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Credibility of the Exchange Rate Policy

in Transition Countries

No. 38

Contents

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Part 1

Introduction

Credibility of an exchange rate policy is one of the most important factors contributing to success or failure of any stabilization program. Authorities usually hope that the public will trust official exchange rate commitments and take decisions regarding domestic currency holdings accordingly. However, as the experience of several countries analyzed in this study shows, this is not always the case. Economic agents behave in line with their own expectations which need not directly reflect central bank's commitments but are most often a combination of official policy and public's own notions regarding its actual future course.

There are clear advantages of high credibility of exchange rate policy to the country's disinflation efforts. It can help bring inflation down quicker and reduce inevitable output losses. Naturally, this prompts the question of whether one can quantify credibility and find factors that are affecting it. Various studies found in the literature have attempted to find an answer to this problem. In line with these efforts, our paper tries to shed new light on the issue. It makes use of the new theoretical model specially designed to approximate credibility of exchange rate policy and provides its empirical application for a number of transition economies that have actively used exchange rate policy in their stabilization programs during the 1990s. For each country we present the model-derived coefficient of credibility, draw conclusions from the model's predictions and confront it with the behavior of other macroeconomic indicators. The resulting analysis and discussion enable us to identify a set of possible "independent" factors explaining the developments of credibility.

Our paper is composed as follows. Chapter 2 presents the theoretical model and its dynamics. Subsequent chapters are devoted to individual countries and contain empirical estimation of the model and the discussion of results. Chapters 3–10 contain studies of Poland, Bulgaria, Estonia, Lithuania, Latvia, Moldova and Georgia. Finally, chapter 11 concludes with summary of results and findings.

Part 2
The Model

Below we present a simple model of an exchange rate based stabilization or, more strictly, of an introduction of a new exchange rate commitment. We believe that this model captures some crucial aspects of the behavior of monetary aggregates and inflation in the discussed circumstances. The construction of the model highlights the importance of the credibility of the exchange rate policy. The model allows us to formalize the notion of credibility and lays the foundation for the empirical analysis in the subsequent chapters.

We concentrate on the situation where the government sets the exchange rate, and the money supply is endogenous. The model includes the price setting mechanism and the money demand relationship, which determines the behavior of the monetary aggregate. To simplify things, the model abstracts from the problems of foreign trade and the availability of foreign exchange reserves of the Central Bank. Furthermore, we ignore the direct influence of the deviation from the absolute PPP on domestic prices (through tradable goods). In the model, the *relative* PPP is all that matters, because *changes* in the real exchange rate affect depreciation expectations. The balance of payments of a country, the level of foreign reserves and the absolute level of the real exchange rate are of course important for the credibility of the exchange rate policy. Although for the sake of simplicity they are missing from the model that follows, they will be back in the center of interest when the lessons from the model are applied to actual economies.

2.1. The Assumptions of the Model

Consider an economy in which the following 5 assumptions are met:

Assumption 1

The real product (real GDP) is constant and there are no sectoral shocks. Foreign rate of inflation is equal to zero.

Assumption 2

At the end of each period the authorities (called here "the Government") announce the rate of devaluation of the currency for the next period (d per cent per period).

The time period in question, used mostly in the subsequent empirical analysis, is one quarter. Usually, the devaluation rate would be the same as in the previous period, with one exception: At the end of period "0" the government introduces a new, tighter devaluation target and suggests that this is also its new inflation target.

Assumption 3 (Formulating expectations)

At the end of each period domestic economic agents formulate expectations about the next period's inflation and devaluation rates in order to set prices of their products correspondingly.

The process of formulating expectations can be partitioned into two phases: 1) formulation of two pure, extreme scenarios (the "believing" scenario and the unbelieving or "skeptical" scenario); 2) applying subjective probability weights to the two extreme cases and calculating the final expectation as a sort of expected value of the two scenarios.

3.1. According to the **"believing" scenario** the government will stick to its commitment, and in period $t+1$ the rate of devaluation will really be the declared d_{t+1}.

$$E_t^b \left\{ \frac{\Delta e_{t+1}}{e_t} \right\} = d_{t+1} \tag{1}$$

(superscript b refers to the "believing" scenario, e denotes the nominal exchange rate)

In the economy in which authorities conduct the exchange rate targeting policy, money supply becomes residual and the currency devaluation is the primary source of inflation. We abstract from other sources of inflation, like the changes in real GDP, Balassa-Samuelson effect or price shocks and we assume that the domestic prices are reasonably close to the PPP. Anyway, the Government would not admit that it is trying to push the exchange rate out of the PPP. Therefore, if one believes the Government, one

expects that the domestic prices follow the nominal exchange rate, so that the current real exchange rate is preserved. Therefore the rate of inflation should also be d_{t+1}.

$$E_t^b \left\{ \frac{\Delta P_{t+1}}{P_t} \right\} = d_{t+1} \qquad (2)$$

(*P* denotes the price level)

3.2. According to the **"skeptical" scenario** the government commitment is not credible and the government will go back on its promise to control the rate of devaluation at d_{t+1}. In fact, in this scenario the agents suspect that the government will be unable to control the exchange rate at all (e.g. because its reserves are too low, or have to be conserved for the servicing of the foreign debt). Instead, the monetary expansion will continue at the unchanged rate, because the government deficit, which is monetized, will not be reduced in line with the announced policy.

