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**Preslava Kovatchevska**

**The Banking and Currency Crises  
in Bulgaria: 1996–1997**

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Born on January 31st, 1975 in Sofia, Bulgaria. In 1993 she entered the Business Administration joint program between the University of Humberside, England and the University of Economics in Sofia. After her second year at the university, the author won an academic scholarship to continue her studies at West Virginia Wesleyan College, USA which she graduated in May 1997 with distinction earning a B.Sc. degree in Finance. In June 1997, she won the Open Society Fund Fellowship and enrolled in a graduate program in Economics at the Central European University. The first year of the MA program was held at the University of Essex, England followed by a year at the Central European University, Hungary from where she graduated with an MA in Economics in June 1999. Her research interests focus on issues related to macroeconomic policies in transition countries.

## **Abstract**

The paper examines the nature of the Bulgarian banking and currency crises in 1996–1997 and evaluates the causal link between them. The analysis shows that the banking crisis has resulted from slow structural reforms, inefficient prudential regulation and prolonged unsound lending practices. The probit model estimates illustrate that excessive credit, augmented interest rate spread and overvalued exchange rate exacerbated the banks' liquidity position. The currency crisis was a consequence of expansionary monetary policy, which led to irreversible depletion of international reserves and caused eventual collapse of the exchange rate. The probit estimations found real exchange rate, money multiplier, interest rate, current account balance, ratio of broad money to reserves and credit expansion to be the most relevant indicators of the balance-of-payment crisis. The causal link between the twin crises is explained through expansionary monetary policy that comes as a response to the banking crisis. It focuses on the inability of the central bank to sustain the exchange rate when it faces a run on its reserves.

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## **Introduction**

The implementation of a coherent macroeconomic policy has been a key requirement for the successful revival and robust stabilization of Bulgaria. Although initial restructuring yielded favorable results in terms of moderate economic growth in the early years of the transition, consistent economic development was severely complicated by the turbulent banking and currency crises of 1996–1997. At that time, Bulgaria found itself in the middle of a widespread banking sector insolvency, double-digit monthly inflation and an abruptly collapsing exchange rate.

No doubt, the crisis halted or even reversed the reform process initiated in 1990. More important, however, is to identify the particular causes for the economic disturbance and learn lessons how to avoid future economic crises. It is also worthwhile to investigate the causal chain that runs between banking and currency collapse and specify how macroeconomic environment becomes susceptible to twin crises within a short period of time.

The objective of this paper is to provide a quantitative analysis of the determinants of the banking and currency crises in Bulgaria and assess the causal relationship between them. To provide a background for the empirical analysis, Section 1 reviews a number of theories explaining banking and exchange rate collapses. In this context, bad economic fundamentals, self-fulfilling speculative attacks and contagion define the nature of currency crises. With regard to the banking crises, we stress the importance of overoptimistic lending behavior, inefficient financial regulation and pervasive government involvement in the banking system. Special attention is drawn to the causal chain of the twin crises. Following the banking crisis, a bailout is financed through an expansionary monetary policy that erodes the value of the domestic currency. The relationship also runs in the opposite direction where the macroeconomic policy in response to a currency collapse translates into augmented interest rates that exacerbate the liquidity side of the banks. Section 2 presents a definition of the banking and currency crises and discusses the choice of the explanatory variables to be used later in the empirical analysis. Statistical testing based on the Probit estimation in Section 3, identifies the most relevant macroeconomic indicators of the Bulgarian banking and currency crises. The main empirical tests are followed by evaluation of the predictive accuracy of the models. This section also provides a graphical illustration of the development of main macroeconomic aggregates in response to the banking crisis that ultimately precipitated the collapse of the exchange rate.

Lastly, concluding remarks comprise a summary of the main empirical findings and assessment of the macroeconomic deficiencies leading to the twin crises.

## **I. What does the Theory Say about Currency and Banking Crises?**

This section presents the existing currency crisis theories in order to provide background for the descriptive and econometric part of the research and cast light on the robustness of potential macroeconomic indicators. The analysis proceeds with the banking crisis literature to identify potential reasons for systemic banking failures, and concludes with an overview of the causal relationship between the twin crises.

### **I.1. Currency Crises Theories**

**First generation models of currency crisis.** First generation models, as defined by Krugman (1979), determine continuously deteriorating economic fundamentals, such as excessively expansionary monetary and fiscal policies, to be main causes for the crisis. Initially, Krugman shows that the attempt of the monetary authorities to fix the exchange rate is unsustainable under weak economic fundamentals. The basic problem originates from credit expansion, intended to finance the fiscal deficit or to provide assistance to a weak banking system [1], therefore leading to money creation, inflationary pressures, low credibility of the domestic currency and devaluation expectation. In their attempt to avoid capital losses, investors replace domestic currency holdings with foreign currency assets. Such capital outflows precipitate a collapse of the exchange rate regime, which becomes inevitable, given the depletion of reserves and the prevailing devaluation expectations.

The empirical implications propose that high inflation and low foreign reserves, which clearly indicate the presence of expansionary monetary policy and low credibility of the pegged exchange rate, prevail in pre-crisis periods. Kaminsky, Lizondo and Reinhart (1997) suggest a vital role for the fiscal deficit, credit to the public sector, money growth, declining international reserves and real exchange rate for explaining currency crises. Goldfajn and Valdes (1997) and Kaminsky, et. al. (1997) demonstrate that real exchange rate

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[1] Esquivel and Larrain (1998).

misalignment is to be corrected, in due course, through a nominal depreciation. Real exchange rate appreciation is usually reflected in worsening of the trade balance and the current account balance. Lastly, a policy of high interest rates pursued to maintain investors' holdings of domestic currency, may prove unfruitful in situations when the credibility of the domestic currency and the stability of the banking sector are significantly undermined.

**Second generation currency crisis.** Second generation models, represented by Garber and Flood (1984a) and Obstfeld (1986), depart from the assumption of unsustainable economic fundamentals and emphasize the role of self-fulfilling speculative attacks for triggering a crisis. In this context, agents' expectations of the exchange rate preclude a successful maintenance of the peg, and induce a capital outflow. In response, the authorities increase the level of the exchange rate, thus accommodating a self-fulfilling speculative attack [2]. Even though many crises are not related to economic fundamentals, predictive accuracy of second generation models, as expressed by Kaminsky et.al 1997, has, so far, been negative.

**Contagious currency crises.** Recent models of currency crises shed light on four different reasons for financial crises to spread across countries [3]:

Real integration contagion, also known as "spill-over effect", occurs whenever a devaluation abroad induces a loss of a country's international price competitiveness and, in its place, leads to subsequent devaluation of that country's domestic currency. Thus, empirical estimations disclose that the probability of attack and devaluation is negatively related to both the expected trade balance and foreign reserves, and positively to the stock of debt, foreign interest rate and a devaluation abroad.

Fundamentals contagion stipulates how a crisis in an anchor country makes investors more sensitive to risks in countries with correspondingly weak fundamentals, the outcome of which is a massive capital outflow from the whole region.

Institutional contagion relates to a decline in the real return from the stock market thus making forward looking investors leave the country and allocate their assets elsewhere [4].

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[2] Recent models pay special attention to the optimizing behavior of governments [Obstfeld, 1994]. In their attempt to defend a fixed exchange rate, authorities face a trade-off between defending the peg and bearing the subsequent costs, or abandoning the exchange rate. The timing of the exchange rate collapse, therefore, is often uncertain and the attack can be justified ex post, only if the government changes its policy. Furthermore, government may respond to augmented devaluation expectations with a policy of higher interest rates which, if perceived as a last chance to restore the undermined credibility of the domestic currency, induces self-fulfilling speculative attacks.

[3] Contagious crises are designed with particular reference to the turbulent crises of Latin America in 1994–1995 and East Asia in 1997–1998.

[4] Institutional contagion focuses on crises that spread without the affected countries necessarily displaying any economic weaknesses. Therefore, it is important to note that contagion effects can be used to explain the obscure reasons for a speculative attack in the second-generation theories.



Herding contagion evolves under costly information acquisition, when small investors find it rational to act alike large investors who are better informed, thus creating a chain reaction of withdrawing capital funds from the market.

