financial vulnerability to the Asian crisis. He has identified the phenomena that led to the appearance of any of the four factors described above, thus provoking a situation of financial fragility. As we have just said, according to this author, the upsurge of any of the four factors leads to a situation of financial vulnerability. From his point of view, there is one important factor that emerged in Asia, provoking ultimately a financial crisis. This factor was the deterioration of banks' balance sheets, that is, the fourth factor identified as problems in the banking sector. Mishkin also describes the process that impinged upon a deterioration in banks balance sheets: "the story starts with financial liberalization that resulted in the lending boom which was fed

by capital inflows.” (Mishkin, 1999, p. 2). That is, after the abolishment of restrictions to capital inflows, high volumes of foreign capital entered the Asian emerging economies, mainly in the form of debt. The consequence was a lending boom: domestic credit started to grow faster than GDP. According to this author, the lending boom combined with two particular features of emerging financial systems provoked an excessive risk-taking. Firstly, the lack of expertise of banking institutions to manage great inflows of foreign debt. As a result, the national banking network engages in great amounts of foreign debt which are invested in risky domestic projects. Secondly, emerging countries often lack an adequate regulatory and supervisory system. In such cases, there is an implicit safety network perceived by foreign investors that leads to a situation of moral hazard<sup>49</sup>. Thus, investors engage in highly risky operations (Figure 1).

Excessive risk taking leads to the deterioration of banks balance sheets, having a particularly devastating effect in emerging financial systems. According to Mishkin (1996, 1998 and 1999), the main difference in banking intermediation between industrial countries and emerging economies is the mismatch in both currencies and maturities. In industrial countries, with historically low rates of inflation and solid currencies, the banking system receives short and long-term deposits in national currency from national savers and lends in the same currency, either to domestic or foreign borrowers, also on a long-term basis. On the contrary, emerging countries usually receive foreign short-term funds in foreign currencies (usually dollars, DM or yen). The reason is that emerging countries historically have suffered from fragile currencies and episodes of high rates of inflation. In such uncertain context, foreign investors rather prefer to lend short-term funds in strong currencies. Besides, emerging banking systems grant long-termed loans denominated in domestic currency to national borrowers. The net result is a greater currency and maturity mismatch in emerging financial systems than in industrial financial nets. As a consequence, we believe that the impact of an excessive risk taking is more serious in emerging economies and thus leads to a greater deterioration in banks balance sheets. According to Mishkin (1996, 1998 and 1999), this will lead to an increase in both adverse selection and moral hazard, therefore provoking a situation of financial vulnerability.

### *B.3. From globalization of financial markets to financial crises: a combined explanation*

We have analyzed so far, and separately, three important issues related to the asymmetry of information. In the first place, there is a heterodox strand of thought

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<sup>49</sup> Here, Mishkin refers to another kind of moral hazard that can spring out in financial operations. Moral hazard in this context is a consequence of an explicit or implicit guarantee conceded by the government to national or foreign agents. Financial agents engage in risky operations because they feel indorsed by the authorities.

which maintains that the asymmetry of information - an intrinsic characteristic of any financial market - is exacerbated when financial markets become global, thus leading to an increase in risk and volatility (Hermalin and Rose, 1999). Secondly, Mishkin elaborates a theory of financial vulnerability where four different factors – that can act separately or combined - can impinge upon an increase in adverse selection and moral hazard. Finally, the same author applies his theory of financial fragility to the Asian crisis and identifies the deterioration of banks balance sheets as the main vehicle of the rise in adverse selection and moral hazard, thus leading to an increase in financial vulnerability. We believe that Hermalin and Rose's (1999) hypothesis on globalization and volatility focuses on the asymmetry of information problem from an international point of view. On the contrary, Mishkin deals with the same problem from a domestic point of view. Then, both theories could be combined in order to explain how asymmetric information can affect a financial system from two flanks (international and domestic) and lead to an increase in financial vulnerability. We could also try to apply this combined explanation to the particular case of the East Asian crises while introducing some other empirical variables that Mishkin did not consider in his empirical analysis (Mishkin, 1999) (Figure 2).

### B.3.1. From financial globalization to financial vulnerabilities

As shown in section I, East Asian emerging economies undertook a substantial financial liberalization at the beginning of the current decade. This process of liberalization included both domestic deregulation and capital account opening and led, as also stated by Mishkin (1999) to a sudden increase in foreign capital inflows (table 1.6) which resulted in a lending boom (table 1.16). The rise in lending, together with the lack of expertise and with a weak regulatory framework, provoked an excessive risk taking in financial operations and, finally, a deterioration of banks balance sheets.

However, we think that some nuances could be introduced in Mishkin's explanation. In the first place, we think that financial liberalization in those countries was the result of two combined phenomena. On the one hand, East Asian policymakers considered for some reason (mainly to increase competition in the financial sector in order to reduce lending interest rates) that financial deregulation was a necessary step to undertake in their economies, that is, liberalization was, in part, promoted by internal factors. On the other hand, the process of financial opening was also a consequence of the process of globalization that the international economy had featured since the collapse of the Bretton Woods system, simply because attracting capital flows was becoming much more competitive and was considered much easier in an open-economy framework.

