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Marek Dąbrowski (ed.)

Currency Crises in Emerging-Market Economies: Causes, Consequences and Policy Lessons

with contribution from Małgorzata Antczak, Rafał Antczak, Monika Błaszkiewicz, Georgy Ganev, Małgorzata Jakubiak, Małgorzata Markiewicz, Wojciech Paczyński, Artur Radziwiłł, Łukasz Rawdanowicz, Marcin Sasin, Joanna Siwińska, Mateusz Szczurek, and Magdalena Tomczyńska

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Abstract

Currency crises have been recorded for a few hundreds years but their frequency increased in the second half of the 20th century along with a rapid expansion of a number of fiat currencies. Increased integration and sophistication of financial markets brought new forms and more global character of the crises episodes.

Eichengreen, Rose and Wyplosz (1994) propose the operational definition, which helps to select the episodes most closely fitting the intuitive understanding of a currency crisis (a sudden decline in confidence towards a specific currency). Among fundamental causes of currency crises one can point to the excessive expansion and over-borrowing of the public and private sectors, and inconsistent and non-transparent economic policies. Over-expansion and over-borrowing manifest themselves in an excessive current account deficit, currency overvaluation, increasing debt burden, insufficient international reserves, and deterioration of other frequently analyzed indicators. Inconsistent policies (including the so-called "intermediate" exchange rate regimes) increase market uncertainty and can trigger speculative attack against the domestic currency. After a crisis has already happened, the ability to manage economic policies in a consistent and credible way becomes crucial for limiting the crisis' scope, duration and negative consequences. Among the dilemmas that the authorities face in such circumstances is the decision on readjustment of an exchange rate regime, as the previous regime is usually the first institutional victim of any successful speculative attack.

The consequences of currency crises are usually severe and typically involve output and employment losses, fall in real incomes of a population, deep contraction in investment and capital flight. Also the credibility of domestic economic policies is ruined. In some cases a crisis can serve as the economic and political catharsis: devaluation helps to temporarily restore competitiveness and improve a current account position, the crisis shock brings the new, reform-oriented government, and politicians may draw some lessons for future.

The responsible macroeconomic policy can help to diminish a risk of an occurrence of a currency crisis. It involves balanced and transparent fiscal accounts, proper monetary-fiscal policy mix, and low inflation, avoiding indexation of nominal variables and intermediate monetary/exchange rate regimes. On the microeconomic level key elements include privatization, demonopolization and introduction of efficient competition policy, prudential re-gulation of the financial sector, trade openness, and simple, fair and transparent tax system. All the above should help elimination of soft budget constraints, over-borrowing on the side of both private and public sector and moral hazard problems. All these measures need to be strengthened by legal reforms, efficient and fair judiciary system, implementation of international accounting, reporting and disclosure standards, transparent corporate and public governance rules, and many other elements. Reforms can be supported by the IMF and other international organizations, which on their part should depoliticize their actions and decision-making processes, sticking to the professional criteria of country assessment and their consequent execution.

1. Introduction

Financial crises cannot be considered new phenomena of the last decade or even of the entire 20th century. Older history registers many episodes of government defaults and bank runs. However, currency crashes – one of the forms of financial instability – were not so frequent until the middle of the last century[1]. The reason for this was very simple. The world monetary system was dominated by a number of strong currencies based on the gold standard and their satellites (currency boards in colonies) and consequently only the extreme events such as the World War I and Great Depression could temporarily damage this system. However, with abandoning the direct gold standard after the Great Depression and the World War II stability of individual currencies became dependent on national economic policies, and, therefore, more vulnerable to market speculation. Although the Bretton Woods system introduced after the World War II tried to return to an indirect gold standard (parities of individual currencies were set in relation to the US dollar and the latter was officially backed by the US gold reserves) and currency stability (through fixed but adjustable pegs) it contained the fundamental inconsistency leading to its final crash in the beginning of 1970s. This inconsistency originated from an attempt to follow the so-called impossible trinity (see Frankel, 1999), i.e. exchange rate stability, monetary independence, and financial market integration. As long as the importance of the last element was limited (convertibility of most of currencies in the after-war period was very limited) the Bretton Woods system could sustain, avoiding major disturbances. However, progress in free capital movements and very expansionary fiscal and monetary policies in the US during the Vietnam War brought the definite collapse of this system in 1971.

As a result, the last decades of the 20th century were dominated by fiat money individually managed by each country, that were not always following the price stability goal. Additionally, the number of independent countries (and monetary authorities) rapidly increased, first resulting from decolonization processes in Africa, Asia, and Latin America and later due to the collapse of the Soviet Union, Yugoslavia and the whole Soviet block. An increasing number of countries opted to liberalize capital accounts and at the same time progressing technological revolution made cross-border capital transaction much easier than a few decades earlier. All these events increased the global integration of financial markets on the one hand, but also a possibility to speculate against exchange rates of individual currencies and, thus, the frequency of currency crises, on the other.

The decade of 1990s brought a new experience in this field. While earlier currency crises were caused mainly by the evident domestic macroeconomic mismanagement (that gave theoreticians an empirical ground for a construction of the so-called first generation models of currency crises), during the last decade crises also hit economies widely regarded as following solid policies and having a good reputation. This new experience started with the 1992 ERM crisis when the British pound and the Italian lira were forced to be devalued. This was particularly surprising in the case of the UK that successfully went through a series of very ambitious economic reforms in the 1980s.

At the end of 1994, the serious currency crisis hit Mexico, and during the next few months it spread to other Latin American countries, particularly to Argentina (the so-called Tequila effect). Although Argentina managed to defend its currency board, the sudden capital outflow and banking crisis caused a one-year recession. Currency crises were not the new phenomena in the Western Hemisphere where many Latin American countries served as the textbook examples of populist policies and economic mismanagement through several decades. However, the two main vic-

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[1] Bordo and Schwartz (1998) provide an interesting overview of 19th and 20th century financial and currency crises.

tims of the "Tequila" crisis – Mexico and Argentina – had been widely regarded as examples of successful reforms and thus the experienced turbulence seemed to be unjustified, at least at first sight.

Two years later an even more unexpected and surprising series of financial crises hit South East Asia. The Asian Tigers had for many years enjoyed a reputation of fast growing, macroeconomically balanced and highly competitive economies, which managed to make a great leap forward from the category of low-income developing countries to middle or even higher-middle income group virtually during the life of just one generation. However, a more careful analysis could easily specify several systemic weaknesses, particularly related to the financial and corporate sectors. Additionally, as in the case of Mexico the crisis management in its early stage was not especially successful and only provoked further devaluation pressure and a financial market panic.

The external consequences of the Asian crisis became much more serious than in the case of Mexico. While the latter had a regional character only, the former affected the whole global economy spreading to other continents. The Asian crisis started in Thailand in July 1997 and its first round of contagion hit Malaysia, Indonesia and the Philippines in summer 1997. The next wave caused serious turbulence in Hong Kong, the Republic of Korea, and again in Indonesia in the fall of 1997 and beginning of 1998. Singapore and Taiwan were affected to lesser extent. Development in Asia undermined investors' confidence in other emerging markets, particularly in Russia and Ukraine, both of which were characterized by chronic fiscal imbalances. Both countries, after resisting several speculative attacks against their currencies at the end of 1997 and the first half of 1998, finally entered the full-scale financial crisis in August – September 1998. Following Russia and Ukraine, also other post-Soviet economies (Moldova, Georgia, Belarus, Kyrgyzstan, Uzbekistan, Kazakhstan, and Tajikistan) experienced forced devaluations and debt crisis. Finally, Russian developments triggered eruption of a currency crisis in Brazil in early 1999, and some negative contagion effects for other Latin American economies, particularly for Argentina.

In the meantime, cumulated negative consequences of the Asian and Russian crises damaged confidence not only in relation to the so-called emerging markets but also affected the financial markets of developed countries. In the last quarter of 1998, the danger of the US and worldwide recession pushed the Federal Reserve Board to ease significantly the US monetary policy. However, some symptoms of the global slowdown such as a substantial drop in prices of oil and other basic commodities could not be avoided.

The new crisis episodes stimulated both theoretical discussion and a large body of empirical analyzes trying to identify the causes of currency crises and their rapid propagation, their economic and social consequences, methods of their preventing and effective management after a crisis had happened. On the theoretical ground, the new experience brought the so-called second- and third-generation models of currency crises. Both theoretical and empirical discussions started to pay more attention on the role of market expectations and multiple equilibria as well as global integration of financial markets and their functioning.

While most of recent empirical studies available in economic literature concentrated on Latin America and Asia, the main objective of this paper[2] is to expand this analysis to the countries of Central and Eastern Europe and the former Soviet Union. This additional empirical input allowed for reexamination of the existing theoretical models and accumulated empirical observations and verification of policy conclusions and recommendations proposed by other authors.

This paper contains an overview of the main findings and conclusions of the several studies related both to the concrete currency crisis episodes[3] and selected aspects of these crises from the comparative perspective[4]. In section 2 we try to clarify the definition of a currency crisis (comparing to other forms of financial crises) and make it operational. In section 3 we present the evolution of theoretical models of currency crises during the last two decades. Section 4 gives an overview of the symptoms informing about danger of a crisis occurrence, i.e. the so-called early warning signals (indicators). Based on this, section 5 gives a more in-depth

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[2] This paper summarizes main findings of the research project on "Analysis of Causes and Course of Currency Crises in Asian, Latin American and CEE Countries: Lessons for Poland and Other Transition Countries", grant No. 0144/H02/99/17 of the Scientific Research Committee (KBN) carried out by the CASE under direction of Marek Dąbrowski, from October 1, 1999 to September 30, 2001.

[3] Eleven country monographs covered two countries of Latin America (Mexico 1994–1995 and Argentina 1995), four Asian countries (Thailand 1997, Malaysia 1997–1998, Indonesia 1997–1998, and the Republic of Korea 1997–1998), and five emerging market economies in Europe (Bulgaria 1996–1997, Russia 1998, Ukraine 1998, Moldova 1998, and Turkey 2000).

[4] Thirteen comparative studies dealt with definitions, theoretical models and causes of currency crises, crisis management and propagation (contagion effect), economic, social and policy consequences of the crises, and crisis prevention.

analysis of some fundamental causes of currency crises: fiscal imbalances, current account deficits, currency overvaluation, the performance of specific exchange rate regimes, structural weaknesses in the banking and corporate sectors, and political instability. In section 6 we discuss crisis management, concentrating on changes in the exchange rate regime in a crisis period. Section 7 is devoted to crisis propagation, concentrating on the empirical example of the CIS in 1998–1999. In section 8 we analyze the economic, social and policy consequences of currency crises. In particular, we try to assess to what extent crisis shocks can contribute to an improvement of macroeconomic fundamentals. Section 9 deals with crisis prevention. In this context we discuss two particular issues: the optimal level of central bank's international reserves and the role of the IMF in preventing crises, using the empirical case of five CIS countries. Section 10 contains general conclusion and policy recommendations.

2. Definition of Currency Crisis and its Empirical Exemplification

The existing terminology related to currency crises is not precise and can create certain confusion. This relates not only to popular policy discussions but also to analytical and theoretical works of an academic character.

Any clarification attempt should involve two stages of discussion. First, we need to distinguish *currency crisis* from a more general category of *financial crisis*, and some other similar notions such as *balance of payments crisis*. The second stage involves building a clear operational definition of a *currency crisis*, which can be used in empirical research.

The notion of a *financial crisis* seems to be the broadest, involving all kinds of instability related to monetary and financial systems. Generally speaking, this is a sudden decline in confidence in relation to government/central bank and banking sector ability to respect their liabilities (on the committed terms).

Historically, financial crises were defined in two ways. The narrow definition, associated with the monetarist school linked financial crises with banking panics (Friedman and Schwartz, 1963). However, this definition seems too narrow from the point of view of the existing spectrum of episodes of financial instability. What Friedman and Schwartz have in mind could be better called as *systemic banking crises* understood as an inability of commercial banks to respect their liabilities (see below).

The second, very general definition of systemic financial crisis outlined by Minsky (1972) and Kindleberger (1978) involved broad categories of crises, including sharp declines in asset prices, failures of financial and nonfinancial institutions, deflations or disinflations, disruptions in foreign exchange markets, or some combinations of the above. In this approach the root cause of financial instability lies in the breakdown of information flows hindering the efficient functioning of financial markets (Antczak, 2000). Contrary to the Friedman-Schwartz one, the Minsky-Kindleberger definition seems too general, and, therefore, not very useful in practice. In fact, it covers the very broad set of various macro- and microeconomic disturbances, including the regular cyclical developments.

Being the broadest among the discussed categories (see **Figure 2.1**), financial crises cover other narrower definitions (WEO, 1998; pp. 111–112; Antczak, 2000). As it was mentioned earlier, *banking crisis* refers to the actual or potential bank runs or failures that induce banks to suspend the internal convertibility of their liabilities or which compels the monetary authorities to intervene to prevent this by extending assistance on a large scale. The *public debt crisis* is a situation in which a government cannot service its foreign and/or domestic obligations. The *balance of payment* crisis is a structural misbalance between a deficit in a current account (absorption) and capital and financial account (sources of financing) that after exhausting international reserves leads to a *currency crisis*. The balance of payment crisis was a synonym of a currency crisis in the light of the first-generation theoretical model (see below).

Figure 2.1. Typology of financial crises

Financial crisis	Banking crisis
	Public debt crisis
	Balance of payments crisis $\Rightarrow$ Currency crisis

Source: Based on Antczak (2000).

Finally, a currency crisis can be understood as a sudden decline in the confidence to an individual currency[5] usually leading to a speculative attack against it.

All the above-mentioned specific forms of a financial crisis are very often inter-related. A systemic banking crisis can trigger a speculative attack against national currency as it happened, for example, in Bulgaria in 1996 (Ganev, 2001) and in

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[5] I am grateful to Witold M. Orłowski for suggesting this general definition of currency crisis.

Turkey in 2000–2001 (Sasin, 2001d). The opposite sequence of events is also very often in place (Argentine 1995, Russia 1998). The same concerns interrelations between a public debt crisis and a currency crisis. The former may provoke massive capital outflow and consequently a balance of payments/currency crisis (Russia and CIS 1997–1998). On the other hand, substantial devaluation/depreciation of the domestic currency leads to an increase in the domestic value of the foreign exchange denominated debt and can dramatically worsen the debt to GDP ratio. Thus, one specific form of a crisis may (although does not need) lead to its development into a full-scale financial crisis involving the entire financial market. We will discuss these interlinks in more detail in the subsequent sections of this paper (especially sections 5.1. and 5.5).

Having discussed general terminological issues we will now try to make a definition of a currency crisis more precise and operational[6]. One possibility is to make a pure expert assessment as to whether any particular country experienced a currency crisis as suggested by Glick and Rose (1999). However, such an approach bears risk of being too arbitrary.

In a popular and intuitive understanding, a currency crisis should result in a substantial devaluation/depreciation of the domestic currency. However, the question arises as to how substantial should the change in a nominal exchange rate be and over how long period should this be measured. In particular, answers to the above questions may prove difficult in the case of floating (flexible) exchange rate regimes when changes in nominal rate are expected, by definition, to accommodate fluctuations in demand for domestic money that is unstable at least in short term.

If a country follows a fixed peg and market pressure forces government and monetary authorities to abandon or change this peg, situation is clearer[7]. However, recently less and less countries follows this kind of rigid exchange rate regimes (apart from countries that introduced currency boards or joined the monetary union). Consequently researchers need to find some kind of quantitative criteria allowing for identification of specific cases of currency crises.

Frankel and Rose (1996) propose one such criterion, defining a "currency crash" as a nominal depreciation of a currency of at least 25 percent in a year, provided that this represents a 10 percentage points increase in the rate of depreciation from the previous year.

However, speculative attacks against a currency are not always successful, particularly in cases of currency board arrangements (examples of Argentina in 1995 and Hong Kong in 1997). If nothing changed in the behavior of the nominal exchange rate one could eventually claim that these countries avoided crisis. However, defending the exchange rate can be very costly in terms of decrease in official reserves (and domestic money stock) and temporarily higher interest rates with the resulting negative consequences for output and employment. Hence, it would be unjustified to eliminate such cases from the analysis of currency crises.

The above leads to a multi-factor definition of currency crisis that was formulated, among others, by Rodrik and Velasco (1999), Bussiére and Mulder (1999), Tanner (1999), Aziz, Caramazza and Salgado (2000), Goldfajn and Valdés (1997) and van Rijckeghem and Weder (1999).

Eichengreen, Rose, and Wyplosz (1994) proposed the index of exchange market pressure (EMP) being the weighted average of the changes in exchange rate, official reserves, and interest rate measured relative to a foreign currency. The crisis is defined by the EMP reaching an extreme value, i.e. by a factor times the standard deviation above the sample mean. Weighting in the EMP index results from different volatility of the components, and weights are different for every country. Sample mean and benchmark standard deviation can also be differentiated among countries.

Trying to find more precise definitions, WEO (1998, p. 115) introduced the additional notion of *currency crashes*, related to the situation when the exchange rate component of the EMP index accounted for more than 75 percent of its overall value. We will not follow such a detailed specification in our analysis, using the operational definition of currency crises according to Eichengreen, Rose and Wyplosz (1994) proposal.

Following this concept, Jakubiak (2000) tested 14 historical episodes[8] considered by experts as currency crises, using the individual components of the EMP index or similar concepts of measuring a decline in confidence to a specific currency.

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[6] Szczurek (2001) provides review of some operational definitions.

[7] This kind of situation seems to be considered by Bordo and Schwartz (1998, p. 1) defining currency crisis as "...a clash between fundamentals and pegged exchange rates, whether fixed or crawling". The similar approach is used by Ötker and Pazarbasioglu (1997).

[8] The sample covered Argentina (1995), Brazil (1999), Bulgaria (1997), the Czech Republic (1997), Georgia (1998), Indonesia (1997), Korea (1997), the Kyrgyz Republic (1998), Malaysia (1997), Mexico (1994), Moldova (1998), Russian Federation (1998), Thailand (1997), and Ukraine (1998). Due to data unavailability some countries had to be excluded from individual tests.

Figure 2.2. Severity of the currency crises measured by reserve losses and nominal depreciation of the domestic currency

Country	Crisis date	Loss of reserves		Nominal depreciation against USD[b]	
		Reserves/M2 at a crisis date	in percent[a]	at a crisis date	3 months after the crisis
Mexico	Dec 1994	8.2%	64.5%	54.6%	97.62%
Argentina	Mar 1995	18.3%	41%	0.0%	0.0%
Bulgaria	Feb 1997	25.8%	16.8%	100.98%	53.92%
Czech Republic	May1997	29.6%	23.0%	5.44%	9.00%
Thailand	Jul 1997	23.3%	23.0%	24.34%	54.01%
Malaysia	Jul 1997	23.2%	18.4%	4.19%	35.85%
Indonesia	Aug 1997	18.3%	5.2%	16.78%	40.36%
Korea	Dec 1997	17.0%	33.2%	45.64%	18.83%
Russian Fed.	Aug 1998	14.9%	40.6%	26.72%	186.63%
Ukraine	Sep 1998	25.2%	58.1%	51.11%	52.31%
Moldova	Nov 1998	111.2%	35.0%	55.41%	40.76%
Kyrgyz Rep.	Nov 1998	87.96%	18.7%	19.40%	25.35%
Georgia	Dec 1998	59.9%	24.5%	16.8%	43.51%
Brazil	Jan 1999	24.2%	53.5%	64.08%	37.40%

Note: a – Monetary authorities' reserve loss is calculated from the month when the stock of these reserves peaked until the crisis date (following Choueiri and Kaminsky, 1999);

b – Scope of depreciation is calculated from the month before the crisis until one month ("depreciation at the crisis date") or three months later; end-period exchange rates are used.

Source: Jakubiak (2000).

Generally, in most of the examined cases Jakubiak found the relevance of three basic criteria proposed in the Eichengreen, Rose, and Wyplosz (1994) EMP index, i.e. loss of international reserves or serious nominal depreciation plus high real interest rates.

According to **Figure 2.2**, central banks of all the countries covered by this study experienced heavy losses of their official reserves. In four out of fourteen analyzed cases (Malaysia, Indonesia, Bulgaria, and the Kyrgyz Republic) they lost less than 20% of their international reserves at the time of a crisis. Malaysia and Bulgaria kept floating exchange rate regime when the decisive stage of respective currency

crises occurred. However, Malaysian reserves deteriorated again during the next year after the first wave of the crisis and started to be rebuilt only at the end of 1998. Bulgaria experienced a banking crisis in 1996, during which its central bank has already severely depleted its foreign reserves. In the case of Indonesia, after floating of the rupiah in August 1997, the official reserves continued to fall, and the lowest level was recorded in February 1998, giving a cumulative decline by 24% comparing to the pre-crisis period. At the other end of the spectrum, Mexico, Argentina, Russia, Ukraine and Brazil lost over 40% of their international reserves.

Figure 2.3. Real interest rate differentials around crisis dates, monthly

Month before/ after the crisis	Argentina 1995	Brazil 1999	Mexico 1994	Moldova 1998	Russia 1998	Thailand 1997	Ukraine 1998
m-6	2.57	11.32	6.90	14.90	-1.30	2.99	6.32
m-5	1.94	11.51	7.93	17.89	-1.58	3.06	6.76
m-4	1.99	23.61	5.84	17.20	-1.11	2.45	7.76
m-3	2.08	30.63	4.85	17.25	1.51	2.05	10.21
m-2	2.17	24.87	3.95	17.98	3.68	1.47	11.93
m-1	3.30	23.03	4.16	15.97	5.66	1.50	11.98
CRISIS	**11.65**	**29.84**	**4.53**	**23.22**	**3.96**	**3.21**	**12.90**
m+1	11.36	37.97	11.59	26.49	-32.33	1.47	9.12
m+2	8.40	35.60	12.08	26.73	-35.25	1.15	5.13
m+3	4.29	26.91	23.68	25.20	-48.19	0.72	-0.01
m+4	4.07	19.79	23.35	24.61	-62.23	-0.04	-0.69
m+5	3.31	15.77	8.45	21.18	-75.96	-0.22	-3.18
m+6	3.86	15.25	-1.44	24.53	-83.80	-1.03	1.89

Note: The interest rates differentials are calculated as the real deposit rates in a crisis country minus the real deposit rate in the US.
Source: Jakubiak (2000).

