Currency Crises: Theoretical and Empirical Overview of the 1990s

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Summary

This paper provides an overview of currency crises theories, methods for crises prediction, implications of currency crises for economic policy, as well as different currency crises episodes in the 1990s. The theoretical models of currency crises can be divided into three generations of models: first-generation models, first found in the work of P. Krugman in the 1970s, second-generation models, following M. Obstfeld's papers in the 1980s, and third-generation models developed on the basis of the Asian crisis experience. A crisis can be forestalled if it is detected in its early stage and appropriate measures are undertaken; however, this pose a great challenge that requires better co-operation between private investors and economic policy makers.

Since the exchange rate regime is a crucial element in precipitating a crisis, it is important to take into account changes in the regime. The Asian, Russian and Brazilian crises have confirmed once again that the international financial system needs to be adjusted in order to decrease the possibility of a crises and to reduce its extent. The private sector, national governments and international financial institutions, such as the IMF, play the major role in this process.

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Introduction

Although the literature on currency and balance of payments crises (speculative attacks on currencies leading to devaluations, sharp depreciations of currencies or depletion of international reserves) officially started with the seminal paper of Paul Krugman in the 1970s, interest in that area was renewed in the 1990s, launching a wave of new models and interpretations of these crises. This decade saw a large number of crises, starting with the crisis of the European Exchange Rate Mechanism in 1992/93, through the Mexico "tequila" crisis in 1994/95, to the Asian crisis in 1997/98, the Russian crisis in 1998 and the Brazilian crisis in 1998/99.

The reasons for such a large number of crises are increased globalisation and capital mobility on the global market, current account and capital account liberalisation unadjusted to the liberalisation and reforms of the other economic sectors, the emergence of many new markets and market economy oriented transition countries, and the weakening of the international monetary system due to the abandonment of the international exchange rate system pegged to the US dollar at the beginning of 1970s and the establishment of a vaguely defined floating exchange rate regime.

Therefore, it could be useful to study a theoretical basis of currency crises on the examples of the most important models (the first section of the paper), the possibilities of detecting and predicting crises (the second section), implications of crises for economic policy (the third section), and several different currency crises episodes (the fourth section).

1 Theory on Currency Crises

1.1 Currency Crisis Model under a Floating (Flexible) Regime

The equation of exchange can be written in the following form, according to Cagan's model of inflation (Cagan, 1956):

$$m_t - p_t = -\eta \cdot i_{t+1} + \phi \cdot y_t \qquad (1)$$

where m is a natural logarithm of money, p is a natural logarithm of price level, i is a logarithm of nominal interest rate (either of t or $t+1$ period depending on the formation of expectations), and y is a natural logarithm of the real GDP.[1] The coefficients η and ϕ represent constant interest elasticity of money and constant income elasticity

of money, respectively. In the equation (1), equilibrium in the money market is assumed, i.e., money demand equals money supply, $m_t^d = m_t^s$.

Further, purchasing power parity (PPP) is assumed to determine the exchange rate:

$$P_t = \varepsilon \cdot P_t^* \Leftrightarrow p_t = e_t + p_t^* \qquad (2)$$

where P is the domestic price level, P^* the international price level[2], ε the nominal exchange rate, e a logarithm of the exchange rate, and p and p^* logarithms of domestic and international price level, respectively.

The relation between interest and exchange rate is established through the uncovered interest parity, assuming a high degree of capital mobility:

$$1 + i_{t+1} = (1 + i_{t+1}^*) \frac{E(\varepsilon_{t+1})}{\varepsilon_t} \qquad (3)$$

$$i_{t+1} = i_{t+1}^* + E_t(e_{t+1}) - e_t \qquad (4)$$

In this equation, E represents the expectation operator. Equation 4 is equation 3 in logs. Accordingly, i and i^* represent non-logarithmed domestic and international interest rates in equation 3 and logarithms of domestic and international interest rates in equation 4.[3]

If equations (1), (2), and (4) are substituted into one another, the equation

$$(m_t - p_t + \eta i_{t+1}^* - \phi y_t) = -\eta \left[E_t(e_{t+1}) - e_t \right] \text{ results.}(5)$$

Fundamental macroeconomic variables (real money balance, interest rate[4], and domestic output) that affect the exchange rate in the current period e_t, are placed in the brackets on the left side of equation (5). The right side shows the impact of expectation on the formation of the exchange rate. The exchange rate in period t is determined by:

$$e_t = \frac{1}{\eta} \left[(m_t - p_t + \eta i_{t+1}^* - \phi y_t) - \eta E_t(e_{t+1}) \right] \qquad (6)$$

that is, the value of fundamental variables in the current period and the future exchange rate expectations in period t. Equation 6 can be solved by a method of undeter-

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[1] Further in the text, logarithms of variables will be written in lowercase.

[2] Hereinafter, variables in superscript * denote international variables.

[3] In many studies of money demand, non-logarithmed interest rates are used instead of the logarithmed ones, since a logarithm reduces the relative impact of interest rates (which are normally single-digit numbers, in contrast to other macroeconomic variables). For low nominal interest rates (without high inflation) interest factor $(1+i)$ and $(1+i^*)$ are near unity. The following equation can thus be applied: $E(\varepsilon_{t+1}) / \varepsilon_t = 1 + (r_t - r_t^*) / (1 + r_t^*) \approx 1 + r_t - r_t^*$, out of which equation 4 is derived.

[4] International interest rate, which in the case of complete capital mobility becomes equal to domestic interest rate.

mined coefficients that are used to solve the dynamic rational expectations models. The logic is the following: the exchange rate in period t is influenced by the fundamental variables' value from the current period and the future exchange rate expectations in period t. Since the future exchange rate expectations are also effected by the previous realisations of exchange rate (until e_t), as well as the perception of the functioning of the exchange rate (implicit assumptions of PPP and uncovered interest parity), the full equation for the exchange rate in the current period is obtained by summing the expectations in all the previous periods, which are influenced by the values of the fundamental variables in all the previous periods.

$$e_t = \frac{1}{1+\eta} \sum_{s=t}^{\infty} \left(\frac{\eta}{1+\eta} \right)^{t-s} \cdot E_t \left\{ m_t - \phi \cdot y_s + \eta \cdot i_{s+1}^* - p_s \right\} \quad (7)$$

This is the basic exchange rate model for a completely flexible regime with complete capital mobility. In the above framework, theoretically there shouldn't be an attack on the currency, since changes in fundamental variables are immediately reflected in exchange rate changes (this is a characteristic of the exchange regime rather than of the model itself). This allows only a discussion of how changes or other forms of expectations can influence the equilibrium exchange rate.

1.2 Currency Crisis Model under a Fixed Exchange Regime

The starting point in discussing the currency crisis model under a fixed exchange rate is the approximation of P. Cagan's equation of exchange (equations 5 and 6 show the relation between money and exchange rate):

$$m_t - e_t = -\eta \cdot \dot{e}_t$$
$$\dot{e}_t = \frac{de_t}{dt} = \frac{d\varepsilon_t}{dt} \cdot \frac{1}{\varepsilon_t} \quad (8)$$

from which the following is derived:

$$m_t = f(e_t) \Leftrightarrow \overline{m}_t = \overline{e}_t \quad (9)$$

which means that parity of the exchange rate that is being defended determines monetary policy, which becomes the function of the exchange rate.

Money base equals money supply, according to a more narrow definition (M_1), since the impact of the multiplier in that model is disregarded for the purpose of simplicity, i.e. the multiplier is assumed to equal one (therefore, only M will be written, leaving out the index 1 throughout the section). Money base/supply is composed of a domestic and foreign part (according to the central bank's balance sheet):

$$M_t = B_{H,t} + \varepsilon \cdot B_{F,t} \quad (10)$$

1.2.1 First-Generation Models of Currency Crisis (P. Krugman, 1979)

The assumed source of disequilibrium in the first-generation models comes from a budget deficit that grows at rate μ and monetizes through the growth of domestic credit:

$$\frac{\dot{B}_H}{B_H} = \dot{b}_H = \mu \quad (11)$$

μ thus denotes the growth rate of domestic credit or the domestic components of the money base.

In order to maintain the exchange rate at a fixed level (under the fixed exchange regime), a central bank must reduce B_F international reserves up to their complete exhaustion, $B_{F,t} = 0$. At that point, the previously established exchange rate parity cannot be defended and devaluation takes place.

However, even prior to the point at which $B_{F,t} = 0$ applies, speculators will rightly estimate the developments of the fundamental macroeconomic variables (in this example, money supply growth rate), foresee the forthcoming course of events and start selling domestic currency and buying foreign exchange in order to avoid losses when devaluation takes place. In that way, speculators' coherent actions (exchanging domestic currency for foreign) will cause a speculative attack on the domestic currency and a more rapid exhaustion of international reserves, leading to an earlier devaluation.

This is the main feature of the first-generation models of currency crisis. According to the first-generation models' assumptions, the main cause of speculations and pressures on a currency are unfavourable developments in some of the fundamental macroeconomic variables. Therefore, it is possible to predict a currency crisis through adverse movements in the macroeconomic fundamentals. Krugman (Krugman, 1979) started the first-generation models of currency crisis, which attempted to determine the time when a speculative attack occurs.

The instant of a speculative attack in Krugman's model is determined by establishing the "shadow exchange rate", i.e. the market exchange rate that would be obtained when the reserves are exhausted, or the market rate at which a central bank can no longer defend the exchange rate. Equation 10 of money base/supply, with $B_{F,t}=0$ yields:

$$M_t = B_{H,t} + 0 \quad (12)$$

or, expressed in logarithms:

$$m_t = b_{H,t} \quad (13)$$

which, when incorporated into the approximated Cagan's equation of exchange (8), gives:

$$b_{H,t} - e = -\eta \dot{e}_t \quad (14)$$

from which the "shadow exchange rate" is derived:

$$\tilde{e} = b_{H,t} + \eta \cdot \mu \quad (15)$$

Since there are no reserves left, μ is also the depreciation rate of the shadow exchange rate. It should also be taken into account that

$$\varepsilon \cdot \dot{B}_F = -\dot{B}_H \quad (16)$$

i.e., the rate of change of the domestic part of the money base is the opposite of the rate of change of the foreign part of the money base.

A speculative attack occurs when the shadow exchange rate becomes equal to the fixed rate, since losses and profits from intertemporal arbitrage (selling domestic currencies for foreign currencies in the beginning, in order to do the opposite later) are equal.

The growth path of domestic credit is:

$$b_{H,t} = b_{H,0} + \mu \cdot t \qquad (17)$$

Since the actual exchange rate equals the shadow rate at the moment of a speculative attack, it can be written:

$$\bar{e} = \tilde{e} \Rightarrow \tilde{e} = b_{H,0} + \mu \cdot t + \eta \cdot \mu \qquad (18)$$

where the moment of change of the exchange rate regime:

$$t = \frac{\bar{e} - b_{H,0} - \eta \cdot \mu}{\mu} \qquad (19)$$

is also the equation of a speculative attack. The equation shows that the time of a speculative attack depends on the developments in fundamental macroeconomic variables (here, budget deficit growth rates according to the initial assumption).

The first-generation models explain currency crisis as a result of unsustainable developments in fundamental macroeconomic variables – such as excessively expansionary monetary policy, significant currency depreciation in real terms, large and growing balance of payments current account deficit, excessive investments in risky and low-profit projects, as well as deficiencies in regulation and banking and financial system supervision. All this widens the discrepancy between the promises and the proclaimed goal of the monetary authorities, on the one hand, and keeping these promises on the other, which undermines the monetary authorities' credibility and can trigger a crisis (e.g. Blejer, 1998). Provided that expectations are rational and allow anticipation, the exact point of attack on a currency can be determined, according to Krugman's model and first-generation models.

1.2.2 Second-Generation Models of Currency Crisis (Self-Fulfilling Speculative Attacks) (M. Obstfeld, 1986)

The second-generation models of currency crisis focus on expectations, expectations coherence and a "trigger" causing expectations to move in the same direction, rather than on fundamental macroeconomic variables and their developments. In other words, instead of focusing on government economic policies, emphasis is put on the market itself. The second-generation models represent a continuation of Krugman's work and the first-generation models of currency crisis.

First Extension of Krugman's Model
Even if the fundamental variables, i.e. their developments, are not particularly unfavourable, a speculative attack may occur.

The following equation shows the situation prior to the attack:

$$B_{H,t} = B_{H,0} + \mu_0 \cdot t \qquad (20)$$

The attack occurs at point T. The situation after the attack is represented by the following equation:

$$B_{H,t+\tau} = B_{H,T} + \mu_1 \cdot (t + \tau) \qquad (21)$$

This extended model implies that the actions of the government or central bank are determined by the occurrence of the attack.