Secondly, we think that the increase in capital inflows in emerging markets and, more specifically in East Asia, was not merely the result of domestic financial

liberalization but also a consequence of financial globalization through the increase in cross-border flows. After the process of financial liberalization that took place in the OECD countries in the mid-1970s, there was an increasing volume of funds looking for higher yields. Then, industrial countries began to invest their savings in emerging economies, especially in Latin America and East Asia. Moreover, the increase in asymmetric information provoked by the rise in cross-border flows led to the particular structure of emerging countries capital inflows already pointed by Mishkin (that is, short-term funds denominated in developed countries currencies), indirectly bringing with it the excessive risk taking that occurs after the lending boom.

Thirdly, although we agree with Mishkin in the fact that the combination of some internal disequilibria with a sudden increase in credit provoked an excessive risk taking, we do not think that those internal disequilibria are simply intrinsic features of emerging financial systems but rather consequences of an accelerated process of financial deregulation and opening, as it has already been shown in section I of this paper. Moreover, apart from the lack of managerial expertise and a weak regulatory system, other domestic factors contributed to the increase in risk taking: these were mainly the decrease in the cost of borrowing (as domestic investors had access to lower interest rates following financial opening) and the currency peg to the US dollar (which reduced the perceived exchange rate risk).

We have analyzed (in section B.1 above) how heterodox theory links the financial globalization process with the increase in volatility (through the widening in the asymmetry of information). From our point of view, volatility could be linked to the rise in uncertainty, one of Mishkin's four factors of his theory of financial vulnerability. In fact, Mishkin also deals with this possibility (Mishkin, 1998). Although there does not seem to be a strong empirical correlation between financial globalization and the rise in volatility (and, therefore, in vulnerability), we believe that there can be a connection between the increase in asymmetric information and an increase in uncertainty. As we have already pointed out, investors "know more" about domestic than about foreign markets, thus, uncertainty increases in cross-border financial operations.

Up to here, we can see that two of Mishkin's four factors (deterioration of bank's balance sheets and a rise in uncertainty) arise in the explanation of the East Asian financial crisis, explained from an asymmetric information problem point of view. In Mishkin's theory of financial vulnerability, two other factors (an asset market decline and a rise in interest rates) could bring with them an increase in adverse selection and moral hazard and thus a rise in financial fragility. The empirical evidence suggests that none of those two problems sprang up in East Asia before the financial crises. As shown in section I (table 1.26), the stock market decline that took place in the East Asian economies was a consequence of the 1997 speculative attack, rather than an antecedent, with the partial exception of Thailand and South Korea. In relation to the evolution of interest rates in these

economies, as shown in table 3.5, there was not an outstanding increase in the cost of borrowing before the crisis in any of the countries involved. This is probably explained by the fact that volatility and risk were not correctly assessed and thus, the excessive risk that was being undertaken was not reflected by an increase in the risk premia and thus in interest rates.

### B.3.2. From financial vulnerability to financial crisis

We have analyzed, so far, how financial globalization leads to an increase in financial vulnerability by both national and international mechanisms. Moreover, these two channels can interact propagating asymmetric information from world markets to the domestic financial system. However, we consider, according to some second generation models (Calvo, 1998a and Chang and Velasco, 1998) explained in section II, that the financial vulnerability recorded in East Asian countries in 1997, may not lead by itself to a speculative attack and thus, to a financial crisis. For the speculative attack to occur, there must also be a shift in private agents' expectations.