Figure 2.4. Nominal and real interest rates before and after the crisis
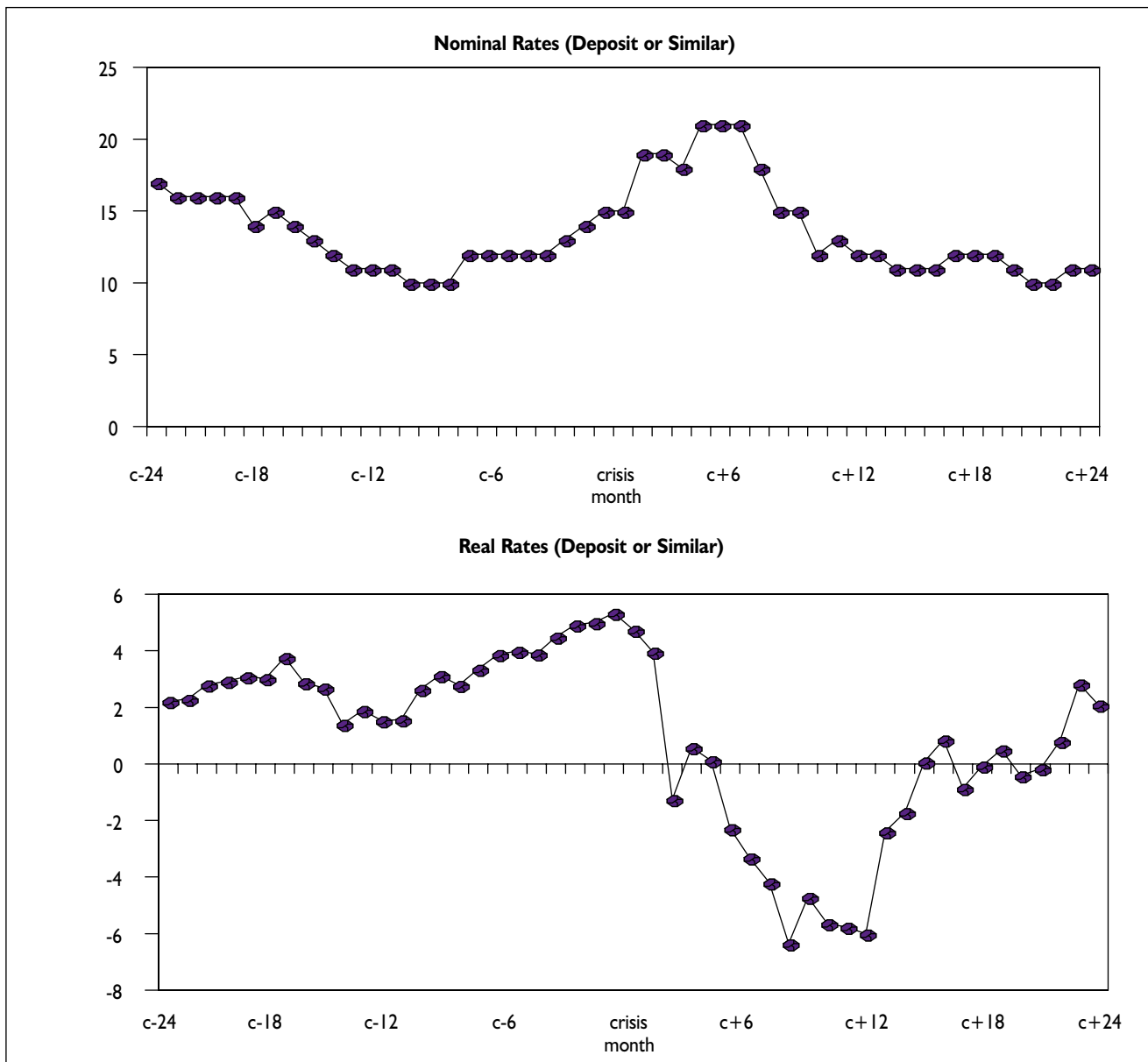
Note: Monthly data; graphs plot medians for the sample. Real rates were calculated using CPI index.
Source: Błaszkiewicz and Paczyński (2001).

In addition to a fall in reserves all countries but Argentina experienced devaluation/depreciation of their currencies, sometimes very substantial. Only in the Czech Republic the scale of depreciation of the *koruna* can be considered as modest.

What concerns the third component of the Eichengreen, Rose and Wyplosz (1994) EMP index, high domestic interest rates were present in each of the analyzed countries at times when their currencies came under pressure (see **Figure 2.3**). There were also significant increases after a crisis hit, or shortly before, indicating the attempts of central banks to defend the currency.

However, the relative magnitude of interest rates varied across the countries. The highest rates were observed in Brazil around the 1999 crisis. Significant increases were also recorded in Argentina, Russia, Thailand, and Ukraine.

The similar results were obtained in comparative analysis of nominal and real interest rates in 41 developing and transition economies carried out by Błaszkiewicz and Paczyński (2001) – see **Figure 2.4**.

A sudden fall in demand for money could be another indicator of the loss of confidence in the currency subject to market pressure. However, in Jakubiak's (2000) sample currency crises did not manifest themselves clearly by the fall in

Figure 2.5. Broad money monetization in the crisis countries, 1992–1998

Country	1992	1993	1994	1995	1996	1997	1998
Argentina	11.2%	16.3%	19.4%	18.8%	21.1%	24.0%	27.5%
Brazil	20.9%	22.9%	25.1%	26.3%	25.7%	26.4%	29.9%
Bulgaria			61.9%	55.7%	42.8%	23.7%	26.7%
Czech Rep..		61.1%	62.3%	68.7%	70.9%	65.6%	63.9%
Georgia					5.8%	6.6%	7.6%
Indonesia	38.3%	38.7%	40.4%	42.3%	46.1%	49.4%	53.4%
Korea	35.7%	37.3%	36.8%	36.6%	38.4%	42.1%	50.7%
Kyrgyz Rep.					12.8%	11.9%	13.8%
Malaysia	67.3%	73.7%	78.6%	77.8%	83.1%	88.5%	93.2%
Mexico	22.7%	24.6%	25.7%	25.1%	23.7%	25.1%	24.6%
Moldova		10.4%	11.4%	14.5%	17.6%	18.9%	
Russia					14.6%	16.4%	17.8%
Thailand	69.5%	71.8%	71.0%	72.2%	75.4%	85.9%	99.0%
Ukraine		13.1%	12.1%	9.6%	9.4%	11.8%	13.1%

Note: Crisis period is indicated by the grey color.
Source: Jakubiak (2000).

the demand for money measured as the change in the level of monetization (ratio of broad money to an annualized value of GDP in current prices – see **Figure 2.5**).

There was a visible fall in demand for money in Bulgaria in 1996–1997, in Argentina in 1995 and in the Czech Republic in 1997. Monetization was also depressed during the two years following crises in Bulgaria and in the Czech Republic. The results are ambiguous in relation to East Asia in 1997–1998 and the CIS countries in 1998 where in some cases a crisis year brought even an increase in the overall monetization level.

This a bit surprising results concerning changes in demand for money can originate from measurement problems. First, due to lack of data on domestic currency aggregates Jakubiak (2000) used broad money data, which included foreign currency deposits. A substantial devaluation normally leads to an increase in the domestic currency denominated value of the foreign exchange deposits, thus artificially improving the broad money to GDP ratio. Second, end-of-year stocks of broad money to nominal GDP ratios were used (data availability was again ground for such a presentation) representing cumulative flow for all the year. Consequently, if a crisis happened at the end of the year this ratio could be distorted. Third, CIS countries generally represented a chronically low level of monetization (even before the crisis), so we could not expect significant fluctuations of this ratio.

Generally, the Jakubiak (2000) study demonstrates that the best known recent historical episodes of currency crises in emerging markets meet the definition criteria proposed by Eichengreen, Rose and Wyplosz (1994). On the other hand, testing them according to additional criteria such as changes in broad money monetization gives less univocal results. However, an attempt to do the opposite, i.e. to identify the episodes of currency crises using the EMP index can produce misleading results, i.e. selecting "tranquil" periods as crises.

Sasin (2001a) mentions a trade-off faced by researchers choosing a selection algorithm: the more out of the "true" crises it captures, the more of "tranquil" periods it wrongly marks as crises. Hence, any quantified definition of a currency crisis cannot serve as an automatic selection tool. An additional expert-type assessment (clearly, involving a certain dose of arbitrariness) is always necessary. This type of mixed approach has been adopted in empirical studies summarized in this paper.

3. Theoretical Models of Currency Crises

One can distinguish three generations of theoretical models trying to explain the phenomenon of currency crises. Each of them developed as a result of empirical experience of the following waves of crisis episodes[9]. The first-generation models were constructed after balance-of-payment crises in Mexico, Argentina, and Chile in the1970s and the early 1980s. The ERM crisis in 1992 and the Mexican crisis of 1994–1995 acted as stimulus for working out the second-generation models. Finally, first attempts to build the third-generation models started after the Asian crisis of 1997–1998.

3.1. First-generation Models

Looking back, Mundell (1960) balance of payments model[10] was among the first attempts at presenting the interdependence between the ability to maintain a currency peg and the level of the international reserves of a central bank. However, as mentioned earlier, the classical first-generation model was elaborated later on the basis of empirical experience of the series of balance of payments crises in Latin America in the decade of 1970s and in the early 1980s. Krugman (1979) provided the first version of such a model and Flood and Garber (1984) later simplified and extended it[11].

The first-generation model relates to a small open economy whose residents have a perfect foresight and consumes a single, tradable good of a fixed, exogenously determined domestic supply. There are no private banks and money supply is equal to the sum of domestic credit issued by the central banks and the domestic-currency value of foreign reserves maintained by the central bank, which earn no interest.

Central bank accommodates any changes in domestic money demand through the purchases or sales of international reserves. Therefore, if domestic credit expansion (usually caused by the monetization of a fiscal deficit) exceeds the fixed money demand, international reserves will be declining at the rate of credit expansion leading to their final depletion.

The higher the initial stock of reserves and/or the lower the rate of domestic credit expansion, the longer it takes before an exchange rate peg is attacked and collapses. In the absence of speculation, collapse of the peg exchange rates occurs after depletion of reserves. The larger the initial portion of domestic credit in the money stocks the sooner the collapse. Finally, the higher interest rate elasticity of money demand, the earlier the crisis occurs.

Central bank is able to defend an exchange rate peg until it has reserves and then has no choice but to allow an exchange rate to float freely. Thus, rational agents observing expansionary monetary policy can expect that a decline in reserves and resulting collapse of an exchange rate peg at some point is inevitable, even without a speculation. However, active speculators working in a competitive environment and trying to avoid losses or earn gains at a time of collapse will force the crisis occurrence before central bank's reserves are depleted. The collapse may happen when the "shadow floating exchange rate" becomes equal to the exchange rate peg. This is the equilibrium exchange rate prevailing after the full depletion of foreign reserves and forced abandoning of the peg. As long as the peg exchange rate is more depreciated than the implicit shadow rate, it is not attacked because potential speculators face a danger of losses.

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[9] The content of this section draws heavily from Antczak (2000), Siwińska (2000) and Szczurek (2001) were used as an additional input.

[10] In standard economic textbooks it is referred to as the Mundell - Fleming model.

[11] Agenor, Bhandari and Flood (1992) provide an excellent overview of the evolution of the first-generation models.

Summing up, the first-generation crisis occurs as a result of an expansionary macroeconomic policy incompatible with a peg exchange rate. The speculative attack against currency is provoked by a threat of depletion of central bank's international reserves caused by an excessive fiscal deficit, being monetized by monetary authorities. The international reserves in the Krugman (1979) model take the role of exhaustible resource in the equivalent model of Salant and Henderson (1978) elaborated in order to question the idea of commodity prices stabilization board proposed by Hotelling (1931).

3.2. Modified First-generation Models

The basic first-generation model has been subsequently extended in three main directions. The first one concerns an active governmental involvement in crisis management and sterilization of reserve losses. The second group of modifications abandons assumption on the perfectly foreseen speculative attacks and introduces uncertainty. Finally, the third direction is related to the target zone models.

The first modification refers to an experience of some currency crises in the 1990s (UK, Mexico; later also in Russia and Ukraine) when the negative money-supply effect of reserve loses has been sterilized allowing a smooth money growth through the period of attack. Hence, in this presentation, money supply, exchange rate, foreign price level, and interest rate level remain constant during the attack. The difference with the canonical model lies in the structure of money supply: during capital outflow declining international reserves are substituted with domestic credit. However, this only accelerates time of depleting the central bank international reserves, collapse of exchange rate peg and speculative attack against currency. The straightforward policy conclusion is that an exchange rate peg cannot survive if the authorities plan to sterilize reserve losses and speculators expect it (see Flood, Garber, and Kramer, 1995). Under sterilization policy and free capital mobility a currency peg proves unsustainable regardless of the size of international reserves.

The second modification of the canonical model removed the assumption of perfectly foreseen speculative attacks. Market participants are never sure when an attack will take place and how much the exchange rate will change as its result. Therefore, uncertainty becomes a crucial element in speculators' calculations (see Flood and Marion, 1996).

The model contains non-linearity in private behavior, which reveals multiple solutions. If agents expect more currency variability in future, it affects the domestic interest rate through the uncovered interest parity relation and feeds into the demand for money, making the exchange rate more variable. The shift in expectations, therefore, alters the relevant shadow rate for determining whether an attack is profitable and changes the attack time. Crises can still be the outcome of inconsistency in macroeconomic policies (canonical first generation models), but they can also arise from self-fulfilling prophecies about exchange-market risk related to some or all fundamentals. The existence of non-linearity in private behavior assures that an economy can jump suddenly from no-attack equilibrium to attack equilibrium.

The third kind of modification has originated from the empirical observation that in many peg exchange rate regimes, an exchange rate can still fluctuate within a certain band around the official parity. This rises a question of how an exchange rate behaves within the band. Krugman (1988) initiated the work on what later became commonly called as the target zone models.

These models assume that authorities are fully committed to maintain the band and follow policy of fixing the money stock at a level allowing to keep the exchange rate within the band. However, there are random disturbances in the money supply process. Let us suppose that such a random disturbance increases the money stock. In the flexible exchange rate system the exchange rate would depreciate. In target zone models with strong and credible commitment of the authorities, speculators realize that the future money stock is more likely to decrease than to increase. As a result, the exchange rate is also more likely to appreciate than to depreciate in the future. Speculators, therefore, will be willing to sell foreign exchange today (expecting a lower price in the future). The exchange rate will appreciate.

The opposite mechanism is at work for shocks decreasing the money stock and putting appreciation pressure on the exchange rate. Maintaining the exchange rate within the band requires from authorities to increase money stock in the future and the exchange rate is more likely to depreciate than appreciate. In an anticipation of this fact speculators will be willing to sell domestic currency (expecting a lower price in the future). The exchange rate will depreciate. As result one can conclude that speculation will be stabilizing the exchange rate, and speculators substitute fully credible authorities in maintaining the exchange rate within the band.

If the authorities are less credible, shock in the money stock will make speculators uncertain about its interpretation. The shock may be a result of random disturbance that will be corrected by authorities in the future or may be a result of a change in policy. The latter implies an increase in the money stock (if exchange rate faces depreciation pressure due to a shock) and raises doubts about commitment of authorities towards the target zone regime. Speculators may interpret the weakening of currency as a signal of future problems with fundamentals. In such case they will be buying foreign currency instead of selling it. Therefore, speculation will be a destabilizing factor.

Consequently, in the lack of full credibility case, domestic interest rates must be positively related to changes in the exchange rate within the band. On the contrary, if speculators stabilize exchange rate, interest parity condition would require domestic interest rate inversely related to the exchange rate.

Destabilizing effects of exchange rate movements within the band often led the authorities to intervene in the foreign exchange market long before the limit of the band is reached, limiting the variability of the exchange rate and narrowing the *de facto* width of the band. Therefore, the existence of a band does not give, in practice, a bigger flexibility.

3.3. Second-generation Models

The second-generation models were developed after speculative attacks against the ERM in Europe in 1992 and Mexican peso in 1994. They addressed serious drawbacks of the first generation models. In the latter the governments and central banks acted like lemmings: once engaged in a policy incompatible with peg exchange rates, they were heading for the disaster of reserve depletion (Szczurek, 2001). In reality, the governments have more options: for example, they can change their policy when balance of payments gets worse, or devalue without depleting the reserves first. The second-generation models allow the governments to optimize its decision. The loss function is usually dependent on the exchange rate and variables referring to both actual depreciation and the prior public expectations of depreciation.

The second-generation model first proposed by Obstfeld (1994) and further developed by Obstfeld (1997), Velasco (1996), Drazen (1999) and many other authors[12] draws on

game theory, more precisely non-cooperative game with three players: authorities possessing a finite stock of reserves to defend currency regime and two private players. The size of committed reserve stock defines the payoffs in the two players' game, played by private agents. The outcome of the game depends on the size of international reserves possessed by authorities. In the first case called the "High Reserve" game an amount of the official reserves is higher than the combined stock of domestic money hold by both traders. Even if both players sell their resources to a central bank, its reserves remain at the level high enough to maintain the exchange rate peg and speculators incur losses. The exchange rate peg will survive the attack.

In the second case called the "Low Reserve" game the level of central bank's reserves is so low that each player can solely take out a currency peg. A trader who manages to exchange his entire domestic currency assets into foreign currency receives a capital gain (in domestic currency terms; alternatively she avoids a capital loss in foreign currency terms) net of transaction costs. If both traders sell, each of them will be able to obtain half of the official reserve stock and share a capital gain. In this variant the collapse of an exchange rate peg is unavoidable.

The most interesting is the third "Intermediate Reserve" game where neither trader alone can deplete the official reserves but both can do it if they happen to coordinate a speculative attack. The payoff structure is such that either player fails in an individual attack, bearing the loss, while the second players has zero payoff (no gain, no loss). But if both attack, each registers a gain. Therefore, there are two Nash equilibria: if both players sell the currency the exchange rate peg must collapse, but if neither player believes the other will attack the currency peg survives. So the intermediate state of fundamentals (illustrated by the stock of international reserves of a central bank) makes the crisis possible, but not certain.

In the canonical model fundamentals are either consistent with a currency regime or not. In Obstfeld (1994) the same is true for extreme values of fundamentals, but there is also a large room within which fundamentals are neither so strong as to make a successful attack impossible, nor so weak as to make it inevitable. In this case speculators may or may not coordinate their actions in order to attack the peg.

The second-generation crisis models require three elements: a reason for authorities to abandon its exchange rate peg, a reason to defend it, and increasing cost of defending the current regime when its collapse is anticipated or self-fulfilled.

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[12] A survey of second-generation models is provided in Eichengreen, Rose and Wyplosz (1996).

In order to have an incentive to attack the exchange rate regime, there needs be something awkwardly fixed in domestic economy. The arguments in favor or against maintaining the current (peg) regime may be of various natures. Obstfeld (1994) based his example on unemployment and authorities willingness to relax monetary policy, which cannot be implemented as long as the commitment to a peg exchange rate.

So, the logic of second-generation models arises from the fact that defending exchange rate parity can be expensive (via higher interest rates) if the market believes that it will ultimately fail. As a result, speculative attack on currency can develop either as a result of a predicted future deterioration in fundamentals, or purely through self-fulfilling prophecy.

3.4. Third-generation Models

The outburst of Asian crises in 1997–1998 brought a new challenge for the theory. Clearly, these crises differed from the ones experienced in Latin America during 1980s (first generation crises) or the ERM crisis of 1992 (giving the pretext for building the second-generation models). First, none of the fundamental problems such as high fiscal deficit, expansionary monetary policy, or high inflation – typical for the first-generation models – was observed in the Asian countries. Second, the authorities in these countries did not face any dramatic trade-offs between political and economic goals, an issue on which second-generation models were based. Third, all Asian countries experienced a boom-bust cycle in their asset markets, preceding the currency crisis. Fourth, the currency crises were only part of a widespread financial crisis, which included also collapses of many banks and non-banking financial institutions as well as bankruptcies of large non-financial corporations (Krugman, 1998a).

Two major approaches dominated in the post-1997 theoretical literature. The first one, represented by McKinnon and Phil (1996) as well as Krugman (1998a, 1999) modeled the "over-borrowing syndrome", and emphasized the role of moral-hazard-driven lending by unregulated banks and financial institutions (Corsetti, Pesenti, and Roubini 1998a, b).

According to this view, a rational agent can expect the government rescue operation of any large bank or corporation with good political connections in case it had solvency problem. This assumption has two kinds of implications. Expectation of future bailing out means a sort of hidden subsidy to investment, thus stimulating a boom-bust cycle on the asset market. On the other hand, part of a private sector "over-borrowing" may be interpreted as an implicit government debt. The currency side of a financial crisis can therefore be understood as a consequence of the anticipated fiscal costs of financial restructuring and its partial monetization.

Generally, this approach referred, in some way, to the first-generation models, which stressed the key role of the policy fundamentals. The difference was that while canonical and modified first-generation models concentrated on fiscal and monetary factors leading to speculative attacks, the above mentioned interpretation of the Asian crises extended this analysis also to microeconomic flaws.

In the alternative view represented by Radelet and Sachs (1998), a self-fulfilling pessimism of international lenders caused financial fragility of the Asian countries. The authors stressed that while there were significant underlying problems within Asian economies at both macroeconomic and microeconomic level, the imbalances were not severe enough to cause a financial crisis of such magnitude. Radelet and Sachs (1998) blamed a combination of a set of factors such as panic in the international investment community, policy mistakes in crisis management, and poorly designed international rescue programs, for triggering a fully fledged financial panic resulting in currency crises, bank runs, massive bankruptcies, and political disorder. Chang and Velasco (1998) have proposed the similar approach, i.e. explaining Asian currency crisis as a product of a bank run.

Thus, this direction of theoretical effort referred to second-generation models putting the attention on multiply equilibria and self-fulfilling character of the speculative attacks. Analysis of a herding behavior went in the similar direction.