The logic of the "skeptical" scenario goes as follows:

1) There is no reason to expect that the inflation rate will change upwards or downwards, so it remains unchanged compared with the recent period:

$$E_t^s \left\{ \frac{\Delta P_{t+1}}{P_t} \right\} = \frac{\Delta P_t}{P_{t-1}} \qquad (3)$$

(superscript s refers to the "skeptical" scenario)

2) The real exchange rate (RER) will return to the level at which it had been before the government started to manipulate the exchange rate.

$$E_t^s \left\{ \frac{P_{t+1}}{P_{t+1}^* e_{t+1}} \right\} = \frac{P_0}{P_0^* e_0} \qquad (4)$$

(*P** denotes the foreign price level, 0 is the number of the period when the new exchange rate commitment was announced)

According to the "skeptical" scenario all government interventions in the currency market were only driving the nominal (and thus the real) exchange rate away from equilibrium. Typically (if the Government is trying to slow down the rate of depreciation and inflation) the interventions would be in defense of the domestic currency. The real exchange rate would appreciate. Indeed, virtually all transition economies are undergoing a real appreciation after they emerge from the initial high inflation. The real appreciation that happened since the Government started defending the exchange rate determines the potential for depreciation, if the currency market is left on its own.

Such expectation is obviously simplistic. There is little controversy among professional economists that real appreciation is to be expected in an economy 1) to which foreign capital flows, 2) where productivity grows (even if this results mainly from the growth of unemployment and not the volume of GDP), 3) where the currency had been significantly undervalued in the past.

However, this view is hardly ever shared by the wide

public. It seems that most people tend to treat any changes in the RER as deviations from equilibrium. It would be difficult to gauge what exactly the equilibrium RER is thought to be and what exact criteria should be used to call it equilibrium (even the professional economists cannot agree on that), but the popular consensus would probably be that it was the past one rather than the present.

There are psychological reasons for that. People tend to be conservative and accept stability more than changes. Changes in the real exchange rate require adjustment from entrepreneurs (whether they are net importers or exporters). Past RER is the one to which they had already adjusted, so they tend to treat it as more natural. Also, those who are net losers from the real exchange rate appreciation, are usually more audible and influence the public opinion more, convincing it that the direction of the recent change of the exchange rate was away from equilibrium.

The model is intended to imitate the first 1–2 years since the introduction of the examined exchange rate commitment. In the real life, if we apply it in the longer run, anchoring the depreciation expectation at the initial level of the real exchange rate is increasingly problematic. The economy adjusts to the new level of the RER and long run processes, which lead to a change in the equilibrium PPP, take effect.

3) The expectation of the inflation rate to remain constant and the RER to return to the value from the outset of the stabilization program determines the potential for nominal depreciation (we assume that foreign prices remain constant). In the "skeptical" scenario the expected nominal depreciation is equal to this potential. We obtain:

$$E_t^s \left\{ \frac{\Delta e_{t+1}}{e_t} \right\} = \frac{\left(\dfrac{P_t}{P_0} \right) \left(\dfrac{P_t}{P_{t-1}} \right)}{\left(\dfrac{e_t}{e_0} \right)} - 1 \qquad (5)$$

3.3 In the second step of formulation of expectations the economic agents weigh the two scenarios with their, subjectively assessed, probabilities to obtain the expected values of the forecast variables – inflation and devaluation rates.

$$E_t \left\{ \frac{\Delta P_{t+1}}{P_t} \right\} = \theta_t E_t^b \left\{ \frac{\Delta P_{t+1}}{P_t} \right\} + (1-\theta_t) E_t^s \left\{ \frac{\Delta P_{t+1}}{P_t} \right\} \qquad (6)$$

(θ denotes the subjective probability of the fulfillment of the "believing" scenario and $1-\theta$ is the subjective probability of the fulfillment of the "skeptical" scenario)

$$E_t \left\{ \frac{\Delta e_{t+1}}{e_t} \right\} = \theta_t E_t^b \left\{ \frac{\Delta e_{t+1}}{e_t} \right\} + (1-\theta_t) E_t^s \left\{ \frac{\Delta e_{t+1}}{e_t} \right\} \qquad (7)$$

The parameter θ is crucial for the behavior of the economy. It represents the credibility of the Government's announcement of the exchange rate target. The value of 1 means that the Government's exchange rate policy is fully

credible and the agents adjust their expectations instantaneously. The value of 0 means that the Government completely lacks credibility, people ignore its announcements and expect the inflation to continue at the previous rate and the exchange rate to evolve towards what they perceive as equilibrium. The values between 0 and 1 represent the continuum of Government credibility, from total distrust to the full confidence in the ability of the Government to stick to its announced goals.