Slika 1.
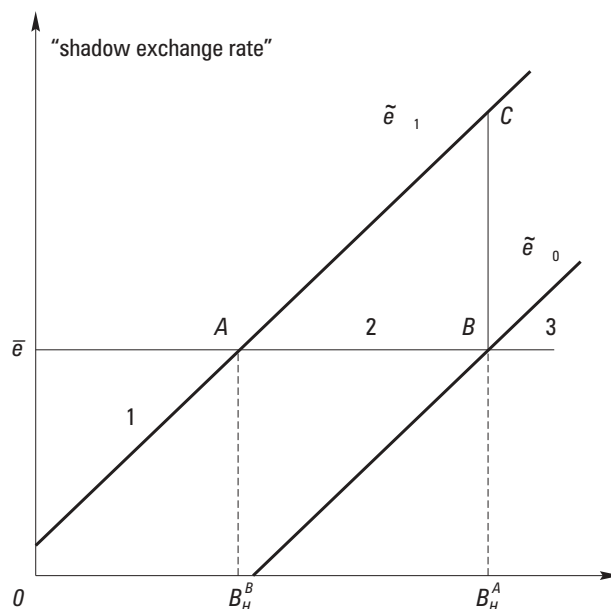
Range 1 in Figure 1 (up to point A) denotes the range without the attack, while range 3 (from point B onwards) denotes the range of the simultaneous (coherent) attack.

Range 1 is free of speculative attacks, since the fundamental macroeconomic variables are consistent with the pegged exchange rate. In range 3, attacks occur coherently and speculative profit is earned, amounting to a difference between the two curves (segment BC). The common model from the first-generation models of currency crisis applies to this part.

The intermediate range 2 is a fragile area, an area where the following applies: a) if expectations are incoherent, the fixed (pegged) exchange regime will be maintained, b) if expectations are coherent (of the same direction), a self-fulfilling attack will occur (caused exclusively by expectations and not that much by low levels of fundamental macroeconomic variables).

It is implicitly assumed that there is atomistic competition in the foreign exchange market (i.e., that there are no big participants, such as Mr. Soros). Political events or government/state policy may induce expectation coherence in the fragile area and trigger a speculative attack.

Second Extension of Krugman's Model (M. Obstfeld, 1986)
This model extension examines the government's motivation to change its exchange rate policy. The government pursues its exchange rate policy by minimising the loss function:

$$L = \frac{\Theta}{2}\delta + \left(\frac{\delta - E(\delta) - u - k}{2}\right)^2 \qquad (22)$$

where L – is a social loss function, δ – (shadow) exchange rate depreciation rate, k – economywide distortive factor representing the (estimated) transmission mechanism, Θ – relative depreciation (inflation) weight, and u – a random term. The second addend, i.e. the parenthesis on the right side of the equation (22), is a loss function of *Kydland-Prescott* type.

This extended model also reflects the credibility of the economic policy. The government is considered credible regarding its exchange rate policy if it maintains a fixed (pegged) exchange rate. Accordingly, the government may stick to the exchange rate rule (i.e. defend the pegged exchange rate), or abandon it and make a discretionary move when the situation deteriorates (when the value of the fundamental variables begins to compromise the pre-set level of the pegged exchange rate).

For government to stick to the rule, the following must apply:

$$L^R < L^D + C \qquad (23)$$

where the loss from sticking to the rule L^R must be smaller than the sum of losses when pursuing discretionary policy L^D and credibility loss C.

A speculative attack occurs for the value u, when the following applies:

$$L^R(u) = L^D(u) + C \qquad (24)$$

i.e., the loss arising from maintaining the regime just equals the sum of losses incurred due to discretionary policy and credibility loss.

This model is assumed to provide the best explanation for the European Exchange Rate Mechanism (ERM) crisis in 1992, when the Danish and French referendums on accession to the EU and their negative or poor results were a possible trigger for speculative attacks on the Italian lira, British pound, Swedish krona and Finnish markka (the weakest currencies in the system at that time).

Second-generation models generally developed following the ERM crisis in 1992/1993, when no critical developments in fundamental macroeconomic variables could be noticed. These models stress the influence of self-fulfilling expectations and market panics on a currency, as well as the influence of "triggers" that initiate these panics and shift all the expectations in the market in the coherent or same direction.

According to second-generation models, a currency crisis occurs due to: 1) coherent self-fulfilling expectations, 2) rational herd behaviour, and 3) contagion (Blejer, 1998).

Coherent self-fulfilling expectations depend on multiple equilibria in the equations of exchange rate and monetary policy (as well as other policies) and various triggers that can range from political scandals to negative official statistical reports on the economic activities. Speculative behaviour on foreign exchange markets, involving approximately the same number of optimistic and pessimistic participants regarding the exchange rate movements, may lead to stabilisation of the exchange rate movements. However, if the number of pessimistic participants expecting a devaluation of the national currency prevails for any reason, they will cause a devaluation by their actions in the market.

Herding models are based on the costs of gathering complete information for small investors; the majority of the market (composed of small investors) follows big participants in their investments (who are considered to be well informed, i.e. having a good reputation from the past) or a general market trend.

The occurrence of *contagion* is based on the perceived spread of a currency crisis to other countries in the region where it originally appeared, due mainly to regional trade and financial linkages or a regional approach of big investors/big banks usually forming a joint regional securities portfolio for the emerging markets. That can be easily understood for countries that are regionally related commercially and financially; a currency crisis and worsening trends in fundamentals in one country definitely have an adverse effect on fundamental macroeconomic variables in another country, thus increasing the possibility of stirring up a currency crisis in that second country.

Second-generation models accurately describe developments immediately preceding a currency crisis. However, they overestimate the importance of expectations and triggers in setting off the wave of pessimism and coherent expectations in the market that results in currency devaluation. More reliable currency crises theories result if second-generation models are understood as a complement to first-generation models. Fundamental macroeconomic variables reflect the current economic policy of the government, its economic aims and its methods for achieving these aims. The exchange rate regime is usually publicly announced and legalised for longer time periods, especially for fixed regimes. The greater the deviation of the current economic policy from the optimum policy consistent with maintaining the stability of the announced exchange rate regime (e.g. fixed exchange rate), the greater the probability of currency attack and currency crisis. Currency attack and currency crisis occur as an interplay between the government and the market, through a series of government measures and market responses to them. If pessimism prevails in the market regarding the government ability to defend the established exchange rate regime and pressure on the foreign exchange market causes devaluation, the government will attempt to defend the exchange rate by selling international reserves. Why doesn't a currency crisis unfold as soon as the government policy has begun to deviate from the proclaimed optimum policy for maintaining the exchange rate regime? Probably because of various macroeconomic frictions, such as: transaction costs, difficulties in arranging credit lines for currency attacks, and the fact that many indicators of the government economic policy are available only after a certain delay and are subject to reviews. Accordingly, there has been increasing emphasis on the role of various events, such as various political events, becoming a trigger and turning point in market expectations. This has forced market analysts to re-examine their views on government economic policies and the consistency of these views with the promised exchange rate regime.

1.2.3 Third-Generation of Speculative Attack Models (P. Krugman, 1998b)

The models of this generation developed after the Asian crisis in 1997. They attempt to relate overall problems in the banking and financial sector to currency crises, based

on the experience of these countries hit by currency crises as a consequence of other problems.

The paper by P. Krugman (1998b) describes an investment bubble and the bursting of this bubble – a breakdown in the securities market. The model is real, i.e. it does not involve any currencies, but it can explain the problems of foreign indebtedness and currency crises in East Asian countries in 1997.

This approach is based on a one-sector growth model, with full capital mobility and free capital inflows and outflows. The government (explicitly and implicitly) guarantees bank investments in overvalued company shares since they do not have hard budget constraints – the banks are mainly branch offices of foreign banks or borrow money in the international capital market in order to extend loans to companies in the domestic market. The government issues implicit or explicit guarantees (concessions) for these banks in an attempt to attract foreign banks and investments and maintain the financial system. However, the government does not strengthen control and regulation of the financial agents, and serious problems of moral hazard occur.

The model encompasses two periods. In the first period, companies purchase capital, which they use for production in the second period.

Let the production function be in the quadratic form:

$$Q = (A + u)K - BK^2 \qquad (25)$$

where u represents a random variable which introduces uncertainty (risk) into the investment decision, K represents capital amount, and A and B coefficients.

This model applies to a small open economy that can borrow at the fixed international interest rate equal to 1, whereas the domestic real interest rate equals zero (for the purpose of simplicity).

Capital is expected to earn its marginal product, i.e. a producer will produce the optimum quantity, and the compensation for the borrowed capital (r) will equal the marginal product of capital (dQ/dK):

$$r = A + u - 2BK \qquad (26)$$

If there are no disturbances, capital will be invested up to the point at which the expected return on capital becomes equal to the borrowing costs of 1. The quantity of capital in the economy without disturbances will thus amount to:

$$K = (A + E(u) - r) / 2B \qquad (27)$$

where E represents the expectation operator.

At that point, financial agents enter the model. They borrow money in the global market and lend money to companies for the purchase of capital equipment.

Any yield higher than the international yield $(r>1)$ represents a profit for the financial agents (which can occur at any time when under u $r>1$). In that case, two outcomes are possible: a) competition between financial intermediaries will lead to an equalisation of $r=1$, and b) financial intermediaries with guarantees will buy out all the necessary capital K under which r>1, and share a profit, at the same time assuming the risk due to increased u.

Outcome a) is favourable for the economy. However, outcome b) has adverse effects, because the financial intermediaries with explicit or implicit guarantees drive the price of capital higher in an attempt to buy out all the needed capital, and the growing capital prices soon reach the profitability margin for the positions taken, i.e. guaranteed losses.[5]

There is a linkage between the maximum quantity of guaranteed losses for banks/companies implicitly or explicitly announced by the government, i.e. the losses which the government is willing (implicitly or explicitly) to cover, and share prices. After the maximum quantity of guaranteed losses has been reached, new losses are no more guaranteed. Banks thus take loans abroad and extend loans to companies based on the maximum quantity of guaranteed losses. Any unfavourable shock can cause an excess of losses beyond the maximum quantity of guaranteed losses. At that point, the price of capital falls since the market becomes aware of banks' exposure to losses. Banks that invested in companies request repayment of their loans. The head offices of branches and foreign banks that lent their capital withdraw the funds from the country, thus triggering a currency crisis.

In view of this generation of models, a new term appears – "banking crisis" – related to the concept of currency crises through a fragile financial sector within which both currency and banking crises occur (Kaminsky and Reinhart, 1999).

2 Predicting Currency Crises

Every crisis, including banking and currency crises, is very expensive for the economies in which it was provoked. Since 1980, there have been more than ten banking crises in the developing countries, whose costs accounted for a minimum of 10 percent of the gross domestic product. It is thus not surprising that economic policy makers and all other participants in a market have a special interest in early-warning signals that can anticipate and identify a crisis before it develops. The common indicators are evidently not reliable. For instance, interest rate spread did not indicate any possible difficulties in Indonesia, Malaysia and the Philippines. Unfortunately, the information provided by independent credit rating agencies could not be used to predict a crisis either, since it was not received on time. The problem usually lies in the reliability of data obtained by debtors or even the government, for example, when the real amount of international reserves is blurred by forward or contingent liabilities.

At present, several approaches to anticipating currency crises can be found in the literature.

In his paper in 1996, Morris Goldstein discusses a number of early-warning signals which operate in accordance with the following principle: the more they stand out, the greater the probability of the development of a crisis (Flood and Marion, 1998). The selection of indicators was based on a sample of 25 emerging markets and smaller industrial countries present in the international financial market. According to their methodology, a banking crisis appears

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5 A more complex model that includes the state is represented in: Irwin and Vines (1999).

in the cases of bank closures, bank merger or bank take-over by the public sector, whereas a currency crisis appears when the nominal effective exchange rate depreciates or when losses in reserves are incurred in the amount of three or more standard deviations from its mean. The more reliable indicators correctly anticipated 80 to 100 percent of banking and currency crises in the period from 1970 to 1995. The most reliable monthly indicators of banking crises are: an upward trend in real exchange rate, a fall in equity prices, money multiplier growth, a fall in real output, a decline in exports and a rise in interest rate. The most reliable monthly indicators of currency crises are: exchange rate appreciation, the existence of a banking crisis, a fall in stock indices, a decline in exports, an increase in the M2 to international reserves ratio, and a fall in international reserves. Balance of payment current account deficit compared to gross domestic product (GDP) and investments represents the most effective annual indicator of currency crises, whereas the most effective annual indicators of banking crises include the ratio of short-term capital inflows to GDP and current account deficit compared to investments.