Figure 1. Mishkin's analysis of the East Asian financial crises

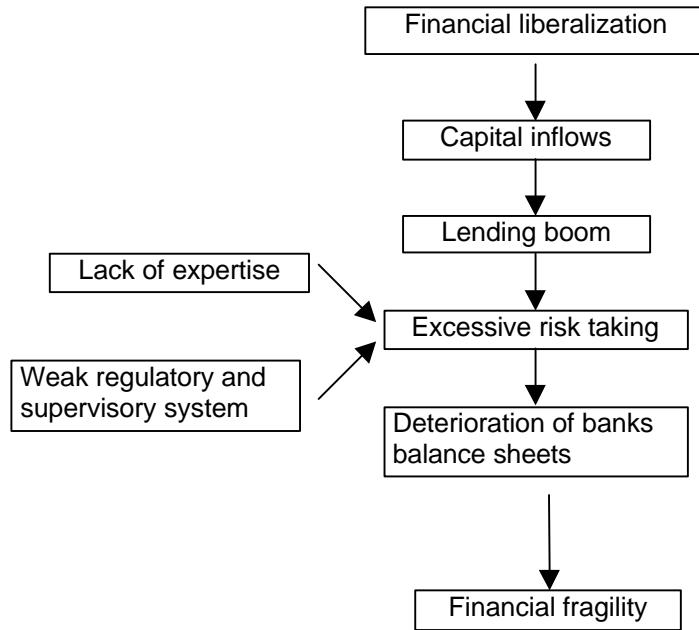
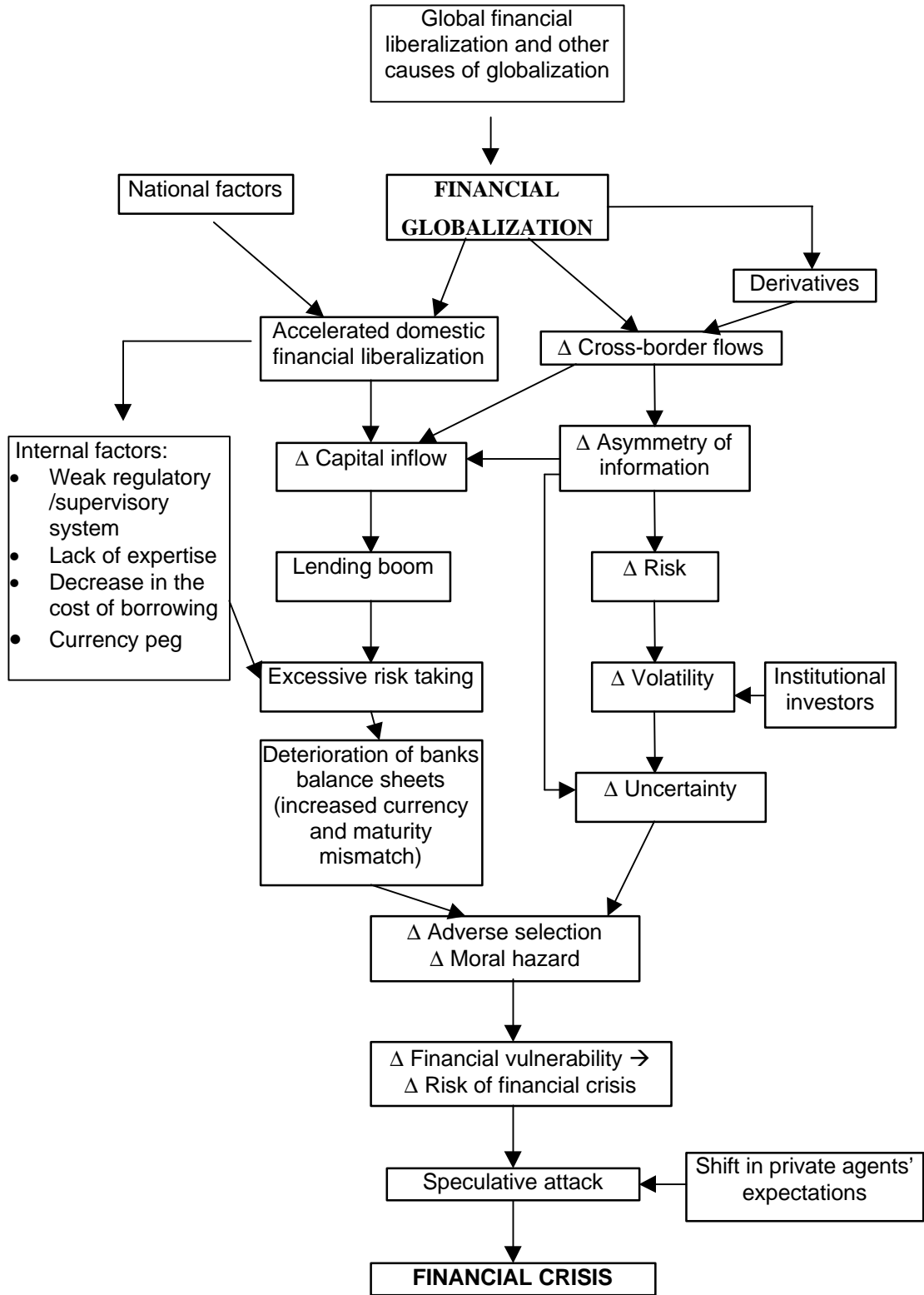




Figure 2. A combined explanation of the Asian crises



## CONCLUSIONS

This paper has tried to suggest that a new approach is needed in order to identify the causes of the East Asian financial crises. With that aim we have done, first, an empirical study which highlights the specific and “not-so-bad” fundamentals (both different from those in the ERM in 1992-1993 and Mexico in 1994-1995, and “intermediate”) that made East Asia prone to a financial crisis. Second, we have analyzed models of financial crises in order to explain how, theoretically, fundamentals may not be sufficient for causing a crisis. Finally, we have studied the financial international context which, added to those “not-so-bad” fundamentals and to a shift in private agents’ expectations, has caused the East Asian crises.

Our empirical analysis concludes, on the one hand, that the nature of the East Asian crises was essentially different from that of previous turmoils in the 1990s. The ERM crisis was related to restrictive monetary policies in Europe in a context of global recession. The Mexican crisis was associated to overconsumption. The East Asian crises were a result of private overinvestment and overproduction. On the other hand, we have suggested that a careful analysis of the East Asian episodes should emphasize specific unsound fundamentals, such as a lending boom associated with high capital inflows and financial deregulation, a declining capital efficiency (as a result of overinvestment), and a large short-term foreign debt (especially as a proportion of foreign exchange reserves).