Regarding contagion, the empirical work of Fratzscher (1998) shows that spreads of currency crises in Latin America and Asia are to a significant extent explained by financial and trade integration, whereas weak economic fundamentals have no relevant importance.

## **1.2. Bank Failure Theories**

**Macroeconomic epidemics** [5]. Banking system difficulties are endogenously linked to periods of booms and subsequent macroeconomic downturns. Optimistic over-lending to projects with unstable creditworthiness over boom periods, bids up prices but exacerbates banks' position when the economy slows down. Thus, during periods of output decline, terms of trade deterioration, or fall in asset prices, borrowers become incapable of servicing their outstanding loans, which places the viability of banks under uncertainty, and augments the likelihood of widespread runs and systemic banking crises.

**Poor management and microeconomic deficiencies** become evident in the following situations:

Self Lending. The period following bank liberalization, but lacking strict bank supervision and accurate law enforcement, may give rise to banks, established with the sole purpose of providing inexpensive financing to founders' enterprises. As Honohan (1997) already suggested it, even if supervisors detect self-lending, they are often unable to impose restrictions or fines because bank owners may be highly placed in the political hierarchy.

"Looting" refers to a situation when bank managers not only undertake risky projects, but also invest in projects that are sure failures with the sole reason of diverting funds for their personal use. Weak legal system allows fraud to remain unpunished which augments the crisis probability.

Implicit and explicit deposit insurance [6] removes depositors' fear of default. This guarantee of a bailout allows equity holders to undertake risky projects that offer higher

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[5] As defined by Honohan, P. (1997).

[6] Under explicit deposit insurance banks may purchase full or partial insurance on behalf of depositors from a government agency or from a private insurer. Implicit insurance is presumably provided by the government which will either bail out the troubled bank, or in the case of a bank failure, will compensate depositors [Honohan, 1997].

returns if projects prove successful, without incurring higher interest costs if these projects fail, thus bringing the problem of moral hazard. Under a strict supervision of the banking system by the government or the central bank, however, the moral hazard problem can be subsided [7].

Interest rate risk. The maturity transformation function of all banks defines interest rate risk as a major source of systemic banking sector problems. The liability side of banks' balance sheet consists of short-term deposits, whereas the assets are long-term loans with fixed interest to businesses and consumers. Thus, banks' balance sheets deteriorate whenever returns on their assets fall short of the returns they pay on liabilities. Such a possibility arises when an increase in short-term interest rates forces banks to raise the rate paid on deposits. Since banks' assets are loans with fixed interest rate and longer maturity, the return on assets cannot be adjusted fast enough to offset the mismatch in the rate of return. Even if high interest rates are eventually passed on to borrowers by increasing the interest rate on loans, this augments the number of non-performing loans and also exacerbates the condition of banks' balance sheets.

Open foreign exchange positions also cause mismatch between rates of return. When banks borrow in foreign and lend in domestic currency, they are exposed to the risks of exchange rate devaluation. A possible depreciation of the domestic currency implies that banks will have to convert larger amount of domestic currency to service their foreign debt. This automatically puts restrictions on the banks' liquidity position, and may further lead to insolvency problems. Even if banks decide to close their open positions by lending in foreign currency, they simply transmit the foreign exchange risk on to borrowers. Yet, the risk has not been eliminated, but rather transformed into credit risk which, in case of devaluation, will reduce banks' profitability through an increase in non-performing loans. It is thus evident, that shifting the burden of possible currency devaluation from commercial banks to borrowers does not provide a rational solution to the exchange rate risk.

Lastly, findings of the empirical study conducted by Detriagache et al., 1997 attest that high real interest rates, high past credit growth to the private sector, and explicit deposit insurance are closely associated with the probability of crises.

### **Government controlled banking system**

In many transition economies, the banking system operated as a quasi-fiscal mechanism, thus satisfying the ultimate goal of financing the government or providing

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[7] Komulainen (1999) talks about supportive legal and regulatory environment, strong internal governance, external discipline provided by supervision at both the domestic and international levels as being essential elements of a sound financial system.

resources on behalf of the government [8]. Such government permeated banking system was closely involved in financing state-owned enterprises (SOEs) that have eventually proved either unable or unwilling to repay loans.

Furthermore, commercial banks that split off from the mono-bank system but continued to lend heavily to SOEs and unprofitable private companies exposed themselves to substantial systemic risks and bore the burden of upcoming insolvency problems. In this context, Claessens (1996) argues that liquidity problems need not be inherited from the past, but may also be contingent on prolonged refinancing of SOEs, financial unsoundness of private borrowers, and inefficiency of the privatization process.

### **1.3. Twin Crises**

Twin crises theories explore the correlation and direction of causation between banking and balance-of-payments crises.

**Banking crisis leading to a currency crisis.** The key line focuses on the underdeveloped banking sector as being the initial source of the twin crises. As shown by Kaminsky and Reinhart (1993), once a successful run on banks precipitates banking crisis, the central bank performs its function of lender of last resort. In addition, Chang and Velasco (1998a) base their paper on Diamond and Dibvig model (1983), arguing that with a convertible currency, bailout is incompatible with maintenance of the exchange rate anchor because it gives rise to expansionary monetary policy, which erodes the value of the domestic currency. In their effort to escape capital losses, agents convert domestic holdings to foreign exchange and the central bank's reserves deplete. Hence, at the point when the exchange rate is no longer sustainable, the banking crisis gives rise to a currency crisis.

**Currency crisis causing banking crisis.** The reverse relationship appears whenever the central bank, in its attempt to defend the undermined currency and control the decline in foreign exchange reserves, increases interest rates. Higher interest rates worsen the liquidity of commercial banks and may trigger a run on the banking system.

With regard to the empirical literature on twin crises, Kaminsky et al. (1996), present a comprehensive study [9] encompassing a total of 25 banking crises and 71 balance-of-payments crises to show that 24 percent of the banking crises preceded the currency crises within a year, whereas the reverse relation accounts for less than 3 percent. They

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[8] The involvement takes the form of government ownership, programs of direct lending or investment, and subsidies [Honohan, 1997].

[9] Kaminsky et al. (1996), study 20 countries in Europe, Asia, Latin America and the Middle East.

conclude that foreign exchange crises are preceded by declining international reserves, expansionary monetary policy, and mounting liabilities of the banking system that are not backed by foreign reserves.

**Simultaneously occurring twin crises.** When caused by common factors, such as investment and consumption boom, twin crises can occur simultaneously [Kaminsky and Reinhart, 1996]. Consumption boom is reflected by large bank lending which, if not serviced, affects the liquidity position of banks. On the other hand, foreign investment and slowly converging to international levels domestic inflation, may produce exchange rate appreciation and larger current account deficit. If devaluation occurs and the foreign debt has not been hedged against the exchange rate risk, the ratio of domestic currency liabilities to assets rises. This situation can easily undermine the stability of the financial system and make it more vulnerable to banking crisis.

## **2. Modelling the Determinants of Banking and Currency Crises**

### **2.1. Definition of the Banking and the Currency Crises**

**Banking Crisis.** The banking crisis period is determined according to one of the criteria proposed by Demirguc-Kunt and Detragiache (1997). Four conditions of systemic banking distress are identified of which at least one should hold in order for the period to be classified as a crisis. The criteria are the following:

1. The ratio of non-performing loans to total assets in the banking system exceeds 10 percent.
2. The cost of rescue operations was at least 2 percent of GDP.
3. Banking sector problems resulted in a large nationalization of banks.
4. Extensive bank runs took place or emergency measures such as deposit freezes, prolonged bank holiday, or generalized deposit guarantees were enacted by the government in response to the crisis [10].

In the paper, we rely on the fourth requirement only due to the lack of relevant data on bad loans and costs of rescue operations. In the case of Bulgaria, the nationalization of banks criterion remains outside the scope of the authorities' response to the crisis.