Kaminsky, Lizondo and Reinhart (1997) proposed a useful and practical approach to measuring exposure to currency risk by means of an indicators system (composite indices of macroeconomic variables). Macroeconomic variables considered fundamental are examined (such as, nominal/real exchange rate, production, money supply growth rate, reserve level, etc.), their movements in a period of crisis are determined and indicators[6] are established, which can be leading, coinciding and lagging, on the basis of which currency crises can be anticipated. The indicators are grouped into six broad categories: (1) external sector, (2) financial sector, (3) real sector, (4) public finances, (5) institutional and structural variables, and (6) political variables. These variables are then classified into several sub-categories, with a total of 103 indicators presented. Many of the indicators are transformations of the same variable. After consolidating, the main indicators classified by category, are as follows:

- **Capital account:** international reserves, capital flows, short-term capital flows, foreign direct investments, and the differential between domestic and foreign interest rates.
- **Debt profile:** public foreign debt, total foreign debt, short-term debt, share of debt classified by type of creditor and interest structure, debt service and foreign aid.
- **Current account:** real exchange rate, current account balance, trade balance, exports, imports, terms of trade, price of exports, savings and investment.
- **International variables:** foreign real GDP growth, interest rates, and price level.
- **Financial liberalisation:** credit growth, change in money multiplier, real interest rates, spread between bank lending and deposit interest rates.
- **Other financial variables:** central bank credit to the banking system, gap between money demand and supply, money growth, bond yields, domestic inflation, the parallel market exchange rate premium,

the position of the exchange rate within the official band, M2 over international reserves.
- **Real sector:** real GDP growth, output gap, employment/unemployment, wages, changes in stock prices.
- **Fiscal variables:** fiscal deficit, government consumption, credit to the public sector.
- **Institutional/structural factors:** openness, trade concentration, exchange controls, duration of the fixed exchange rate periods, financial liberalisation, banking crises, past foreign exchange market crises, and past foreign exchange market events.
- **Political variables:** elections, electoral victory or loss, change of government, left-wing government, new finance minister, and degree of political instability.

The currency crisis signals that proved efficient according to the authors are the following: a) output, b) exports, c) deviations of the real exchange rate from trend, d) equity prices, e) ratio of broad money to gross international reserves. Some of the other signals that were considered but proved inefficient according to the criteria of the authors, include: a) imports, b) differential between foreign and domestic real deposit interest rates, c) ratio of lending to deposit interest rates, and d) bank deposits. However, some researchers criticise this approach since it is not firmly based on the theoretical models (first, second and third generation), leaving the researchers too wide discretion in, for example, inclusion/exclusion of certain macroeconomic variables into the system of indicators (Blejer, 1998).

According to another approach to anticipating currency crises, the sustainability of the exchange rate regime is evaluated by vulnerability (the value-at-risk approach). This approach was put forward by Blejer and Schumacher (1998) on the basis of a rational expectation model and the credibility of the monetary authorities, which are generally crucial for currency stability. The value-at-risk approach estimates the value of financial instruments developed in the financial economy during a merger of companies, thus determining the potential costs of abandoning the current exchange rate regime (exchange rate parity) as well as the real and potential solvency of the monetary authorities facing a currency crisis. Value-at-risk is an assessment of maximum loss in a small segment of a period. Based on the probability of loss (according to past episodes of currency crises or the assessment of the distribution of the probability of future events that may lead to crises), it is possible to calculate the worst loss or value-at-risk, thus quantifying the loss for the government arising from the abandonment of the previously announced parity.[7]

Furthermore, it is possible to use macroeconomic variables, representing the fundamental variables and expectations from the first, second and third generation models, and evaluate the devaluation probability and the contributions of each variable to devaluation by means of probit/logit models.[8] Abandonment of the exchange rate

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6 See in: Ahec-Šonje (1999) for a detailed methodology of Kaminsky, Lizondo, Reinhart.

7 For more detailed *value-at-risk* models see: Hendricks (1996).

8 As in: Funka (1996). This paper assesses the significance of fundamental macroeconomic variables for 12 OECD countries (France, Italy, UK, Belgium, Germany, the Netherlands, Norway, Portugal, Spain, and Sweden) over the 1979-1995 period by applying the standard probit analysis. The dependent variable is a choice between maintaining the exchange rate regime (0) or abandoning it – devaluation (1). The same as in: Razin and Milesi-Ferretti (1997).

regime and/or balance of payments difficulties are precisely defined (e.g. 5 percent current account deterioration[9] or 5 percent devaluation) and value 1 is set for the binary dependent variable, whereas the binary dependent variable takes on value 0 for the remaining (control) period.[10] In view of the fact that cross-section and cross-country analyses are generally applied, the limitations of such analyses should be taken into account and countries should be divided into sub-groups within the sample.

In addition to the described method, some fundamental variables and expectation variables could be estimated or compared relative to the period prior to or following devaluation episodes (balance of payments problems) by using first-difference (FD), differences-in-differences (DD), and differences-in-differences-in-differences (DDD) methods. Devaluation episodes or balance of payments difficulties should be clearly defined.

The possible indicators, that is, the macroeconomic variables that should be monitored, are the following: a) portfolio investment level (current level/cumulative), velocity and dynamics of portfolio investments, and investment inflows and outflows acceleration, b) level of other investments (current level/cumulative, as well as by categories: short-term and long-term), velocity and dynamics of other investments, and other investment inflows and outflows acceleration (by categories, paying special attention to the short-term category), c) ratio of investment portfolio level to GDP (current/cumulative), d) ratio of other investment level to GDP (current/cumulative), e) exchange rate volatility, velocity and acceleration of exchange rate changes (under a regime that is not completely fixed), f) geographical distance from an area in a crisis (war, economic, natural), g) political stability and level of democratisation, h) external openness of current account, i) external openness of capital account, j) level and changes in international reserves, dynamics and acceleration (in the case of the fixed exchange rate), k) degree of exchange rate fixity/flexibility (ranging from completely fixed to completely flexible), l) ratio of NFA (net foreign assets) or NDA (net domestic assets) to a monetary aggregate (NFA/M4 = 1 – NDA/M4), m) the country's relative size (e.g. by GDP per capita), n) ratio of international reserves (IR) to external debt, o) level and changes in external debt (especially short-term and denominated in domestic currency), p) share of short-term external debt in total debt, r) share of external debt denominated in domestic currency in total debt, s) ratio of (IR + banks' additional international reserves) / (real and potential short-term foreign exchange liabilities of a country or overall financial system). Exchange rate and/or balance of payments variables are particularly important, indicating current deterioration in external equilibrium due to currency crisis (relative to the exchange regime). They are followed by economic activity and economic policy variables (especially monetary policy, which has the greatest effect on external equilibrium), indicating overall economic developments that affect internal and external equilibrium, and the overall international liquidity and solvency of a country. Finally, there are institutional variables (e.g. financial market development and fragility), structural variables (e.g. the share of foreign currencies in the money supply) and political variables (such as a country's geostra-

tegic position or level of democratisation). They attempt to encompass specific features of particular countries and the currency crisis level that can be accounted for by fundamental macroeconomic variables.

Furthermore, Kaminsky, Lizondo and Reinhart (1997) proposed a list of 103 macroeconomic variables that were considered important by researchers in various studies on the currency crisis phenomenon. Some of the variables in that list proved excellent signals of a currency crisis (output, exports, deviations of the real exchange rate from trend, equity prices, and the ratio of broad money to gross international reserves); in most cases, these variables changed as they should have in the periods of currency crises. However, some variables in the list did not prove to be efficient signals (imports, differential between foreign and domestic real deposit interest rates, and bank deposits), while other macroeconomic variables were efficient in some cases and inefficient according to some criteria.

3 Implications of Currency Crises for Economic Policy

Monetary authorities faced with a currency crisis can (Blejer, 1998): 1) defend the fixed parity by active intervention, 2) increase domestic interest rates in order to repel the attack (since the speculators must borrow in the national currency to be able to carry out the attack or conduct a foreign exchange transaction)[11], and 3) give up, that is, allow the currency to float or devalue it to the level considered favourable for the developments of fundamental macroeconomic variables.

International reserves and the possibility of mobilising additional foreign assets in order to defend the exchange rate (e.g. commercial bank reserves), as well as the current government practice, especially the monetary authorities' practice in implementing the exchange rate policy, i.e. balance of payments policy (e.g. if the central bank defended the exchange rate in four of the past five cases of exchange rate and/or balance of payments difficulties, it is logical to assume that it will do the same the next time) play a crucial role in defending the fixed parity by active policies.

Another defence strategy of monetary authorities refers to the basic problem of a currency crisis – in order to attack a currency, the speculator has to have assets denominated in that currency. While domestic economic entities can cause a collapse of their own currency by selling the domestic currency for foreign currency, international

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9 See: Razin and Milesi-Ferretti (1997).
10 See: Berg and Pattillo (1999).

11 A speculator who intends to profit from an attack on currency/devaluation, must take either a short position in the domestic currency that is being attacked or a long position in the foreign currency by which the attack is being provoked. The case when the speculator decides to take a short position will be considered. He is, for example, obliged to deliver kunas equivalent to DEM 100,000 in three months, when he owns German marks instead of kunas. The exchange rate of this transaction is, for example, 3.6 kuna per German mark, reflecting the situation in the market which does not expect devaluation. In view of this exchange rate, the speculator is actually obliged to deliver HRK 360,000 in three months. If the currency attack/devaluation occurs and the exchange rate rises to 4.00 kuna per German mark, as the speculator has correctly predicted, he will still be obliged to deliver HRK 360,000, which costs him now only DEM 90,000, implying that he has earned DEM 10,000.

economic entities must first borrow in that currency in order to sell it for foreign currency. Since all interest rates in the market are interdependent, when the central bank increases its interest rates, particularly the interest rates for commercial bank refinancing, the commercial banks will have to increase their interest rates as well – especially the lending interest rates that are also set for borrowing in the domestic currency. Therefore, in order to attack a currency from the outside, there must be the possibility of borrowing in the currency in which the attack is being carried out, with an adequate level of liberalisation of the balance of payments capital account, i.e. non-resident's access to the currency in question.

Provided that active intervention in the foreign exchange market and an interest rate increase fail to succeed, the monetary authorities must give up and devalue the domestic currency to the level favourable for the development of the fundamental macroeconomic variables or allow a clean float. The clean float does not necessarily imply that the domestic currency will stop devaluing. Nevertheless, after a certain period its value will stabilise and remain at the level considered satisfactory by the market (which may not necessarily correspond to the equilibrium rate, due to investors' excessive caution following a currency crisis episode). If they decide to lower the exchange rate parity, the monetary authorities must beware of setting too low or too high a rate, since both outcomes have adverse effects.

Currency crises can be prevented by applying several methods: a) establishment of capital controls over international movements of capital in order to prevent movements of speculative short-term capital, b) monetary union accession and acceptance of foreign currency, and c) adherence to consistent and transparent macroeconomic policies.

The International Monetary Fund also has an important role in monitoring the global economy. More specifically, the unpredicted Mexican crisis in 1994/95 jeopardised the IMF's surveillance of individual national economies, especially through Article IV consultations (the results of which are often found in World Economic Outlook, published semi-annually). The IMF issued a timely warning about the Asian crisis, but it was not clear enough and was not adequately announced to the public, with no warnings about contagion.

- Below are some recommendations for avoiding or minimising currency crises costs, given by Ito and Portes (1998):
- It is not recommended to liberalise the capital account in advance and with no reason, which was done by Korea in order to join OECD. Short-term capital inflows should be carefully monitored, especially when banks or companies borrow in foreign currency.
- Permanent long-term capital inflows should be adjusted to foreign direct investments.
- If a pegged exchange rate is used to stabilise the economy, the methods for abandoning the peg should be considered (the so-called "exit strategy"). If the authorities wait for the point of attack on the pegged exchange rate, it will be too late to forestall the crisis by a float. Countries are recommended to start using a form of managed exchange rate regime at an earlier point.
- The financial sector, including its regulation and supervision, should be strengthened.

4 Currency Crises Episodes

This section reviews the countries that have experienced a currency crisis over the past few years. These countries are grouped into the three currency crisis models studied to date. First-generation models or the so-called canonical crisis models encompass countries whose fundamental macroeconomic variables are deteriorating (Mexico, Russia). Second-generation models include countries exposed to speculative attacks and self-fulfilling expectations, characteristic, for example, of the European Exchange Rate Mechanism (ERM) or Argentine crisis. The Asian crisis represents a typical third-generation crisis.

4.1 Latin-American Crisis I

4.1.1 Mexican and Argentine Crisis

The Latin crisis was similar to the ERM crisis in that the warnings were more or less ignored by the financial markets. Government officials were adamant that devaluation was not under consideration, and the markets believed them. Throughout 1993, interest premia on the pesos remained low, and the current account deficits were easily financed.

The situation deteriorated in the course of 1994, when political uncertainty emerged following two events: the peasant rebellion in the Mexican province of Chiappas, and the assassination of the ruling party's Presidential candidate. The government also decided to relax monetary and fiscal discipline before the presidential elections. Foreign capital inflows began to dry up, which caused a rapid decline in international reserves. A critical point was reached when the government found itself unable to roll over its dollar-denominated short-term securities (*tesobonds*).

Faced with this pressure, the Mexican government decided to devalue its national currency (peso) shortly after the election. However, devaluation produced adverse effects. First, a 15 percent devaluation was inadequate, since the government committed itself to maintaining a fixed rate, which considerably undermined the credibility of the Mexican government. Second, by consulting business leaders about the devaluation plan, the government in effect gave Mexican insiders the opportunity to profit at the expense of uninformed foreign investors. In the days immediately following the devaluation, the Mexican government conveyed a sense of both arrogance and incompetence to foreign investors.