Besides, the empirical analysis also concludes that, like previous crises of the 1990s, the East Asian crises could have been avoided if a soft landing would have been carried out. That is, those “bad” fundamentals (whether conventional or not) were not as “bad” as to provoke inevitably a crisis by themselves.

Two questions arise from these conclusions: How is it possible that fundamentals which were not considered dangerous, neither by empirical nor by most theoretical studies, turned out to be the starting point of every explanation of the East Asian crises? What are the mechanisms that turned “not-so-bad” fundamentals into a crisis?

Both questions are, at least partially, answered by some theoretical models of financial crises. On the one hand, first generation models (even those emphasizing mechanisms different from large public deficits) are not useful for understanding the crises of the 1990s, mainly because they consider crises as predictable and unavoidable events. On the other hand, second generation models do not give a complete view of reality (neither for the East Asian crises nor for the previous ones). Nevertheless, second generation models explain that an intermediate state of any sort of fundamentals opens the door to the self-fulfillment of expectations. That is, no matter what kind of problems is the country in question suffering, a shift in private agents’ expectations may lead to a crisis through the increase of the cost of maintaining the fixed exchange rate regime. Moreover,

neither fundamentals need to be of a specific kind (they can be non-conventional) nor they need to be very “bad” for a crisis to happen. Second generation models show that crises may erupt even when fundamentals are not as “bad” as to cause crises by themselves: it is enough that fundamentals are not “very good” for expectations to be self-fulfilling. The second part of this paper concludes that, for explaining the East Asian episodes (apart from others), there is something that theoretical models are missing. These models explain the role of fundamentals in relation to private expectations. But they do not explain how is it possible that a shift in private agents’ expectations turns into a financial crisis. What is it that make countries (especially emerging markets) vulnerable to a shift in expectations?

Our study of the vulnerabilities that financial globalization brings about tried to answer, at least partially, such question. There are two ways through which financial globalization leads to higher vulnerability of countries, so that a shift in expectations may cause a financial crisis. On the one hand, globalization increases certain market failures inherent to capital markets. For instance, the lack of transparency of any financial market is exacerbated when such market becomes global. Thus, the whole international financial system is affected by non-efficient mechanisms (free riding, herding...) which increase risk and therefore uncertainty. On the other hand, globalization (together with perceived national needs) impinges upon the pace of domestic financial liberalization of emerging markets and facilitates the flows of capital to them. Both an accelerated and indiscriminate domestic financial liberalization, and the reception of massive capital inflows, lead to domestic financial vulnerabilities. Note that such domestic financial vulnerabilities are a particular case of all the different “not-so-bad” fundamentals which open the door to self-fulfilling expectations. Therefore, we conclude that globalization increases the vulnerability of emerging markets to crises by affecting both international and domestic capital markets.

We have argued, on theoretical and empirical grounds, that this was the case in East Asia. On the one hand, East Asian policy-makers considered that financial deregulation was a necessary step to undertake, mainly to increase competition in the financial sector in order to reduce lending interest rates (that is, liberalization was, in part, promoted by internal factors). On the other hand, financial opening was also a consequence of the process of globalization that the world economy has featured since the collapse of the Bretton Woods system, simply because attracting capital flows was becoming much more competitive and was considered much easier in an open-economy framework. Besides, the increase in capital inflows in emerging markets and, more specifically in East Asia, was not merely the result of domestic financial liberalization but also a consequence of financial globalization through the increase in cross-border flows.

Therefore, we conclude that globalization increases the vulnerability of emerging markets to crises by affecting both international and domestic capital markets.

We can extract some lessons from the conclusions seen above. We have seen that both domestic factors (“intermediate” fundamentals) and international factors (those that permit financial panics) play a role in causing financial crises.

Therefore, prevention measures should be adopted both domestically and internationally. First, governments have the responsibility of exiting crisis zones so as to avoid the self-fulfillment of expectations. Second, governments should take care of how domestic financial liberalization is carried out. They should not allow domestic needs and/or globalization to lead to an accelerated and indiscriminate financial liberalization. Thus, a certain pace and a careful order must be followed so as to avoid the domestic vulnerabilities that would arise otherwise. Third, governments must avoid the other way through which globalization impinges upon domestic financial vulnerability: massive inflows of capital (mainly in short-term funds). Thus, some capital controls should be imposed in order to receive the amount and nature of capital least dangerous for the country in question (this was the case of Chile in 1991-1998 and of Malaysia in 1998-1999). The second and third lessons may be regarded as particular cases of the first one. That is, by caring about the pace and order of domestic financial liberalization, and/or caring about the amount and nature of capital inflows, governments avoid “bad” financial fundamentals, and thus avoid entering a crisis zone.

Fourth, even when domestic financial vulnerabilities are successfully repressed, the inherent failures of financial markets are enhanced by globalization, so that financial vulnerability still exists. Therefore, governments should try to design collectively a new global financial architecture in order to counteract the negative effects of such market failures. One could consider that once all governments have exited the crisis zones there is no need of counteracting the effects of globalization on vulnerability, as expectations can no longer be self-fulfilling. Nevertheless, it is not easy to determine with precision what is a crisis zone, given that so many kinds of fundamentals may determine it, and given that there is no consensus about what are “bad”, “not-so-bad” (or “intermediate”) or “good” fundamentals.