**Currency Crisis.** A currency crisis is assumed to occur when there is a sharp devaluation of the real exchange rate. The method of constructing a crisis variable has

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[10] Demirguc-Kunt and Deragiache (1997).

been rendered by Esquivel and Larrain (1998). They define the existence of a crisis according to the magnitude of the real exchange rate movement which is subject to two conditions:

$$\Delta^1 \varepsilon_t > 2.54 \sigma^{\Delta \varepsilon} \text{ and } \Delta^1 \varepsilon_t > 4\% \quad ,$$

or one-month change in the real exchange rate is higher than 2.54 times the county-specific standard deviation of the real exchange rate, provided that it also exceeds 4 percent [11]. Although there is no precise rule for setting up a threshold value for the real exchange rate (RER) movement, the above two conditions try to capture sufficiently large changes of the RER relative to regular monthly changes of the RER [12].

## **2.2. Model Specification**

The analysis of the banking and currency crises in Bulgaria will be based on the Maximum Likelihood – Binary Probit test, which says that, in each period, the country is either experiencing a crisis, or it is not. Accordingly, the crisis variable is constructed as binary, a crisis dummy, which takes the value of 1 if a crisis has occurred, and 0 otherwise. The model estimates how a set of different macroeconomic variables determines the occurrence of a crisis.

### **2.2.1. Model Specification of the Banking Crisis**

The following model attempts to determine the optimum set of indicators that explains the occurrence of the Bulgarian banking crisis. Since the purpose of this paper is not only to explain what causes the banking crisis, but also to estimate the predictive power of the model, explanatory variables enter the regression equation in lagged form [13].

$$\text{BankingCrisis}_t = f(\text{RER}_{t-i}, \text{InterestSpread}_{t-i}, \text{SCR}_{t-i}, \text{PRCR}_{t-i})$$

where,

*RER* – monthly change in the real exchange rate;

*Interest Spread* – monthly change of the spread between commercial banks' lending and deposit real interest rates;

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[11] Esquivel and Larrain (1998).

[12] Ibid.

[13] The same reasoning will apply to the currency crisis as well.

RSCR – monthly change of the ratio of credit to SOEs to total credit;

PRCR – monthly change of the ratio of credit to the private sector to total credit.

The choice of banking crisis variables is dictated by the theoretical and empirical literature on crisis [14] determinants as well as the availability of data.

Real Exchange Rate. The real exchange rate tests whether the banking crisis is driven by excessive foreign exchange risk exposure either in the banking sector or among bank borrowers. Overvalued exchange rate is a characteristic of pre-crisis periods usually leading to a contraction of banks' profit margins, which in itself increases the vulnerability of banks to possible bankruptcies.

Spread Between Lending and Deposit Rates allows banks to opt for maximum profits, a feature typical for countries like Bulgaria, where capital markets are underdeveloped and alternative sources of funding are practically nonexistent. Consequently, an excessively augmented spread would intuitively suggest a large number of bad loans and a magnified susceptibility of the banking system to financial crisis.

Real Domestic Credit Expansion measures the weakness of the banking system [15]. As bank lending expands rapidly, the ability of banks to monitor lending activities becomes limited. Credit expansion, here, is used to reflect lending to both non-financial public and private sectors because the pre-crisis period in Bulgaria was characterized not only by prolonged lending to SOEs, but also by a significant increase in unsecured loans to the private sector.

### **2.2.2. Model Specification of the Currency Crisis**

The Bulgarian balance-of-payments crisis of 1996–1997 relates to obvious gaps in the government fiscal position that fit within the framework of first generation theories. In addition, we put emphasis on the role of the central bank in expanding domestic credit, bailing out troubled banks and financing unprofitable SOEs. In this respect, it warrants notice that monetization of the budget deficit and subsequent monetary policy developments will trigger high inflationary levels and undermine the domestic currency. In the presence of accelerating inflationary pressures, a policy of high nominal interest rates fails to restore the confidence in the lev, produces negative real interest rates and a decreasing money demand. To support the domestic currency,

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[14] The theoretical and empirical crisis literature has been reviewed in Section 1 of this paper.

[15] Although the best measure for the vulnerability of the banking sector is probably the ratio of bad loans to total credit, we are unable to use it in our empirical estimations due to unavailability of data.

the Central bank intervenes on the foreign exchange market at the cost of its international reserves. Thus, taking into account the outlined macroeconomic developments, it is appropriate to assume that weak fundamentals were the potential and most probable cause for the severe currency crisis in 1996–1997.

Since our model will be designed to detect an actual currency crisis, we can intuitively exclude the possibility of self-fulfilling speculative attacks. In this context, Esquivel and Larrain (1997) argue that construction of a speculative attack index [16] for self-fulfilling crisis is often subjective and fails to attack periods of exchange rate collapse, which are closely related to bad fundamentals. However, to further justify our assumptions, we construct a dummy variable for the negative per capita GDP growth which explains the crisis through the scope of second generation theories.

Also, we rule out the possibility of the crisis being contagious as no country in the region experienced a currency crisis before the outbreak of the Bulgarian crisis.

The model classifies the following macroeconomic indicators as the most relevant determinants of the Bulgarian currency crisis. Again, following the same rationale as in the model for the banking crisis [17], the specification determines that the currency crisis has been influenced by past values of the explanatory variables.

$$\text{CurrencyCrisis}_t = f [ \text{RER}_{t-i}, \log( \text{M2} / \text{Reserves} )_{t-i}, \text{IntrRate}_{t-i}, ( \text{M2} / \text{M0} )_{t-i}, \text{CAB}_{t-i} ]$$

where,

*RER* – monthly change of the real exchange rate;

*M2/Reserves* – monthly change of the ration of *M2* over reserves;

*IntrRate* – monthly change of the nominal interest rates;

*M2/M0* – monthly change of the *M2* Multiplier;

*CAB* – current account balance in USD.

Real Exchange Rate. The real exchange rate has been found to be the best empirical determinant of balance-of-payments crises [Kaminsky and Reinhart, 1996], as it is overvalued in pre-crisis periods and the greater the magnitude of appreciation, the higher the probability of crisis.

Reserves. Loss of substantial forex reserves exposes central bank to higher risks of possible runs against the domestic currency [Eichengreen, 1996; Frankel and Rose

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[16] A speculative attack index has been constructed by Eichengreen (1995) as a weighted average of the changes in reserves, interest rates and nominal exchange rates.

[17] Since the purpose of this paper is not only to explain what causes the crisis, but also to estimate the predictive power of the model, explanatory variables enter the regression in lagged form.

1996]. An alternative measure of the monetary authorities' ability to withstand attacks on the currency and back broad monetary aggregates by reserves is the Ratio of M2 to International Reserves. The possibility of devaluation may lead to a flight from domestic-currency denominated assets to dollar-denominated assets, and undoubtedly to a loss of international reserves. It has been shown by Kaminsky and Reinhart (1996) and Esquivel and Larrain (1998) that the ratio of M2 to reserves is a significant predictor of balance-of-payments crises, representing a sharp increase of the ratio in the months prior to a crisis. International reserves are also included as a regressor for the banking crisis to test whether the banking crisis is related to sudden capital outflows.

Interest Rates. An increase in interest rates is interpreted as an attempt of the monetary authority to restore the confidence in the domestic currency. Increasing inflationary levels that consequently produce negative real interest rates, however, may offset high nominal interest rates.

Current Account Balance is directly affected by RER appreciation and, not surprisingly, is anticipated to deteriorate. RER appreciation induces an upward pressure on the relative price of exports and lowers their international competitiveness.

M2 Multiplier. The downward behavior of this ratio in the period before a crisis suggests the presence of expansionary monetary policy and a loss of confidence in both the domestic currency and the banking system.

### **2.3. Data Sources and Methods of Estimation**

The sample of monthly data covers the period from January 1992 to September 1998. The main sources of data are the International Financial Statistics (IFS), the Bulgarian National Bank (BNB) and the National Statistical Institute (NSI) of Bulgaria databases. Monthly and yearly reports of BNB, the Organization for Economic Cooperation and Development (OECD), the International Monetary Fund (IMF) and the Institute of International Finance (IIF) have been used as supplementary sources of data.

The estimation method for the banking and the currency crises in Bulgaria will be based on the Maximum Likelihood – Binary Probit test, intended to display to what extent a set of different macroeconomic variables determines and accurately predicts the occurrence of a crisis. In each period, the country is either experiencing a crisis,



or it is not. Accordingly, the dependent variable is constructed as binary, a crisis dummy, which takes the value of 1 if a crisis has occurred, and 0 otherwise.