The first theory of herding (Chari and Kehoe, 1996) underlines that a bandwagon effect is driven by an assumption that some investors have private information. Another explanations focus on the principal-agent problem, i.e. that these are agents rather than principals who manage money investment processes. When money managers are compensated based on comparison with other money managers, they have more incentives to follow the others (herd behavior) even if they are wrong, rather than to make independent decisions.

Building on this discussion, Krugman (1999) elaborated a third-generation model concentrating on microeconomic weaknesses (such as moral hazard and resulting over-borrowing), which may trigger, in the world of high capital mobility, speculative attacks against the existing exchange rate regimes. This model attempts to consider both fundamental factors and multiply equilibria in the market behavior.

4. Early Warning Signals

The decade of 1990s brought a large body of empirical literature trying to design a system of the so-called early warning signals (indicators) that could help to predict currency crises. These studies have been motivated mainly by practical considerations of providing policymakers with an analytical tool helping them to avoid crisis episodes and their heavily devastating consequences (see section 8). Focusing on symptoms of mounting imbalances and misalignments (countries' vulnerability to crisis) rather than on their fundamental roots they can serve as a good starting point for a deeper analysis of crisis-generating factors.

A commonly used approach involves comparing the behavior of a set of macroeconomic variables before a crisis with that during tranquil times. One of the possible variations of this methodology is to monitor the stylized facts in the period preceding the currency crisis. The pre-crisis behavior of a variable is compared to its behavior during non-crisis periods for the same group of countries or for the group of countries where no crisis occurred. The aim is to find variables that display anomalous performance before a crisis but do not provide false signals predicting crisis, which will never happen (see WEO, 1998, p. 126; Tomczyńska, 2000).

Figure 4.1. Early warnings indicator (statistically significant)

Sector	Variable	Number of studies considered	Statistically significant results
1. Monetary Policy	International reserves	12	11
	M2/int. Reserves	3	3
	real exchange rate	14	12
	inflation	5	5
	money	3	2
	money multiplier	1	1
	credit growth	7	5
	central bank credit to banks	1	1
	real interest rates	1	1
2. Fiscal Policy	fiscal deficit	5	3
	government consumption	1	1
	credit to public sector	3	3
3. Real Sector	real GDP growth or level	9	5
	employment/unemployment	3	2
4. External Sector	trade balance	3	2
	exports	3	2
	terms of trade	3	2
5. Global Variables	Foreign interest rates	4	2
	Domestic-foreign interest rate differential	2	1
	foreign real GDP growth	2	1
6. Institutional and Structural	banking crisis	1	1
	financial liberalization	2	1
	openness	1	1
	crisis elsewhere	1	1

Source: Tomczyńska (2000) following the analyzes of Kaminsky, Lizondo, Reinhart (1998).

Figure 4.2. Behavior of selected warning indicators (stylized facts)

Indicator	Before Crisis	After Crisis
Monetary policy		
M2/reserves	Strong increase and beginning of decline just before the crisis	Decline
Excess real M1 balances	Strong increase	Decline
Fiscal policy		
fiscal deficit/GDP	Increase	Improvement
Real Sector		
Output	Decline	Start to increase
External Sector		
real exchange rate	Very strong appreciation	Depreciation
Foreign exchange reserves	Strong decline	Start to increase
Exports	Strong deterioration	Increase
terms of trade	Deterioration	Poor, with predisposition to improve over longer time
Financial Liberalization		
M2 multiplier	Increase	Decline and remains on low level
real interest rates	Fluctuation and decline	Increase
Domestic credit/GDP	Strong increase	Decline

Note: The pre- and post-crisis behavior is compared to the average behavior during normal periods. Observation of the 12-month percentage changes of variables, except for interest rate, real exchange rate and excess real M1 balances which are in levels.

Source: Tomczyńska (2000) following Kaminsky and Reinhart (1999).

Kaminsky, Lizondo and Reinhart (1998) presented a very detailed overview of such indicators. Any signal identified within the 24-months window before the crisis was considered as a good one, while any signal outside that period was regarded as a false alarm.

The leading indicators were grouped into the following broad categories: domestic macroeconomic variables, external sector variables, public finance, global variables, and institutional and structural variables. After the additional selection based on other empirical studies authors came to conclusions summarized in **Figure 4.1**. It shows the number of studies, in which any particular indicator was considered and results were statistically significant.

The above results were partly confirmed by the cross-country empirical analyzes carried out by the members of the CASE research team. Sasin (2001a) examined the panel of 46 developed and developing countries for the period of 1990s. The special attention was devoted to distinction between variables emphasized by the fist-generation and second-generation models, including multiple equilibria and contagion effect. Considerable amount of predictability was found in respect to such "classical" indicators as overvaluation of a real exchange rate and the level of central bank's international reserves. Multiple equilibria did not get much support from the investigated data while contagion, through various channels, was clearly present.

Błaszkiewicz (2000) conducted an econometric probit analysis aiming to establish the most important determinants of the currency crises in East Asia in 1997–1998. Although

her results occurred to be mixed (the probit modeling turned out to be very sensitive to changes in the sample size and introduction of new variables and brought up an important issue of causality) they stress importance of fundamental problems such as current account deficits, total debt, short term debt, slowing GDP growth rate, exchange rate appreciation or excessive capital inflow rather than just a market panic as suggested by Radelet and Sachs (1998).

The next step in investigating "early warning" indicators (after completing their list) is looking into their individual behavior. Example of such an analysis is provided, among others, by Kaminsky and Reinhart (1998) (see **Figure 4.2**).

Jakubiak (2000) carried out the similar exercise examining a set of macroeconomic variables in 14 emerging economies. She found that the ratio of central bank's international reserves to short-term external debt gradually decreased during the months preceding crises (**Figure 4.3**). Mexico, Korea, Indonesia, Russia, Bulgaria, and Thailand represented cases where international reserves were well below countries' short-term external liabilities. Argentina also recorded low level of the examined ratio but no earlier than at the crisis date. Although this ratio was on a decline in Malaysia and Brazil, as they were approaching the crisis date, its value stood above 1.5 in both cases, thus not indicating dramatic external liquidity problems. The same is true for Ukraine although this country recorded very rapid deterioration of the reserves-to-debt ratio.

Jakubiak (2000) study also confirms that the ratio of the official international reserves to reserve money is of partic-

Figure 4.3. Reserves over short-term debt
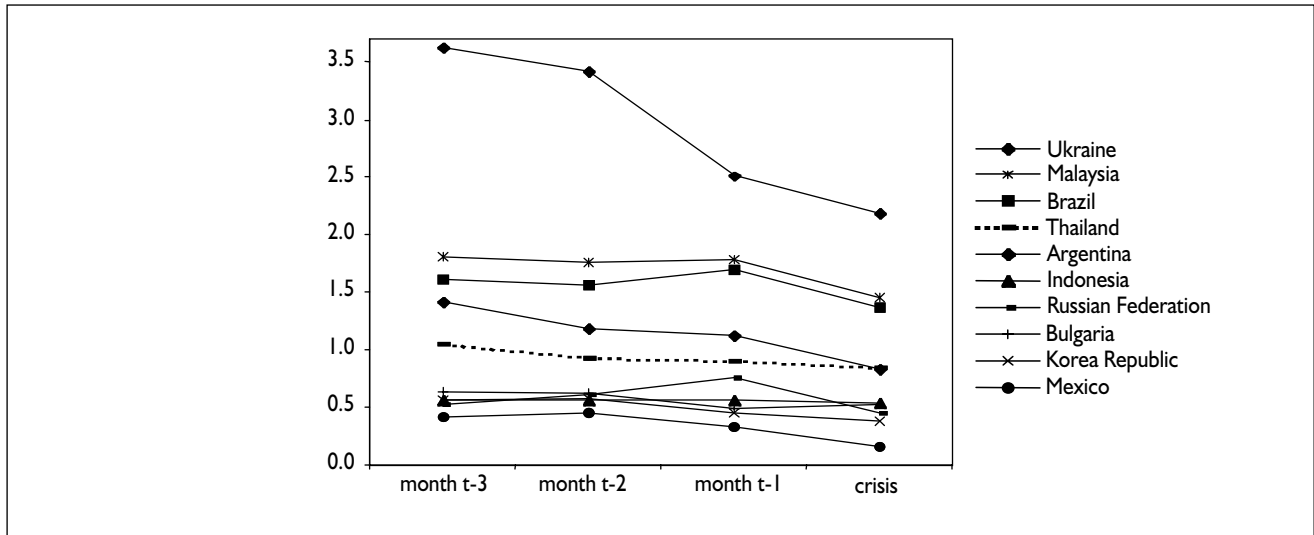
Notes: The stock of reserves in taken from the months prior to the crisis dates, and at the crisis dates. Short-term external debt is the end-year value reported in Global Development Finance.
Source: Jakubiak (2000).

Figure 4.4. Ratio of the official international reserves to reserve money
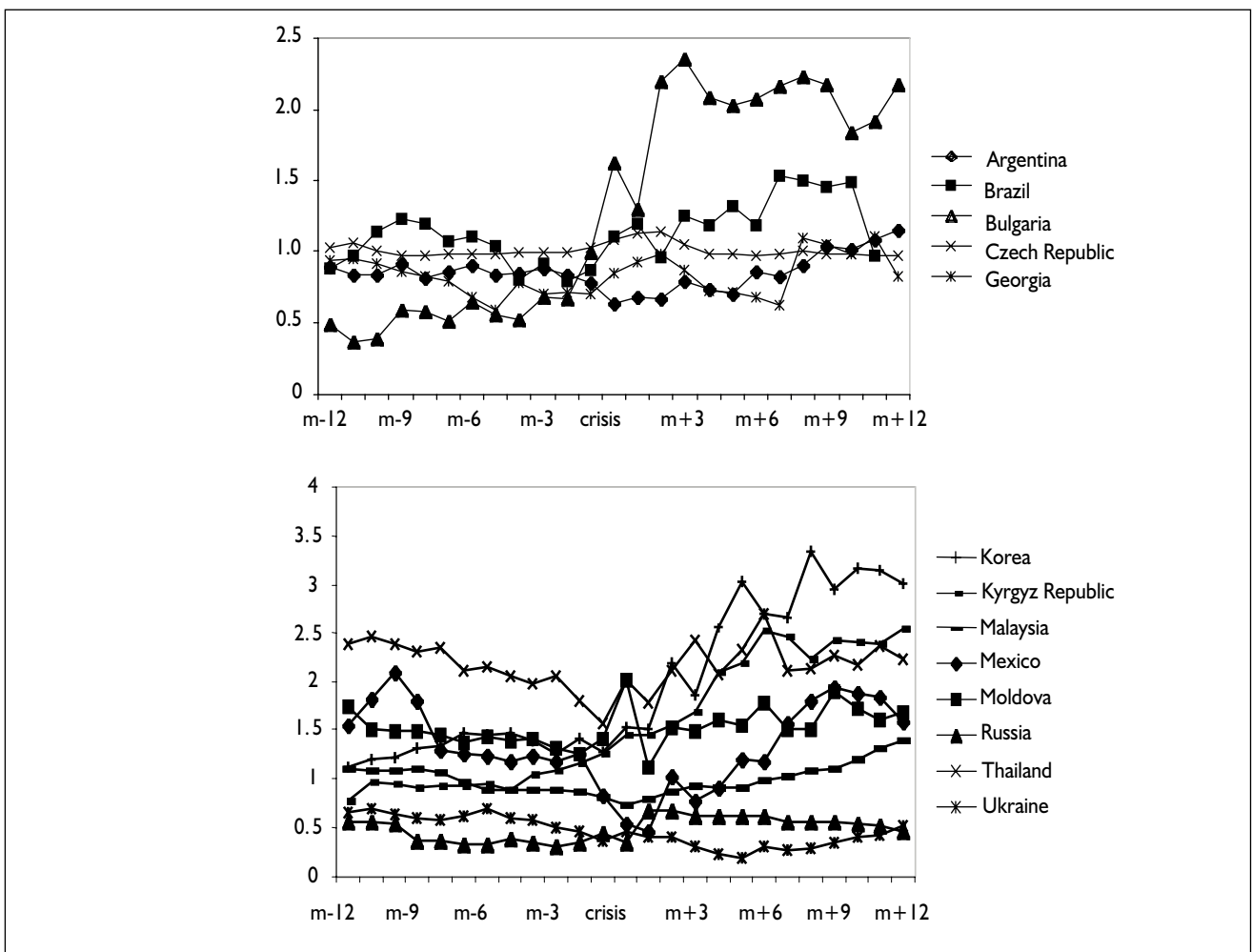
Source: Jakubiak (2000).

Figure 4.5. Real effective exchange rates in crisis countries
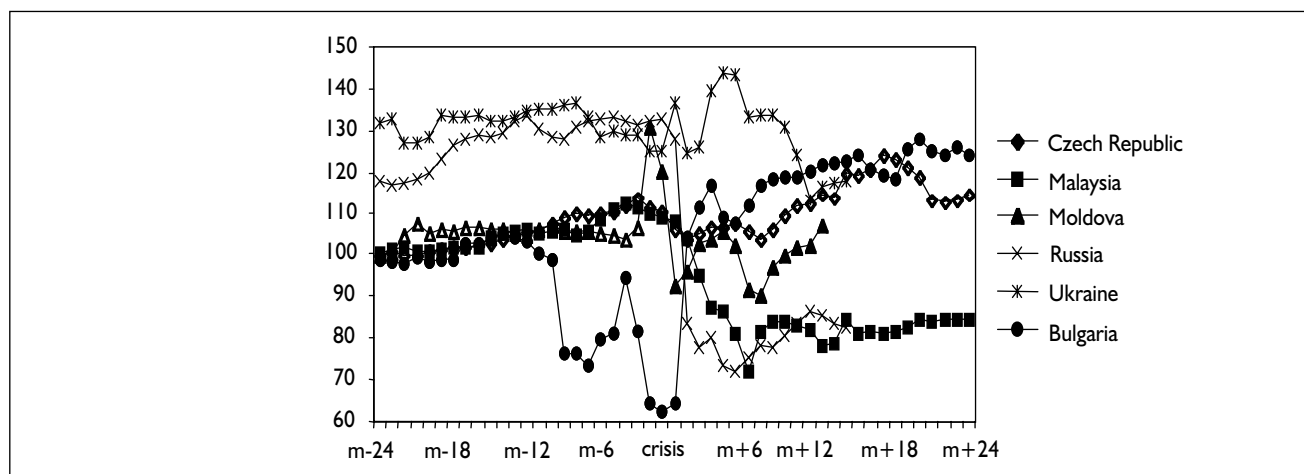
Source: Jakubiak (2000) using IFS IMF data.

ular importance in the case of peg/fixed exchange rate regimes. A fall of this indicator below one indicates potential difficulties with the commitment to a declared nominal anchor. As seen from **Figure 4.4** problems with insufficient backing of the monetary base by central bank's reserves could be observed in Argentina, Brazil, Bulgaria, Russia, Ukraine, Georgia, Kyrgyz Republic, and, to some extent, in Mexico during pre-crisis months. East Asian economies recorded relatively safe values of this measure in the months prior to the crisis. Nevertheless, they were substantially lower during the last months preceding the crisis than at other times. This indicator did not have any importance in relation to Malaysia, which kept floating exchange rate regime around the crisis time.

Similarly, the real appreciation of a currency proved an important factor. As we see from **Figure 4.5** real effective exchange rates have been indeed appreciating through several months prior to the crises in Russia, Malaysia, Czech Republic, and, to some extent, also in Moldova. The same has been true for Bulgaria but only when we consider the banking crisis in 1996, which preceded the drastic currency crash at the beginning of 1997. Real effective exchange rate had not been appreciating in Ukraine during at least six months prior to the crisis.

For the rest of "crisis" countries where real effective exchange rate index was unavailable Jakubiak (2000) calculated the CPI based real exchange rate index versus US dollar, which gave less clear results (see **Figure 4.6**) because countries under consideration traded also in other currencies. However, beginning of a currency crisis was marked by the large real exchange rate depreciation in every economy. Later on, real exchange rate usually recovered partially.

Figure 4.6. Real exchange rates in relation to US dollar, CPI based
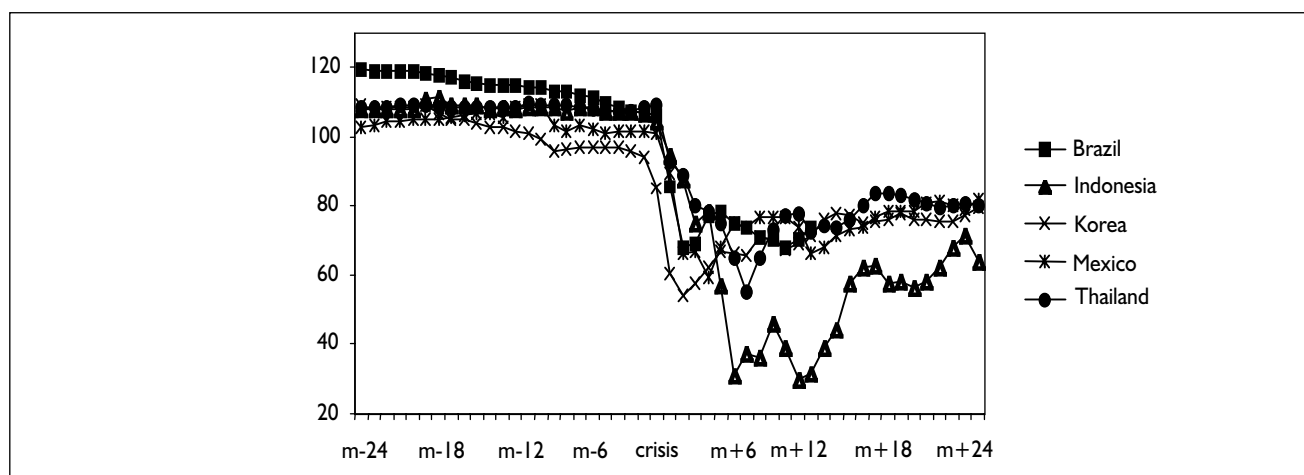
Source: Jakubiak (2000).

5. Causes of Currency Crises

This chapter contains the survey of results of empirical research related to the selected underlying causes of currency crises. We start from fiscal imbalances and later move to a current account deficit, currency overvaluation, the role of specific exchange rate regimes, structural weaknesses in the banking and corporate sectors, and political instability.

5.1. Fiscal Imbalances

The role of fiscal imbalances in generating currency crises seems to be obvious at least from the time the first-generation models appeared in theoretical literature (see section 3). Fiscal deficit, if monetized by a central bank at the pace exceeding increase in demand for money must sooner or later lead to an exhaustion of official reserves and a currency crash. This link is a more indirect and delayed in the case of non-monetary financing of the fiscal deficit, i.e. when government borrows on the market. In this case excessive borrowing, increasing yields on government bonds and perspective of the possible debt trap influence investors' expectations and push them from the optimistic equilibrium to the pessimistic one. Thus, investors' behavior and crisis spiral can be well explained in terms of the second-generation models (see Siwińska, 2000 for a detailed analysis of this mechanism).

When we turn to empirical research, the picture becomes less clear. Results depend on the sample selection and adopted analytical methods. A short review of the selected previous research efforts is presented in **Figure 5.1**.

Still, this kind of causality, i.e. fiscal imbalances leading to currency crises, was established in less formalized case studies related to transition economies (Markiewicz, 1998 for Hungary, Bulgaria, Russia, Ukraine and Kyrgyzstan; Antczak R., 2001 for Russia; Markiewicz, 2001 for Ukraine; Ganev, 2001 for Bulgaria; Radziwiłł, 2001 for Moldova).

Siwińska (2000) conducted two kinds of comparative analysis related to this issue. In the first one she examined the behavior of a number of fiscal variables before and dur-

Figure 5.1. Links between fiscal variables and currency crisis – review of empirical research

Authors.	Sample	Univariate Analysis	Econometric Analysis
Eichengreen, Rose, Wyplosz (1994)	1967–1992, 23 countries, mostly of ERM	**Links found, but only in non-ERM sample.** In the non-ERM sample the hypothesis of the equal distribution of the fiscal deficits in crisis and non-crisis periods is rejected; the same hypothesis is accepted in the ERM sample.	Effect of budget deficit and public debt on the probability of a crisis is insignificant.
Frankel, Rose (1996)	1971–1994, 105 countries	**Links not found.** Fiscal deficit tends to be small and shrinking in countries experiencing a crisis.	
Kaminsky, Reinhart (1999)	1970–1995, 20 countries	**Links found.** Fiscal deficit found to be higher in the two years prior to currency crisis, as compared to tranquil period. Fiscal deficit as an indicator of crisis has accurately called 27% of currency crisis (the lowest share out of the considered indicators).	
Aziz, Caramazza, Salgado (2000)	1975–1997, 20 industrial and 30 developing countries	**Weak links found.** Fiscal deficit found to be on average larger for two years before the crisis across the whole sample, but the result was not significant at 95-percent level and not robust across different sub sample.	

Source: Siwińska (2000) on the basis of: Aziz, Caramazza and Salgado (2000), Eichengreen, Rose and Wyplosz (1994), Frankel and Rose (1996), Kaminsky and Reinhart (1999).

ing the crisis, compared to tranquil periods. The sample consisting of 30 developing countries for the period of 1980–1999 and 20 transition countries for the period 1992–1999 constituted the base for this comparison.

Both in developing countries (only for the period of 1990–1999 – earlier the "tranquil" periods were also characterized by the large deficits) and transition economies, the crisis was preceded by larger, than in normal times, fiscal deficits. In CIS countries the difference has been up to 80%.

The external public debt in developing countries failed to display any distinct pattern, but sovereign foreign debt in transition economies was, on average, higher before and during the year of a crisis. The domestic debt in developing countries was higher than tranquil average for up to two years before the crisis. This stands in line with Obstfeld (1994) model. The lack of comparative data for CIS countries did not allow the author to analyze the domestic public debt for this sub-sample.

The second analysis carried out by Siwińska (2000) compares the fiscal developments in a number of transition economies in the second half of 1990s in a more descriptive way. The focus was put on the coincidence between fiscal imbalances and occurrence of currency crises. **Figure 5.2** presents summary of this analysis related to countries of the

former Soviet Union. Most of them suffered from the series of 1998–1999 currency crises.