Perhaps for these reasons, the initial small devaluation was followed by a near-complete loss of confidence in the Mexican economic policy and the country's economic prospects. The peso quickly fell to half its pre-crisis value. The resulting rise in import prices caused inflation, which had previously been at a low single-digit level, to soar. In order to stabilise the peso and the inflation rate, the Mexican government was forced to raise interest rates to very high levels, peaking at above 80 percent per year. The high interest rates in turn led to a sharp decline in demand, and the real GDP fell by 7 percent in the year following the crisis.

Figure 1: Nominal exchange rate of the dollar against the mexican peso (monthly averages)

Source: IFS.

Figure 2: Nominal exchange rate of the dollar against the argentine peso (monthly averages)
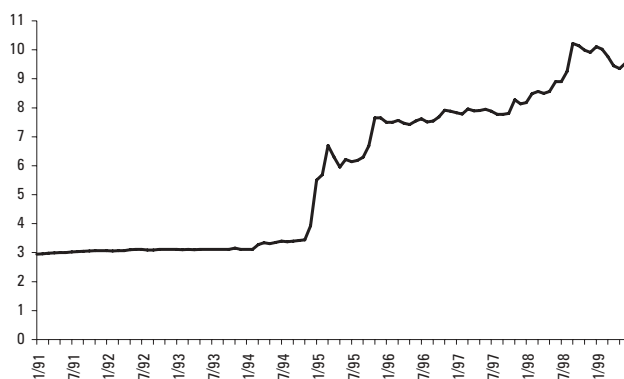
Source: IFS.

Fears that the crisis would undermine the political stability of Mexico and its region led the United States to provide considerable international financial assistance to Mexico through an intervention loan, hoping to buy a breathing space while confidence in the Mexican government was restored. This effort eventually proved successful: during 1996 economic growth resumed, and Mexico regained normal access to international capital markets, repaying the intervention loan before it fell due. By its characteristics, the Mexican crisis can be related to first-generation models of currency crises, with international liabilities as one of the main causes of the fundamental imbalance.
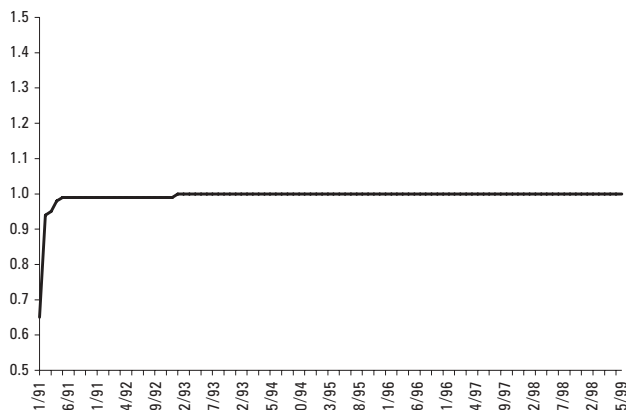
Argentina had a different currency regime than Mexico. It had a currency board system, with the Argentine peso pegged to the American dollar at a one-for-one parity and with every peso in the money base backed by a dollar of international reserves; this was expected to protect Argentina from any spillover from the Mexican crisis. In effect, Argentina had ensured that it was not vulnerable to the kind of crisis envisaged by the canonical crisis model (first-generation crisis model), expecting that the absence of any strong trade linkage with Mexico would prevent contagion effects. However, speculators attacked the Argentine peso, presumably suspecting that the Argentine government might abandon the currency board in order to reduce the unemployment rate. Under the currency board system, the capital outflows led to a rapid decline in the monetary base, which triggered a banking system crisis. The crises, in turn, contributed to a decline in economic growth, milder than in Mexico but still extremely severe. As a result, international financial assistance, albeit on a smaller scale than in Mexico, was needed to prop up the banking system. The Argentine case could be described as a second-generation model or expectation based model.

In contrast to Mexico, Argentina chose to maintain the fixed exchange rate regime (Figure 2) and show to international investors that its commitment was serious, expecting that the pressure would ease. In 1996, Argentina resumed economic growth.

4.2 Crisis of the European Exchange Rate Mechanism

The Exchange Rate Mechanism of the European Monetary System has been the basis of the European monetary strategy since 1979. It is considered to be the most ambitious monetary experiment since the Bretton-Woods system. In the last decade, the Exchange Rate Mechanism has changed considerably, from an almost fixed exchange rate regime at the beginning to fluctuating exchange rates with limited capital mobility. The Exchange Rate Mechanism crisis of 1992-1993 was a key event in recent European monetary history and a classic example of speculative attacks on some European currencies.

The crisis of the European Exchange Rate Mechanism was a crisis of an exchange rate system, rather than a collapse of unilateral, pegged exchange rates following one another. The clash of the German mark with other currencies within the Exchange Rate Mechanism following the unification of Germany has been dealt with in economic literature. As an event unprecedented in history, both politically and economically, it gave a fresh momentum to the creation of a completely new economic environment in Europe. The cost of unification was financed by West Germany's tax payers as an additional tax, with net transfers to East Germany in 1991 amounting to DEM 139 and DEM 180 billion in the following year. To give an idea of the magnitude, West Germany's total private savings in that year were DEM 260 billion. The exchange of the East German mark for the West German at a rate of 1:1, and interest rate growth, caused the real exchange rate of the German mark within the European Monetary System to depreciate due to faster price growth than in other countries of the European Union. The difference between the German inflation and inflation in other countries of the European Union in 1992 and 1993 was positive, except in Italy, Spain and Portugal, where inflation was slightly higher than in Germany. Because of this, some countries within the European Monetary System lost on their competitiveness.

4.2.1 Chronology of the European Exchange Rate Mechanism Breakdown

Tensions on the interest rate market grew after the negative result of the Danish referendum, with the Italian lira becoming the most prominent speculation target. The official Italian foreign exchange reserves started to shrink in February 1992 and in June they fell from USD 36.5 to USD 31.6 billion. This was followed by discount rate changes in Japan, the USA and Germany. The Federal

Reserve Bank lowered its discount rate from 3.5 to 3 percent, the Bundesbank raised its discount rate from 8 to the unprecedented 8.75 percent and the Bank of Japan lowered the rate from 3.75 to 3.25 percent. This huge difference in interest rates led to an increased demand for the German mark, and increased tensions in the European Exchange Rate Mechanism. The crisis reached its first culmination at the end of August, when the dollar fell to its historically low value of 1.4 German marks. The fall of the dollar led to the fall of the pound, which traded slightly above the bottom range of the Exchange Rate Mechanism and was soon followed by the lira. To defend its position within the Exchange Rate Mechanism, the Bank of England broadened its capacities against speculative attacks by improving its foreign exchange reserves. The bank bought USD 14.5 billion worth of German marks.

The Scandinavian crisis only added to the problems piling up in the European Exchange Rate Mechanism. The devaluation of Finland's markka which took place at the end of 1991 and additional problems which arose in 1992 ended in 14% high short-term interest rates which Finland chose not to tolerate, so the markka was made to fluctuate. Quite the opposite was the case of Sweden; interest rates on overnight loans of the central bank were raised and reached 75 percent per year. At the same time the central bank borrowed abroad and increased its foreign exchange reserves. Speculative attacks quickly shifted back to the lira and the pound. Attempts to save these two currencies failed despite numerous interventions in the foreign exchange markets and agreements.

Black Wednesday is a popular name for the 16th of September 1992 when the British pound made its exit from the European Exchange Rate Mechanism. Following several increases of short-term interest rates, the Bank of England decided to temporarily withdraw the pound from the European Exchange Rate Mechanism. The Italian central bank soon followed and withdrew the lira. The peseta devalued 5 percent, but remained within the mechanism. The Swedish central bank made a spectacular move by raising its interest rate to 500 percent.

Soon, all the currencies came under attack and fell to their lowest values within the range of Exchange Rate Mechanism. The French franc was defended, but the Bank of France lost about FRF 80 billion in foreign exchange reserves and repurchase rate was raised to 13 percent. In October and November tensions on the financial market eased, Spain partially lifted control of its capital account, and key interest rates decreased. The range of the Exchange Rate Mechanism expanded to 30 percent (15 percent on each side from central parity), which practically meant a return to free fluctuation.

4.2.2 The Causes of the Crisis of the European Exchange Rate Mechanism

It is hard to imagine large, economically developed countries in an exchange rate crisis, with the European and global capital being available to them. According to Krugman, the European Exchange Rate Mechanism crisis belongs to second-generation models. Attacks on European currencies in 1992 and 1993 do not fit the canonical crisis model (first-generation model). In all these cases, governments retained full access to domestic and foreign capital markets. This meant they had no need to

monetise their budget deficits; and indeed, they did not record rapid growth of domestic credit. In addition, these countries did not have large foreign exchange reserves restrictions and they remained able to borrow on the international capital market. They did not need to monetise their budget deficit because their governments had the possibility of borrowing freely abroad. Thus, it was possible to stabilise their currencies by simply raising interest rates, a sign of an ideal situation in European countries. Nevertheless, the crisis eventually became a reality and raised a question of the motive for the devaluation.

According to Krugman (1998a), the answer may lie in unemployment due to insufficient demand and in the pressure unemployment exerted on monetary authorities to pursue a more expansionary policy. Expansionary policy could not be followed in an environment characterised by an almost fixed exchange rate system which was clearly a limiting factor. European governments had to choose between the political costs of unemployment and the abandonment of the Exchange Rate Mechanism.

The underlying cause of unemployment lies in the fall of the Berlin Wall and the unification of West and East Germany, an event that made a mark on the history of Europe. Heavy expenditures generated by this process led to an expansionary fiscal policy which called for a tight monetary policy. The fact that the German mark was the key currency of the European Exchange Rate Mechanism, to which other currencies within the mechanism were pegged, forced other countries to match the tight monetary policy without the fiscal expansion; thus they were pushed into recession and unemployment.

As Krugman (1998a) points out, four special aspects of the crisis should be mentioned.

First was the role of a large actor – George Soros – in triggering the crisis. Soros had counted on the possibility of a sterling devaluation, and set about establishing a short position in the form of a number of short-term credit lines, totalling approximately USD 15 billion. Second, the crisis demonstrated the almost complete irrelevance of foreign exchange reserves in a world of high capital mobility. The central banks of Italy and Great Britain had substantial foreign exchange reserves, and were also entitled under Exchange Rate Mechanism rules to credit lines from Germany. Third, the crisis seems to have been virtually unanticipated by the financial markets. And finally, the fourth aspect of the crisis lies in the remarkable fact that the countries which failed, i.e. were driven off their pegs, did better by almost any measure in the following period than those that succeeded in defending their currencies. The UK, in particular, experienced a rapid drop in its unemployment rate without any corresponding rise in inflation. However, the last aspect of the crisis should be taken with caution, since the UK belongs to the Anglo-Saxon cycle (the USA, Canada, Australia,…) which is separate from the European cycle.

4.2.3 The Effects of the Crisis of the European Exchange Rate Mechanism

The crisis led to the exit of Britain and Italy from the European Exchange Rate Mechanism and to the expanding of the exchange rate range within the mechanism.

The UK was the first to leave the Exchange Rate Mechanism, at first temporarily and then permanently. Italy followed, but returned to the mechanism in 1997, to become a part of the European Monetary Union in 1999. The exits of two large European countries such as the UK and Italy from the mechanism somewhat undermined the confidence in the single currency and the credibility of the Exchange Rate Mechanism. It should be borne in mind that the Bundesbank played a dominant role in defining the system's conditions. Such a system functioned well as long as it satisfied national interests of the member countries that followed the leader. A similar example can be found in the 1980s, when countries such as France, Italy and Belgium used the anti-inflation strategy and the European Monetary System to achieve low inflation.

Additional factors contributing to the crisis are differing business cycles. For example, at the beginning of the 1990s some countries were going into a recession, while Germany was thriving. Therefore, the strategy of tight monetary policy was right for Germany but wasn't right for those countries that were in a recession at that moment.

In 1992 most currencies fell to their lowest value of 4.5 percent (2.25 percent on each side from central parity) within the Exchange Rate Mechanism range. In 1993 the range expanded to 30 percent (15 percent on each side from central parity). The Exchange Rate Mechanism in use until 1993 may be interpreted as a device for introducing rules instead of discretionary decisions. The expanding of the range to almost six times the previous range may be seen as a situation where exchange rate targeting exists, but with no target area. Most currencies moved differently from the German mark in the first year after the range was expanded and started fluctuating within their former margins.

4.3 Asian Crisis

The recent Asian crisis is among the recent examples of currency crises. In only a short period of time it shook the "Asian tigers"[12] which had been considered as examples of successful economies of state capitalism. The Asian crisis was neither the first nor the last. It emerged in the wake of the widely-known Mexican crisis (1994/95) and was followed by a wave of currency crises, from Russian to Brazilian at the beginning of 1999. At first it was not recognised as problem since it is believed that in economies where bankruptcies are rare capital markets are not functioning properly (Ito and Portes, 1998). Investors are expected to take risks and be prepared to lose some of their investment. Of course, this will depend on their business policies; the greater the risk, the bigger the profit. A more conservative investment policy may reduce the risk but also be less profitable.