It warrants notice that, since our empirical estimation is based on monthly time series data, we have conducted tests of stationarity for each one of our explanatory variables [18]. The purpose of this preliminary testing is to examine whether the behavior of our regressors is influenced by their past time values.

### **3. Empirical Evidence from the Econometric Analysis**

#### **3.1. Evidence on the Banking Crisis**

The results of the banking crisis are reported in Table 1. The table contains regression coefficients and their z-statistics that show the significance of the results, as well as estimations for the overall goodness of the model and its predictive power.

The estimations of the binary probit model yield strong statistical significance of the explanatory variables in each of the regression specifications for the banking crisis. A quick comparison across columns (1) to (3) reveals that coefficients tend to be very stable and the significance of the regressors is not considerably affected by the introduction of additional variables. All coefficients have the expected sign, which corresponds to the effect of each of the explanatory variables on the probability of crisis [19], i.e. positive values indicate that an increase of the regressors augments the probability of a crisis, whereas negative values have the opposite effect. Higher banking sector fragility is associated with real currency appreciation. The real interest rate spread, lagged for the three consecutive periods just preceding the crisis, proves to be significant at 1 percent confidence level. Yet, interest rate spread tends to lose its significance when inflation is included in column (3). Thus, inflation can erode interest rate returns and induce people to withdraw their bank deposits. Another possible concern is that, in the run up to the crisis, reserve losses became progressive. Surprisingly, reserves and inflation which explicitly suggest declining confidence in the domestic currency, are already present at the time of the banking crisis. This interesting result will be used later to explain the causal relationship between the twin crises and to even explore the possibility of a currency

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[18] We start with estimating whether the residual series of our independent variables are autocorrelated, applying the Lagrange Multiplier test. The null hypothesis suggests no serial correlation. We then proceed with tests for stationarity, using the Augmented Dickey Fuller test whose null hypothesis tests non-stationarity.

[19] Esquivel and Larrain (1997).

**Table I. Determinants of Banking Crisis**

Variables	Regression Coefficients (z-statistics)			marginal Effect (4)
	(1)	(2)	(3)	
Spread (-1)	0.169*** (3.306)	0.146*** (3.153)	0.118** (2.053)	0.06
Spread(-2)	0.313*** (3.449)	0.284*** (3.357)	0.207** (2.086)	0.12
Spread(-3)	0.206*** (3.305)	0.200*** (3.162)	0.173** (2.341)	0.08
RER(-1)	-0.169*** (-3.305)	-0.138*** (-3.151)	-0.115** (-3.573)	-0.05
PRCR(-4)	0.002*** (2.943)	0.003*** (2.914)		0.44
SCR(-1) 4 lags included for regression(3)	1.114* (1.675)	17.987* (1.628)	0.009** (1.985)	0.01
Reserves(-2)		-0.004** (-1.977)	-0.004* (-1.956)	
Inflation(-1)			0.149*** (2.599)	
No of observations	68	68	68	
No of crises	12	12	12	
% total correct	96.93	88.35	94.12	
% crisis correct	66.67	65.75	75.00	
% of noncrisis correct	98.18	93.19	98.21	
Mc Fadden Rsquared	.56	.59	.70	
$\chi^2$	36.020***	37.942***	44.207***	

Note: All regressions include a constant. One star (\*) indicates statistical significance at 10% level. Two stars (\*\*) indicate significance at 5% level. Three stars (\*\*\*) indicate significance at 1% level.

collapse that is not preceded by a banking crisis. The regression results also support the view that credit growth to both public and private sector enhances the probability of upcoming systemic problems. The consistently positive sign of the coefficient for the ratio of credit to SOEs over total credit, reveals that credit growth makes the event of the banking crisis more likely to happen. As predicted by theory, the expansion of private sector credit to total credit demonstrates high level of significance.

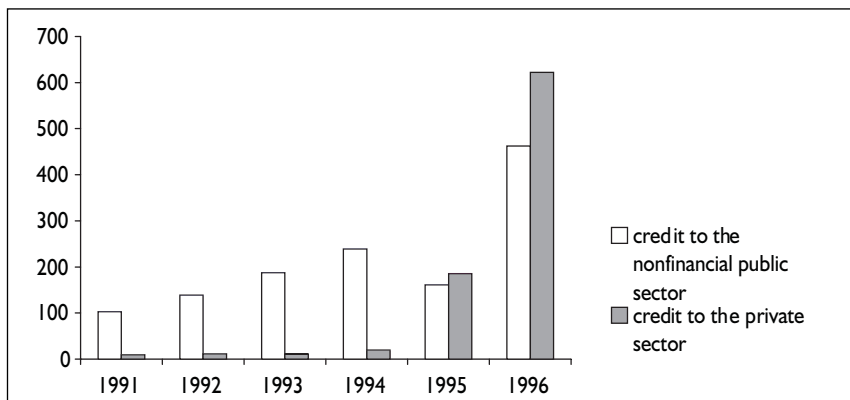
Before we turn to each variable impact on the crisis, it's worth explaining that, since the binary probit gives the estimated coefficients in z-metric form, they cannot

be immediately interpreted as marginal effects on the dependent variable. In this case we use the forecast method to construct residual series of the forecast dependent variable, which when multiplied by the estimated coefficients, evaluates each variable's marginal effect on the crisis.

We use equation (1) as a benchmark. Column (4), translates the coefficients into marginal effects and gives a comprehensive insight about their impact on the crisis probability. Surprisingly, credit expansion to the private sector has had the most significant impact on the crisis probability, equal to 44 percent. A possible explanation for this phenomenon may be the fact that, the private sector has been absorbing nearly half of the credit during the transition period.

This is graphically illustrated by Figure 1 showing that commercial banks not only placed themselves in the trap of providing credit to SOEs, but at the same time, increased substantially the amount of unsecured loans to the private sector, which intensified the deterioration of their solvency position.

**Figure 1. Credit to the nonfinancial public and private sector (Billions of BGL)**



Furthermore, the credit to the private sector was mostly granted in large amounts to a relatively small number of borrowers. Later on, it became evident that most of these private borrowers were involved in outright fraudulent practices, which in itself is a reason to intensify the vulnerability of banks. Simultaneously, credit to the state-owned sector explains only 1 percent of the crisis. Interest rate spread in each period accounts for nearly 10 percent of the banking crisis, whereas the impact of the real exchange rate is assessed at 5 percent.

To estimate the overall goodness-of-fit, we use chi-square statistic (Table I), which tests that all coefficients are jointly significant at 1 percent confidence level.

The final step in our banking crisis analysis is to calculate the percentage of correctly classified crisis and non-crisis periods, and the overall correct prediction of the model. According to the prediction rule, a crisis is anticipated whenever the predicted probability  $P_{it}$  exceeds a previously defined threshold value  $P^*$ , or whenever  $P_{it} > P^*$ ; otherwise – a tranquil period is predicted. For our analysis, we choose the most commonly used threshold value of 0.5, as proposed by Esquivel and Larrain (1997). In this context, Table I reports high predictive accuracy of our banking crisis model. The overall percentage of correctly estimated observations varies between 88.35 and 95.59 percent. Nevertheless, it should be emphasized that the percentage of crisis periods that are correctly predicted, tends to deteriorate from the overall good prediction ability of the model, while the estimated accuracy of the non-crisis months remains high.

### **3.2. Evidence on the Currency Crisis**

The empirical estimations of the currency crisis are presented in Table 2, which contains regression coefficients, their z-statistics and values for the overall goodness of the model and its predictive accuracy.

The econometric analysis focuses on the behavior of key economic variables, uses three different specifications, and yields robust evidence that macroeconomic fundamentals played a crucial role in determining the currency crisis in Bulgaria. Equation (1) is used as a benchmark. In the second equation, we introduce the credit boom dummy variable. It is binary with a value of 1 if the six-month increase in credit exceeds 50%, and 0 otherwise. Sequentially, in the third specification, we include dummy for the negative per capita GDP growth, which is assumed to capture any existing insights of second generation models. It shows that the policymaker's incentive to switch to more expansionary monetary policy may be achieved through a nominal devaluation of the currency. The goal is to prove, by the regression results, our hypothesis that the currency crisis in Bulgaria was not triggered by a self-fulfilling speculative attack.