The ratio of general government fiscal deficit to GDP proved the most reliable indicator in predicting currency crises. This tendency was confirmed by the larger sample covering also Central European countries. This indicator issued a right signal in 7 out of 8 cases when a currency crisis did occur within next 24 months and produced only two wrong signals out of 10 cases when there was no crisis.

The amount of external public liabilities owed to commercial creditors also performed quite well but only when the arbitrary measures (marked by an asterisk in the exhibit) were introduced. Still, this indicator had a tendency to overstate the danger of a crisis. The indicators of the indebtedness level occurred even less reliable.

Generally, Siwińska (2000) study confirms an important role of fiscal imbalances in triggering currency crises in developing and transition countries. In particular, large budget deficits and rapidly growing short and medium-term liabilities were among the key determinants of the series of 1998–1999 crises in the CIS countries. When the investors became increasingly concerned about the ability of governments to honor their obligations they began to withdraw their capital, central banks were faced with significant

Figure 5.2. The value of fiscal indicators in predicting a crisis in selected FSU economies

	A No. Of countries, where indicator was **larger** and crisis **did emerge** within 24 months	B No. Of countries, where indicator was **larger** and crisis did **not emerge** within 24 months	C No. of countries, where indicator was **not larger** and crisis did **emerge** within 24 months	D No. of countries, where indicator was **not larger** and crisis did **not emerge** within 24 months	True indica-tions (A+D)	Wrong indica-tions (B+C)	Tendency to issue a signal before a crisis A/(A+C)	Tendency not to issue a signal when there is no crisis D/(D+B)
Deficit of general government	3 (+); 6(+*)	1 (+*)	4(+) 1 (+*)	4 (+*)	7 (+); 10 (+*)	5 (+) 2 (+*)	3/7 (+); 6/7 (+*)	4/5 (*+)
External debt	1 (+); 2(+*)	1 (+*)	6 (+); 5 (+*)	4	5 (+); 6 (+*)	8 (+*); 9 (+)	5/14(+); 8/14 (+*)	4/5
Short – term external debt	2	2	5	3	5	7	2/7	3/5
Debt service to reserves	2	0	5	5	7	5	2/7	1
External public liabilities owed to private creditors	2 (+); 4 (+*)	1 (*+); 0 (+)	5 (+); 3 (+*)	5 (+); 4 (+*)	7 (+); 8 (*+)	5 (+); 4 (*+)	2/7 (+); 4/7(+*)	1 (+); 4/5 (+*)

Notes: (+) denotes that an indicator was larger than its average plus one standard deviation across all FSU; (*) indicates that the indicator was relatively large, but did not exceed the statistical threshold. In case of budget deficit "relatively large" was over 5% of GDP, during at least two years; in case of public debt owed to private creditors – over 4% of GDP, and external debt – over 40 of GDP; (+*) denotes, that both (+) and (*) were considered.

Source: Siwińska (2000).

reserves and exchange rate pressures and governments with a liquidity crisis.

However, one must remember that fiscal imbalances in CIS economies reflected deeper structural shortcomings and the lack of consistent reforms: soft budget constraints across the economy, weak governments, inefficient tax systems, Soviet-type budget expenditures.

5.2. Current Account Deficit

5.2.1. Evolution of the Theoretical Views

Over the past few decades there have been important changes in the way the economist perceive the current account – from "current account deficit matters" through "current account deficit is irrelevant as long as the public sector is balanced" and, again, "deficit matters", finally to "deficit may matter" (see Edwards, 2001)[13].

Until mid-1970s, the discussion on external imbalances was dominated by the "elasticity approach" focusing on the necessity to have trade flows balanced. Because most of developing countries run large and persistent current account deficits at that time recurrent devaluations were the standard remedy to cope with this problem.

However, effects of these devaluations depended on export and import price (exchange rate) elasticities. Researchers were divided in their assessment concerning these results. Optimists saw devaluations as effective tools for restoring trade balances. For example, Cooper (1971) examined 21 major devaluation cases during the period of 1958–1969 and found them successful in bringing the current account back to balance. On the other hand, representatives of the "elasticity pessimism" argued that elasticity occurred to be small and countries had to arrange a large exchange rate adjustment in order to improve their external position that in turn caused a huge income and output contraction. According to "pessimists" view since developing countries exported mainly commodities and there was no prospect for surge in demand for them in the world market the devaluation was ineffective and the answer was not to devalue but to encourage industrialization through import substitution policies.

After the oil shock and dramatic deterioration of the current account balance of oil importing countries in the 1970s the trade-flow/elasticity approach was replaced by the inter-temporal approach. This approach based on two arguments: (i) the current account is equal to national savings minus investment; (ii) both savings and investment decisions are based on inter-temporal factors such as permanent income, expected return on investment projects, etc. As far as current account deficit reflected new investment perspectives but not falling saving rates there was no reason to be concerned about it. The deficit meant only that economic agents expecting future prosperity brought by new investment opportunities were smoothing their consumption paths–moving it from the future to the present. The influential paper of Jeffrey Sachs (1981) strongly insisted on this view.

In addition, the new approach made a distinction between the deficits that result from fiscal imbalances and those reflecting private sector decisions. The public sector was thought to act rather on political than on economic ground, so the current account deficit induced by the fiscal deficit was regarded as "bad", while private sector's decisions were assumed rational and the current account deficit responding to them was perceived "good". It was assumed that in the future private sector would be able to make necessary corrective actions (i.e. repay debt) while public sector most probably would not. This view was most frequently associated with the former UK Chancellor of the Exchequer, Nigel Lawson.

However, the debt crisis of 1982 exposed the obvious inadequacy of the Lawson Doctrine. In fact, in some of the crisis affected countries (example of Chile – see Edwards and Edwards (1991)) large current account deficits were accompanied by the balanced fiscal accounts. Emphasis was put again on the current account deficit and the real exchange rate overvaluation (see e.g. Fischer, 1988; Cline, 1988).

This view was even stronger reiterated after the 1994–1995 Mexican crisis. This led Lawrence Summers, the then Deputy US Treasury Secretary to warning that *any* current account deficit in excess of 5% of GDP should be subject of attention (Summers, 1996; Edwards, 2001). This gave the beginning of the new Doctrine of 5% adopted in practice of both the IMF and private investors in the late 1990s (some other analysts used the threshold of 4%). Still, this view is not shared by everybody.

For instance, Dornbusch (2001) distinguishes between old- and new-style currency crises. The first type – current account crisis – involves a cycle of overspending and real appreciation that worsens a current account, decreases foreign reserves and finally leads to devaluation. The new-style

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[13] This section follows closely Sasin (2001b) review, which in turn draws from Edwards (2001).

crises, which can be called "capital account crises", are connected with the potential insolvency of the balance sheets of a significant part of the economy (for example, large portfolio of non-performing loans) or by maturity (and currency) mismatches and manifest themselves by a sudden capital flight.

Other authors try to determine "current account sustainability" (see e.g. Milesi-Ferretti and Razin, 1996; Edwards, 2001). Because of the lasting improvement in capital market access, persistent terms of trade improvement and productivity growth emerging market economies can, as it is predicted by the inter-temporal models, finance moderate current accounts on an ongoing basis.

The weakest notion of sustainability implies that the present value of the (future) current account deficits (plus debt) must equal the present value of the (future) surpluses, or in other words that a country will (in infinity) repay its debt. This criterion is certainly not satisfactory. The debt repayment prospects may be too distant and say nothing about the appropriateness of a present deficit: virtually any present deficit can be (somehow) undone by sufficiently large surplus in the (unspecified) future.

According to the stronger notion, the deficit is sustainable if it can be reverted into sufficient surplus in the foreseeable future and debt repaid on an ongoing basis (in a sense of non-increasing debt/GDP ratio) without drastic policy changes and/or a crisis. This definition is a starting point for a calculation of a sustainable current account. If the actual deficit lasts longer above sustainable level and a country does not undertake corrective measures (restrain of domestic demand or devaluation) it can perhaps expect an externally forced adjustment.

Summing up the discussion on whether the current account "matters" as a potential cause of currency crises Edwards (2001, p.37) gives a partly positive answer. He states that "*if this question is interpreted very narrowly, in the sense that countries with an (arbitrarily defined) large current account deficit, almost inevitably face a crisis, then the answer is "no." If, however, it is interpreted more broadly, as suggesting that there are costs involved in running "very large" deficits (...) the answer is a qualified "yes". Also Dornbusch (2001) concludes that "...it is safe to say that a rapid real appreciation – say over 2 or 3 years – amounting to 25 percent or more, and an increase in the current account deficit that exceeds 4 percent of GDP, without the prospect of a correction, takes a country into the red zone.*"

5.2.2. Results of Empirical Research

Sasin (2001b) provides an extensive review of the existing empirical research, examining links between current account deficits and currency crises. In most cases the studies do not show a strong and significant correlation between (high) current account deficit and currency crises in a proper econometric treatment.

Figure 5.3 contains the summary of various attempts to predict currency crises, which usually include current account deficit as one of explaining variables. In the second column the t-statistics for the null hypothesis that the current account deficit is irrelevant in crisis prediction is presented.[14] Whenever author tests more than one specification additional t-statistics are presented.

As can be seen from **Figure 5.3**, the reviewed papers present mixed results. One possible explanation can be that much depends on the sample selection and the specification of the variables included. This possibility was formally confirmed by Sasin (2001a) who found that depending on specification one could obtain values for t-statistics from -5 to 8.

As a proper econometric methodology is unable to provide strong proofs in favor of the impact of external deficits on crises, the narrative case studies can shed some light on the issue. For example, Milesi-Ferretti and Razin (1996) attempt to answer when and why current account problems may end in a currency crisis. They discuss the cases of Australia (persistent current account deficit, no drastic policy actions, no crisis), South Korea (early 1980s), Israel, Ireland, (high deficit, preventive policy reversal, no crisis), Chile, Mexico (deficit, crisis). Basing on the improved portfolio approach (with financing constraints) the main determinants of current account deficit sustainability *ex ante* included: the size of the export sector, level of international competitiveness, level of domestic savings, composition of external liabilities, strength of the financial system, degree of political stability and fiscal balances.

Their analysis shows that among countries with a current account deficit, the group that did experience currency crises differs from those that did not in the following respects: overvaluation of the real exchange rate (with rapid growth of imports), relatively small export sector, high external debt burden, low and declining saving ratio (espe-

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[14] Values over 1.9 indicate that, with 95% confidence, the current account has an impact on the emergence of currency crises. For around 1.6 the confidence level is 10%.

Figure 5.3. Summary of the empirical researches showing the role of a current account deficit in predicting currency crises

Study	Results (t-statistics)	Notice
Edwards (2001)	1) 1.64 2) 1.64 3) 1.44 4) 0.31	four definitions of crisis and different specifications
Milesi-Ferretti and Razin (1998)	1) 1.25 2) 2 3) 1.65 4) 0.36 5) 1.3 6) 2.25 7) 0.6 8) 0.77 9) 1.71 10) 2.05	different samples 1-4) during current account reversals 5-10) prediction of overall crash
Abhuvalia (2000)	1) 1.94 2) 1.44 3) 1.52 4) 1.43	two samples two different set of contagion controls
Caramazza et.al. (2000)	1) 2.17 2) 2.5 3) 1.84 4) 0.51	different specification of crisis index
Bussiere and Mulder (1999)	1) 2.03	Early Warning System with 5 regressors
Eichengreen, Rose and Wyplosz (1996)	1) 0.8 2) 1.9 3) 1.2	different specification of variables
Frankel and Rose (1996)	1) 1.03 2) 0.22	1) default and 2) predictive power
Berg and Pattillo (1999)	1) 5.6 2) 9.5 3) 5.5	1) "indicator model" 2) linear model 3) "piecewise linear model"
Kaminsky, Lizondo and Reinhart (1998)	-not t-statistics, but "noise to signal ratio" – export change: 0.42 (the third best result)	univariate "signal" analysis, "noise to signal ratio"; 0-perfect prediction, 0.5-no information, >0.5 worse than unconditional guess
Sasin (2001a)	1) 1.1 2) 3.1 3) -0.1(wrong sign) 4) 1.2 5) -0.4 (wrong sign) 6) 2.8	- 1,3,5) fixed effect linear model; 2,4,6) probit; 1,2) full sample; 3,4) emerging markets; 5,6) developed economies - Actually Sasin checks around 10,000 specifications and concludes that an average significance for current account is 0.5 (2 for developed and 0.1 for emerging economies).

Source: Sasin (2001b).

cially Chile and Mexico[15]), political instability (elections in Mexico) and the composition of capital inflows[16]. All countries arranged devaluation but some were preventive and successful (Australia, Israel) while some countries were forced to do it by the crises (Chile, Mexico).

On the other hand, Błaszkiewicz and Paczyński (2001) investigating a sample of 41 crisis-affected developing and transition countries found that almost all of them suffered from persistent current account imbalances and that deficit oscillating around 5% of GDP should be considered as a "red flag" by policymakers. However, it does not mean the opposite – that each country with such a deficit must suffer a currency crisis.

The above observations seem to be confirmed by the current account developments in transition economies. While Central European and Baltic countries have been able to run substantial current account deficits (sometimes well exceeding 5% of GDP) on a sustainable basis, some CIS countries (for example, Russia and Ukraine) have been

pushed, in fact, into a current account surplus. The first group is advanced in the EU accession negotiation, its financial markets and banking systems are consider as being relatively stable and these countries managed to create a favorable business climate for FDI and portfolio investments. On the other hand, the investment climate in the CIS is much worse than that of the EU candidates, and the 1998–1999 series of financial crises effectively closed access of these countries to the international financial market.

5.3. Currency Overvaluation

Analysis of the real effective exchange rate seems to be very closely related, at least at the first glance, to the issue of the current account deficit discussed in the previous subsection. However, empirical results differ substantially (see below). While a current account position does not deter-

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[15] Ireland and Israel also experienced a decline in saving rates but it was an effect of public sector imbalances that were later much improved. Australia's saving rate is low as well but it is seemingly counterbalanced by the efficiency of its banking system.

[16] Australia relied more on equity investments. Significant part of its debt was denominated in domestic currency which meant that risk was shared by foreign investors. Ireland, in turn, had a large and sustainable inflow of FDI's.

mine univocally probability of a currency crisis occurrence, this relation seems to be more explicit in the case of exchange rate overvaluation[17]. One can try to explain this difference by the specific level of sustainable current account balance for each country and, perhaps, by problems with measuring a real exchange rate and its overvaluation.

5.3.1. How to Measure a Real Exchange Rate Overvaluation?

While the idea that an overvalued currency violating the law of one price can lead to trade and balance of payments disequilibrium and cause devaluation sounds reasonable, the operative measuring of this overvaluation is not an easy task. This is strictly connected with the methodological difficulties to find a concrete numerical level of the equilibrium exchange rate in an individual economy. In addition, in an open economy such an equilibrium level can be subject to frequent changes, responding to various nominal and real shocks. As a result, the overvaluation can arise as a consequence of (see Sasin, 2001b):

- changes in an external environment, for example, in terms of trade or as a result of real depreciation of the major trade partner's currencies;
- domestic supply-side shocks;
- policy related causes, for example, limited credibility of an exchange-rate-based disinflation program;
- large foreign capital inflow, which put an upward pressure on the exchange rate.

In practice estimation of the over-/under-valuation of the exchange rate can be done in two ways (Sasin, 2001b). The first approach is based on the assumption that equilibrium RER implies balanced current account or some current account position considered as sustainable. As the initial step, the long-run level of domestic saving and investment is estimated, then the normal capital flows (assuming some long-term equilibrium interest rate differentials, growth rate of the economy, etc.) are determined. If the two sides are different it means that the real exchange rate is not in balance. Afterwards, the equilibrium value being able to equate the two sides is assessed basing on estimated exchange rate elasticity of various macroeconomic variables. Subtracting prevailing exchange rate from the equilibrium one gives the measure of RER overvaluation.

The second approach uses the econometric and statistical tools and rather abstracts from a detailed country-specific knowledge. The easiest way is to explicitly use the notion of purchasing power parity. One selects the price index (CPI, WPI, PPI) and a period of time, and then decides that the average of index-based RER over the chosen period constitutes an equilibrium rate. Subtracting that average from the current index-based RER gives the RER overvaluation.

Other popular method, slightly more demanding, requires empirical estimation of the real exchange rate determinants what is usually done through one-equation regression. Basing on the common knowledge and various models, relevant theoretical fundamentals are selected (these usually include terms of trade, degree of openness, government expenditures, etc.) and included into the regression. Afterwards the fundamentals are decomposed into permanent and temporary components. The permanent ones are included in the estimated real exchange rate equation and equilibrium (fitted) rate is inferred. Even more sophisticated method requires an underlying model of the exchange rate – it is usually a monetary model.

Theoretically, the overvaluation can be undone by the exactly opposite processes to the one that led to its occurrence. However, because of downward price and wage rigidity it is more difficult to arrange a smooth real depreciation (restore the equilibrium) than to allow the real appreciation.

Goldfajn and Valdes (1996) assumed that, after controlling for other macroeconomic fundamentals, the real exchange rate overvaluation could be undone in two ways: by cumulative inflation differentials and by nominal depreciation (including a currency crisis). Afterwards, they calculated the probability that overvaluation would end smoothly without a sharp nominal depreciation (crisis) for a large set of countries over the period of 1960–1994. Probability of reverting the prolonged (over six-month) overvaluation successfully was 32% for an appreciation not exceeding 15%, 24% for 20% misalignment, 10% for 25% threshold, 3% for 30% overvaluation and zero for overvaluation exceeding 35%.

5.3.2. Results of Empirical Research

Sasin (2001b) presents an ample empirical evidence that overvaluation can explain currency crises. **Figure 5.4** con-

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[17] This section draws on Sasin (2001b).

Figure 5.4. Summary of the empirical researches showing the role of real exchange rate overvaluation in predicting currency crises

Study	Results (t-statistics)		Notice
Edwards (2001)	1) 0.03	2) 1.05	four definitions of crisis
	3) 0.59	4) 0.12	overvaluation as deviations from PPP
Milesi-Ferretti and Razin (1998)	1) 4.75	2) 4.9	different samples
	3) 3.8	4) 3.04	1-4) during current account reversals
	5) 3.25	6) 3.75	5-10) prediction of overall crash
	7) 6	8) 5.6	
	9) 6	10) 2.8	
Ahluvalia (2000)	1) 2.7	2) 3	two samples
	3) 1.46	4) 2.48	two different set of contagion controls
Caramazza et.al. (2000)	1) 2.17	2) 1.70	different specifications of crisis index
	3) 0.62	4) 1.07	
Bussiere and Mulder (1999)	1) 1.9		Early Warning System with 5 regressors
Frankel and Rose (1996)	1) 1.51	2) 2.53	1) default 2) predictive power
Berg and Pattillo (1999)	1) 15.9	2) 13.5	1) "indicator model" 2)linear model
	3) 3.35		3)"piecewise linear model"
Goldfajn and Valdes (1996)	1) 1.69	2) 1.53	different models and nominal vs. real devaluation
	3) 2.63	4) 1.51	
Kaminsky, Lizondo, and Reinhard (1998)	Not t-statistics, but"noise to signal ratio" 1) 0.19 (the best result)		univariate "signal" analysis, "noise to signal ratio"; 0-perfect prediction, 0.5-no information, >0.5 worse than unconditional guess
Sasin (2001a)	1) 4.7	2) 5.4	1,3,5 -fixed effect linear model; 2,4,6 -probit; 1,2 -full sample; 3,4 -emerging markets; 5,6 -developed economies
	3) 1.6	4) 2.8	Actually Sasin checks around 10,000 specifications and concludes
	5) 4.1	6) 2.6	that an average significance for RER is 4 with standard deviation of about 2

Source: Sasin (2001b).

structed similarly to **Figure 5.3** contains the summary of empirical research testing such a hypothesis[18].

The results presented in **Figure 5.4** indicate strong support for the hypothesis that real overvaluation is linked to currency crises. The advocates of the opposite view have only few arguments. The most often raised is the Balassa-Samuelson effect, according to which real overvaluation (as revealed by price index) should not impair competitiveness because of higher increase of productivity in tradable goods sector. Sasin (2001b) confirms this view to some extent, discovering that the significance of the real exchange rate to currency crisis prediction is much lower for the emerging-market economies. On the other hand, as noted by Dornbusch (2001), the Balassa-Samuelson model is often used to justify overvaluation in the presence of large current account deficits, while, according to this model, real exchange rate appreciation, other things being equal, should not deteriorate trade equilibrium.

Some researchers, skeptical about the econometric methodology prefer to use "before-after analysis", which

usually depicts the stylized facts associated with currency crises. Aziz, Caramazza and Salgado (2000) provide a recent example. They categorize crises into subgroups: crises in industrial countries, in emerging economies, crises characterized by currency crashes[19], by reserve losses, "severe" crises, "mild" crises, crises accompanied by banking sector problems, crises with fast and slow recoveries. Afterward, they analyze how the given variable (real exchange rate) behaves on average in the time window before and after a crisis. Their results, once again, support the hypothesis of a significant role of currency overvaluation in causing currency crises.

The similar conclusion is formulated by Jakubiak (2001a) who analyzed probability of ending peg in 14 emerging-markets economies. Real exchange rate appreciation increases this probability. Błaszkiewicz and Paczyński (2001) who estimated changes in real exchange rates for the group of crisis-affected developing and transition countries also found a gradual real appreciation through 48 months preceding a crisis.

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[18] In the second column the t-statistics for the null hypothesis that the overvaluation is irrelevant in crisis prediction is presented. Values over 1.9 indicate that, with 95% confidence, the real overvaluation has an impact on the emergence of currency crises. For around 1.6 the confidence level is 10%.

[19] Crises in which currency depreciation accounts of more than 75% of a crisis index.

5.4. The Role of Exchange Rate Regimes

The first reaction of many economists after a recent series of financial crises both in the developed countries (the ERM crisis in 1992–1993) and in emerging markets in 1995–1999 (Mexico, Thailand, Malaysia, Korea, Philippines, Indonesia, Russia, Ukraine, and Brazil) was the strong critique of the peg exchange rate regimes. These regimes became generally blamed for generating currency crises (see e.g. Obstfeld and Rogoff, 1995; IIE, 1999; Sachs, 1998; Mishkin, 2000; Mishkin, 2001) and policy recommendations, including those of the IMF, started to go towards advertising more flexible exchange rate arrangements.