Before the crisis, the "Asian tigers" had enjoyed high reputation with the International Monetary Fund which held them to be the most successful emerging market economies with regard to economic growth and living standard (WEO, 1998a). Most of these countries adopted pru-

12 The following countries are referred to: South Korea, Thailand, Indonesia, Malaysia, although the term usually also implies Taiwan, Singapore and other Asian countries which were not strongly hit by the crisis.

dent fiscal policies and had high savings rates, standing as role models to other countries.

The role of institutions is to help avoid the avoidable; they should not, however, be used to an extent that would disable normal functioning of the open capital market. Institutions could play a great role in preventing currency crises, but their mechanisms, if used in extremes, could impede the basic driving force of economic growth. A liberalised and inadequately monitored capital market, on the other hand, may soon trigger a currency crisis. International market-seeking speculative capital will make a quick entry to any market with profit prospects, but it will also make its speedy exit at the first sign of distress, leaving an economy devoid of capital. In each case, adequate supervision and regulation of financial institutions and markets are necessary.

International institutions such as the International Monetary Fund could help limit or mitigate the effects of currency crises, in order to prevent their spillover into other economies and possible domino effects. The amount of damage that a currency crisis will cause in a particular country or in the international market will depend on the specific characteristics of each crisis.

The events that led to the Asian crisis revealed several things. First, it was a combination of banking and currency crises. Second, the problems that emerged had more to do with private sector behaviour than with the excessive public sector policies. Third, recommendations given until recently by the international community to less successful economies to emulate the successful ones proved inefficient.

4.3.1 Chronology and Causes of the Asian Crisis

The beginning of the crisis could be attributed to the Plaza Accord – the Meeting of the G-7 which took place in 1985 and which marked the beginning of the yen's appreciation against the dollar. The yen's appreciation against the dollar enabled the transfer of production towards countries pegged to the dollar with cheaper skilled labour. Favourable loans from Japan and heavy government support encouraged big investments in Southeast Asia (Wade, 1998).

At the end of the 1980s Japan saw a rapid increase in the prices of real estate and securities. After the trend of price increase was discontinued at the beginning of the 1990s, many banks were left with non-performing investments, which caused a slowdown of Japan's economic growth. At the same time, household savings continued to be high (around 31 percent of GDP in 1995), which increased the country's current account surplus and exports of capital, mostly to Southeast Asia. By increasing the money supply, the Bank of Japan attempted to encourage consumer spending and make a positive change. However, this proved to be a slow process as the Japanese, obviously not used to spending money, reacted cautiously. This resulted in surplus liquidity which was partly channelled into Southeast Asia. Banks and entrepreneurs in East and Southeast Asia preferred foreign loans at 5 percent interest over domestic loans available at 10 percent interest.

The inflow of capital into South Korea, Indonesia, Malaysia, Thailand and the Philippines grew from USD 47 billion in 1994 to USD 93 billion in 1996. The basic pre-

condition for investment and lending to East and Southeast Asia was a stable rate of exchange or its committed peg to the American dollar. However, as the value of the national currencies against the dollar and the yen decreased, the value of these countries' debt in their national currencies increased, thus deteriorating the quality of the investment.

At the same time, (i.e. at the beginning of the 1990s) these countries undertook a radical deregulation and liberalisation of the capital market, by almost completely lifting restrictions on capital inflows and outflows. Large profit for those with access to foreign capital was the main reason for the pressure on the governments to deregulate their financial accounts. This policy was in line with the recommendations of the IMF and the World Bank. South Korea deregulated its financial account in 1993 to get access to OECD.

Meanwhile, before large inflows of foreign capital came into Asia, Asian households saved diligently. Gross savings in East and Southeast Asia usually approximate to one third of GDP, which makes this area one of the best saving areas in the world. For example, South Korea's gross savings in 1995 accounted for 36 percent of GDP. Thailand has a similar savings rate, while China's savings rate accounts for 42 percent of GDP. In comparison with these countries, the U.S. saves only 15 percent of GDP.

Commercial banks drew the major part of these savings, owing to the fact that the population of East and Southeast Asia are not keen on keeping their savings in securities or similar instruments. Commercial banks thus assumed an intermediary role, mediating between large savings and the business sector. Most of the savings were channelled into domestic corporate rather than state investment. As a result, the corporate sector wound up in an extremely high debt-equity ratio towards the lending banks. Such a situation makes companies vulnerable to all kinds of cash flow shocks, urging banks and companies to co-operate in order to facilitate coping with the system's shocks. Very often they are given government support, especially when it is in the interest of the state that distressed companies should not take commercial banks down with them. Thus state interference is common in such situations.

In conclusion, there were six preconditions for the crisis in Southeast Asia:
1. a high level of domestic savings channelled into corporate investment contracted a large domestic debt;
2. a fixed exchange rate pegged to the American dollar created a low risk perception;
3. the capital market liberalisation in the early 1990s;
4. a huge inflow of international capital due to surplus liquidity in Japan and Europe and prospects of higher profits created large external debt in the countries of East and Southeast Asia;
5. implicit agreement between governments and foreign investors on the bail-out of distressed companies and banks;
6. the large share of short-term debt in the total external debt.

The capital channelled through the banking system was not covered by adequate system of banking supervision. The growth of the commercial banks' balance sheets, due to their rapid loan expansion, failed to be properly monitored by the supervisory authorities, which were inadequately staffed and technologically unprepared. The result was a deterioration in banks' balance sheets because rapid capital inflows demand from banks quick response and quick investment of the inflows. Very often, on account of asymmetric information, an extended loan may end up being a non-performing one. Banks as lenders often lack information about the borrower, especially information crucial for loan extension. Non-performing loans deteriorate commercial banks' balance sheets, which, as it can be seen from the Asian example, leads to a financial crisis. A banking crisis may lead to a financial crisis in two ways. Firstly, the banks' insolvency which directly prevents the banking sector from supplying new credits. Secondly, the central bank may be unable to defend its currency against speculative attacks when the commercial banks' balance sheets deteriorate to an extent which makes this impossible (Mishkin, 1999).

The countries of East and Southeast Asia are considered by the International Monetary Fund to be the victims of their own success. Blinded by this success, foreign and domestic investors failed to pay attention to the weaknesses of these countries' economies. What the IMF specifically holds against the authorities of East and Southeast Asia is their dismissal of any kind of assistance or advice when the first problems were detected by the IMF before the onset of the crisis.

The International Monetary Fund identified five factors which led to the crisis and its spillover to other countries, causing contagion among the countries of East and Southeast Asia (WEO, 1998a). Firstly, it was market overheating, as evidenced by large current account deficits and increased prices of real estate and securities. Secondly, the pegged exchange rate was held on to for too long, thus complicating the effects of monetary policy in an environment of overheated economy. Foreign investors interpreted such an exchange rate as a sign of security and implicit guarantee of a stable exchange rate. This encouraged foreign speculative investors to short-term lending, thus exposing all domestic business entities to currency risk. Thirdly, poor management in the financial sector and poor risk management and supervision also contributed to the crisis. Fourthly, poor data availability and lack of transparency prevented investors and other market participants from obtaining a realistic picture of the economy. And finally, governmental and political insecurity attracting mostly short-term and speculative investors also added to the crisis.

According to Paul Krugmann (1998b) the Asian crisis does not belong to the first or second generation of crises that marked the last decade but rather to the third generation. Between 1994 and 1997 the consolidated central government account ran a surplus averaging one percent of GDP. At the same time, the money supply did not grow too fast relative to GDP. When compared with a nominal growth of GDP of 15 percent per year, an increase in money supply of 18 to 20 percent per year is not too large. Inflation was kept under control, with a moderate growth of 6 percent annually. In the context of the second-generation model, there was a slowdown of economic growth but unemployment did not increase to such an extent as to create a serious political problem. The only reliable warning sign of the crisis lay in the balance of payments current account deficit. Current account deficit increased from 2 percent in 1993 to over 5 percent in 1996 and in

Thailand this deficit stood at 8 percent. Furthermore, Krugman points to considerable connected lending to banks' management boards and legal entities connected to banks as well as considerable government involvement and poor transparency (Krugman, 1998b).

The state had to intervene and help institutions when they were temporarily illiquid rather than when they became permanently insolvent.

The widening of the current account deficit could have been seen as a warning signal, but for several years it continued to be successfully financed by capital account inflows, which were so large that it was possible to set aside additional international reserves.

Charles Wyplosz finds that countries hit by the crisis had had previous weaknesses which made them more vulnerable to attacks (Chote, 1998).

The complexity and the volume of financial transactions characterising the emerging market opening, coupled with the capital account liberalisation posed new challenges to the tax administration. In recognising the merits of foreign capital these countries opened their borders to globalisation and paved the way for a thriving economy. Technological changes made the taxation of capital worse. The existing system of taxation supported those macroeconomic factors which initiated the Asian crisis, even though tax policy was not the primary source of the crisis.

### 4.3.2 Developments in the Asian Crisis

Following the dollars' appreciation against the yen of approximately 50 percent, the Japanese economy went into a recession, while China devalued its yuan by 35 percent, thus increasing the country's export competitiveness. East and Southeast Asia manufacturers found themselves in a situation where the relative price of exports and imports changed to the benefit of the latter, which could (ceteris paribus) cause a widening of the current account deficit.

To preserve the value of their capital, investors were forced into buying real estate, which was at the time considered the best investment. Real estate speculations thrived; in a single year the prices of real estate in Bangkok rose by 40 percent with a large share of the trade being done by private entrepreneurs. The period was also characterised by a rapid increase in money supply because a large share of investments originated from abroad.

The "Asian flu" broke out in Thailand first, following the mid-1996 collapse of securities and later on, real estate markets. Many debtors were unable to pay off their short-term foreign loans, and at the same time, creditors and citizens started withdrawing their deposits. Economic growth and the exports slowed down rapidly, and the baht's (the national currency of Thailand) devaluation was in sight, which meant a departure from the pegged exchange rate.

The International Monetary Fund had already earlier pointed to a too large balance of payments current account deficit which continued to be over 4 percent every year following 1994. The Fund had also expressed concerns regarding a poor system of financial supervision. Moreover, the IMF criticised the Thailand government for failing to introduce economic reforms before the collapse became inevitable (Chote, 1998).

Figure 3. Nominal exchange rate of the dollar against the thai baht (monthly averages)
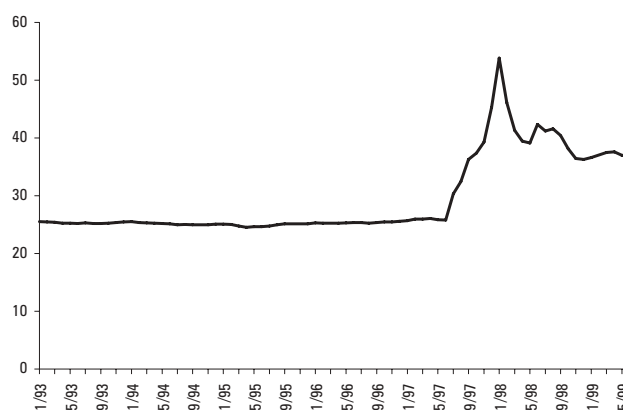
Source: IFS.

IMF experts felt it was necessary for the countries hit by the contagion (Indonesia, South Korea, and Thailand) to take corrective measures recommended by the IMF. But the governments of these countries rejected the IMF's recommendations to carry out adequate reforms or other measures which would win back investors' confidence, the loss of which deepened the crisis.

Thailand eventually turned to the IMF for support in the summer of 1997 when the baht's peg to the dollar became unsustainable. The baht devaluation caused contagion to spread into other Asian countries whose business sectors chose to opt for the advantageous peg to the dollar in order to decrease the costs of capital, thus creating unsecured dollar obligations rather than opt for a more expensive borrowing in local currency. Soon after the baht devaluation, pegged exchange rates were abandoned in Malaysia and Indonesia.

Soon after, Russia was also faced with a crisis (for completely different reasons) and by the end of 1998 Brazil also found itself in a crisis due to movements of funds in globalised markets. The International Monetary Fund prescribed its well-known macroeconomic remedy; consolidated budget and restrictive monetary policy. These, however, were not sufficient to forestall on time the crisis which was to hit countries of East and Southeast Asia.

Figure 4. Nominal exchange rate of the dollar against the indonesian rupiah (monthly averages)
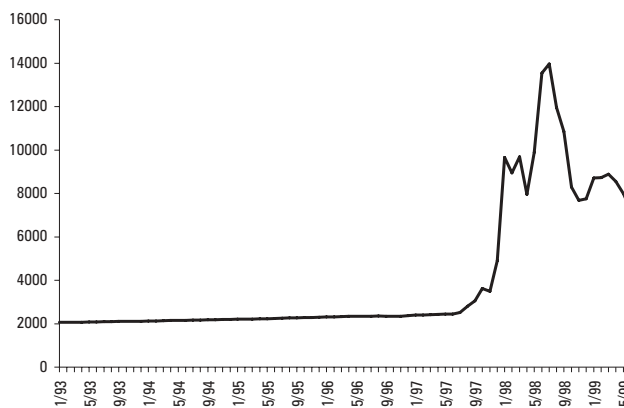
Source: IFS.