The estimations of the binary probit model yield the following results.

All five variables in our benchmark equation (1) are individually and jointly significant at 5% and 1% confidence level respectively. The estimated coefficients have the expected signs and confirm the predicted relationship between each one of

**Table 2. Determinants of Currency Crisis**

Variables	Regression Coefficients (z-statistics)			marginal effects (4)[20]
	(1)	(2)	(3)	
Real Exchange Rate [21]	-0.084** (-2.229)	-0.123** (-2.163)	-0.085** (2.157)	-0.032
M2/M0 [22]	-0.695** (-1.981)	-0.899** (-2.118)	-0.744* (-1.934)	-0.271
Interest Rate [23]	0.039*** (2.833)	0.046*** (2.567)	0.039*** (2.761)	0.015
Current Account Balance [24]	-0.015** (0.400)	-0.015* (-1.884)	-0.016** (-2.273)	-0.005
log(M2/Reserves)	3.314** (1.994)	3.038 (1.387)	3.265** (1.961)	0.882
Credit Growth Dummy (1 if 6 month growth rate > 50%)		1.723* (1.803)		
Negative Growth Dummy (1 if per capita GDP growth is < 0)			0.316 (0.386)	
No of observations	75	75	75	
No of crisis	10	10	10	
% of crisis correct	66.32	80.00	66.62	
% of non-crisis correct	95.04	98.46	95.04	
% of total correct	91.21	96.00	91.25	
Mc Fadden R-squared	0.65	0.71	0.65	
$\chi^2$	38.345***	42.327***	38.494***	

Note: All regressions include a constant. One star (\*) indicates statistical significance at 10% level. Two stars (\*\*) indicates significance at 5% level. Three stars (\*\*\*) indicates significance at 1% level.

the macroeconomic indicators and the likelihood of crisis. The crisis tends to be preceded by RER appreciation. The M2 Multiplier and the interest rate, which are closely related to the exchange rate collapse, point to the situation where an increase in the nominal interest rates is not sufficient to restore the credibility in the currency,

[20] Equation (1) has been used as a benchmark.

[21] Lagged for 1 period.

[22] Lagged for 3 periods.

[23] Lagged for 5 periods.

[24] Lagged for 6 periods.

and ultimately induces people to flee leva denominated deposits. Not surprisingly, the current account balance deteriorates following the real appreciation of the domestic currency. Lastly, our evaluation focuses on the ratio of M2 to international reserves [25]. The variable is a highly significant indicator of the approaching foreign exchange collapse, but it loses its significance when we include the dummy for the credit growth. Last, the combined influence of the variables on the crisis, as shown by the R-squared statistic, comes up to 55 percent.

Regression equation (2) shows that the credit expansion explains the currency crisis and does not change the benchmark coefficients significantly. However, it has to be interpreted with caution because credit expansion further contributes to inflationary pressures and thus can additionally influence the money multiplier. When we include the second dummy for the negative per capita GDP growth in column (3), it turns out to be insignificant. Not surprisingly, this result is conclusive of our preliminary hypothesis that second generation theories are not applicable for the Bulgarian crisis.

The chi-square statistic reveals strong joint significance of all coefficients in the model at 1 percent confidence level.

Column (4) in Table 2, translates the coefficients from column (1) into marginal effects on the probability of crisis, evaluated at the mean value of the explanatory variables. The exchange rate accounts for 3.2 percent increase in the probability of crisis; M2 multiplier raises the probability of crises by 27 percent; interest rates translate into 1.5% increase in the likelihood of crisis. It is estimated that the ratio of M2 to international reserves accounts for the largest probability of crisis - equal to 88 percent and supports the widely expressed view that the ratio rises very quickly in the months just preceding the currency collapse [26]. The deterioration of the current account has a negligible impact on the crisis probability, because its impact could have been already captured by the RER appreciation.

Next, the predictive ability of the model is significantly high. The correctly classified number of observations and the number of noncrisis periods fall in the range of 90 percent. The forecast of the crisis months, however, fails to maintain such a high prediction level and drops to 66.32% percent in our benchmark regression.

In conclusion, we evaluate the nature of the exchange rate crisis and the degree to which it fits within the framework of 1st generation theories. The regression results find unequivocal relationship between the crisis and the existence of bad

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[25] The logarithm has been used to reduce dispersion of this variable and facilitate the interpretation of the estimated coefficient.

[26] See, for example, Kaminsky and Reinhart (1996).

macroeconomic fundamentals. Our analysis however, failed to capture the importance of the budget deficit as being the major source of balance-of-payments problems [27]. Rather than being a result of problems on the fiscal side, the Bulgarian currency crisis turns out to be a consequence of inappropriate expansionary monetary policy, thus departing from the traditional models of 1st generation theories.

### **3.3. Causal Relationship Between the Banking and the Currency Crises**

The causal link between the banking and the currency crises focuses on the inability of the central bank to sustain the exchange rate when it faces an attack on its reserves [Chang and Velasco, 1998b]. In this respect, our hypothesis draws attention to expansionary monetary policy that came as a response to the banking crisis and eventually precipitated the exchange rate collapse in early 1997. In order to justify our reasoning, we examine the behavior of the following macroeconomic indicators: inflation, real interest rates, real stock of deposits, money multiplier, international reserves and exchange rate.

Following the banking sector disturbance in 1996, the monetary authorities failed to substantially increase the basic interest rate, because this would have further harmed the already illiquid banking system and put additional pressure on the government for servicing the domestic debt. In addition, the prevailing two digit monthly inflation in the summer in 1996 (Fig. 2), undoubtedly suggests that the return on deposits would suddenly decrease. Thus, under intensifying inflationary pressures, the monetary authority found itself so unsustainable that the real interest rate recorded negative levels (Fig. 3) and the real stock of deposits decreased abruptly and remained at low levels throughout the whole 1996 (Fig. 4).

Also, the Central Bank, had earlier provided large amounts of uncollateralized financing to troubled commercial banks, leading to the ultimate expansion of the monetary base. It warrants notice that the money multiplier was progressively decreasing (Fig. 5) which explicitly indicated both plummeting credibility in the domestic currency and lost confidence in the banking system. The flight from the lev was reflected in the declining level of international reserves (Fig. 6). Hence, the Bulgarian National Bank was using the exchange rate as a target while intervening into the foreign exchange market to satisfy the augmented demand for hard currency.

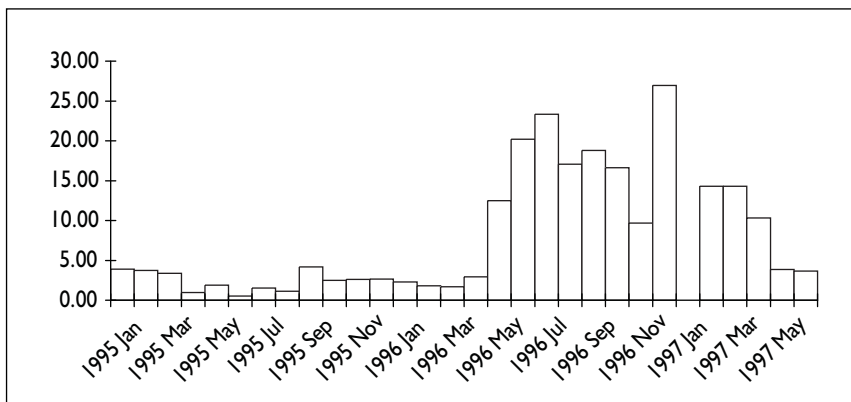
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[27] Although the fiscal deficit was progressively deteriorating over the whole period between 1991–1996, and could have been another important indicator of the crisis, it has been excluded from the regressions due to unavailability of monthly data for the whole period.

The monetary policy response to the banking crisis can be viewed as a reason for the further depletion of international reserves, which accompanied by the plunging confidence in the lev, proved insufficient to support the exchange rate. The lev underwent an abrupt depreciation from nearly 500 leva per US dollar in the last quarter of 1996 to a level of 2203.35 lev per USD in February 1997 (Fig.7).