Doubts concerning a pegged exchange rate usually concentrate on four arguments:

1. Exchange rate peg itself becomes an easy target of speculative attack.

2. Exchange rate stability (predictability in the case of crawling peg) stimulates excessive capital inflow and over-borrowing in foreign currencies, particularly if financial and corporate sectors experience serious regulatory weaknesses.

3. Stable exchange rate helps currency overvaluation (what does not need to be necessarily true as a real exchange rate is rather unmanageable under free capital movement at least using monetary policy instruments).

4. Unsustainable peg ends up with sharp devaluation, which triggers sudden capital outflow and heavily damages balance sheets of financial and non-financial corporations.

The above critique seems to be a bit superficial, not necessarily well balanced, and sometimes excessively emotional. As Jakubiak (2001a, p. 43) correctly points out "...*it is clear that the eruptions of the currency crises were not caused by the fixed regime choices themselves, but rather by the inconsistent macroeconomic policies within this financial framework*".

Empirical case studies conducted by Jakubiak (2001a) demonstrate a variety of the actual exchange rate regimes in the fourteen crisis-affected countries – from an incomplete currency board (Argentina) through various kinds of relatively stable exchange rate arrangements (Brazil, Georgia, Indonesia, Korea, Malaysia, Mexico, Moldova, Russia, Thailand, and Ukraine) to mostly floating rates (Bulgaria, Czech Republic, Kyrgyz Republic)[20]. On the other hand, logit estimates show the increasing probability of ending a peg when real exchange rate appreciates and with more months spent with a peg.

A floating exchange rate regime does not provide a guarantee that a country avoids a currency crisis and its painful consequences that could, for example, include massive insolvency of banks and enterprises with foreign exchange denominated liabilities. On the other hand, it has certain advantages comparing to a peg. First, the real free float excludes possibility of a market speculative test of the sustainability of the declared exchange rate trajectory. Second, as Mishkin (2001, p. 35) notes "...*movements in the exchange rate are much less nonlinear in a pegged exchange rate regime*". Third, the floating exchange rate makes all borrowers (both private and public) more aware of the exchange rate risk. Fourth, significant depreciation or appreciation of the exchange rate may serve as an early warning signal for policymakers that economic policy needs some adjustment.

Floating exchange rate may be, however, a difficult and costly regime for developing or transition countries suffering from chronic high inflation, high currency substitution, and lack of credibility of domestic monetary policy. This is the reason why a fully floating exchange rate is not a very popular variant in emerging-market economies even among those that recently went through currency crises and were forced to abandon a formal peg. Calvo and Reinhart (2000) call this phenomenon the "fear of floating". In this context even some of the above mentioned critics of the peg exchange rate regimes (see Mishkin, 2000 and 2001) accept the possibility of introducing the hard peg in the form of a currency board or dollarization/ euroization.

This brings us to the central point of the discussion concerning monetary/exchange rate regimes and their responsibility for generating currency crises. In fact, this is not the exchange rate regime itself (e.g. fixed rate) which creates a danger of a speculative attack but an attempt to manage simultaneously both the exchange rate and the domestic money supply. The intermediary regimes such as the adjustable peg, crawling peg, target band, crawling band or managed float all violate, in fact, the principle of the "impossible trinity" (Frankel, 1999). According to this principle any country must give up one of the three policy goals: exchange rate stability, monetary independence, and financial market integration. Having all three simultaneously proves impossible. Assuming that the free (or relatively free) capital mobility is irreversible, the future choices of a monetary/exchange rate regime will need to be restrained to basically two options – either monetary independence or the exchange rate fixing.

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[20] The de facto implemented regimes often differed from the declared ones – see Jakubiak (2001a).

Why the intermediate regimes are difficult to operate and can provoke speculative attacks? The first and most fundamental reason is that compromised solutions are unlikely to provide the advantages of any of extreme regimes, i.e. neither an exchange rate anchor nor a sufficient discretion in managing domestic liquidity. On the contrary, they may bring both a substantial exchange rate variability (actual or expected when a peg is not perceived credible) and make money supply exogenous (i.e. being out of control of monetary authorities). Second, compromised regimes can prove technically very difficult to manage due to the fluctuating demand for money and changing market expectations. Moreover, the pressure of current economic and political conditions may bring temptation to go beyond the compromise. Third, transparency, and, therefore, credibility of intermediate regimes is lower than that of the extreme solutions.

5.5. Structural Weaknesses of the Banking and Corporate Sectors

As we look at the history of currency crises, it is apparent that these were often accompanied by banking crises (see e.g. Glick and Hutchison, 2000). The series of Asian crises in 1997–1998 and CIS crises in 1998–1999 brought the researchers' attention back to the structural and institutional weaknesses of commercial banks and their role in provoking currency troubles. In addition, Asian crises illustrate the importance of the proper corporate governance, particularly if the large financial-industrial conglomerates dominate an economy. The similar conclusion might be drawn from the 1998 Russian crisis.

This recent experience gave impulse to development of a new (third) generation of currency crisis theoretical models discussed in details in section 3 of this paper.

5.5.1. Relationship Between Banking and Currency Crises

In analyzing the impact of a banking crisis on probability of provoking a currency crisis one can find several potential transmission mechanisms[21]. First, economic agents have good reasons to expect that authorities will prevent the financial system from collapse and bail it out by monetary expansion. In practice, this means preference towards higher inflation relative to giving up the exchange rate stability. Second, domestic agents can run on domestic banks, withdraw deposits and then convert this money into the hard currency (this kind of behavior is very likely to occur in both developing and transition economies). This puts a pressure on the exchange rate and usually leads to depreciation or devaluation. Third, a banking crisis impairs credit relations, worsens the position of domestic corporations, and brings about an economic slowdown. As the availability of profitable investment opportunities is decreasing, foreign investors might choose to withdraw their assets. As they would likely be reluctant to leave their money in hands of presumably insolvent banks and would expect other investors to think along similar lines, they might consequently expect a massive capital outflow and currency collapse. Thus, in order to avoid potential losses, they would probably choose to withdraw as quickly as possible triggering a sharp devaluation. This kind of scenario was recently observed in Turkey in 2000–2001 (Sasin, 2001d).

However, the opposite causality – from a currency crisis to a banking crisis – is also often in place. The main mechanism at work is connected with the significant role of foreign exchange liabilities in balance sheets of commercial banks and large corporations of many developing and transition economies. Even if commercial banks follow strict rules of balancing foreign exchange assets and liabilities (that was clearly not the case in many crisis-effected countries) non-financial corporations (banks' major clients) often run huge currency mismatches in their balance sheets. Sharp depreciation (devaluation) of a national currency rapidly deteriorates the financial situation of corporations with large unhedged foreign exchange liabilities thus negatively influencing both liquidity and solvency position of the commercial banks. If banks run open foreign exchange positions on their own this only accelerates eruption of the systemic banking crisis. The second and probably less important channel is the impact of devaluation on the higher expected inflation and, therefore, on short-term interest rates. Because the banking system is funded on short-term money (maturity mismatch) the increase in the respective interest rates poses an increased burden on their balance sheets. The balance sheets of shortly indebted corporations also deteriorate and negatively affect the banking system through an increase in non-performing loans.

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[21] The entire subsection 5.5 bases on Sasin (2001c).

There are also common factors to both crises and they manifest themselves through financial market reactions. If the economic situation is unfavorable, prospects for future profitable investment are weak, politicians or economic agents act irresponsibly, and foreign creditors are not sure whether exchange reserves are sufficient to cover potential short-term obligations there can be a shift in the market sentiment and a sudden capital outflow. Investors can stop rolling over the debt demanding immediate repayment. There are only two alternatives at the authorities' disposal to counteract the situation, i.e. an increase in interest rates or devaluation. Both actions have a very harmful impact on the unhedged and imbalanced financial and corporate sectors. Often both take place, so a currency and banking crises – the twin crises – coincide.

5.5.2. The Most Frequent Weaknesses of the Banking Sector

Banks act as intermediaries whose primary function is maturity transformation: their liabilities consist mainly of short-term deposits while assets of medium- and long-term loans. By their nature, they must be highly leveraged institutions. In addition, they face several kinds of risks connected with borrower creditworthiness, unexpected changes in a yield curve and exchange rate, and with non-credit operation on the equity or real estate markets. A small change in the balance sheet performance translates into very large changes in banks' capital. When the value of their assets less liabilities falls below some point banks are believed to be undercapitalized; when it turns to be negative, banks are considered insolvent (negative net worth).

Banking problems can be classified according to various criteria. The most popular approach distinguishes between the liabilities-side distress (bank run) and the asset-side problems (boom-bust cycle).

Bank run spiral can be well described in terms of multiple equilibria and game theory (see Sasin 2001c). It is worth noticing, however, that recent banking crises in industrialized countries such as the Nordic (early 1990s) or Japanese (1990s) ones do not have a liability-side character. Such a character seems, in turn, typical in emerging markets where large creditors (very often non-residents) choose to leave

following the disclosure of some bad news concerning the asset side of the financial system. This was a case in recent crises in Bulgaria in 1996, Indonesia (and Asia in general) in 1997–98, Russia in 1998 and Turkey in 2000–2001. However, all these were not really examples of runs against otherwise solvent financial institutions (as in the classical bank-run models) but rather against presumably insolvent banks suffering from the asset deterioration.

The asset-side crisis usually takes a form of an endogenous boom-bust cycle with over-lending. Investors' over-optimism, herding behavior and "disaster myopia" typical for the boom phase of the cycle[22] may be additionally stimulated by both loose monetary and fiscal policies and the numerous regulatory and microeconomic weaknesses encouraging moral hazard behavior of both banks and their clients (see Krugman, 1998b). In particular, one can mention expectations of the government bailing out borrowers in trouble, political influence on banks lending decisions, badly designed deposit insurance (guarantee) schemes, improper sequencing of financial market and capital account liberalization, weak banking supervision, weak prudential and accounting standards, weak property rights protection and contract enforcement mechanisms, and many others. Many of the above characterized Asian and CIS economies.

5.5.3. Review of Empirical Research

Analyzing the panel of 21 industrial, 37 developing and 32 emerging-market countries over the period of 1975–1997[23] Glick and Hutchison (2000) find that out of these 90 countries 72 had banking crises and 79 experienced at least one currency crisis. There were 90 banking crisis episodes and 202 currency crisis episodes. Out of 90 banking crises 37, i.e. 41% of the total have been twin-crises.[24] The frequency of banking crises increased four times between the decade of 1970s and 1990s while the frequency of currency crises remained more or less the same. The occurrence of twin crises rose as well. All types of crises, in particular the twin crises, were more frequent in the financially liberalized emerging markets.

The same authors also provide empirical evidence on the interrelation between currency and banking crises (see

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[22] Sometimes, these are activities that would be classified as illegal or criminal in developed countries. We have in mind, for example, massive insider/connected lending, stripping bank/corporation profits/assets, looting, and corruption.

[23] "Emerging markets" were defined as countries with relatively open capital markets while "developing country" sample included other developing and transition economies.

[24] "Twin" crises were defined as banking crises accompanied by a currency crisis in the previous, same, or following year.

Figure 5.5. Performance of bank crises as a signal of currency crises and vice versa

	Number of banking crises	Freq of accompanying currency crises (%) *Currency crises as bank crisis indicator (index)*			Cumula- tive freq.	Number of currency crises	Freq of accompanying banking crises (%) *Bank crises as currency crisis indicator (index)*			Cumula- tive freq.
		t-1	t	t+1			t-1	t	t+1	
All	90	11 *1.38*	16 *1.40*	15 *0.98*	41	202	7 *0.98*	7 *1.44*	5 *1.42*	18
Developing	71	10 *1.32*	18 *1.59*	15 *0.82*	42	160	7 *0.82*	8 *1.66*	5 *1.35*	19
Emerging	46	9 *1.87*	24 *2.30*	20 *0.87*	50	78	11 *0.77*	14 *2.46*	6 *1.96*	29

Note: Predictability index: the higher the value of the index, the better predictability, the value of 1 indicates ambiguous informative content.
Source: Glick and Hutchison (2000); Sasin (2001c).

Figure 5.5). The frequency of banking crises accompanied by currency crises is higher than the frequency of currency crises accompanied by banking crises. Currency crises tend to cluster one year after a banking crisis while banking crises accompanied a currency crisis usually in the previous year. Both findings support the view that banking crises provoke currency crises rather than the opposite.

Also the comparison of the predictability index developed by Glick and Hutchison (2000) reveals that currency crises in period t and t+1 can be well predicted by the occurrence of a banking crisis in period t. The predictability is stronger for emerging markets (values of 2.46 and 1.96 respectively). The occurrence of a currency crisis in period t does not contain any information regarding the next period probability of a banking crisis (the value of 0.98).

The referred analysis was univariate. When exploiting a cross-correlation among variables in the multivariate model the results change somehow. Currency crises as predictors of banking crisis remain insignificant (except for contemporaneous events). The usefulness of banking crises as predictors of currency crises decreases substantially. They issue a proper (and very strong) signal of an approaching currency crisis for the emerging markets only. The contemporaneous correlation is significant for both developing and emerging markets.

Kaminsky (1998) develops a so-called "signal approach" to assess what are the determinants of both currency and banking crises. The estimated coefficients are noise-to-signal ratios (ntsr): the coefficient equal to zero indicates perfect predictability power of the variable, the coefficient equal to one indicates the power of a simple unconditional guess (i.e. the variable in question is neutral) while values greater than one disqualify the variable as a predictor. She notices that it is a little harder to predict banking crises (compounded ntsr=0.8) than currency crises (ntsr=0.7). The best variable to predict both crises is the real exchange

rate overvaluation (ntsr=0.2 for currency crises and 0.3 for banking crises). Consistently with other studies she finds that a banking crisis is a very good indicator of a currency crisis (ntsr=0.3) while the opposite is not true (ntsr=1.2).

5.6. Political Instability

The role of a political factor in provoking currency crises seems to be obvious but certainly needs in a more concrete specification. The notion of political instability/fragility may involve a broad range of situations. On the one extreme, these can be such dramatic events as external or domestic military conflicts. Some countries suffer chronic constitutional problems like conflict between executive and legislative branches of governments (very frequent in CIS and Latin American countries) or between federal (central) and regional governments (examples of Russia, Brazil and Argentina). Many developing and transition countries do not have a well-established configuration of political parties what creates difficulties in forming stable and predictable governments. Finally, even in the most stable democracies there are episodes of minority governments, unstable government coalitions, irresponsible behavior of individual politicians or political parties, and uncertainty related to forthcoming election results. On the other hand, even the very stable authoritarian regime can be challenged by democratic aspirations of societies.

Political instability creates uncertainty among money holders what, in turn, increases the risk margin associated with a specific currency or debt instrument. This may trigger the sudden capital outflow, stop capital inflow or push money holders towards currency substitution.

Political instability decreases chances of correcting unsustainable policies inconsistent with a currency peg and,

therefore, accelerates the moment of a speculative attack (under the first- and third-generation crisis models). It also increases probability of inconsistent policy goals what may trigger a speculative attack according to the second-generation crisis models.

Finally, political instability complicates crisis management (see section 6), deepening its scale and negative consequences. In some cases political instability can be endogenous vis-a-vis a crisis. When crisis starts it usually undermines legitimacy of a government that often results in political destabilization, which in turn makes any bold anti-crisis steps very difficult.

Looking at the recent crisis episodes, one can find several cases of significant role of political fragility in causing or at least triggering a crisis. This relates, for example, to Mexico (Paczyński, 2001), Argentina both in 1995 and even more in 2001–2002 (Jakubiak, 2001b), Brazil, Russia (Antczak R., 2001), Ukraine (Markiewicz, 2001), Moldova (Radziwiłł, 2001) and Turkey (Sasin, 2001d). The outburst of crises in many of these countries contributed to serious political destabilization, initiating a negative "crisis spiral". This happened in Bulgaria (Ganev, 2001), Russia (Antczak R., 2001), Indonesia (Sasin, 2001f) and recently in Argentina (2001–2002).

6. Crisis Management – How to Defend an Exchange Rate if at All?

After a currency crisis' outburst its further dynamics depends very much on government ability to take the required corrective measures, introduce a consistent policy package, act consequently and quickly enough, influence financial markets developments and calm market panics. Political factors mentioned above (see subsection 5.6) play an important role here. Also support of the international financial institutions (notably the IMF) may help a government in regaining influence on financial markets and help to convince market participant to resist temptation to withdraw their capital.

As analyzing all the potential scenarios of crisis management would go far beyond the thematic boundaries of this paper we will concentrate on one important dimension: how to manage an exchange rate if market pressure is already there? Because a currency crisis is, by its nature, connected with speculative attack against the exchange rate this must be a central point in any discussion on crisis management.

Hypothetically, when the speculative attack starts (or can be expected soon) the first dilemma, which policymakers face is their capacity to defend an exchange rate. This concerns the level of central bank's liquid foreign exchange reserves, room of maneuver in increasing interest rates and fiscal adjustment, access to external aid, opportunity to persuade financial markets high probability of future positive scenario. If such capacity does not exist it is better to give up an exchange rate earlier in an orderly way than later in the atmosphere of the market panic. This is a very popular topic of *ex post* discussions in countries, which were eventually forced to devalue, for example in Russia. Of course, it is usually not easy to assess *ex ante* the government and central bank capacity to defend an exchange rate but sometimes the situation is quite clear from the very beginning.

Assuming that authorities have capacities to defend an exchange rate the next question concerns the rationale of doing it. In this respect every government must balance (*ex ante*) costs and benefits of each policy option. Defending exchange rate is likely to involve loss of central bank's foreign reserves and monetary contraction (if an intervention is non-sterilized; if it is sterilized it only increases the effectiveness of a speculative attack – see subsection 3.2), higher interest rates, lower external competitiveness, output contraction, and higher unemployment. On the other hand, currency depreciation, although helpful for trade and current account balance (at least in the short term), can be disastrous for inflation and inflationary expectation, future credibility of monetary and exchange rate policy, and is bound to increase domestic currency value of the foreign exchange denominated debt (see Jakubiak, 2001a)[25]. This last factor serves sometimes as a crucial argument in favor of authorities' attempt to avoid sharp devaluation as they are afraid about potential default on their own foreign exchange denominated debt and massive bankruptcies of banks and enterprises. In addition, if country successfully resists the attack against its currency it may strengthen its credibility for future, incurred costs notwithstanding. This is particularly important in the case of hard peg solutions such as a currency board.

If speculative attack is successful and authorities give up the exchange rate level they must at the same time decide on the future strategy. The first possible option is to allow an exchange rate to float expecting that market will find a new equilibrium level. This option minimizes a risk of missing a new exchange rate target (and associated further credibility loses) but involves a danger of serious overshooting (towards depreciation) at least for some period that, however, can be long enough to cause a massive insolvency of commercial banks and enterprises. The alternative choice involves re-pegging of an exchange rate on the new level

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[25] On the contrary, if government, banks or enterprises run large domestic currency denominated liabilities at fixed interest rates a surprised devaluation can provide a certain relief to debtors. The key question is, of course, how it will influence borrowing conditions in future. In addition, it is rather uncommon situation in developing and transition economies, which generally suffer huge currency and maturity mismatches between their assets and liabilities.

Figure 6.1. Declared and actual changes in the exchange rate regime during the crisis

Country	Declared exchange rate regime prior to the crisis	Exchange regime into which the country switched after the crisis	FLT index over 12 months prior to the crisis	FLT index over 12 months after the crisis
Brazil	Adjustable band with dual exchange rate	independently floating	0.080	0.505*
Thailand	Basket peg	independently floating	0.081	0.437
Mexico	Crawling band	independently floating	0.081	0.360
Russia	Exchange rate band	managed float	0.124	1.093
Georgia	Conventional peg	independently floating	0.185	0.566
Ukraine	Horizontal band	horizontal band	0.202	0.558
Korea	Exchange rate band	independently floating	0.256**	0.530
Indonesia	Crawling band	independently floating	0.271	0.495
Malaysia	Managed float	managed float***	0.285	1.221
Moldova	Managed float	independently floating	0.358	0.672
Kyrgyz Rep.	Managed float	managed float	0.683	0.414
Czech Repub.	Horizontal band	managed float	0.943	0.796
Bulgaria	Free float	currency board****	1.048	0.128

Notes: FLT index is defined as…

* over 11 months;

** counted back form the beginning of the Thai crisis. It is commonly agreed that the crisis in Korea erupted in December 1997, but won was under serious pressure form the summer of 1997. For this reason period from July to November 1997 was excluded from the pre-crisis calculations.

*** Malaysia switched to the conventional peg arrangement in September 1998, a year after the currency crisis started.

**** Bulgaria adopted a currency board arrangement in July 1997 that is 4 months after its currency collapsed.

Source: Jakubiak (2001a).

and/or according to a new formula. The key problem is connected with the ability of authorities to find a proper new level and formula (this is not an easy task in the environment of the market turmoil) and convince financial markets that the new peg will be credible and defendable. This kind of approach has more chance for success if it has a preemptive character (prior to crisis) and when the new peg is hard enough in institutional terms (for example, a currency board) rather than when abandoning the previous regime is forced by a market panic.

In both cases the success of the adopted strategy (in terms of minimizing costs of a crisis) depends on the comprehensiveness and consistency of the entire adjustment package (including fiscal policy, banks rehabilitation, structural measures, etc.), determination and credibility of government actions, and external support (for example, from the IMF).

Jakubiak (2001a) tried to determine empirically what kind of exchange rate regime the 13 crisis-affected countries actually chose after the previous one collapsed. In order to identify the real regimes (which sometimes differ significantly from the declared ones) she used the so-called "effective exchange rate flexibility index" (FLT) following Poirson (2001). The index is calculated as a ratio of monthly nominal exchange rate depreciation to the monthly relative change in reserves. It is based on the idea that if a country follows a floating regime, the volatility of its exchange rate should be relatively large, while the monetary interventions – small. Conversely, if a country follows a currency peg, the movements in the exchange rate are expected to be close to zero.