Requests for financial help filed by Indonesia, Thailand, and South Korea were unprecedented and together they amounted to USD 120 billion. At the beginning of February 1998, securities markets in Indonesia, Malaysia, the Philippines, South Korea and Thailand recorded a drop of from 53 percent to 76 percent compared to their highest values in 1996 and 1997. In the meantime, these countries' exchange rates against the American dollar depreciated from 40 to 72 percent (Chote, 1998). Once again it became evident that the IMF's policy of applying uniform crisis-exit programs to all countries was wrong.

Figure 5. Nominal exchange rate of the dollar against the korean won (monthly averages)

Source: IFS.

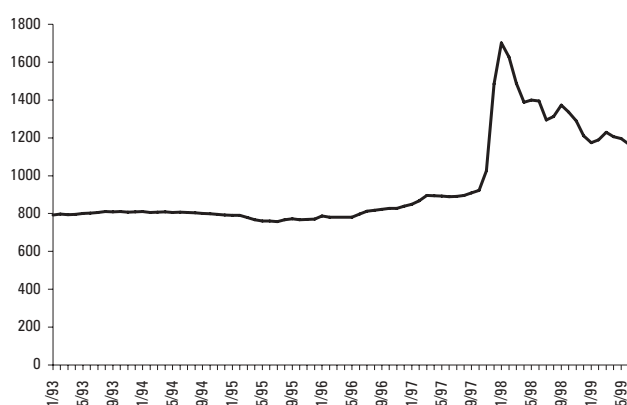It should be mentioned that the IMF significantly lowered its expectations of "the crisis countries" economic growth in 1998, starting from mid-1997 to the beginning of 1998 (Table 1). This shows that the IMF itself was not sure if the crisis would emerge at all and if so, what its range would be.

With the end 1997 nearing, the IMF made downward adjustments of its projections. For example, initial forecast for Thailand's growth of real GDP was 7 percent. However, after nine months the country recorded a fall of real GDP of 2.7 percent, and the final data for 1998 indicated an even sharper fall of 8 percent. The same matrix could be observed in the cases of other crisis countries with the exception of the European Union whose economic growth was the only one that the IMF managed to forecast.

The International Monetary Fund always plays a key role in co-ordinating financial aid to countries faced with a crisis. However, financial aid is not given unconditionally; monetary, fiscal and other constituents of a country's economic policy are monitored by the Fund. *Monetary policy* has to be reliable and stable to fend off sudden depreciation of domestic currency which negatively affects domestic inflation and balance sheets of numerous financial institutions exposed to currency risk. The *Financial sector* lies at the root of the crisis and its rehabilitation is an urgent issue that has to be dealt with promptly and carefully. *Corporate governance* should improve and at the same time enhance transparency and responsibility. *Fiscal policy* should involve lessening of foreign borrowing and reliance on foreign savings.

Table 1 Projected growth of real GDP, in percent

	5/1997	10/1997	12/1997	2/1998	1998[a]
Thailand	7.0	3.5	0.0	−2.7	−8.0
Indonesia	7.5	6.2	2.0	−3.3	−13.7
Malaysia	7.9	6.5	2.5	−3.3	−6.8
Philippines	6.4	5.0	3.8	2.9	−0.5
South Korea	6.3	6.0	2.5	−0.2	−5.5
USA	2.2	2.5	2.3	−0.2	3.9
Japan	2.9	2.1	1.1	0.1	−2.8
EU	2.9	2.8	2.7	2.7	2.8

[a] real outturn

Sources: Chote (1998); IMF World Economic Outlook, May 1999.

4.3.3 Post-Crisis Developments (mid-1999)

According to the latest IMF report, after reaching the bottom, countries hit by the Asian crisis have started their economic recovery. This process will be helped by financial stabilisation and exchange rate strengthening which enable a less restrictive monetary policy, sustainable fiscal policy and improved confidence at home and abroad. Of the four countries hit by crisis, only Indonesia is forecast to have a fall in real GDP of 4 percent in 1999, mostly as a consequence of political and social problems in the country. Real interest rates must remain high to preserve exchange rate stability. Although partial, some progress has been made in bank restructuring, with the largest restructuring being expected to take place in state banks.

Thailand was the first Asian economy to face the crisis in 1997. However, its economy stabilised at the beginning of 1999 thus strengthening the exchange rate and making it possible to reduce interest rates to the levels below those before the crisis. Credit growth is not satisfactory, but recovery is expected in that area. Expansionary fiscal policy is appropriate to the situation. Hence, the IMF forecasts a slight growth of real GDP of 1 percent in 1999.

Korea, which also went through a crisis, stands the greatest chance of recording positive growth of GDP this year. According to the latest IMF forecasts, the country is expected to record a growth of real GDP of 2 percent in 1999. Such a situation has been achieved thanks to financial stability and good macroeconomic policy, as well as quickly regained confidence of foreign investors in Korea. A budget deficit of 5.5 percent of GDP is expected in order to give boost to the economy. In addition, a restructuring of the financial sector has also been planned.

According to the latest IMF projections, Malaysia is expected to record a slight growth of real GDP of 0.9 percent in 1999. The country is focused on improving its competitiveness in relation to other countries in the region whose currencies appreciated against the American dollar, while Malaysia pegged its exchange rate to the dollar in September 1998. Despite monetary and fiscal policy measures introduced last year, only partial effects are expected.

4.4 Currency Crisis in Russia and the Transition Countries

In August 1998, the epicentre of pressure on global financial markets shifted from Southeast Asia to Russia. Emer-

gency measures which the Russian government announced in mid-August of 1998 actually meant a rouble devaluation without any support of macroeconomic policy. The emergency measures included the restructuring of public debt in roubles as well as a 90-day suspension of foreign debt payments. These developments increased fears on the financial market, not only in connection with Russia but also in connection with the related emerging economies, mostly Central European and East European transition countries.

4.4.1 Causes of the Russian Crisis

An immediate cause of the Russian crisis lay in the financial markets' growing loss of confidence in Russian fiscal and payment condition, which led to a decrease in international reserves and inability to pay off treasury bills when due. The overall cause of the crisis, however, may be attributed mostly to poorly developed fiscal system, which lacks adequate support of the legislative authority (Duma) to implement reforms and establish an efficient fiscal system. A thorough fiscal reform is essential for quality functioning of the entire macroeconomic policy. Low budgetary revenues on the one hand, and large demands on fiscal expenditures to keep political legitimacy and preserve social peace on the other, create a large budget deficit. Continued over years, such a situation has led to an unsustainable level of public debt and an inability to service it. Fiscal problems can be attributed to the collapse of the tax system and inadequate tax collections, encouraging payment evasion behaviour, lack of discipline in spending budgetary funds in key areas, slow structural advances, including corporate restructuring and restructuring of the legal framework. All these factors had a negative impact on the Russian economy, even before the crisis.

The biggest achievements of the reformist Russian government lie in reduced inflation and a stable rouble (Tables 5 and 4) resulting from pegging the rouble to the American dollar and a relatively restrictive monetary policy. Although inflationary pressures relieved, budgetary debt as well as total domestic and foreign borrowing grew. In addition, the Russian stabilisation program benefited from the Asian crisis which prompted many foreign investors to transfer their funds from Asia to Russia. In an attempt to transfer, on a short-term basis, their So-

utheast Asia investments to a "safer" place until the situation calms down, Russia seemed to provide a favourable solution. Its economic indicators were promising, and it attracted foreign investors with its short-term treasury bills.

Figure 6. Nominal exchange rate of the dollar against the russian rouble (monthly averages)
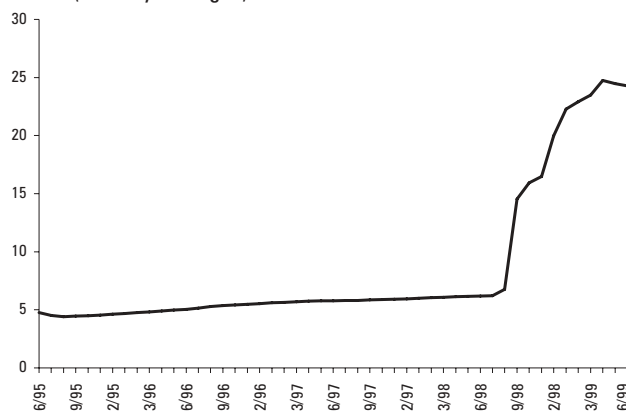
Source: IFS.

The Russian crisis can also be attributed to a fall in the price of energy, primarily a fall in oil prices which, though less important than political and structural changes, also contributed to the crisis. The Russian crisis could best be characterised as the currency crisis of the first-generation model which arises due to unsustainable values of the fundamental variables.

4.4.2 The Russian Currency Crisis Spillover to Neighbouring Transition Countries

Developments in Russia very negatively affected economic growth and balance of payments in many neighbouring transition countries. The Russian crisis contributed to a depreciation of national currencies in Belarus, Georgia, Moldova, and Kirghisia and increased inflationary pressures and slowed down economic growth in the whole region. Additional financial support was granted to a number of smaller countries which suffered a deterioration of their external positions because of the Russian crisis. Faced with a threat of spillover from Russia, the neig-

Table 2 International reserves, balance, in million USD

	1991	1992	1993	1994	1995	1996	1997	1998
Croatia	…	167	617	1,410	2,036	2,440	2,686	2,816
The Czech Republic	…	…	3,789	6,145	13,843	12,352	9,734	12,623
Poland	3,633	4,099	4,092	5,842	14,774	17,844	20,407	27,400
Slovakia	…	…	416	1,691	3,364	3,419	3,230	2,923
Hungary	3,936	4,428	6,771	6,810	12,052	9,795	8,476	9,341
Slovenia	112	716	788	1,499	1,821	2,297	3,315	3,639
Romania	695	826	995	2,086	1,579	2,103	3,803	1,663
Bulgaria	311	902	655	1,002	1,236	484	2,249	2,679
Russia	…	…	8,889	6,505	17,207	15,324	17,784	12,223
Ukraine	…	96	133	679	1,167	2,040	2,375	949

Sources: Croatia – CNB Bulletin; Other – IMF IFS or WIIW.

hbouring countries had to adopt relatively restrictive monetary policies to reduce the foreign relations imbalance and keep prices under control. In addition, they had to continue with their efforts to implement structural reforms and fend off pressures which prevent an exchange rate and current account liberalisation because of a deterioration in the balance of payments position.

4.4.3 The Asian and Russian Currency Crises Spillover to European Transition Countries

European transition countries suffered a relatively brief and weak blow to their financial markets and to their access to foreign financing due to the Asian and Russian crisis. This may be explained by the fact that some countries are relatively closed systems which have not liberalised their capital accounts. However, the crisis did not have a large impact even on those countries which are open to international capital markets and had relatively large current account deficits.

As the crisis reached its climax, Hungary, Poland, and the Czech Republic came under pressure to appreciate their currencies, being perceived at the time as potential markets for safe foreign investment. The reason for that lay in the fact that these countries had started implementing macroeconomic measures which were viewed as desirable by the foreign investors. It should be borne in mind that in 1997 the Czech Republic came under depreciation

pressures because of its problems in the banking system. According to Hrnčir (1997), it was only a "warning" given by market actors that macroeconomic policy should be changed.

The Czech Republic, therefore, is an interesting example of a country which had gone through a sort of "currency crisis" warning a year before the Russian crisis. This country was the first among transition countries which had successfully promoted its transition into a developed industrial country and thus attracted significant foreign investment. Interest of foreign investors in direct and portfolio investment in this country was stimulated by an early initiated coupon privatisation. Until mid-1997, when the first weaknesses surfaced, the Czech Republic had been taken as a role model for other transition countries. The weaknesses were reflected in a failure of several medium-sized banks, growing fiscal deficit and balance of payment current account deficit. Exit from the crisis was initiated following the adoption of restrictive monetary and fiscal policy. This led to an improved balance of payment current account and a slowdown of economic growth so that the Asian and the Russian crisis only made a limited impact on the Czech financial market.