Finally, it is worth emphasizing that the pattern of decreasing international reserves was already present at the time of the banking crisis. This unambiguously shows that the credibility of the domestic currency had been undermined long before the evident outbreak of the financial crisis occurred. Although our hypothesis of expansionary monetary policy response to the banking crisis coincides with the actual chronology of events, the eventual emergence of the currency crisis might have been possible even in the absence of the banking collapse which is, however, a topic further research.

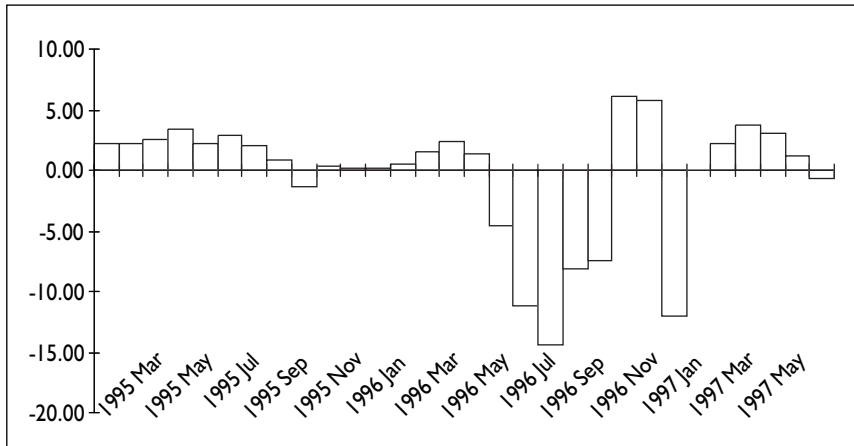
**Figure 2. Monthly Inflation**



Note: To present a clear picture of the inflation movements, the series has been truncated for Jan 1997, when inflation surged to 295%

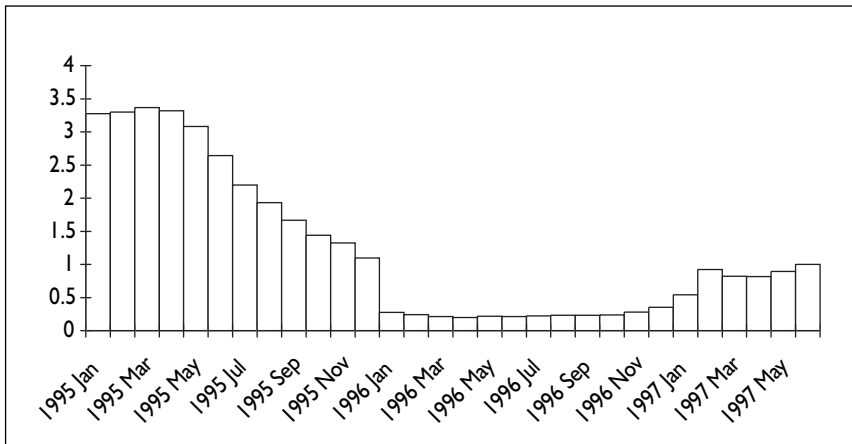


**Figure 3. Real Interest Rates**

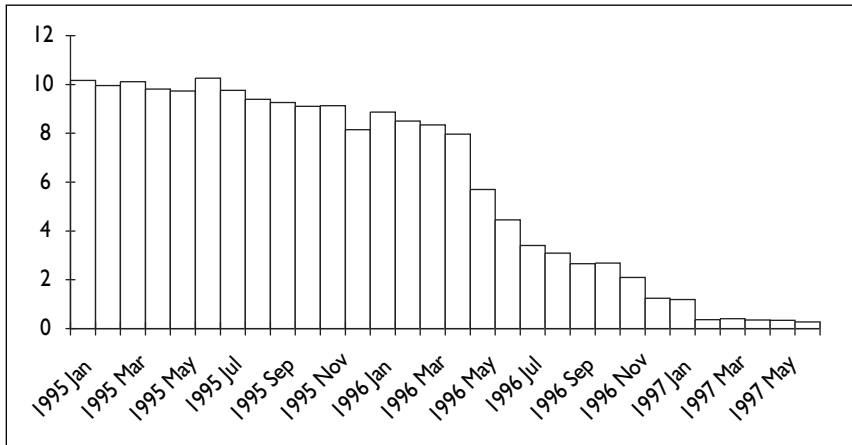


Note: To represent a clear picture of the movement in the real interest rate we omitted the value for Jan 1997 which plunged to -280.73%

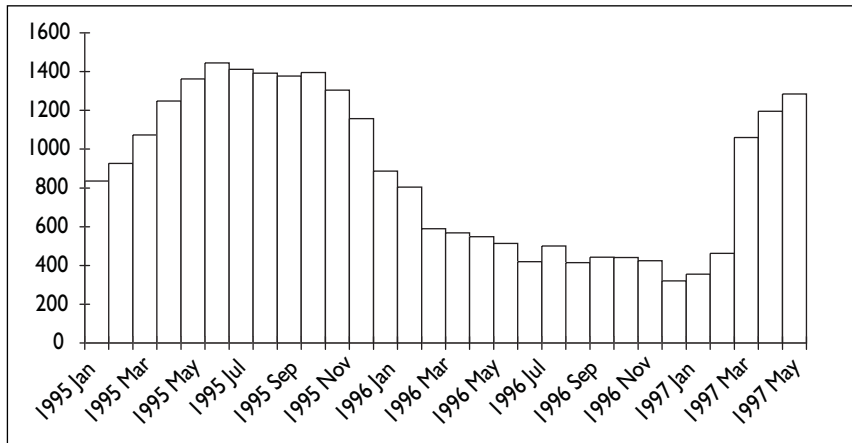
**Figure 4. Stock of Real Deposits**



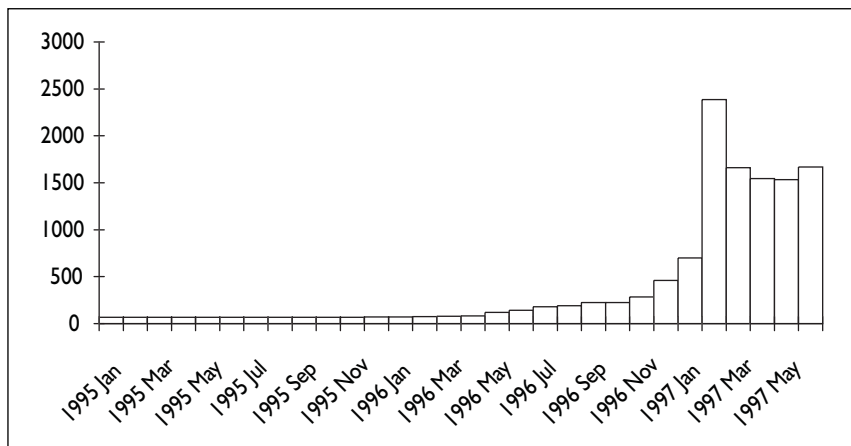
**Figure 5. Money Multiplier**



**Figure 6. International Reserves (in millions of USD)**



**Figure 7. Nominal Exchange Rate (BGL/USD)**



#### 4. Concluding Remarks

In an attempt to examine the nature of the banking and currency crises in Bulgaria in 1996–1997 and the causal chain between them, the paper addressed a number of theoretical issues to support the empirical part of the research.

The empirical part presented a clear picture of the most probable macroeconomic causes for the twin crises. The results have several important implications for the policy-makers since they would help authorities detect economic crises in advance and take appropriate preventive measures to avoid them. In this respect, the Bulgarian banking crisis was a consequence of inappropriate macroeconomic policies – slow pace of structural reforms, inefficient prudential regulation of banks, and prolonged unsound lending practices. The increased risk of banking sector problems was subject to the bad credit to both public and private sectors. What turns out to be a surprising result though, is the impact of the private sector credit on the crisis probability, contrary to our expectations that the public sector credit would have had a major impact. A possible explanation for this phenomenon may be the fact that, the private sector has been absorbing nearly half of the credit in the transition period, which was granted in large amounts and to a relatively small number of borrowers. The increased

interest rate spread further contributed to the accumulation of bad loans, thus leading to a more illiquid banking sector.