The indices were calculated using monthly data and then averaged for the 12 months prior to the crisis, in order to get a better picture of what was the pre-crisis situation. The index could take the values between zero (no exchange rate movements) and infinity (no interventions). The small values of the index meant that the authorities were intervening heavily on the foreign exchange to offset market forces and a country followed a relatively hard peg.

Results presented in **Figure 6.1** suggest two kinds of conclusions. First, there was certain discrepancy between the declared and actual regimes both before and after the crisis. Second, most of countries, which had *de iure* or *de facto* currency pegs before the crisis, decided to allow for a greater exchange rate flexibility in the period directly following the crisis (apart from Argentina and Hong Kong, which managed to defend their currency boards)[26]. On the contrary, countries, which had more flexible exchange rates before, narrowed their fluctuations after the crisis. Bulgaria was the most extreme case as it adopted the currency board regime.

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[26] Some of them, for example, Russia, Ukraine and Georgia later stabilized their exchange rates again.

7. Contagion Effect

The new feature brought by currency crises in the decade of 1990s is their fast propagation from one country to another. This happened after the collapse of British pound in November 1992, after the Mexican crisis in December 1994 (the so-called Tequila effect), after the Thai crisis in July 1997 (sometimes called the "Asian flue") and again after the Russian crisis in August 1998. A large body of both theoretical and empirical literature started to analyze what was referred to as a "contagion" effect.

7.1. Definition Problems

Rawdanowicz (2001, p. 80)[27] rightly points out that although the term contagion seems to be intuitively understandable, it is surrounded by many misconceptions. In some papers authors have not explicitly defined contagion at all (e.g., Glick and Rose, 1999) or have provided a specific definition for particular purposes of their research, like in Eichengreen, Rose and Wyplosz (1996, p. 19): "*The contagion effect with which we are concentrated can be thought of as an increase in the probability of a speculative attack on the domestic currency which stems not from "domestic fundamentals" such as money and output but from the existence of a (not necessarily successful) speculative attack elsewhere in the world*".

In other papers more formal and clear-cut distinctions have been put forward. For instance, Masson (1998) distinguishes three types of phenomena related to the spread of crises: *monsoonal effects* – arising from a common shock such as an interest rate hike in the US; *spillovers* – a crisis in one country worsens the macroeconomic fundamentals in other countries, for instance, via trade linkages; *contagion* – crises spread unrelated to fundamentals, being an effect, for example, of a shift in market sentiment or in the perception

of market conditions. Though Masson's definitions have conceptual appeal, some problems with differentiating between spillovers and contagion can arise on the empirical side.

Forbes and Rigobon (1999; 2001) proposed a different definition. They coined the term *shift-contagion*, i.e. "*a significant increase in cross-market linkages after a shock to an individual country (or group of countries)*". Cross-market linkages can be measured by various statistics, like the correlation in returns on assets, the probability of a speculative attack or the transmission of shocks or volatility. This definition is very neat for testing purposes, however, it focuses mechanically on one specific channel and therefore ignores developments in other segments of the economy as well as overall economic background.

7.2. The Channels of Crises Propagation

Describing the channels of crisis propagation Rawdanowicz (2001) follows Forbes and Rigobon (2001) and the WEO (1999b, chapter III) concept.

The first channel connected with <u>multiple equilibria</u> was described by Masson (1998). According to this author, a crisis in one country affects investors' expectations, which then leads to a shift from a good to a bad equilibrium in other countries. Expectations are thus the mechanism by which crises spread. Clearly, this channel would not work during tranquil periods. Masson argues that multiple equilibria are associated with pure contagion.

The second channel, i.e. <u>endogenous liquidity shock</u>, occurs when a crisis in one country causes liquidity strains in other countries. Investors, in order to survive, maintain margin calls, etc. and have to alter their portfolios. Very often this entails selling assets in other countries, which in

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[27] The entire section 7 draws heavily from Rawdanowicz (2001).

turn sparks crises. The drop in liquidity can also induce tighter credit rationing in other countries, which can lead to the selling of assets.

The third channel, called <u>political contagion</u>, can be activated when there is a political conflict concerning exchange rate target, on the one hand, and policy objectives such as competitiveness, dynamics of output or fight with unemployment, on the other. A country may then decide to sacrifice its peg exchange rate to meet these other objectives. Such a possibility is revealed by a successful speculative attack, which, in turn, impacts on other countries in a similar position, which may also experience pressure on their currencies. This channel has been analyzed thoroughly by Drazen (1999) and applied to the 1992 ERM crisis. In fact, this is a modification of a second-generation crisis model.

The fourth channel relates to <u>trade</u>. Demand for foreign goods in a crisis-hit country is slashed due to (i) devaluation/depreciation of the domestic currency and (ii) lower economic activity dampened by higher interest rates. In practice, the exchange rate channel is the most important as it has a direct and immediate impact as opposed to the aggregate demand channel. Lower demand in the crisis-hit country induces strains on countries that export significant amounts to this country. A drop in their exports may lead to current account problems and trigger a crisis too. The same effect can be expected if two exporting countries compete in third markets and one of them devalues its currency.

While considering the trade channel, the issue of timing and expectations should be brought to attention. In the spillovers paradigm (see Masson, 1998) depreciation in the crisis-hit country worsens export prospect in other countries. This process is rather long lasting – depending on the structure of trade contracts – but probably not shorter than 3 months. Faster reaction involves the expectation mechanism. Trade linkages may enter the reaction function of financial market actors.

The fifth channel deals with <u>common aggregate shocks</u> such as a change in world interest rates, a slowdown in world output growth or changes in bilateral exchange rates among major world currencies.

In practice, the above channels may occur simultaneously and the separation of their effects is statistically difficult if not impossible.

7.3. Empirical Investigation of Contagion Effect in CIS Countries

Rawdanowicz (2001) analyzed the spread of the Russian crisis among selected CIS and CEE countries without formal differentiation between contagion and spillovers. In the first approach author employed a simple probit model testing trade linkages between crisis-affected countries and Russia.

The crisis was defined with a binary variable (1 – crisis occurred, 0 – no crisis occurred). Russia represented the ground-zero country. Out of the 24 transition countries in the sample, 6 were identified as crisis-hit countries, on the basis of expert assessment (Belarus, Georgia, Moldova, Kazakhstan, the Kyrgyz Republic, and Ukraine). Given the numerous problems with data availability and reliability the crisis variable was explained only with the use of trade shares and a single macroeconomic variable.

The trade variable was constructed as the cumulative share of exports to the ground-zero country and other countries that were previously hit by the crisis in total exports of a country in 1997 (the last year before the Russian crisis). For countries that did not experience the crisis it was the cumulative share of exports to all crisis-hit countries. Due to data constraints the macroeconomic variable covered only the ratio of total reserves minus gold (at the end of the third quarter of 1998) to exports (for 1998 as a whole, fob).

Figure 7.1 specifies probabilities of a crisis in each analyzed country basing on estimation results provided by the above-mentioned probit model. Given a cut-off point of 50%, the model failed to predict one crisis out of six, which really did happen (the Kyrgyz Republic), and selected two potential crisis episodes, which did not happen (Lithuania and Tajikistan). What concerns the Kyrgyz Republic, the official trade statistics probably underestimated the actual share of its export to Russia (including unregistered "shuttle" export) and other crisis-hit countries[28]. Adopting a higher cut-off point of 75% the model failed to predict two crises, which really did happen but avoided issuing a false signal in relation to crises, which did not happen.

Figure 7.2 shows a trade matrix between the crisis-effected countries what gives an additional, illustrative confirmation of an importance of the trade channel of crisis transmission.

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[28] Uzbekistan, being an important trade partner of the Kyrgyz Republic, also experienced macroeconomic problems similar to currency crisis. However, due to lack of credible statistics the country was dropped from the examined sample. In addition, Uzbekistan and Kazakhstan adopted numerous trade restrictions in relation to Kyrgyz export. Kyrgyz export also suffered from a decline of gold prices in 1998.

Figure 7.1. Contagion crisis probability in transition countries basing on trade links – results of the probit model

Country	Actual crisis*	Fitted probability	Cut-off = 0.50	Cut-off = 0.75	Country	Actual crisis*	Fitted probability	Cut-off = 0.50	Cut-off = 0.75
Ukraine	1	0.9154	1	1	Latvia	0	0.1640	0	0
Moldova	1	0.9474	1	1	Lithuania	0	0.5277	1	0
Kyrgyz Rep.	1	0.1411	0	0	Poland	0	0.0000	0	0
Belarus	1	1.0000	1	1	Romania	0	0.0109	0	0
Georgia	1	0.5739	1	0	Slovakia	0	0.0424	0	0
Kazakhstan	1	0.8924	1	1	Slovenia	0	0.0013	0	0
Armenia	0	0.0000	0	0	Tajikistan	0	0.5309	1	0
Azerbaijan	0	0.0011	0	0	Turkey	0	0.0000	0	0
Bulgaria	0	0.0000	0	0	Turkmenistan	0	0.0000	0	0
Czech Rep.	0	0.0002	0	0	Albania	0	0.0000	0	0
Estonia	0	0.3009	0	0	Croatia	0	0.0000	0	0
Hungary	0	0.0018	0	0	Macedonia	0	0.0656	0	0

Note: * binary variable: 1– presence of a crisis; 0 – no crisis.
Source: Rawdanowicz (2001).

Figure 7.2. Trade matrix of the crisis-affected countries in 1997 (% of total exports)

A\B	Russia	Ukraine	Moldova	Kyrgyz Rep.	Belarus	Georgia	Kazakhstan
Russia		26.2	58.2	16.3	64.5	30.0	33.9
Ukraine	8.5		5.6	0.8	5.9	3.5	4.8
Moldova	0.4	2.1		0.0	1.3	0.0	0.0
Kyrgyz Rep.	0.2	0.0	0.0		0.1	0.0	1.0
Belarus	5.4	5.8	4.0	1.5		0.4	0.7
Georgia	0.2	0.3	0.5	0.2	0.0		0.0
Kazakhstan	2.9	0.7	0.2	14.3	0.7	1.7	

Note: % of country B's exports to country A in terms of country B's total exports.
Source: Rawdanowicz (2001).

In order to gain more insights into how the Russian crisis spread Rawdanowicz (2001) conducted additional back-of-the-envelope calculations within the framework of a balance of payments model proposed by Masson (1999). This model is capable of demonstrating how a large enough shock to the current account can trigger a crisis if foreign debt servicing exceeds a certain level. Borrowing costs reflect expectations of crisis.

Results of these estimations indicated that most of the countries under investigation (18 out of 24) had fundamentals that were conducive to the outbreak of crisis at the end of 1997. Only two fell in the zone of multiple equilibrium (Bulgaria and Poland) and 5 featured "healthy" fundamentals (the Czech Republic, Hungary, Russia, Slovenia, Turkmenistan).

Among the countries with a low probability of crisis, Russia and Turkmenistan deserve closer examination. Russia, despite its very low reserves (even by the standards of the sample countries) and significant external debt, recorded a substantial trade surplus of 6.2% of GDP. It should be noted, however, that the high trade surplus in Russia was overestimated, as the

deficit in shuttle trade was not included. Due to a decline in oil and natural gas prices at the end of 1997 and 1998, Russian trade and current account surplus rapidly disappeared in the course of 1998. In addition, through all the decade of the 1990s Russia suffered a negative capital account balance (massive capital flight). In the case of Turkmenistan, very high international reserves (over 47% of GDP) made this country, according to the model, resistant to balance of payments shocks.

The high probability of a crisis occurrence in many examined countries was caused by their high debt and trade deficit ratios. If we assume the different level of sustainable trade (current account) deficit in individual countries (see subsection 5.2) these results can be misleading. In fact, assessment of fundamentals quality should include a broader set of macroeconomic and institutional variables such as public debt, fiscal balance, current account balance, inflation, unemployment, the structure of foreign capital flows, exchange rate regime.

Taking into account the above reservations Rawdanowicz (2001) made a synthesis of the results obtained in the two above reported econometric analyzes (**Figure 7.3**).

Figure 7.3. Contagion crisis probability in transition countries: comparison of results of the probit and balance of payments models

	Crisis		No crisis	
	Good fundamentals	**Bad fundamentals**	**Good fundamentals**	**Bad fundamentals**
Significant trade linkages		Belarus, Georgia, Kazakhstan, Moldova, Ukraine		Lithuania, Tajikistan
Insignificant trade linkages		Kyrgyz Republic	Bulgaria*, Czech Republic, Hungary, Poland*, Slovenia	Albania, Armenia, Azerbaijan, Croatia, Estonia, Latvia, Macedonia, Slovakia Turkey, Turkmenistan

Notes: * – multiple equilibria.
Source: Rawdanowicz (2001).

Significance of trade linkages was determined on the basis of the probit model whereas quality of fundamentals was assessed using Masson (1999) balance-of payments model.

Most countries that did not experience a crisis (Albania, Armenia, Azerbaijan, Croatia, Estonia, Latvia, Macedonia, Slovakia, Turkey, Turkmenistan) had bad fundamentals although there was insufficient crisis propagation to trigger crises there (at least in trade linkages, as no formal inferences about financial linkages could be drawn). However, as was noted earlier, the criteria for "bad fundamentals" were too "sensitive" and selected cases, which did not really belong to this category. Thus, the group might incorporate countries that either had bad fundamentals and no crisis propagation or had relatively good fundamentals and crisis propagation (if any) was not strong enough to trigger financial turmoil.

Five countries (Bulgaria, the Czech Republic, Hungary, Poland, and Slovenia) proved to be in "healthy" condition (Bulgaria and Poland had tendencies to multiple equilibria) and had insignificant trade linkages. As these countries did not experience a crisis, they probably did not experience enough crisis propagation via financial channels.

Lithuania and Tajikistan turned out to be interesting cases. These countries were not defined as crisis-hit though both the probit model and balance of payments model indicate that they should have had crises. Although Tajikistan was not chosen as a crisis-hit country it experienced depreciation of its ruble in November 1998. What concerns Lithuania, 45% of its exports in 1997 went to crisis-hit

countries (mainly Russia and Belarus), its external debt stood at 33.8 per cent of GDP (28.2 per cent excluding debt to IFIs). The factor, which helped this country to retain good reputation in financial investors' eyes and resist speculative pressure, was the currency board regime.

Peculiarities of the actual trade structure and trade problems of the Kyrgyz Republic have been explained earlier in this section. In addition, financial channels should be also taken into consideration. At the end of 1997, 18.7% of the country's external public debt was owed to CIS creditors on a non-concessionaire basis and this was roughly equal to the level of its official international reserves excluding gold. Thus, the withdrawal of Russian and Kazakh creditors (see IMF, 1999) could have impacted the *som*, especially in the face of a very shallow exchange rate market. Moreover, the high dollarization and low banking deposits indicated a lack of domestic confidence to the Kyrgyz currency.

Summarizing the above results, one can conclude that all the crisis-hit countries might be classified as having conditions conducive to crisis. They experienced not only the balance-of-payments fragility but also chronic fiscal problems and numerous structural flaws (Dąbrowski, 1999). Thus, there were not "innocent victims" in the sample, i.e. countries with good fundamentals still suffering crises from a pure contagion effect. The shock propagation through both trade and financial channels determined only the actual timing of the individual crises.

8. Economic and Social Consequences of Currency Crises

In the public discussion about currency crises and other kinds of financial turbulence the majority of opinions point at crises' severe costs (see e.g. Stiglitz, 1998). According to this dominant view, crises are unfavorable incidents and should be avoided using all possible means. On the other hand, one can expect that crises, punishing evident cases of economic mismanagement, could have disciplining effect on governments (and indirectly on their electorate), push necessary reforms (Rodrik, 1996), and may automatically correct imbalances created by politicians[29]. The comparison with a mechanism of bankruptcy on the micro-level seems to be a good parallel here.

Among the countries analyzed, Bulgaria seems to be the best case of such a positive self-correcting mechanism, involving a change of government, comprehensive package of economic reforms and introducing a currency board just after the 1996–1997 crisis (Ganev, 2001). Other such positive examples involve Mexico (Paczyński, 2001) and Thailand (Antczak M., 2001).

However, it is not easy to find a more comprehensive and balanced picture of potential and actual crises consequences in the existing crisis literature. First, most of theoretical models and empirical researches concentrate on factors causing currency crises rather than on their effects. Among the latter the attention is put on the immediate negative consequences such as output decline, income contraction, higher unemployment, fiscal costs of restructuring of the financial sector (e.g. WEO, 1998; Milesi-Ferretti and Razin, 1998; Dąbrowski, 1999) rather than on medium and longer term policy implications.

Generally, one can distinguish the following categories of crisis costs (Błaszkiewicz and Paczyński, 2001): (i) fiscal and quasi-fiscal costs resulting from increased burden of public debt service (due to devaluation and higher interest rates) and necessity to restructure financial institutions and some

big corporations; (ii) costs related to lost economic growth; (iii) social costs connected with unemployment, decline in real incomes, worsened health and education situation, etc., leading to bigger poverty; and (iv) political costs. Most of these issues are difficult to measure, especially in international comparisons.

However, Błaszkiewicz and Paczyński (2001) attempted a series of comparative analyzes of various crisis effects with special attention given to transition economies of Eastern Europe and the former USSR. They tried to get a more comprehensive picture of the crisis consequences, including policy changes. The whole investigated sample (ALL) covered 41 countries, and some regional sub-samples were also identified. Transition economies (TR) group contained 23 countries, of which 6 countries (FSU 98 – Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Russia and Ukraine) were considered as those affected by the Russian 1998 crisis and its contagion effects. Southeast Asian countries, which underwent 1997 series of currency crises (Indonesia, Korea, Malaysia, Philippines and Thailand) were nicknamed ASIA97. Finally Latin American sub-sample (LAM) included Argentina, Bolivia, Brazil, Chile, Mexico, and Venezuela.

In the first approach, Błaszkiewicz and Paczyński (2001) analyzed the behavior of several macroeconomic variables before and after crises and described both their positive and negative consequences.

Looking at median GDP growth rate (see **Figure 8.1**) for the entire investigated sample (ALL), the economic stagnation around a crisis year is clear. The signs of the slowdown could be observed two years before a crisis with the 1.5% recession in the crisis year. However, from there on economies tend to grow faster than before.

Transition economies already suffered from recession three years before a crisis but it was connected, at least partly, with the early transition output decline caused main-

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[29] Additionally, crises brought the experience to the international financial organizations (Kohler, 2001).

Figure 8.1. Real GDP growth rate before and after the crisis (median)
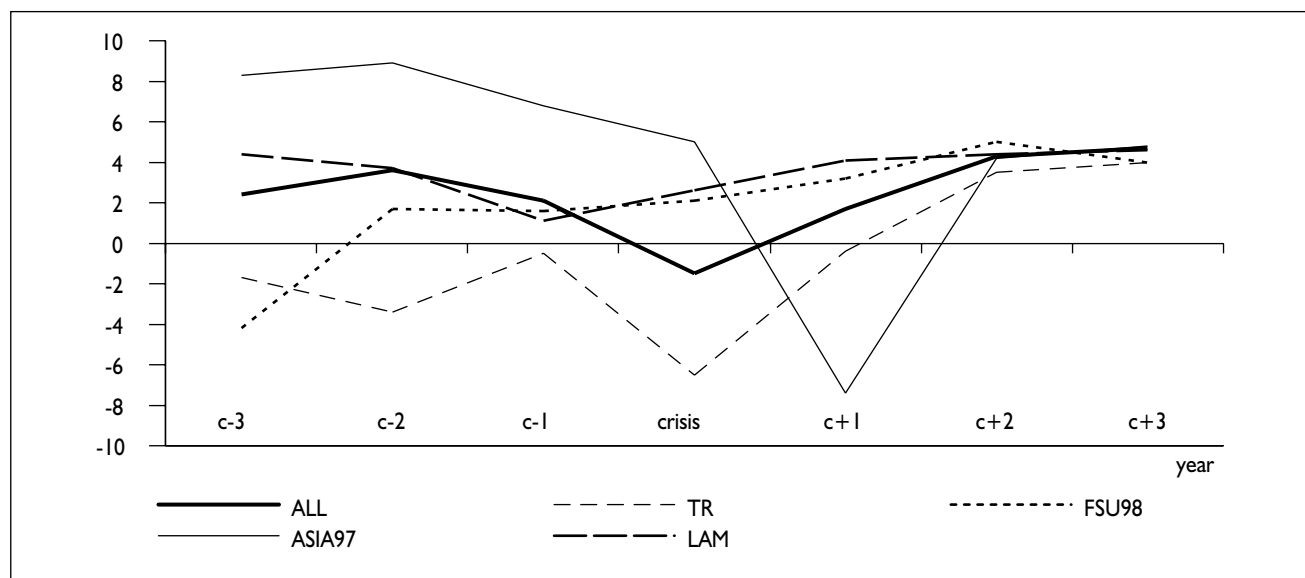
Source: Błaszkiewicz and Paczyński (2001).

ly by structural reasons. Then the situation improved a bit but a crisis worsened it again and the negative growth rate dropped to -6.5%. This rate returned to its pre-crisis level a year after the crisis and economic growth resumed thereafter.

The same pattern can be identified for the FSU98 sub-group. The 1998–1999 crises occurred exactly when these economies started to recover after several years of early transition output decline. Consequently, the impact of a transition itself was perhaps more pronounced than the impact of the crises. However, the crisis brought a major setback to a weak recovery that started to be observed in FSU countries around 1997. Three years after the crises growth rates remained positive staying in the moderate range of 3–4%[30].

In South-East Asia, the 1997 crisis brought the median rate of output growth down from more than 8% in 1994 to an estimated 4.8% in 2001. In terms of the scale of growth contraction, the ASIA97 group stood out in the entire examined sample (with the recession of 7.4% a year after the shock). However, this group was also exceptional in terms of its pre-crisis results with growth rates of around 8% annually.

The economic growth in Latin America started slowing down earlier with the sharpest drop a year before the crisis. However, two years after crises the GDP growth rate surpassed its pre-crisis high.

While disaggregating GDP median growth rates by demand components Błaszkiewicz and Paczyński (2001) found that investments and imports contracted the most sharply. The former suffered more seriously and for longer periods with ASIA97 recording the highest and longest investment contraction and LAM group – the most limited and shortest one.