Hungary also experienced a slight pressure on its foreign market due to the Asian and the Russian crisis. The positive experience can be attributed to the measures introduced by the Hungarian government, which were aimed at improved fiscal policy and economic growth. It

Table 3 Total foreign direct investment, balance, in million USD

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1998 per capita
Hungary	1,200	2,851	4,338	6,632	8,316	13,265	16,093	17,529	19,500	1,932
Slovenia	500	827	1,044	954	1,331	1,760	1,981	2,194	2,500	1,261
The Czech Republic	72	595	1,573	2,153	3,191	5,923	7,061	6,763	10,591	1,029
Poland	353	600	1,500	2,828	4,321	6,832	12,028	17,705	27,280	706
Croatia	...	...	...	96	209	311	844	1,232	2,086	454
Slovakia	...	...	...	453	762	1,066	1,361	1,558	1,888	350
Romania	112	267	544	761	1,272	1,595	2,209	3,433	5,464	243
Bulgaria	13	14	34	137	348	510	767	1,403	1,910	231
Russia	...	...	...	...	549	2,569	5,009	10,342	13,703	93
Ukraine	...	...	...	219	484	897	1,356	2,046	2,700	54

Sources: Croatia – CNB Bulletin; WIIW Research Report, No. 257, June 1999.

Table 4 Nominal exchange rate of the dollar against national currencies

		1990	1991	1992	1993	1994	1995	1996	1997	1998
Croatia	HRK	0.011	0.020	0.266	3.57700	5.996	5.230	5.434	6.157	6.362
The Czech Republic	CZK	17.820	29.720	28.190	29.15000	28.790	26.540	27.140	31.700	34.500
Poland	PLZ	0.950	1.058	1.363	1.81100	2.272	2.425	2.696	3.279	3.490
Slovakia	SKK	17.800	29.700	28.200	30.80000	32.000	29.700	30.700	33.600	36.000
Hungary	HUF	63.200	74.700	79.000	91.90000	105.200	125.700	152.600	186.800	214.400
Slovenia	SLT	11.300	27.600	81.300	113.20000	128.800	118.500	135.400	159.700	166.100
Romania	RML	22.000	76.000	308.000	760.00000	1,655.000	2,033.000	3,084.000	7,168.000	8,864.000
Bulgaria	BLL	2.200	17.800	23.300	27.60000	54.100	67.200	177.900	1,681.900	1,760.700
Russia	RUB	...	...	0.270	1.03000	2.210	4.550	5.120	5.790	9.710
Ukraine	UAH	...	...	0.002	0.04795	0.317	1.473	1.830	1.862	2.450

Sources: Croatia – Croatian National Bank; Other – IMF IFS or WIIW.

Table 5 Retail prices, annual percent change

	1991	1992	1993	1994	1995	1996	1997	1998
Croatia	249.8	938.2	1,149.3	–3.0	3.7	3.4	3.8	5.4
The Czech Republic	56.6	11.1	20.8	10.0	9.1	8.8	8.5	10.7
Poland	70.3	43.0	36.8	33.2	28.0	19.9	14.9	8.6
Slovakia	61.2	10.0	23.2	13.4	9.9	5.8	6.1	8.0
Hungary	35.0	23.0	22.5	18.8	28.2	23.6	18.3	14.3
Slovenia	117.7	201.3	32.3	19.8	12.6	9.7	9.1	8.6
Romania	170.2	210.4	256.1	136.8	32.3	38.8	154.7	59.1
Bulgaria	338.5	91.2	72.8	96.0	62.1	123.0	1,082.2	22.3
Russia	92.6	1,460.2	840.0	307.0	197.5	47.8	14.8	27.6
Ukraine	91.2	1,210.0	5,371.0	891.0	376.8	80.2	15.9	10.6

Sources: Croatia – CBS; Slovenia – Bank of Slovenia Monthly Bulletin; Other – WIIW.

should be noted that foreign direct investments per capita in Hungary are by far the largest compared to other transition countries.

Poland's attraction for foreign investors after the Asian crisis probably lay in its size. The zloty came under pressure to appreciate, but in the week when the Russian currency crisis culminated, the zloty depreciated by 7 percent. The central bank did not intervene to prevent this depreciation.

A crucial challenge to transition countries at the moment when a crisis emerges lies in structural reforms. Their absence will in many cases create a macroeconomic imbalance which contributes to financial market pressures and poor economic growth. Russia is a good example of poor fiscal inflow, not only as a result of substandard tax policy and administration, but also as a result of poor government restructuring and fiscal expenditures management, adding to outstanding government claims and resulting in a general lack of payment discipline. Commercial banks also posed a big problem; their massive foreign borrowing limited the monetary policy's scope for manoeuvring.

Not taking into account stabilisation programmes, structural weaknesses slow down economic growth. Empirical analyses indicate that the main reason why Russia's economic growth and that of 11 other countries of the former Soviet Union lag behind that of transition countries of Central and East Europe is a slower pace of market-oriented structural reforms (Fischer, Sahay, and Vegh, 1997). However, in some areas, all these countries failed to make thorough reforms. In particular, the issues of a changed role of the state and business environment suited to the development of the private sector have not been dealt with fully. Priorities in most cases should be on strengthening bank regulation and supervision, privatisation reform, minimising monopoly, including public utilities, improving tax administration and pension and health services. These reforms do not only help boost a possible economic growth, but also reduce the possibility of crisis.

4.5 Latin-American Crisis II

### 4.5.1 Brazilian Crisis (1998/99)

The Brazilian financial and currency crisis is the most recent example which shows how sensitive transition and emerging market countries are to changes in the movements of international capital. The Brazilian crisis which started at the end of 1998 reached its climax at the beginning of 1999 and is typical of the second-generation model. Brazil's economic growth faced difficulties which were primarily of a fiscal nature. The Brazilian government reacted promptly; on November 13, they filed a request with the IMF for a three-year standby arrangement in an amount totalling over USD 30 billion. Apart from the IMF, the request was endorsed by the World Bank, BIS and most of the major highly-developed industrial countries.

Initially, the government successfully implemented the elements of a fiscal package which provided the basis of the programme. But later on, some other parts of the arrangement, especially those related to new taxation to raise funds for social and pension reforms, failed to pass in the house of representatives. The central bank's attempt to calm the situation by cutting interest rates from 40 to 29 percent annually in December unfortunately failed to give positive results. Low expectations of the financial markets caused dollar outflows even before the close of the year, but the pressure on the international reserves reached its maximum by mid-January.

On January 13, the central bank started broadening the fluctuating margins of the Brazilian real and started intervening on the futures and forwards market. The pressure did not relieve and from January 15, 1999 the real was left to fluctuate freely. The average rate of exchange changed from 1.52 reals to the American dollar in January to 1.91 reals to the dollar in February 1999. Before the change of the exchange rate regime, the exchange rate had been 1.21 reals to the dollar. In two months, the real took a fall of 58 percent against the American dollar. The pressure did not cause the house of representatives to pass adequate legislation necessary for the implementation of the fiscal reform. The budget for 1999 was approved only on January 25, 1999. In a situation characterised by a falling real and soaring interest rates, capital fled Brazil and the country soon went into a recession. Brazil soon received financial help and managed to stabilise the exchange rate which made a significant recovery compared to the peak of the crisis. This situation provides a good example of a classical canonical first-generation crisis model and pessimistic expectations combined. Brazilian companies, unlike their Asian counterparts, did not carry a burden of short-term dollar debt.

Figure 7 Nominal exchange rate of the dollar against the brazilian real (monthly averages)
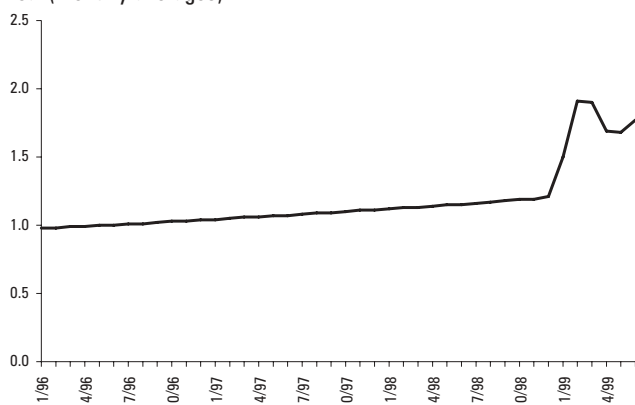
Source: IFS.

4.6 Comments on Crisis Countries Indicators

Tables at the end of this paper (6 to 10) show selected indicators for countries involved in the Latin-American crises I and II (Mexico, Argentina, and Brazil), the European Exchange Rate Mechanism crises (England, Italy, Sweden, and Finland), the Asian crisis (South Korea, Indonesia, Malaysia, and Thailand), and the Russian crisis (Russia). For comparison purposes, data for Croatia are supplied. Shaded areas represent periods of crisis in a given country.

Table 6 shows the total reserves of the countries hit by crisis and of Croatia. This is an indicator of currency crises as provided by the first-generation models. Indeed, in defending an exchange rate, reserves tend to get drained during periods of currency crises, especially in the case of countries which are considered to fall under the category of the first-generation model (Mexico, Argentina, Russia).

Another interesting example expressly pointed to by Kaminsky, Lizondo and Reinhart (1997) is the ratio of broad money (M4) and reserves. It is shown in Table 7. This ratio increases during a crisis as the denominator decreases, because reserves are spent to defend a currency. An increased ratio at the time of crisis can partly be attri-

buted to an increase in the value of that part of broad money which is denominated in foreign currencies.

One of the key indicators of currency crisis is certainly a real exchange rate shown in Table 8, which is calculated on the basis of national currencies' nominal exchange rates against the dollar and national CPIs compared to USA CPIs. An increase in value indicates a real depreciation. It can easily be observed that at the time of currency crises, there occurs a real depreciation of national currencies against the dollar.

With regard to real exchange rate, Kaminsky, Lizondo and Reinhart (1997) suggest an indicator of deviation of the real exchange rate from the trend. This indicator is calculated on the basis of Hodrick-Prescott filter which represents the trend (smooth trend) and deviations (rate of change) from that trend. The results can be seen in Table 9. It can be seen that in the periods of currency crisis only positive deviations from the trend appear.

The most important indicator which belongs to the third-generation currency crisis model is a stock value indicator. Countries' stock exchange indices which were changed into base indices 1990=100 (except for Russia and Croatia, whose stock exchanges and stock exchange indices have been in use only since 1994 and 1997, respectively) are shown in Table 10. The third-generation model is characterised by a speculative bubble (growth in share prices) which bursts at the time of crisis (fall in share prices). This can be confirmed by examples of countries hit by the Asian currency crisis and Brazil, which are closest to the third-generation model.

5 Conclusion

Financial crises are not a new phenomenon, nor will they end with the Asian or the Brazilian crisis. Increasing globalisation of the financial market, and profit-seeking global investors, expose emerging markets to ever increasing capital mobility in search of higher profits (higher risk often brings higher yield). Though a target for the entry of foreign capital, emerging markets may easily become a lo-

Table 6 Gross reserves excluding gold

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Mexico	9,863	17,726	18,942	25,110	6,278	16,847	19,433	28,797	31,799
Argentina	4,592	6,005	9,990	13,791	14,327	14,288	18,104	2,230	24,752
Brazil	7,441	8,033	22,521	30,604	37,070	49,708	58,323	50,827	42,580
Great Britain	35,850	41,890	36,640	36,780	41,010	42,020	39,900	32,320	32,210
Italy	62,927	48,679	27,643	27,545	32,265	34,905	45,948	55,739	29,888
Sweden	17,988	18,331	22,624	19,050	23,254	24,051	19,107	10,824	14,098
Finland	9,644.1	7,608.7	5,213.4	5,410.8	10,662	10,038.3	6,916.3	8,416.6	9,694.5
South Korea	14,793	13,701.1	17,120.6	20,228.2	25,639.3	32,677.7	34,037.1	20,367.9	51,974.5
Indonesia	7,459	9,258	10,449	11,263	12,133	13,708	1,8251	16,587	22,713
Malaysia	9,754	10,886	17,228	27,249	25,423	23,774	27,009	20,788	25,559
Thailand	13,305	17,517	20,359	24,473	29,332	35,982	37,731	26,179	28,825
Russia				5,835	3,980.4	14,382.8	11,276.4	12,894.7	7,801.4
Croatia	0	0	166.8	616.2	1,405	1,895.7	2,314	2,539.1	2,815.7

Source: IFS.

Table 7 M4 and USD reserves ratio

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Mexico	5.78	4.45	5.04	4.35	19.16	4.95	4.54	3.93	3.70
Argentina	3.53	3.34	3.14	3.30	3.74	3.64	3.41	34.78	3.46
Brazil	13.08	17.76	9.89	11.33	6.14	4.21	3.67	4.65	5.60
Great Britain	23.80	21.32	24.95	22.21	21.17	23.42	26.73	36.60	40.22
Italy	10.07	13.38	23.90	19.41	16.29	14.67	12.18	9.81	18.80
Sweden	5.99	6.02	5.21	4.83	4.03	4.33	6.27	9.77	7.25
Finland	7.68	9.62	12.55	9.62	5.41	7.29	9.77	7.28	6.21
South Korea	6.56	8.33	7.20	6.91	6.47	6.11	6.51	10.50	3.55
Indonesia	6.16	5.51	5.61	6.09	6.55	7.09	6.50	7.21	2.50
Malaysia	2.91	2.99	2.64	1.97	2.34	3.17	3.45	4.70	2.70
Thailand	4.58	4.11	4.10	4.04	3.84	3.69	3.90	5.29	3.99
Russia				7.08	14.88	4.21	6.19	6.13	8.30
Croatia				4.54	2.05	2.46	2.90	3.24	3.15

Source: IFS.