Therefore, measures should be taken both to improve domestic fundamentals (either conventional or non-conventional) and to mitigate the adverse effects of globalization on the financial vulnerability of emerging markets.

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## STATISTICAL APPENDIX

**Table 1.1. Fiscal balance (as a percentage of GDP)**

	1990-1995	1996	1997
Indonesia	0.2	0.2	0.0
Malaysia	-0.4	0.7	1.8
Philippines	-1.1	0.3	0.1
South Korea	0.2	0.5	-1.4
Thailand	3.2	2.4	-0.9
Singapore	9.4	6.8	3.3
Hong Kong	9.4	6.8	6.5
Taiwan	-5.0	-6.6	-6.3
China	-1.0	-0.8	-0.7

Source: ADB (1999), table 1.2.

**Table 1.2. Public debt (as a percentage of GDP)**

	1994	1995	1996
Indonesia	36.6	30.9	24.1
Malaysia	50.1	42.8	n.a.
Philippines	56.4	n.a.	n.a.
South Korea	10.0	9.0	8.6
Thailand	5.8	4.7	3.7

Source: IFS.

**Table 1.3. Inflation rates**

	<b>1990-1995</b>	<b>1996</b>	<b>1997</b>
Indonesia	8.7	7.9	6.6
Malaysia	3.7	3.5	4.0
Philippines	10.6	9.1	6.0
South Korea	6.6	5.0	4.5
Thailand	5.0	5.9	5.6
Singapore	2.7	1.4	2.0
Hong Kong	9.3	6.3	5.9
Taiwan	3.8	3.1	0.9
China	11.3	8.3	2.8

Source: ADB (1999), table 1.2.

**Table 1.4. Savings and investment rates (as percentages of GDP)**

	<b>1990-95</b>	<b>1990-95</b>	<b>1996</b>	<b>1996</b>	<b>1997</b>	<b>1997</b>
	S/GDP	I/GDP	S/GDP	I/GDP	S/GDP	I/GDP
Indonesia	31.0	31.3	27.3	30.7	29.9	31.3
Malaysia	36.6	37.5	42.6	41.5	43.8	42.0
Philippines	16.6	22.4	18.5	23.1	20.3	23.8
S. Korea	35.6	36.8	33.7	38.4	33.1	35.0
Thailand	34.4	41.0	33.7	41.7	32.9	35.0
Singapore	47.0	34.9	51.2	35.3	51.8	37.4
Hong Kong	33.6	29.6	30.7	32.1	31.8	35.2
Taiwan	26.9	24.0	25.1	21.2	24.8	22.0
China	40.8	38.8	40.5	39.6	41.5	38.2

Source: ADB (1999), table 1.3.

**Table 1.5. GDP growth, 1990-1997**

	1990-1995	1996	1997
Indonesia	8.0	7.8	4.9
Malaysia	8.9	8.6	7.7
Philippines	2.3	5.8	5.3
South Korea	7.8	7.1	5.5
Thailand	9.0	5.5	-0.4
Singapore	8.6	6.9	7.8
Hong Kong, China	5.0	4.5	5.3
Taiwan	6.4	5.7	6.8
China	10.7	9.6	8.8

Source: ADB (1999), table 1.2.

**Table 1.6. Net private capital inflows (as percentage of GDP)**

	1975-82	1983-91	1992-96
Indonesia	1.1	2.6	4.8
Malaysia	5.1	4.1	10.5
Philippines	5.5	-0.8	4.8
South Korea	5.7	-0.4	3.2
Thailand	4.0	5.7	8.8

Source: Chowdury (1999), table 10.

**Table 1.7. Unemployment rates**

	1995	1996	1997
Indonesia	n.a.	4.1	4.9
Malaysia	2.8	2.5	2.6
Philippines	8.4	7.4	n.a.
South Korea	2.0	2.6	4.7
Thailand	n.a.	1.1	4.4

Source: ILO.

**Table 1.8. International interest rates**

	1980-87	1988-95	1996	1997
LIBOR 6m	5.8	3.0	3.3	3.9
LTIRAC (1)	n.a.	n.a.	6.8	6.1
STIRAC (2)	n.a.	n.a.	4.1	4.0
LTWRIR (3)	4.7	4.3	3.8	3.1

Notes: (1) Long-term interest rate in advanced economies; (2) Short-term interest rate in advanced economies; (3) Long-term world real interest rate.

Source: IMF (1998), tables A18 and A45.

**Table 1.9. GDP growth in the advanced economies**

	1995	1996	1997
Adv. economies	2.5	2.7	3.0
United States	2.0	2.8	3.8
Japan	1.5	3.9	0.9
European Union	2.5	1.7	2.6
Dev. Economies	6.0	6.6	5.8
World average	3.6	4.1	4.1

Source: IMF (1998), table A1.

**Table 1.10. World commodity prices in US dollars (% of change)**

	1988-95	1996	1997
Oil	-0.7	18.9	-6.0
Non-oil	3.8	-1.3	-1.7

Source: IMF (1998), table A45.