With regard to the currency collapse, the empirical results depart from the traditional 1st generation theories and establish a new proposition for the nature of the Bulgarian currency crisis. Rather than being caused by problems on the fiscal side, the Bulgarian currency crisis proves to be a consequence of expansionary monetary policy, which undermined the credibility of the domestic currency and caused an irreversible depletion of international reserves which proved insufficient to avoid the abandonment of the exchange rate target.

Finally, the causal link between the twin crises is explained through expansionary monetary policy that came as a response to the banking. It focused on the inability of the Central bank to sustain the exchange rate when it faces a run on its reserves.

## References

Blachburn, K. and M. Sola (1993). "Speculative Currency Attacks and Balance-of-Payment Crises". *Journal of Economic Surveys*, Vol 7. No.2, Basic Blackwell Ltd., Cambridge, USA.

Calvo, G. (1995). "Varieties of Capital Market Crises.", Working Paper, University of Maryland.

Chang, R. and A. Velasco (1998a). "Financial Fragility and the Exchange Rate Regime". WP 6469, NBER, Cambridge, USA.

Chang, R. and A. Velasco (1998b). "Financial Crises in Emerging Markets: A Canonical Model". WP 6606, NBER, Cambridge, USA.

Claessens, S. (1996). "Banking Reform in Transition Countries", World Development Report (abstract), The World Bank.

Demirguc-Kunt, A. and E. Detragiache (1997). "The Determinant of Banking Crises: Evidence from Developing and Developed Countries". IMF Working Paper 97/106.

Eichengreen, B., A. Rose and Ch. Wyplosz (1994). "Speculative Attacks on Pegged Exchange Rate: An Empirical Exploration with Special Reference to the European Monetary System". WP 1060, Centre for Economic and Policy Research, London, UK.

Esquivel, G. and F. Larrain (1998). "Explaining Currency Crises". Harvard Institute for International Development.

Flood R. and P. Garber (1984). "Collapsing Exchange Rate Regimes: Some Linear Examples". *Journal Of International Economics*, 17, pp 1-13.

Flood R. and N. Marion (1996). "Speculative Attacks: Fundamentals and Self-fulfilling Prophecies". WP 5789, NBER.

Frantzsch, M. (1998). "Why are Currency Crises Contagious? A Comparison of the Latin American Crisis of 1994-1995 and the Asian Crisis of 1997-1998". *Review of World Economics*, Band 134, p.664-692.

Golfain, I. and R. Valdes (1997). "Capital Flows and Twin Crises: The Role of Liquidity". IMF Working Paper 97/87.

Honohan, P. (1997). "Banking System Failure in Developing and Transition Countries: Diagnosis and Predictions". Monetary and Economics Department, Bank of International Settlements, Basle, Switzerland.

IMF Staff County Report on Bulgaria, No 99/29.

Kaminsky, G., S. Lizondo and C. Reinhart (1997). "Leading Indicators of Currency Crises". IMF Working Paper 97/79.

Kaminsky, G. and C. Reinhart (1996). "The Twin Crises: The Causes of Banking and Balance of Payments Problems". International Finance Discussion Papers, No.544, Board of Governors of The Federal Reserve System.

Komulainen, T. (1999). "Currency Crisis Theories - Some Expectations for the Russian Case". No.1, Bank of Finland, Institute for Economies in Transition, BOFIT.

Krugman, P. (1979). "A Model of Balance-of-Payment Crisis". Journal of Money, Credit and Banking, Vol.11, No.3,1979.

Obstfeld, M. (1986b). "Rational and Self-fulfilling Balance of Payments Crises". American Economic Review, 76, pp.72-81.

Obstfeld, M. (1994). "The Logic of Currency Crises". WP 4640, NBER.

OECD, 1997, 1999, "Economic Surveys, Bulgaria 1997", Paris, France.

Sachs J., A. Tornell, and A. Velasco (1995). "The Collapse of the Mexican Peso: What Have We Learned?". NBER Working Paper No 5142, Cambridge, Massachusetts: NBER.

Bulgaria, 1997 and 1998 Economic Report, Institute of International Finance, NY, USA.

The Bulgarian National Bank web page at [www.bnb.bg](http://www.bnb.bg)

National Statistical Institute of Bulgaria at [www.nsi.bg](http://www.nsi.bg).

## **Appendix. Bulgaria – Economic Overview**

The economic performance of Bulgaria during 1990–1997 was very unstable and yielded unfavorable developments. Stabilization was complicated by poorly designed monetary policy, unstable fiscal deficit and unregulated financial sector. Bulgaria experienced a high degree of volatility in inflation and exchange rates, accumulation of large government debt and loss of the confidence in the banking system. Moreover, the implementation of fruitful stabilization policies was hindered by the slow pace of structural reforms. Thus, Bulgaria's weak economic environment proved susceptible to severe problems that culminated in the banking and balance-of-payments crises in 1996 and early 1997.

### **I. Financial Fragility of the Banking Sector**

The financial system in Bulgaria, dominated by the banking sector, was at the heart of the severe economic crisis that emerged in 1996 [28]. A combination of difficult initial conditions, bank refinancing to SOEs, private banks' self-lending procedures, and inefficient legal and regulatory framework lead to a incessant emergence of systemic insolvency problems.

At the onset of the transition, the Bulgarian financial system retreated from the mono-bank arrangement and adopted a two-tier scheme comprising of a central bank and a large number of commercial banks, the latter reaching a number of 41, 46, and 47 in 1994, 1995, and 1996 respectively. The process of establishing new private banks required operational efficiency accompanied by effective regulation and supervision of commercial banks. A number of fundamental laws were adopted to ensure the appropriate functioning of banks. The Law on the Bulgarian National Bank (1991) established the central bank as an independent body responsible for the macroeconomic stabilization and regulation of commercial banks. The Law on Bank and Credit Activity and Prudential Regulation of Licenses (1992) placed capital adequacy requirements in compliance with the Basle criterion of more than 8 per cent. More regulations were adopted with the purpose of imposing minimum requirements for granting banking licenses [29].

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[28] IMF Staff Country Report on Bulgaria, No. 99/26.

[29] Minimum capital requirements were BGL 200mil. (US\$ 7mil) for domestic banking licenses and BGL 500 mil. (US\$16mil.) for licenses to also conduct foreign operations (1997 OECD Economic Survey on Bulgaria).

Although a number of laws were launched to ensure the development of a reliable banking sector [30], commercial banks operated under a lax supervisory regime, allowing them to involve in excessive risk taking and outright fraud. Furthermore, the high inflation of 1994 (see Table 4) eroded the value of the lev and dramatically decreased capital requirements [31], which proved an attractive opportunity for substantial emergence of undercapitalized private banks. In this context, Table I shows the increasing number of banks that failed to meet the capital adequacy requirements of 8 percent, and unequivocally points to the already alarming state of the banking system.

**Table I. Capital Adequacy of Commercial Banks: 1994–1995**

Capital adequacy ratio	1994		1995	
	Banks (units)	Market share (%)	Banks (units)	Market share (%)
> 8	20	51	22	40
4-8	6	23	5	17
0-4	3	10	4	14
< 0	4	14	9	29

Source: BNB, Annual Report, 1995

Note: 1. In 1994, 2 banks (.3% market share) were exempt; 9 banks (1.4% market share) were registered but not operational. 2. In 1995, 4 banks (.9% market share) were exempt. 3. Capital adequacy ratio = assets/risk component (assets weighted by risk). 4. Market share is defined as balance sheet total divided by the sum of all balance sheets

Yet, a large burden on the banks' balance sheets was to come from the state enterprise bad debt. In this sense, it would be rational to expect problems in the Bulgarian financial sector to emerge as a direct consequence of the delayed restructuring and little privatization of state enterprises. Albeit amendments to the privatization law were adopted in 1994–1995, mass privatization remained extremely slow, and state enterprises continued to function under soaring losses and large bad debt obligations to commercial banks.

Albeit the Bulgarian government undertook measures to alleviate the burden of uncollectible debt from the balance sheets of commercial banks by transforming the

[30] In addition the following laws were adopted: Big and Internal Loans of Banks (1993), Capital Adequacy of Banks (1993), Internal Control of Banks (1993), and Liquidity of Banks (1993).