Table 8 Real exchange rates

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Mexico	2.81	3.55	4.08	4.38	4.95	12.36	19.11	23.45	30.88
Argentina	0.49	2.49	3.13	3.39	3.44	3.46	3.37	3.31	3.29
Brazil	0.00	0.00	0.09	32.87	13,931.78	32,314.23	39,791.30	44,561.13	48,759.39
Great Britain	0.56	0.57	0.58	0.67	0.66	0.64	0.65	0.62	0.62
Italy	1,198.10	1,265.60	1,281.74	1,660.50	1,726.15	1,785.36	1,707.48	1,877.71	1,924.01
Sweden	5.92	6.33	6.07	8.23	8.17	7.52	6.87	7.70	7.90
Finland	3.82	4.04	4.45	5.63	5.08	4.17	4.29	4.79	4.92
South Korea	707.76	769.24	843.89	883.23	915.39	892.98	949.92	1,145.57	1,785.49
Indonesia	1,842.80	2,038.27	1,950.52	1,971.99	2,101.73	2,121.32	2,135.40	1,917.51	8,553.28
Malaysia	2.70	2.76	2.59	2.63	2.72	2.65	2.68	3.01	4.35
Thailand	25.11	25.83	26.00	26.06	26.50	27.01	28.26	36.06	50.61
Russia			0.39	8.74	58.06	233.17	375.53	474.77	1,002.76
Croatia	0.01	0.04	4.01	833.71	2,825.84	2,491.92	2,624.98	2,996.44	3,274.80

Source: IFS.

Table 9 Deviations of the real exchange rate from the HP trend

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Mexico	4.4	2.1	−0.5	−3.4	−6.3	−2.5	−0.5	1.0	4.5
Argentina	−1.4	0.3	0.6	0.6	0.4	0.2	−0.1	−0.3	−0.5
Brazil	8,742.1	1,922.6	−4,984.3	−12,052.5	−5,505.5	5,337.9	5,207.6	2,367.0	−1,034.8
Great Britain	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Italy	−15.1	−48.2	−132.5	146.6	115.4	80.9	−88.1	−7.9	−51.1
Sweden	−0.3	−0.2	−0.7	1.2	0.9	0.1	−0.8	−0.1	−0.1
Finland	−0.4	−0.3	0.0	1.1	0.5	−0.5	−0.5	0.0	0.0
South Korea	77.6	56.5	47.8	1.6	−55.6	173.2	−218.5	−131.6	395.5
Indonesia	739.2	587.0	144.2	−210.0	−491.3	930.8	−1,431.4	−2,218.0	3,811.0
Malaysia	0.3	0.2	0.0	−0.1	−0.1	−0.3	−04	−0.3	0.9
Thailand	3.5	2.3	0.6	−1.3	−3.1	−4.9	−6.2	−1.2	10.4
Russia			142.0	4.5	−93.4	−68.4	−79.5	−137.1	231.8
Croatia	280.4	−210.9	−701.1	−369.0	1,128.4	312.5	−24.9	−116.7	−298.7

HP = Hodrick-Presscott
Source: IFS.

Table 10 Stock exchange indices, 1999=100

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Mexico	100	228	280	414	378	442	535	832	626
Argentina	100	811	610	935	720	737	840	1.047	790
Brazil	100	2,432	27,120	1,502,000	17,415,600	17,196,000	28,159,600	40,786,000	27,136,000
Great Britain	100	110	115	132	142	147	167	189	222
Italy	100	100	88	120	124	116	132	208	293
Sweden	100	105	105	160	168	198	274	339	374
Finland	100	73	88	93	139	144	153	239	339
South Korea	100	88	97	124	148	127	94	54	81
Indonesia	100	59	66	141	112	123	153	96	95
Malaysia	100	110	127	252	192	197	245	117	116
Thailand	100	116	146	275	222	209	136	61	58
Russia	...	...	...	...	...	...	534	1,772	1,036
Croatia	...	...	...	...	...	...	...	1,002	716

Sources: UK, Finland – OECD Main Economic Indicators; Italy – www.borsitalia.it; Sweden – www.; Other – Emerging Stock Market Factbook 1998, IFC Washington 1998; Russia – 6.94=100; Croatia – 7.97=100.

cation from which this capital will flee on the slightest change in investment risk.

Theoretical models of currency crises can be divided into three generations of models. The first-generation models which date back to the work of P. Krugman in the 1970s are characterised by movements of fundamental macroeconomic variables incompatible with the proclaimed level of exchange rate, especially in fixed exchange rate regimes, which leads to a speculative attack. The second generation, which begins with the work of M. Obstfeld, stresses the expectations of economic subjects and of markets, which can, without major changes in government policy or in the movements of fundamental macroeconomic variables, lead to speculative attacks. A change in expectations may be prompted by various triggers. Based on the experience of the Asian crisis, the third-generation models point to the fact that there are real causes of crisis which, because of state guarantees and a poor banking system, spill over to the financial system and hence the exchange rate too.

The possibility for crisis prediction remains a big challenge which should be met by better co-operation of private investors and economic policy makers. Early detection of a crisis is vital and in this respect early warning indicators that are being developed more and more can be of great help. It should be borne in mind that it is almost impossible to recognise and correctly interpret warning signals for every type of crisis, because each has its own characteristics. However, early detection of crisis and appropriate response can help forestall a crisis.

Since an exchange rate regime is certainly one of the essential elements which can lead to a crisis it is important to take its changes into account. Pegs, currency boards, and currency unions have helped many countries to stabilise, but they have been found difficult to control in certain situations. In a situation characterised by large capital inflows, adjustable pegs are difficult to sustain. For some economies it is better to have greater exchange rate flexibility, partly because of advantages gained by avoiding risk inherent in fixed exchange rate due to excessive exposure to foreign currency. However, sometimes it is difficult to decide to abandon a fixed exchange rate regime because this type of regime supports stabilisation programs and boosts citizens' confidence. All countries have benefited greatly from their access to the global market and from better reallocation of resources, which is connected to market competition. But these benefits also have their negative sides, which lie primarily in exposure to faster capital outflows at the first glimpse of unfavourable economic changes. Fortunately, the opposite is also true. Thus, the liberalisation of the capital account calls for, among other things, more efficient regulation and supervision of financial institutions.

The Asian, the Russian, and the Brazilian crises showed once again that it was necessary to make adjustments to the international financial system in order to minimise the possibility of crises and their magnitude. The private sector, as well as the national governments and international financial institutions such as the IMF play a key role in this process.

Literature

Ahec-Šonje, A. (1999): *Navješćujući indikatori valutnih i bankarskih kriza: Hrvatska i svijet*, u studiji Pokazatelji međunarodne konkurentske sposobnosti hrvatskog gospodarstva i politika tečaja, Zagreb Institute of Economics, July 1999, Zagreb, pp. 231-276.

Agenor, P.R., J.S. Bhandari and R.P. Flood (1992): *Speculative Attacks and Models of Balance of Payments Crises,* IMF Staff Papers, Vol. 39, No. 2, June 1992, pp. 357-394.

Baig, T. and I. Goldfajn (1998): *Financial Market Contagion in the Asian Crisis,* IMF Working Paper, No. 155.

Berg, A. and C. Pattillo (1999): *Predicting Currency Crises*: *The Indicators Approach and an Alternative,* Journal of International Money and Finance, Vol. 18, 1999, pp. 561-586.

Blejer, M.I. (1998): *The Economics of Currency Crises: Models, Indicators and Policy Responses,* Zagreb Journal of Economics, Vol. 2, No. 2, Croatian Institute for Banking and Insurance, pp. 55-70.

Blejer, M.I. and L. Schumacher (1998): *Central Bank Vulnerability and the Credibility of Commitments: A Value-at-Risk Approach to Currency Crises,* IMF Working Paper, WP/98/65, May 1998, Washington D.C.

Bordes, C., E. Girardin and J. Mélitz, editors (1995): *European Currency Crises and After*, Manchester University Press.

Buiter, H.W., G. Corsetti and A.P. Pesenti (1998): *Financial Markets and European Monetary Cooperation,* Cambridge University Press.

Cagan, P. (1956): *The Monetary Dynamics of Hyperinflation in Friedman, Milton,* ed., Studies in the Quantity Theory of Money, The University of Chicago Press, Chicago, 1956, pp. 25-117.

Chote, R. (1998): *Financial Crises: The Lessons of Asia,* Financial Crises and Asia, CEPR conference report.

Flood, R.P. and N.P. Marion (1998): *Perspectives on the Recent Currency Crises Literature,* IMF Working Paper, WP/98/130, September 1998, Washington D.C.

Fischer, S., R. Sahay and C.A. Végh (1997): *From Transition to Market: Evidence and Growth Prospect in Salvatore Zecchini,* ed. Lessons from the Economic Transition: Central and Eastern Europe in the 1990s, Kluwer Academic.

Funka, N. (1996): *Vulnerability of Fixed Exchange Rate Regimes: The Role of Economic Fundamentals,* OECD Economic Studies, No. 26, 1996/I, pp. 157-176.

Hendricks, D. (1996): *Evaluation of Value-at-Risk Models Using Historical Data,* Federal Reserve Bank of New York Economic Policy Review, April 1996, pp. 39-69.

Hrnčir, M. (1997): *Czech Currency Turbulences Viewed from the Inside,* Lessons from the Czech Exchange Rate Crises, A CEPR Conference, Prag.

IMF (1999): *Brazil Memorandum of Economic Policies,* http://www.imf.org/external/np/loi/1999/030899.htm.

IMF (1999a): *Brazil: Composition of the Support Package,* http://www.imf.org/external/np/exr/facts/brazil.htm.

Irwin, G. and D. Vines (1999): *A Krugman-Dooley-Sachs Third Generation Model of Asian Financial Crisis,* CEPR Discussion Paper Series, No. 2149, May 1999.

Ito, T. and R. Portes (1998): *Crisis Management,* European Economic Perspectives, No. 17, Centre for Economic Policy Research.

Kamin, S.B. (1999): *The Current International Financial Crisis: How Much Is New?,* Journal of International Money and Finance, Vol. 18, pp. 501-514.

Kaminsky, G., S. Lizondo and C.M. Reinhart (1997): *Leading Indicators of Currency Crises,* IMF Working Paper, WP/97/79, July 1997, Washington D.C.

Kaminsky, G. and C.M. Reinhart (1999): *The Twin Crises*: *The Causes of Banking and Balance-of-Payments Problems,* American Economic Review, Vol. 89, No. 3, June 1999, pp. 473-500.

Kaminsky, G. and S.L. Schmukler (1999): *What Triggers Market Jitters? A Chronicle of the Asian Crisis,* Journal of International Money and Finance, Vol. 18, pp. 537-560.

Krugman, P. (1979): *A Model of Balance-of-Payment Crisis,* Journal of Money, Credit and Banking, Vol. 11, No. 3, August 1979, pp. 311-325.

Krugman, P. (1998a): *Currency Crises,* http://web.mit.edu/krugman/www/crises.html.

Krugman, P. (1998b): *What Happened to Asi*a?, January 1998, http://web.mit.edu/krugman/www/DISINTER.html.

Krugman, P. (1999): *Alas, Brazil,* http://web.mit.edu/krugman/www/brazil.html.

Mishkin, F. (1999): *Lessons from the Asian Crisis,* NBER Working Paper, No. 7012, April 1999.

Nellor, D.C.L. (1999): *Tax Policy and the Asian Crisis,* IMF Policy Discussion Paper, No. 2.

Obstfeld, M. (1984): *Balance-of-Payments Crises and Devaluation,* Journal of Money, Credit, and Banking, May 1984, Vol. 16, pp. 208-217.

Obstfeld, M. (1986): *Rational and Self-Fulfilling Balance-of-Payments Crises,* American Economic Review, Vol. 76, No. 1, March 1986, pp. 72-81.

Razin, A. and G.M. Milesi-Ferretti (1997): *Sharp Reductions in Current Account Deficits: An Empirical Analysis,* NBER Working Paper, No. 6310, December 1997.

Razin, A. (1998): *Advanced Topics in International Finance: Lectures,* mimeo, Spring 1998, Harvard University.

Šonje, V. (1998): *Bilješka o valutnim krizama i mogućnostima njihovog predviđanja,* mimeo.

Wade, R. (1998): *The Asian Debt-and-development Crisis of 1997-?: Causes and Consequences,* World Development, Vol. 26, No. 8, pp. 1535-1553.

Weber, A.A. (1998): *Sources of Currency Crises: An Empirical Analysis,* Oesterreichische Nationalbank, Working Paper 25, Wien, March 1998.

WEO (1998a): *World Economic Outlook,* International Monetary Fund, May 1998.

WEO (1998b): *World Economic Outlook,* International Monetary Fund, October 1998.

WEO (1999): *World Economic Outlook,* International Monetary Fund, May 1999.

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