**Table 1.11. Growth in world trade**

	1988-95	1996	1997
World volume	6.7	6.6	9.4
Imp. Of adv. eco.	6.4	6.4	8.6
Imp. Of dev. Eco.	7.9	9.3	12.1

Source: IMF (1998), table A45.



**Table 1.12. Currency real appreciation (cumulative percentage)**

	<b>Dec90/Dec94</b>	<b>Dec94/March97</b>	<b>Dec90/March97</b>
Indonesia	8	18	25
Malaysia	14	16	25
Philippines	38	15	47
South Korea	9	2	11
Thailand	11	16	25

Source: Radelet and Sachs (1998), table 10.

**Table 1.13. US dollar nominal exchange rate (relative to the yen and DM)**

	<b>1995</b>	<b>1996</b>	<b>1997</b>
Yen	94.1	108.8	121.0
D-Mark	4.99	5.12	5.84

Source: IMF (1998), table A19.

**Table 1.14. Growth rates of merchandise exports**

	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>
Indonesia	8.8	13.4	10.4	11.6
Malaysia	24.7	26.0	6.7	-7.2
Philippines	19.9	31.6	17.5	12.2
South Korea	16.8	30.3	5.3	7.3
Thailand	22.7	25.1	-1.3	3.5

Source: World Bank.

**Table 1.15. Current account (as a percentage of GDP)**

	1990-1995	1996	1997
Indonesia	-2.5	-3.4	-1.4
Malaysia	-5.8	-5.0	-5.3
Philippines	-3.7	-4.7	-5.3
South Korea	-1.2	-4.7	-2.0
Thailand	-3.9	-7.9	-2.0
Singapore	0.6	15.4	15.4
Hong Kong, China	-	-	-
Taiwan	4.2	4.0	2.7
China	1.2	0.9	3.2

Source: ADB (1999), table 1.2.

**Table 1.16. Bank lending to the private sector (as a percentage of GDP)**

	1980	1990	1996	$\Delta 90/80$	$\Delta 96/90$
Indonesia	8	45	55	12	10
Malaysia	33	71	93	37	22
Philippines	31	19	49	38	30
South Korea	36	52	62	16	10
Thailand	9	64	102	53	38

Sources: Bisignano (1999) and Glick (1998), table 2.

**Table 1.17. Investment efficiency (investment rate/GDP growth)**

	Investment rate		GDP growth		A/C	B/D
	1990-94 A	1995-96 B	1990-94 C	1995-96 D		
Indonesia	33.6	31.4	6.9	8.1	4.87	3.88
Malaysia	36.0	42.5	8.7	9.0	4.14	4.72
Philipp.	22.7	23.1	1.9	5.3	11.9	4.36
S. Korea	36.7	37.7	7.6	8.0	4.83	4.71
Thailand	40.9	41.7	9.0	4.2	4.54	5.79

Source: IFS and author's calculation.

**Table 1.18. Incremental capital-output ratios (ICORs)**

	1987-92	1993-96
Indonesia	4.0	3.8
Malaysia	3.7	4.8
Philippines	6.0	5.5
South Korea	3.8	4.9
Thailand	3.4	5.1
Singapore	3.6	4.2
Hong Kong	3.7	6.1
Taiwan	2.4	3.9
China	3.1	2.9

Source: JP Morgan and Corsetti *et al.* (1998), table 6.

**Table 1.19. Foreign liabilities of deposit money banks (as % of GDP)**

	End 1990	End 1993	End 1996
Indonesia	6	6	6
Malaysia	7	19	9
Philippines	6	6	17
South Korea	4	4	9
Thailand	5	11	27

Source: Glick (1998), table 2.

**Table 1.20. Bank loans to the property sector ( % of total loans, end 1997)**

Indonesia	25-30
Malaysia	30-40
Philippines	15-20
South Korea	15-25
Thailand	30-40

Source: Glick (1998), table 2.

**Table 1.21. Non-performing loans (as a percentage of total loans)**

	1997	1998
Indonesia	11.0	20.0
Malaysia	7.5	15.0
Philippines	5.5	7.0
South Korea	16.0	22.5
Thailand	15.0	25.0
Hong Kong	1.5	3.0
Singapore	2.0	3.5

Source: JP Morgan and Chowdury (1999), table 12.

**Table 1.22. Debt-to-equity ratios in East Asian corporates, 1988-1996**

	1994	1995	1996	1988-1996
Indonesia	1.661	2.115	1.878	1.951
Malaysia	0.991	1.103	1.176	0.908
Philippines	1.148	1.150	1.285	1.129
South Korea	3.530	3.776	3.545	3.467
Thailand	2.126	2.224	2.361	2.008
United States	1.006	1.099	1.125	1.034
Germany	1.512	1.485	1.472	1.514
Japan	2.193	2.367	2.374	2.302

Source: Claessens, Djankov and Lang (1998), table 6.