Estimation of the potential output loss caused by crises was the next step done by Błaszkiewicz and Paczyński (2001). There are, however, methodological problems connected with such a simulation. It is not clear whether the growth path before the outburst of a crisis was sustainable. This problem can be handled by adding some subjective corrections to the average growth rates before crisis episodes (used as an approximation of a trend).

The obtained results (**Figure 8.2**) do not differ significantly from those obtained for a larger sample of countries in WEO (1998). There were, however, large differences between regional sub-samples. On one side, LAM countries turn out to be relatively weakly affected in terms of lost GDP growth. On the end, ASIA97 group suffered massive GDP losses what could be explained by high growth rates before 1997 (and, even after some downward corrections, high growth trend). Transition economies (TR) and in particular the FSU98 group recovered relatively quickly and with only limited output losses.

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[30] The last year in the crisis window for the FSU98 group was the IMF forecast from May 2001.

Figure 8.2. Costs of crises in terms of lost output relative to trend

	Average recovery time	Cumulative loss of output (% of GDP)	Crises with output losses (%)
WEO (1998) sample	1.6 E(1.5)	4.3 E(4.8)	61 E(64)
ALL sample (Blaszkiewicz & Paczynski, 2001)	1.4	6.4	71
TR sub-sample	1.1	4.8	69
FSU98 sub-sample	1.1	2.9	71
ASIA97 sub-sample	2.4	16.9	100
LAM sub-sample	0.8	1.8	50

Notes: In the WEO (1998) sample the numbers in parentheses refer to emerging economies group. Average recovery time is calculated as the average time of returning to the trend growth path. Cumulative lost of output is calculated as a sum of differences between observed and trend growth figures, until an economy returns to trend growth path. Last column shows the percentage of countries that experienced output loss after a financial crisis.

Source: Błaszkiewicz and Paczyński (2001).

Figure 8.3. Net capital inflow before and after the crisis
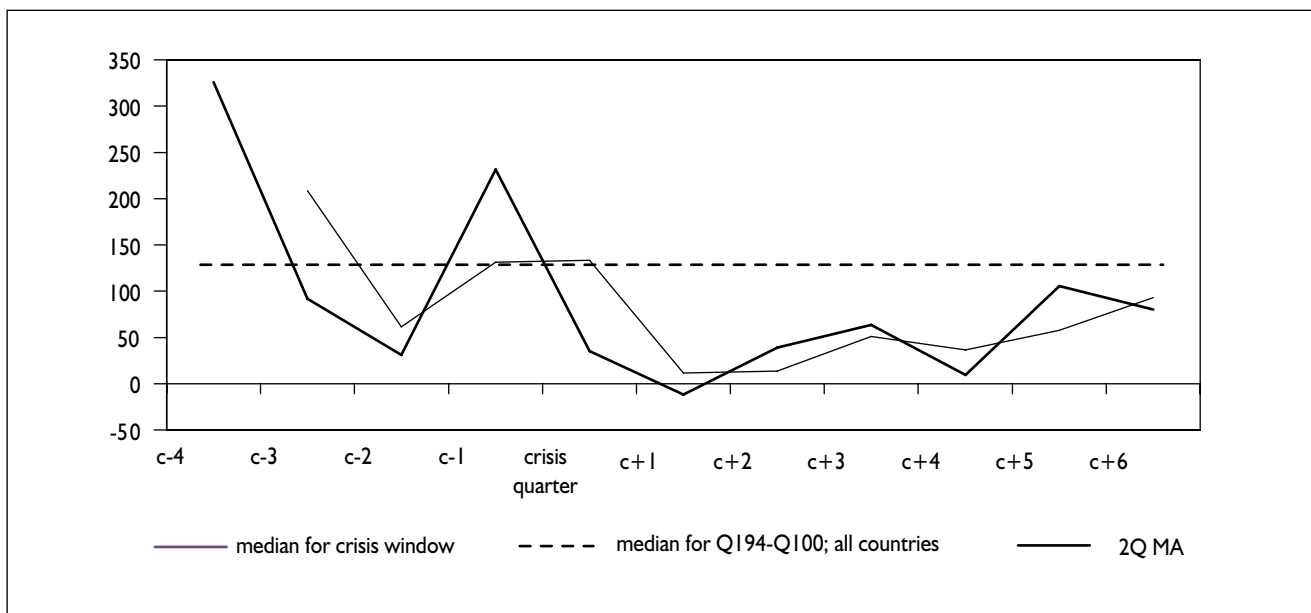
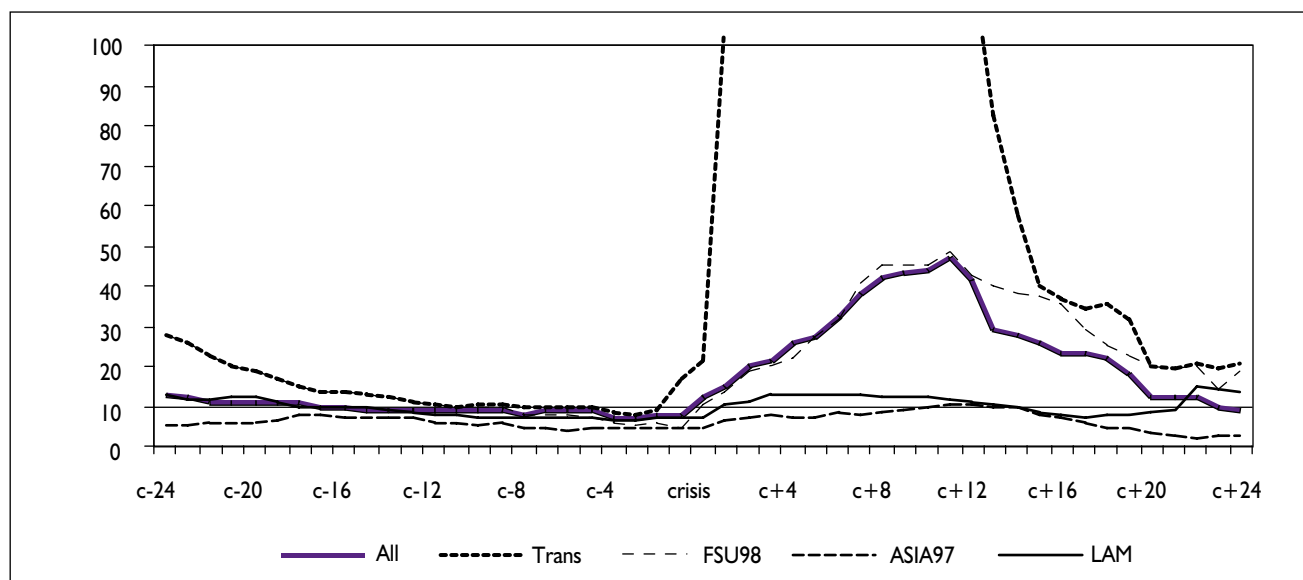Source: Błaszkiewicz and Paczyński (2001).

All the investigated countries suffered from persistent current account imbalances before the crisis. This related particularly to transition economies where the median current account deficit was equal to 7.4% of GDP. However, the impact of currency crises on trade balance occurred to be limited. Even though it started to improve after devaluations, it turned positive only in Asia and Latin America. In the third year after the crises, the trade balance for the whole sample deteriorated again. In Latin America imports outperformed exports already in the second year after the crisis. Trade balance in transition economies improved only for one year after devaluation. The only "textbook case" scenario in which currency devaluation improved trade competitiveness was observed in the Asia97 group.

The pattern for CA recovery was similar – it is only in Asia where crises brought the CA into a surplus position. In other groups, current account deficit shrank only during the first year after a crisis, but widened thereafter.

The above results confirm the well-known observation that devaluation brings usually the short-term windfall gains only, while causing many other adverse effects such as higher inflation (see below).

Crisis-generated changes in the current account balances must be reflected on the capital account (and, in fact, these are often developments on capital account side, which trigger dramatic shifts in a current account). Up to one year before a crisis, countries in the examined sample were experiencing a median net capital inflow of more than US$300 million per quarter. This figure decreased significantly in the quarters preceding the crisis, turning negative in the first quarter after the crisis episode (see **Figure 8.3**). Then, net capital inflows remained repressed for at least

Figure 8.4. CPI, y-o-y percentage change before and after the crisis; monthly data (medians for subgroups)

Source: Błaszkiewicz and Paczyński (2001).

next two years, staying below the pre-crises levels and below the median value for the whole sample in the 1Q94–1Q00. The same held true for portfolio and foreign direct investments. Not surprisingly the drop was sharper for short-term flows. Three years after the crisis FDI and portfolio investments still remained substantially lower than before.

In the period before a crisis a clear disinflation trend could be observed and inflation was generally low, staying at single digit levels. A crisis represented a dramatic change in the trend with CPI rising on average (median of the sample) by more than 40% in 12 months after the crisis. **Figure 8.4** suggests that on average it took at least another year until 12-month rate of CPI growth returned to a single digit level.

In transition economies, currency crises had the strongest inflationary impact what was probably connected with their fresh inflationary history, low monetization level and a relatively high level of currency substitution. On the other hend, Asian countries experienced the very moderate inflationary consequences, with median CPI rising from around 4% before the crisis to some 10% a year later. Aziz, Caramazza, and Salgado (2000) obtained similar results.

A drop of real wages was visible only in the first year after a crisis. In the second year wages tended to rebound strongly. However, the downward impact on real incomes was possibly stronger, due to increased unemployment (see **Figure 8.5**). With the exception of Latin American countries, unemployment started to increase already a year before a crisis and continued a strong upward trend after-

wards. This could suggest that devaluation did not help in protecting employment.

Finally, Błaszkiewicz and Paczyński (2001) tried to investigate to what extent currency crises helped to correct previous economic policies and whether these corrections were sustainable. Due to limited cross-country data availability they could test only one proxy indicator – the behavior of the current account before and after the crisis. The current account balance relative to GDP (in percent) was studied in three years preceding and three years following a crisis year. A "problem" with current account imbalance was defined as deficit larger than 4% of GDP in any two of the three preceding years or deficit of more than 6% of GDP in a year before a crisis. A current account "problem" after a crisis was defined in a similar way: deficit larger than 4% of GDP in any two of the three following years or deficit larger than 6% of GDP in the third year after a crisis.

Such a threshold allowed for identifying 13 crises where current account was potentially a problem beforehand. Of these, in 9 cases the situation improved and current account deficits were reduced (or turned into surpluses) during three years following crises, while in 4 cases there was no much improvement. Additionally, in 5 cases, the current account deficits widened significantly after financial turbulence, while no problems were indicated before a crisis. In addition, the data were not always available for all three years after crises, so the statistics might actually look even worse (i.e. crises tend to bring even less improvement to CA balances). The general conclusion from that exercise

Figure 8.5. Unemployment rate before and after the crisis
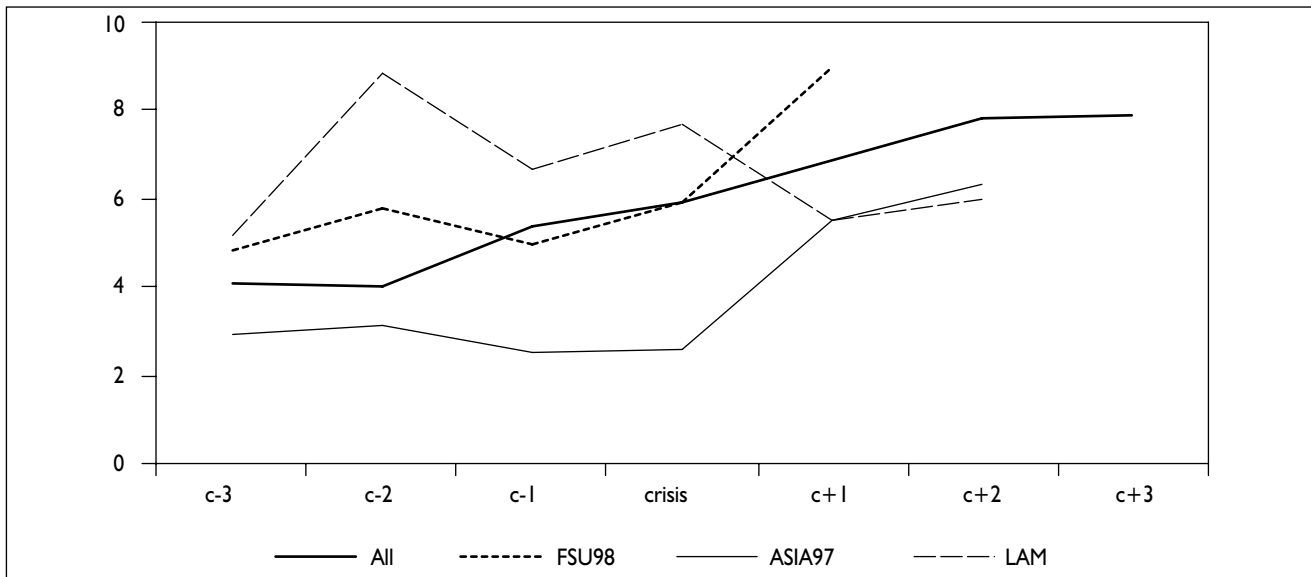
Note: Presented figures are sample medians.
Source: Błaszkiewicz and Paczyński (2001).

was that there was no common pattern in the sample – in some countries previous imbalances were removed by a crisis, while in the others they remained in place or even newly emerged.

Generally, Błaszkiewicz and Paczyński (2001) study does not provide us with the clear answers related to currency crisis consequences. Obviously, the economic and social costs of the crises estimated in terms of lost output, higher inflation, higher unemployment, lower real wages, and negative fiscal implications of higher debt burden and

financial sector restructuring are substantial and painful. The question, as to whether crises can bring *catharsis* to economies in terms of better economic policy and removing previous imbalances cannot be answered in a univocal way. There are examples of positive changes but they relate only to a part of crisis episodes. Perhaps the fear of crisis can be considered as the most important but indirect (and rather immeasurable) effect disciplining governments and central banks.

9. Crisis Prevention

Any attempt to give a comprehensive answer how to avoid currency crises would have involve discussing a broad spectrum of issues related to both macroeconomic policies and structural/institutional measures, going well beyond this paper's agenda. To give a good example, Mishkin (2001, p. 13) paper on the prevention of financial crises in emerging market countries analyzes 12 rather broad areas of policy reforms: (1) prudential supervision; (2) accounting and disclosure requirements; (3) legal and judicial systems; (4) market based discipline; (5) entry of foreign banks; (6) capital controls; (7) reduction of the role of state-owned financial institutions; (8) restrictions on foreign denominated debt; (9) elimination of the "too-big-to-fail" principle in the corporate sector; (10) sequencing financial liberalization; (11) monetary policy and price stability; and (12) exchange rate regimes and foreign exchange reserves. This list is clearly not complete as Mishkin mainly focused on the financial market turbulence. One can add here the fiscal policy and fiscal management, privatization of non-financial enterprises, trade policy or broad range of political/institutional factors.

In order to limit our analysis to reasonable size and avoid repeating observations and conclusions formulated in the diagnostic part of this paper (sections 4-7), we will concentrate below on two specific questions: (i) the role foreign exchange reserves (international liquidity); and (ii) the role of the IMF programs in preventing currency crises.

9.1. The Role of International Liquidity in Preventing Currency Crises

Many economists (e.g. Feldstein, 1999; Mishkin, 1999; Radelet and Sachs, 1998) call for higher foreign exchange reserves holdings as a measure helping to prevent currency crises[31]. At first glance, this proposal seems to make sense: even with less-than perfect economic policy, country could survive any speculative attack, provided that its central bank has enough foreign exchange reserves. What is more, if the reserves are high enough, the attack (bound to fail) will never happen, according to first- and second-generation crisis models (see section 3). In addition, numerous empirical studies suggest that insufficient international liquidity was a good predictor of the recent crises (see e.g. Radelet and Sachs, 1998, Tornell, 1999, Bussière and Mulder, 1999).

This proposal requires, however, a serious theoretical and empirical assessment, taking into consideration both benefits and costs of maintaining high liquidity. First, one must answer the question what is the sufficient level of the international reserves, which gives a full guarantee that any speculative attack will be resisted. Theoretically, the minimum "safe" level of central bank's international reserves under a fixed exchange regime is equal to its high-powered money (and this is a standard norm under the currency board regime). However, if a central bank wants to act as the "lender of last resort" the level of foreign exchange reserves' backing should be higher, somewhere between the equivalent of monetary base and broad money (probably at least the equivalent of M1, to be able to stop a bank run). If a central bank wanted to sterilize its foreign exchange interventions to avoid the liquidity squeeze in the economy, any level of international reserves would not be sufficient enough to provide a full anti-crisis assurance.

Second, keeping international reserves is costly for a central bank, and consequently for a state budget, which gets most of central bank profit. These costs come from the interest rate differences, which can have various forms in practice. For example, if central bank (or government) must borrow abroad, in order to increase its official reserves, this is the difference between the borrowing costs and foreign

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[31] The entire subsection 9.1 heavily draws from Szczurek (2001).

Figure 9.1. Evaluating optimal international liquidity – marginal cost and benefit
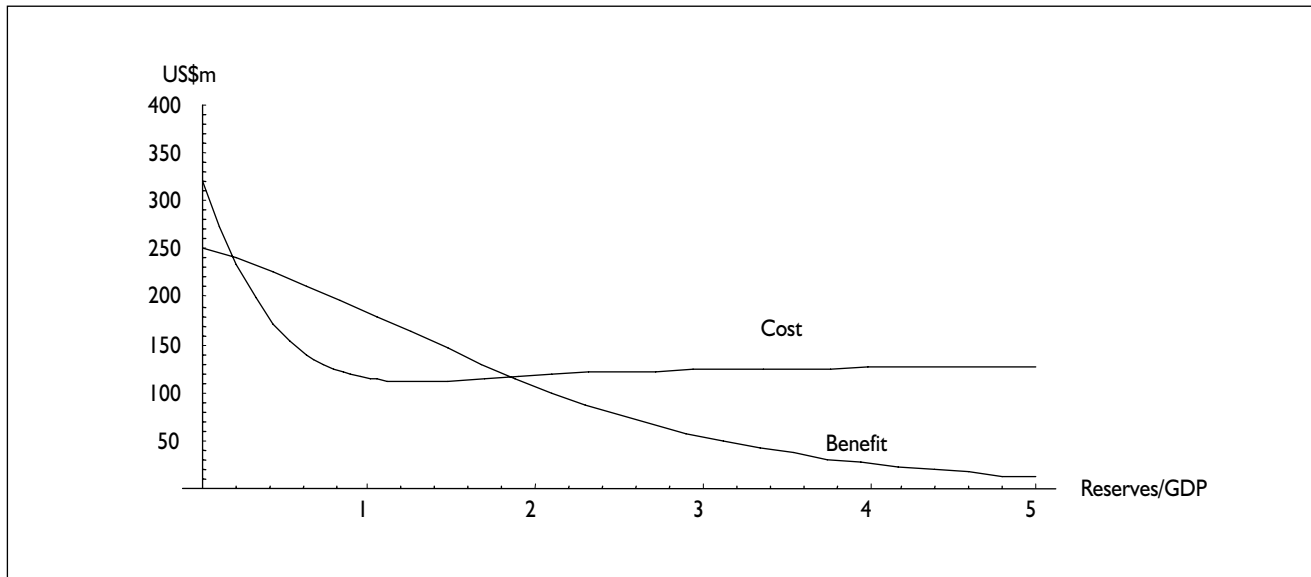
Source: Szczurek (2001).

interest rate income, which central bank can gain from prudent location of its international reserves (these are usually US Treasury bonds and other similar instruments). If accumulation of international reserves pushes the central bank into the structural surplus position, this is the difference between interest rate on domestic currency denominated money market instruments and the above mentioned interest rate on reserves investment.

Szczurek (2001) attempted to estimate the optimal level of foreign exchange reserves using a simple policy optimization model. As we see from **Figure 9.1** there are two possible equilibria. One is at international liquidity equal to zero. Increasing liquidity costs more than it brings because fundamentals are too bad for a slight improvement of liquidity to change the probability of a crisis much. The second equilibrium is in the point where downward sloping marginal benefit and marginal cost curves cross each other. It is clearly the optimal level of liquidity: the total gain (which is the surface below the marginal benefit curve) exceeds the total cost.

Szczurek (2001) used the above model for two applications. First, he tried to estimate what is the optimal holding of international liquidity. The second application involved finding out the perceived cost of the currency crisis to policy-makers.

Obviously, a crisis results in certain costs both to the economy and the policy makers. What concerns the economy it can be observed empirically as, for instance, the deviation of the post-crisis GDP growth from its long-term

trend (see section 8). The second cost element relates to reputation losses of policy makers themselves, and probably is the function of the degree of the rigidity of the foreign exchange regime, and the length for which the regime was maintained, past inflation experience, but also personality of the central banker, etc.

By assuming that the analyzed countries hold optimal (from the point of view of the policy maker) international liquidity, it was possible to estimate "how much the crisis is feared", or the total cost of the currency crisis (including the reputation cost), as viewed by the policymaker.

The sample covered 33 developing and transition economies participating in the global financial market. The overall results proved that international liquidity did matter very much in averting currency crises. The results for the average (from the pool) country are shown in **Figure 9.2**. Vertical scale represents optimal liquidity (as a reserves/short-term debt ratio), corresponding to the assumed cost of the currency crisis (as a percentage of GDP).

The results indicate that the IMF's recommendation of keeping foreign exchange reserves' stock equal to the short-term foreign debt seems to be insufficient. Assuming the cost of the crisis at just 1% of GDP, optimal international liquidity is 1.6 times the short-term foreign debt. If we believe the crises are more costly than 1% of GDP, the reserves held will be a multiple of the short-term foreign debt.