[31] After the strong depreciation of the lev 1994, banks managed to receive licenses for as little as the equivalent of US\$ 3mil. for domestic practices and US\$ 12 mil. for foreign operations.



bad debt contracted before 1990 with special state bonds until 1993 [32], commercial banks ensued a new wave of continuous refinancing of SOEs. Consequently, credit to the non-financial sector, which was based entirely on new loans, reached 41 percent of GDP at the end of 1995. Thus, in December 1995 (Table 2), only 26 percent of commercial banks' loans to SOEs were serviced, while some 55 percent were in arrears of 30 days or less, 4 percent were in arrears from 30 to 90 days, and 15 percent were uncollectible.

**Table 2. Commercial Bank Loans by Classification (Percentage)**

<b>Loans</b>	<b>Standard</b>	<b>Doubtful- Type A</b>	<b>Doubtful - Type B</b>	<b>Uncollectible</b>
1994	17.7	66.9	3.5	12.0
1995	25.9	54.5	4.2	15.2

Note: 1. A loan is doubtful if it is in arrears for less than 30 days. 2. A loan is doubtful if it is in arrears between 30 and 90 days. 3. A loan is doubtful if it is in arrears over 90 days

Source: BNB, Annual Report 1995, p.142

In response to the lower liquidity of commercial banks, the Bulgarian National Bank (BNB) and the State Savings Bank (SSB) engaged in a large recapitalization of troubled banks.

Table 3 represents the figures for commercial banks' outstanding credits from BNB and SSB. Furthermore, in mid May 1995, the Central bank was already involved in the rescue operations of two banks – Mineralbank and Economic Bank. The continuous bailing out of these and other insolvent banks, proved unsustainable in mid 1996, which led to massive bankruptcy of banks and their subsequent closure [33].

**Table 3. Outstanding Credits to Commercial Banks from the National Bank and the State Savings Bank (percentage of GDP)**

<b>Banks</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>
SSB	11.5	8.5	6.0
BNB	6.5	6.6	5.2

Source: BNB, Annual Report, 1995

[32] The transformation of bad loans with state bonds was made possible through the adoption of the "Law of the Settlement of Non-performing Credits Negotiated Before December 31, 1990", the Bad Loans Act (1997 OECD Report on Bulgaria).

[33] The following is the list of banks that went bankrupt and were liquidated later on: Credit Bank, International Bank for Investment and Development, Mineralbank, First Private Bank, Tourist Sport Bank, Business Bank, Balkanbank, Agro-Business Bank, Bank for Agricultural Credit, Bank "Slaviani", Agrobank, Dobrudjanska Trade Bank.

## **2. Macroeconomic Policy Developments**

The control of money supply has been a primary target of the monetary policy in Bulgaria, but proved unsustainable in later years of the transition period. At first place, the fragile banking system caused the central bank to undertake extensive refinancing of insolvent commercial banks and excessive money creation, ultimately leading to inflationary pressures, which were already underway in 1996 (Table 4).

The interest rate policy of the BNB in 1994 and early 1995 was particularly directed towards the maintenance of high interest rates. Initially, the interest rates on lev-denominated deposits exceeded those on dollar-denominated ones, and since the exchange rate was kept stable, agents held their deposits in leva. Besides high nominal interest rates, the period of 1994 and 1995 was particularly characterized by unexpectedly low inflation. Consequently, the policy response involved a decrease in the basic interest rate in mid 1995 leading to a decrease of real money demand as people shifted away from leva into hard currency denominated deposits. Similarly, commercial banks had previously decreased their liquid hard-currency denominated deposits and shifted to leva assets that yielded higher returns. The following decrease in the basic interest rate in mid 1995, put some doubt on the ability of the banks to meet the increased demand for foreign currency withdrawals. To stabilize the position of banks and meet the increased demand for hard currency, BNB intervened in the foreign exchange market. This attempt of the BNB to use the exchange rate as a nominal anchor caused an irreversible depletion of its international reserves which plummeted, in May 1996, to a level below \$500million [34].

The government fiscal position was persistently deteriorating between 1991 and 1996 (Table 4). The revenue side performed below expectations in spite of the introduction of the value-added-tax in 1994, explanations for which are rendered by the low efficiency of tax collection and the existence of tax avoidance practices. In addition, expenditures were increased through domestic and foreign debt interest payments. They reached the level of 20 percent of GDP in 1996. Foreign exchange reserves thus showed the first sign of what was supposed to turn into a turbulent currency crisis in early 1997. It warrants notice that international reserves decreased

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[34] At the beginning of the transition period, because foreign exchange reserves were not sufficient to defend the exchange rate, the central bank adopted a managed float. Yet, it often intervened in the foreign exchange market to prevent the lev's decline. Although initial sustainability of the exchange rate was achieved at 21.81 to 32.71 leva to a dollar between 1991 and 1993, and following the currency crisis in 1994 at 66.02 and 70.70 leva for a US dollar in 1995 and 1996, its fall started in 1996 to plunge to a level of 2385.66 in February 1997.

at the time of the banking crisis reaching their lowest level of \$484mil. in 1996. Simultaneously, the budget deficit had to be monetized which further eroded the value of the lev and produced high inflation. The confidence in the lev was not restored because inflation surged to double digits between May 1996 – January 1997 and to 295.93% in February 1997 producing negative real interest rates. Therefore, the period between 1996 and early 1997 was characterized by a surge on inflation, an abrupt fall in both the credibility in the lev and the stock of international reserves which altogether precipitated the ultimate collapse of the exchange rate.

### **3. Limitations of the microeconomic policy**

The microeconomic policy of Bulgaria failed to realize decisive measures to deal with unprofitable enterprises and banks, failed to accelerate privatization, and failed to achieve the desired stabilization and restructuring of the economy. Delayed structural reforms in loss-making state and privately owned enterprises resulted in bad debt which, in its place, exposed banks to systemic solvency problems. Despite its large financial debt, the government was constantly refinancing the losses of commercial banks, which in their turn continued to lend to unprofitable enterprises.

In addition, problems with structural reforms imposed limitations on the use of monetary policy instruments, namely the interest rate and the exchange rate. Since the banking sector faced the prospect of massive insolvency, a policy of high interest rates was not feasible. It is important to understand that, in its attempt to alleviate the problems in the decapitalized banking sector and simultaneously service substantial foreign debt requirements and foreign currency domestic demand, the monetary authority depleted its stock of international reserves necessary to defend the value of the lev, and thus precipitated the exchange rate collapse.

**Table 4. Macroeconomic Indicators of Bulgaria: 1991–1998**

	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
<b>Real GDP</b> (% change)	-11.7	- 7.3	-2.4	1.8	2.1	-10.9	-8.2	0.5
<b>Interest Rates</b> (%)	54	41	52	78.50	37.31	192	66.42	2.37
<b>Reserves</b> (minus gold, in millions of USD)	311	902	655	1002	1236	484	2249	2599
<b>Inflation</b> (%)	333.5	82.0	73.0	96.3	67.2	174.4	1077.5	1.00
<b>Exchange Rate</b> (average Lev/\$)	21.81	24.49	32.71	66.02	70.70	487.35	1681.88	1765.1
<b>Budget Deficit or Surplus</b> (billions of leva)	-6.1	-9.9	-36.1	-24.5	-46.2	-269.6	353.3	

Source: Institute of International Finance, Inc.



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- 138 Роман Могилевский, Яцек Цукровский, Оценка стоимости льгот, предоставляемых некоторым категориям граждан Кыргызской Республики (September, 1998)
- 
- 139 Роберт Брудзыньски, Малгожата Маркевич, Экономические реформы в Кыргызстане в 1997-1998 гг. (September, 1998)
- 
- 140 Емир Джугели, Ираклий Гварамдзе, «Нулевые» аукционы: цели и анализ результатов (September, 1998)
- 
- 141 Приватизация за любую цену. Анализ опыта Республики Грузия в 1997–1998 годах. Под редакцией Владзимежа Панькува и Барбары Гончаж
- 
- 142 Ирина Синицина, Марек Ярочиньски, Бюджетно-налоговая система и государственные финансы Грузии в 1997–1998 гг.
- 
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