**Table 1.23. Short-term foreign debt/total foreign debt (percentage)**

	June 1990	June 1994	June 1997
Indonesia	51.6	61.1	59.6
Malaysia	25.6	59.1	56.4
Philippines	33.3	44.1	65.6
South Korea	66.4	72.5	67.8
Thailand	60.1	74.2	65.6

Source: BIS.

**Table 1.24. Short-term foreign debt/international reserves (II/1997)**

Indonesia	1.70
Malaysia	0.61
Philippines	0.85
South Korea	2.06
Thailand	1.45
Singapore	2.44
Taiwan	0.24

Source: ADB (1999), table 1.3

**Table 1.25. M2/international reserves**

	End 1990	End 1993	Mid 1997
Indonesia	600	603	616
Malaysia	291	209	399
Philippines	497	478	403
South Korea	649	685	620
Thailand	456	403	490

Source: IFS and Glick (1998), table 4.

**Table 1.26. Stockmarket indexes (1 June 1996 = 100)**

	28 June 1996	1 January 1997	30 June 1997	30 March 1998
Indonesia	114	120	133	28
Malaysia	116	125	109	51
Philippines	127	122	108	62
South Korea	97	64	42	24
Thailand	89	68	74	31

Source: Datastream.

**Table 1.27. Net private capital flows to Asia-5 (US\$ billion)**

	1995	1996	1997	1998	1999
Equity	15.3	18.6	4.4	13.7	18.5
<i>FDI (1)</i>	4.2	4.7	5.9	9.5	12.5
<i>PI (2)</i>	11.0	13.9	-1.5	4.3	6.0
Priv. Credit.	65.1	83.7	-4.2	-41.3	-18.2
<i>CB (3)</i>	53.2	62.7	-21.2	-36.1	-16.0
<i>NBPC (4)</i>	12.0	21.0	17.1	-5.3	-2.3
Total	80.4	102.3	0.2	-27.6	0.3

Notes: (1) Foreign direct investment; (2) Portfolio investment; (3) Commercial banks; (4) Non-bank private creditors.

Source: IIF (1999).

**Table 3.1. Capital flows since 1870 (average absolute value of current account as percent of GDP)**

	UK	USA	Argentina	Australia	Canada	France	Germany	Italy	Japan
1870-1889	4.6	0.7	18.7	8.2	7.0	2.4	1.7	1.2	0.6
1890-1913	4.6	1.0	6.2	4.1	7.0	1.3	1.5	1.8	2.4
1919-1926	2.7	1.7	4.9	4.2	2.5	2.8	2.4	4.2	2.1
1927-1931	1.9	0.7	3.7	5.9	2.7	1.4	2.0	1.5	0.6
1932-1939	1.1	0.4	1.6	1.7	2.6	1.0	0.6	0.7	1.0
1947-1959	1.2	0.6	2.3	3.4	2.3	1.5	2.0	1.4	1.3
1960-1973	0.8	0.5	1.0	2.3	1.2	0.6	1.0	2.1	1.0
1974-1989	1.5	1.4	1.9	3.6	1.7	0.8	2.1	1.3	1.8
1989-1996	2.6	1.2	2.0	4.5	4.0	0.7	2.7	1.6	2.1

Source: Baldwin and Martin (1999), table 5.

**Table 3.2. Geographical distribution of FDI, 1914-1996. Various home and host nations.**

% of world stock	1914		1960		1996	
	% of origin	% of host	% of origin	% of host	% of origin	% of host
USA	18.5	10.3	49.2	13.9	25.0	19.9
Canada	1.0	5.7	3.8	23.7	3.5	4.0
UK	45.5	1.4	16.2	9.2	11.2	10.7
Germany	10.5	6.4	1.2	6.4	9.1	5.3
France	12.2		6.1		6.5	5.2
Belgium	8.7		1.9		2.3	3.1
Italy			1.6		3.7	2.3
Netherlands	8.7		10.5		5.8	3.7
Sweden			0.6		2.4	1.3
Switzerland			3.0		5.1	1.5
Russia	2.1	7.1	na	na	0.0	0.2
Developing nations	nil	62.8	1.0	32.3	8.9	28.4

Source: Baldwin and Martin (1999), table 15.