How much the policymakers fear the crisis? **Figure 9.3** shows quite a wide disparity of implicit currency crisis cost

Figure 9.2. Optimal liquidity holding versus cost of the crisis
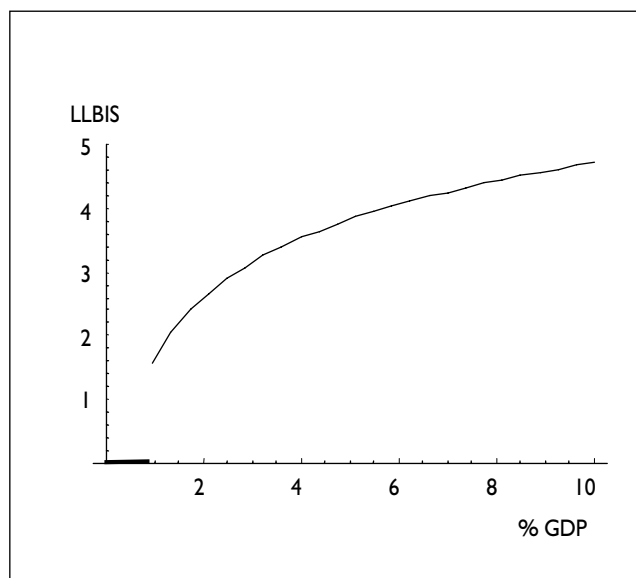
Source: Szczurek (2001).

Figure 9.3. Crisis cost to the policy maker, as of end-99

Country	% of GDP
MALAYSIA	12.1%
CZECH REPUBLIC	5.0%
POLAND	3.3%
CHILE	2.7%
SLOVAK REPUBLIC	2.1%
KOREA	2.0%
PHILIPPINES	1.8%
SOUTH AFRICA	1.5%
RUSSIA	1.4%
ARGENTINA	1.3%
COSTA RICA	1.2%
ECUADOR	0.9%
CHINA,P.R.: MAINLAND	0.9%
COLOMBIA	0.8%
BRAZIL	0.8%
ROMANIA	0.4%
PAKISTAN	0.4%
DOMINICAN REPUBLIC	0.3%

Source: Szczurek (2001).

for the policy makers: from 12.1% of GDP (in Malaysia) to 0.3% (in the Dominican Republic). The results seem to have little to do with the exchange rate arrangements, which is somewhat surprising (as the peg exchange rate regimes should involve higher reputation costs of currency depreciation): apart from Malaysia, the first nine countries on the list had a floating or managed floating exchange rate.

9.2 The Role of the IMF in Preventing Currency Crises

As the basic statutory mission of the International Monetary Fund (IMF) is to deal with balance-of-payments disproportions it is reasonable to ask what has been the role of this organization in preventing currency crises of the last decade (or resolving them when already happened). This question is particularly important as many well-known economists question effectiveness of the IMF in the recent crisis episodes. Meltzer (1998) critique of the IMF and US Treasury role before and during the Mexican crisis, and Radelet and Sachs (1998) critique on the IMF role in Thailand and Indonesia are just two examples of a large body of such opinions.

Antczak, Markiewicz and Radziwiłł (2001) investigated the role of the IMF in preventing the 1998–1999 series of currency crises in five CIS countries – Russia, Ukraine, Moldova, Georgia and Kyrgyzstan (RUMGK). One can distinguish two stages of the IMF cooperation with the CIS countries. In the first stage covering the period of 1992–1995 the IMF offered mainly the short term programs – the Structural Transformation Facility (STF) and the Stand-by arrangements (SBA). The STF financial line was designed especially for transition economies at the beginning of 1993, and involved rather limited and weak conditionality (Dąbrowski, 1998). It aimed to provide less advanced transition economies (mainly in the FSU) with the limited financial support and prepare them to receive a standard Fund aid in future. The second stage of the IMF assistance (1995–1998) was dominated by the medium-term Extended Fund Facility (EFF) and Enhanced Structural Adjustment Facilities (ESAF)[32] containing a much more comprehensive conditionality. Generally, the size of net IMF financing was substantial and picked up before the crisis (1997–1998) but was also volatile at least in the case of Russia, Ukraine and Moldova.

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[32] EFF is a standard medium term program while ESAF represents a special type of the medium term financial aid provided for low and lower-medium income countries, on concessionaire terms. In the investigated sample Kyrgyzstan and Georgia were eligible to receive this type of assistance. After the crisis Moldova became qualified together with Georgia and Kyrgyzstan to receive the Poverty Reduction and Growth Facility (PRGF), the successor of ESAF.

As deep fiscal imbalances constituted the most important cause of the CIS currency crises in 1998–1999 (see section 5.1 and Siwińska (2000), Antczak R. (2001), Markiewicz (2001), Radziwiłł (2001)), the IMF attitude to this problem seems to be a crucial indicator of the relevance and effectiveness of its adjustment programs. Unfortunately, the IMF record in this sphere was far from being satisfactory. The actual fiscal balances occurred to be always worse than those estimated by the IMF as sustainable even under very optimistic assumptions.

There were several reasons of this failure both on the IMF and on client-countries' side. First, forecasts of GDP growth rates were systematically overestimated, particularly in the case of Russia, Ukraine and Moldova (Antczak, Markiewicz and Radziwiłł, 2000). The excessive optimism related to perspectives of overcoming the transformation output decline and positive growth effects of the proposed reform measures might serve as an explanation in the beginning of transition only. Later it was rather the conscious mistake repeated systematically both by governments of the analyzed countries and the IMF. The governments had the strong political reason to do it as presenting an optimistic growth prospects could soften the resistance against unpopular adjustment measures and increase a room of maneuver in fiscal planning. The IMF permanently accused by the populist-minded politicians and economists of being too tough and imposing unnecessary austerity on poor countries, increasingly wanted to present its actions as growth oriented and focusing on poverty alleviation[33]. Also very formally, medium term programs such as the EFF or ESAF had to contain economic growth objectives in order to be accepted by the IMF Executive Board. Hence, wishful thinking was often taken as serious forecast.

The false growth assumptions had an important impact on the sustainability of the programs. Prospects of high growth rates limited the pressure on fiscal adjustments as projected debt accumulation did not significantly exceed a forecast real GDP growth and was, therefore, not seen as an important problem.

In addition, fiscal performance criteria were calculated initially in the IMF programs exclusively on a cash basis while arrears became the important and persistent source of financing budget deficit (calculated on the accrual basis)[34]. The failure of governments to collect projected revenues

and execute planned expenditures also pushed them towards dubious non-cash and other quasi-fiscal operations that both decreased the efficiency of fiscal management and seriously distorted economic life. The IMF recognized these distortive practices as a serious problem relatively late. As result, stopping arrears and non-cash settlements was added to the conditionality lists.

Figure 9.4. Compliance with the IMF quantitative performance criteria

Country	Program	Compliance (full = 100)
Russia	SBA (1995)	100
Russia	EFF (1996)	77
Ukraine	SBA (1995)	(off track) 76
Ukraine	SBA (1996)	99
Ukraine	SBA (1997)	(off track) 62
Moldova	SBA (1993)	86
Moldova	SBA (1995)	100
Moldova	EFF (1996)	82
Georgia	SBA (1995)	100
Georgia	ESAF (1996)	89
Kyrgyzstan	SBA (1993)	(off track) 70
Kyrgyzstan	ESAF (1994)	86

Note: The index is calculated as the simple average of compliance on each performance criteria at each test date. Compliance on a given condition at a given date is evaluated using the following scale: met=100, waived=50, met after modification=50, waived after modification=30, not met=0.

Source: Antczak, Markiewicz and Radziwiłł (2001) on the basis of Mercer-Blackman and Unigovskaya (2000).

Finally, the IMF presented a substantial degree of tolerance in relation to countries' expansionary fiscal policies and their failures to meet the fiscal targets agreed under the Fund supported programs. Formally, the IMF did express its concern about the fiscal imbalances in all their programs and Article IV consultations. Additionally, the large and increasing share of the overall number of structural conditionality benchmarks was related to the reform of the fiscal sector.

However, this effort was relatively poorly reflected in the performance criteria, which were relatively lenient and exhibited poor conditionality. Their implementation went even worse. Nevertheless, the IMF continued to provide support to countries with very high fiscal imbalances, often praising them for the progress towards the market economy, stabilization, and long-term growth. Even if fiscal slip-

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[33] The earlier mentioned renaming ESAF into PRGF is one of the examples of such a PR-type window dressing.

[34] Accordingly, Buiter (1997) stated that the cash deficit indicators used widely by the IMF in its programs were "myopic" and "more than useless" in the evaluation and design of macroeconomic policy packages.

Figure 9.5. Compliance with IMF structural conditionality

Country	Program	Number of structural benchmarks								Compliance (full = 100)
		Trade/ Excha-nge System	Pricing	Public Enter-prise	Fiscal sector	Finan-cial sector	Privati-zation	Other	Total	
Russia	SBA	3	-	-	1	-	-	2	6	50
Russia	EFF	2	1	1	18	7	6	2	37	73
Ukraine	SBA	2	-	-	1	1	5	3	12	68
Ukraine	SBA	1	2	2	1	2	1	2	11	83
Moldova	SBA	4	1	-	3	2	3	-	13	81
Moldova	SBA	2	-	1	-	-	2	-	5	75
Moldova	EFF	6	1	1	2	1	4	1	16	90
Georgia	SBA	1	-	3	8	2	3	-	17	77
Georgia	ESAF	-	2	1	5	5	4	5	22	79
Kyrgyzstan	SBA	-	4	-	-	-	1	1	6	0
Kyrgyzstan	ESAF	1	-	7	10	8	4	5	35	79

Note: The index of compliance (last column) is calculated as the simple average of compliance on each structural benchmark at each test date. Compliance on a given benchmark at a given date is evaluated using the following scale: met=100, met to certain extent or with insignificant delay=50, insufficient information about outcome=50, not met=0.

Source: Antczak, Markiewicz and Radziwiłł (2001) on the basis of Mercer-Blackman and Unigovskaya (2000).

pages led to a program's going off-track, new programs were granted almost immediately.

Figure 9.4 presents the level of compliance with the fiscal and monetary performance criteria during implementation of the SBA, EFF and ESAF programs in RUMGK in the period of 1994–1998 using methodology of Mercer-Blackman and Unigovskaya (2000). The presented picture is not very optimistic.

The level of compliance with structural and institutional benchmarks seems to be higher than that of quantitative criteria (**Figure 9.5**) although one must take into account methodological difficulties with measuring the qualitative conditionality and its execution. Some of these benchmarks could be met only formally, for example, through preparing draft law or even its approval without real implementation. On the other hand, there is a lot of evidence that a chronic fiscal crisis and financial sector fragility in the CIS countries have very strong structural roots. It can imply that either the methodology proposed by Mercer and Unigovskaya (2000) provides too optimistic results or the IMF conditionality in this sphere has been generally weak.

The official evaluation of the IMF programs in RUMGK done by the Policy Development and Review Department of the IMF (2001a; 2001b) indicates rather high compliance with the adopted conditionality. However, Antczak, Markiewicz and Radziwiłł (2001) question this opinion, particularly in relation to Russia. According to their opinion, from the very beginning of a transition process the IMF was not insistent enough on its conditionality, especially in the area of fiscal adjustment. They also claim that the actual con-

ditionality was effectively much weaker than it was suggested by the relatively high scores on compliance presented by IMF sources. This inconsistency stemmed, among others, from several techniques of circumventing the imprecise and nontransparent conditionality invented by the client countries and tolerated by the Fund.

Summing up, Antczak, Markiewicz and Radziwiłł (2001) express their opinion that the IMF conditionality in relation to RUMGK exhibited excessive leniency, allowing them to avoid fiscal and other kinds of necessary adjustment. While flexibility was sometimes necessary, it was clearly abused in the analyzed case. The last conclusion is also relevant to many other countries and regions. For example, Brazil had eight separate stand-by programs between 1965 and 1972, Peru had 17 different arrangements between 1971 and 1977 (McQuillan, 1998) and Turkey – 16 unsuccessful programs between 1961 and 1999 (Sasin, 2001d).

In addition to weak and inconsistently executed conditionality of its programs, the IMF was softening governments' budget constraints in RUMGK by providing nonmonetary sources of deficit financing. As a result, the political support for fiscal tightening was even more difficult to generate than it would have been the case of the absence of IMF programs (Antczak, Markiewicz and Radziwiłł, 2001).

The support of the IMF for the development of nonmonetary deficit financing in RUMGK was twofold. First, the IMF indirectly financed CIS governments, accepting the central bank credit to government backed by the increase in gross international reserves coming from the IMF loans. Second, agreements with the IMF also allowed for negotia-

tions with other creditors on rescheduling of debt payments. Russia, as the legal successor of the Soviet debt, received the largest rescheduling of debt payments from the Paris Club.

The unjustified "seal of good housekeeping" further softened budget constraints, opening the door to cooperation with other multilateral and bilateral donors. IMF programs constituted a stamp of approval, helping to upgrade countries' ratings and new capital inflows. This catalytic role is explicitly recognized as one of the main functions of the IMF in support of adjustment. However, when the IMF underwrites unsustainable policies, the effect is disastrous for the borrowing country: external debt accumulates and incentives for adjustments are diminished. Wrong signals sent to private creditors and governments had a detrimental impact on these countries. Policies based on increasing debt-to-GDP ratios were unsustainable, but could be maintained as long as financial markets stayed not fully aware of this.

Worse, a general sense of implicit guarantees ("too big to fail"), especially in the case of Russia was built up over the course of years. While the role of IMF in the modern world should be the prevention of crises through the surveillance of national policies, transparent information and reduction of moral hazard, the practice was exactly opposite. Meltzer (1999) concludes: "*Moral hazard lending to Russia, encouraged by the bail out of foreign lenders to Mexico, permitted Russia and other countries to finance large unbalanced budgets by borrowing externally. The result is a much larger financial problem for international lenders and for the economies of other countries*".

One can ask what were the sources of such serious flaws of the IMF programs in CIS countries and (probably) in many other regions, particularly if one takes into account the enormous professional expertise and experience of this organization?

If we try to answer this question looking from the perspective of the client country, the issue of the so-called reform ownership plays a crucial role. The most fundamental problems can be solved only if national authorities with broad a political support assume the ownership and full responsibility for reforms and necessary policy corrections

as it happened in most of Central European and Baltic countries. Unfortunately, in countries of weak reform ownership (most of the CIS), policies were assumed (and reluctantly followed) just to please the IMF and receive disbursements, rather than to solve the problems of the country.

But even in such cases, the programs could induce better policies, through enhancing the credibility of reforms and helping reformist governments to overcome political opposition to the program. But this is possible only if the IMF program provides a binding commitment. With soft conditionality and soft financing this goal cannot be reached. So why the IMF is soft and, instead of promoting good policies in a decisive manner, it "*pays due regard to the domestic social and political objectives*"(IMF, 2001a), even if these objectives are detrimental to long-term growth and stabilization?

The answer has most likely of a political nature. The IMF is the international public institution dependent on their shareholders, i.e. member countries. This means that it cannot be too tough in relation to its shareholders, particularly towards big and politically influential countries like Russia, Brazil, Mexico, Indonesia or Korea, to give just a few examples from the last decade. On the other hand, the biggest shareholders, G-7 countries use the IMF (and other development organization like the World Bank or regional development banks) as the flexible instruments of their foreign policies and foreign aid. Facing their own domestic fiscal constraints it is much easier to use such the specific "extra-budgetary fund" like the IMF than ask parliament to approve the explicit budget expenditure lines related to foreign aid (see Meltzer, 1999, Dąbrowski, 1998).

Another problem is related to the system of incentives facing the IMF bureaucracy (see Vaubel, 1991). The IMF as an institution has a stake in the "success" of the program. It is, therefore, difficult for its officials and staff to declare the program failure, even if it cannot impose its real implementation. Finally, the IMF wants to stay in the country, as it considers some influence on policy ("to have the seat at the table") to be better than no influence at all. This is, however, not a good solution if it leads the Fund to underwrite bad policies.

10. Research Conclusions and Policy Recommendations

Currency crises and other forms of financial crises have been present in the economic history for many centuries. However, their frequency and specific forms changed over time as a result of economic development and evolution of currency regimes. In the second half of the 20th century, rapid expansion of a number of the nationally managed independent currencies led to a higher frequency of crisis episodes. Progressing integration and increasing sophistication of the product and financial markets brought new forms and more global character of the crises events (contagion effect) in the last decade.

Currency crises became a very popular topic of academic and political debate with hundreds of conferences and seminars and thousands of publications in recent years. Unfortunately, not in all cases quantity was transformed into quality. Many analyzes have a very fragmental and superficial character and offers unclear or even misleading conclusions.

Confusion starts with terminology. Notion of a crisis is often used in the highly imprecise and too extensive way. Hence, the first research task was to bring some order to the terminology and propose the maximally precise and empirically operational definition of a currency crisis. The conclusion is that definition of Eichengreen, Rose and Wyplosz (1994) helps to select the empirical episodes most closely fitting with intuition understanding of what a currency crisis is (a sudden decline in confidence to a specific currency). However, a certain dose of arbitrary expert assessment seems to be still necessary as the additional selection tool. Otherwise, any formalized definition may always select the cases, which can hardly be considered as the real currency crises and omit the evident crisis episodes.

The similar problems concern diagnosis of what leads to currency crises. The most frequent cases of misunderstanding are connected with taking the symptoms of already existing imbalances and distortions (usually expressed in the form of the so-called early warning indicators) as original causes of the problem. The latter can be summarized as excessive expansion and over-borrowing of the public and private sectors on the one hand, and inconsistent and non-transparent economic policies on the other. Over-expansion and over-borrowing manifest themselves in the excessive (unsustainable) current account deficit, currency overvaluation, increasing debt burden, insufficient international reserves, and deterioration of many other frequently analyzed indicators. Inconsistent policies increase market uncertainty and country risk premium, contribute to shortening of the lending horizon, and can trigger speculative attacks against currencies. The frequently discussed role of pegged (fixed) exchange rate regimes should be seen precisely in this context. An attempt to simultaneously control exchange rate and domestic liquidity in the world of free capital movement (and currency substitution) violates the principle of the "impossible trinity" and can be consider by the market players as a signal of major policy inconsistency.

After a crisis already hit a country, the ability to run a consistent and credible economic policy is crucial for limiting its size, length and negative consequences. One of the key questions that authorities face is how to readjust an exchange rate regime, that is usually the first institutional victim of the successful speculative attack.

One could try to go further by asking what are the causes of over-expansion/over-borrowing and policy inconsistencies? The first attempt at an answer could simply point at bad economic policies. This, however, seems to be too easy and too superficial. To get a deeper diagnosis one must analyze the broad set of political and institutional variables such as the electoral and government systems, federalism, constitutional protection of public finance stability, central bank's independence, transparency of public finances and government policies, external constraints coming from international treaties, and many others. The experience of last decade shows that all these parameters are extremely important and badly need further empirical investigation.

The above mentioned "internationalization" of crisis episodes also contributed to research and analytical confusion expressed in a certain diagnostic fatalism and lack of conviction that international financial markets can behave in rational and predictable way. This triggered a lot of anti-globalization thinking, proposals to reintroduce capital controls, or subordinate international capital markets to strong regulatory control (what would probably be helpful but, at least at present, remains politically unrealistic). True, international financial markets presented a lot of panic reactions in the aftermath of the Asian and Russian crises. However, later on, the evident learning process started and the recent reactions in the case of individual crises (for instance, in Turkey or Argentine) are much more selective and country-specific. In addition, the size of capital inflow to emerging markets moderated after 1997, being now probably more in line with their absorption capacities.

However, even during the most dramatic period of 1997–1998 it was very difficult to find any single crisis-affected country, which did not exhibit enough domestic vulnerability to be prone to speculative attack against its currency. The contagion effect could only accelerate what was anyway unavoidable and it was very unlikely that it could hit a completely "innocent" country.

The consequences of currency crises in developing and transition economies are usually severe with output and employment loses, depreciating real income of population, deeply contracting investment and capital inflows, ruined country credibility, etc. In some cases, a crisis can serve as the economic catharsis: devaluation helps to restore competitiveness and improve current account position. Even if this happens, the results are not necessarily sustainable. The same concerns political changes: the crisis shock can bring the new, more responsible and reform-oriented government but it may also initiate the long lasting political stalemate and destabilization.

The most powerful albeit not immediate positive effects of currency crises are connected with their educative power. In many countries politicians are so afraid of being responsible for causing a potential crisis that they are ready to draw some lessons from those who failed. And this kind of practical experience may be even more convincing than any well-balance advice of the IMF or other international organizations.

The latter must also seriously rethink their role and their potential co-responsibility for the recent crisis episodes. In fact, such a self-evaluation process already started and both the IMF and the World Bank dramatically increased their

openness, dissemination of various official documents and analytical reports, pushed member countries towards greater transparency of their statistics, regulations, and policies, worked out new international standards and codes, etc. All these measures should increase transparency of the international financial transactions and help international financial markets to panic less and react in a more selective way.

However, the most challenging need for the IMF and other IFIs is to depoliticize their actions and decisions and stick to the professional criteria of country assessment and their consequent execution. Otherwise, their professional influence will further shrink as it happened in the last few years. In fact, this challenge concerns the IFIs major shareholders even more than their staff and management. G-7 governments must resist temptation to use these organizations as easy off-budget sources of providing politically motivated foreign aid.

On the national level, there is a large agenda of institutional, structural, and macroeconomic measures, which would help countries to avoid building dangerous imbalances and systemic pathologies, diminishing in this way a danger of currency crises. In the macroeconomic sphere, they involve the balanced and transparent fiscal accounts, proper monetary-fiscal policy mix, and consequent anti-inflationary policies, avoiding various kinds of indexation of nominal variables and intermediate monetary/exchange rate regimes. On the microeconomic level, privatization, demonopolization, trade openness, competition policy and simple, fair and transparent tax system should help to avoid soft budget constraints, over-borrowing and moral hazard problems. Financial sector requires a great deal of transparency, tough and well-executed prudential regulations, and private ownership involving the first-class multinational financial institutions. In most of the emerging-market economies the mentioned microeconomic measures must be strengthened by legal reforms, efficient and fair judiciary system, international accounting, reporting and disclosure standards, transparent corporate and public governance rules, and many others. This clearly implies an extensive agenda of political and institutional reforms aiming at making governments and public governance more accountable, efficient and business-friendly and concentrated on supply of the basic public goods rather than trying to substitute market mechanism in the spheres where the latter work better.

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