**Table 3.3. Annual Capital Net Flows (all developing countries)**

		<b>1978-82</b>	<b>1983-89</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>
Net capital flows	US\$ billion	40.5	45.8	61.8	149.1	125.0	169.9
	% Exports	8.6	9.8	9.3	22.2	17.0	22.1
	% GNP	2.3	1.9	2.4	5.4	4.0	5.3
Net direct investment	US\$ billion	8.3	11.5	19.7	27.1	34.7	52.6
	% Exports	1.8	2.4	3.0	4.0	4.7	6.9
	% GNP	0.5	0.5	0.7	1.0	1.1	1.7
Net portfolio investment	US\$ billion	1.7	5.1	20.0	36.0	44.2	97.1
	% Exports	0.4	1.0	3.0	5.4	6.0	12.7
	% GNP	0.1	0.2	0.8	1.3	1.4	3.0
Net other investment	US\$ billion	30.5	29.2	22.1	85.9	46.1	20.2
	% Exports	6.4	6.4	3.3	12.8	6.3	2.6
	% GNP	1.7	1.2	0.8	3.1	1.5	0.6
		<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1990-97</b>	
Net capital flows	US\$ billion	144.0	180.3	193.6	135.7	144.9	
	% Exports	16.6	17.5	16.8	10.8	16.5	
	% GNP	4.1	4.7	4.7	2.9	4.2	
Net direct investment	US\$ billion	76.5	86.5	108.5	126.5	66.5	
	% Exports	8.8	8.4	9.4	10.1	6.9	
	% GNP	2.2	2.2	2.7	2.7	1.8	
Net portfolio investment	US\$ billion	85.7	22.2	52.7	55.5	51.7	
	% Exports	9.8	2.1	4.6	4.4	6.0	
	% GNP	2.5	0.6	1.3	1.2	1.5	
Net other investment	US\$ billion	-18.2	71.6	32.4	-46.3	26.7	
	% Exports	-2.1	6.9	2.8	-3.7	3.6	
	% GNP	-0.5	1.9	0.8	-1.0	0.9	

Source: IMF in López-Mejía (1999), table 3.



**Table 3.4. Annual net private capital flows (by region)**

		<b>1978-82</b>	<b>1983-89</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>
All developing countries	US\$ billion	18.3	17.2	48.9	124.8	108.2	151.4
	% Exports	3.9	3.7	7.4	18.6	14.7	19.7
	% GNP	0.8	0.7	1.6	3.9	3.1	3.9
Africa	US\$ billion	6.4	2.6	-1.9	1.2	0.2	3.7
	% Exports	7.7	3.2	-1.8	1.2	0.2	3.8
	% GNP	2.0	0.8	-0.5	0.3	0.0	1.0
Asia	US\$ billion	7.6	12.9	27.5	32.2	20.9	54.3
	% Exports	9.8	10.7	13.5	14.0	7.9	18.0
	% GNP	1.2	1.5	2.6	2.9	1.7	3.7
Middle East and Europe	US\$ billion	-24.8	3.3	9.2	65.9	31.3	30.3
	% Exports	-12.2	2.3	4.9	38.0	16.4	16.4
	% GNP	-5.3	0.7	1.5	11.7	5.0	4.9
Western Hemisphere	US\$ billion	29.1	-1.5	14.1	25.5	55.9	63.1
	% Exports	28.9	-1.3	8.5	15.4	32.1	34.4
	% GNP	3.9	-0.2	1.3	2.2	4.5	4.6
		<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1990-97</b>	
All developing countries	US\$ billion	133.4	147.6	189.6	139.0	130.4	
	% Exports	15.3	14.3	16.4	11.1	14.7	
	% GNP	3.3	3.2	3.7	2.5	3.1	
Africa	US\$ billion	9.2	10.5	5.4	14.0	5.3	
	% Exports	9.1	8.9	4.1	10.3	4.5	
	% GNP	2.5	2.4	1.1	2.7	1.2	
Asia	US\$ billion	64.3	91.2	98.3	28.8	52.2	
	% Exports	17.5	20.1	19.4	5.2	14.5	
	% GNP	4.1	4.9	4.6	1.3	3.2	
Middle East and Europe	US\$ billion	13.4	7.7	4.2	8.7	21.3	
	% Exports	7.0	3.6	1.7	3.4	11.4	
	% GNP	2.3	1.2	0.6	1.1	3.5	
Western Hemisphere	US\$ billion	46.5	38.2	81.8	87.5	51.6	
	% Exports	22.2	15.5	29.9	29.2	23.4	
	% GNP	3.0	2.3	4.5	4.4	3.4	

Source: IMF in López-Mejía (1999), table 1.

**Table 3. 5. Short-term real interest rates<sup>a</sup>**

	Annual rates of return			
	1990-94	1995	1996	1997 Q1
China <sup>b</sup>	-2.2	-5.0	0.7	2.2
India <sup>c</sup>	2.2	5.7	4.9	-2.7
Hong Kong	-3.7	-2.7	-0.8	-0.4
Taiwan <sup>d</sup>	3.3	2.5	2.3	3.9
Singapore	1.1	0.8	1.5	1.2
Korea	2.2	4.2	2.4	2.7
Indonesia	8.3	6.7	8.7	11.3
Malaysia	2.7	2.5	3.5	3.9
Philippines	5.0	3.4	3.6	5.8
Thailand	5.3	5.5	4.3	5.1
Argentina	-12.4	8.2	7.2	6.2
Brazil <sup>c</sup>	10.6	25.5	10.3	12.7
Chile	6.6	5.9	6.9	6.8
Colombia	0.1	9.5	8.5	5.7
Mexico	3.3	9.8	-1.1	-1.8
Peru	-12.4	4.3	3.4	5.2
Venezuela	-2.5	-22.0	-36.2	-37.8

Source: BIS (1997), Table VI.2.

<sup>a</sup> Rates on three month paper

<sup>b</sup> One-year deposit rate

<sup>c</sup> Overnight rate

<sup>d</sup> Overnight rate and, before November 1994, weighted average of six money market rates with maturities ranging from overnight to six months.