For the practical application of the model, the limits of {0,1} can occasionally prove too narrow. The two basic scenarios considered by the public represent the situation of the fulfillment of the Government's declared goal (the "believing" scenario) and the scenario of failure of stabilization (the "skeptical" one). In practice it could happen that the situation goes beyond these two cases. Imagine that the currency had been depreciating in the past and the Government declares the intention to peg it. In reality the government could even revalue the currency or, at the other extreme, devalue it to a level lower than it had been at the outset of stabilization (in real terms). As long as we hold strictly to the model, such situations cannot be expected by the public. However, as we try to apply it to real life cases, we cannot rule out such expectations anymore, although they should be rare. Then in the first case q would increase to more than 1 and in the second it would fall below 0. Of course, then it cannot be interpreted as probability anymore but it is still interpretable in terms of expectations.

Assumption 4

At the end of each period the agents set their prices for the next period. The price increases are set in line with the expectations regarding the overall inflation, in order to preserve the relative prices unchanged.

$$\frac{\Delta P_{t+1}}{P_t} = E_t \left\{ \frac{\Delta P_{t+1}}{P_t} \right\} \tag{8}$$

The assumption that prices are set in advance, once per quarter, reflects a certain rigidity of prices (or of the rate of inflation). The rigidity might result from menu costs or from problems and delays in obtaining the information about the whole economy.

Assumption 5

Since the exchange rate is controlled by the Government, the control over money supply is lost and the money supply is determined by the money demand relationship:

$$\ln(M_t) - \ln(P_t) = \ln(y_t) + \alpha - \beta E_t \left\{ \frac{\Delta e_{t+1}}{e_t} \right\} \tag{9}$$

(M_t denotes the money supply/demand, y_t – the real GDP, α and β are parameters of the money demand function)

The money market clears instantaneously according to the demand function similar to the classical one proposed by Cagan. Elasticity of real money demand with respect to real output is equal to 1, which guarantees that, if other condi-

tions are unchanged, the level of monetization (calculated as M/Py) will remain constant, regardless of the dynamics of the real output.

The last variable in the equation, the expected devaluation, represents the alternative cost of holding domestic money. Typically, this cost would be measured by the interest rate on assets alternative to money (e.g. T-bills). However, in most transition countries financial markets are shallow, often also nontransparent and the interest rates are of dubious relevance for the money demand. The real and very popular alternative to holding wealth in domestic money is to buy foreign currency. In addition to foreign currency deposits, large quantities of cash US dollars and Deutsche Marks circulate in transition economies, which makes the foreign currency market relatively liquid and efficient. Thus, the alternative cost of holding domestic money is represented by the expected rate of depreciation of the exchange rate, which corresponds to the expected gain on holding foreign currency.

Parameters of the Money Demand Function

The meaning of the parameters α and β in the money demand function can be better understood while working with the transformed equation:

$$\ln(M_t) - \ln(P_t) - \ln(y_t) = \alpha - \beta E_t \left\{ \frac{\Delta e_{t+1}}{e_t} \right\} \tag{10}$$

The left hand side of the relationship represents the log of the monetization level (*M/Py*), also referred to as the Cambridge *K* (and later denoted by *K*).

One can see, that the constant term α is equal to the level of monetization which will be reached when the expected rate of devaluation is equal to zero, i.e. when the stability of the currency is regarded as certain (as in the case of a credible currency board). In such a situation currency risk does not deter agents from holding all their liquid wealth in the domestic currency. Thus, α represents the potential, maximum level of monetization to be reached, given the structural characteristics of the country (like the structure of the financial system, habits of the population, share of the "natural" economy in GDP etc.).

$$\alpha = \ln\left(\left[\frac{M}{Py} \right]^{\max} \right) = \ln\left(K^{\max} \right) \tag{11}$$

($K^{\max}$ is the potential, maximum value of K or *M/Py*)

Parameter β reflects the sensitivity of the money demand and the monetization level to the expected depreciation. As the expected depreciation approaches infinity, K tends to zero.

The size of β can tell us for example what happens to the monetization of the model economy during hyperinflation. If the rate of inflation is d^{hyp} (equal to 237.5% per quarter or 50% per month) and the same rate of devaluation is antici-

pated, the level of monetization will fall to K^{hyp} which is related to β by the relationship:

$$\ln\left(K^{hyp}\right) = \alpha - \beta d^{hyp} \qquad (12)$$

For example, in an economy with the potential level of monetization of 50% and a β of 1.65, in hyperinflation the monetization level will fall to about 1% of GDP.

Substituting for α from equation 11 we can express b in relation to the two different states of the economy:

$$\beta = \frac{\ln\left(K^{max}\right) - \ln\left(K^{hyp}\right)}{d^{hyp}} \qquad (13).$$

2.2. Dynamic Behavior of the Model

The Initial Equilibrium

The model remains in equilibrium as long as the rates of devaluation and inflation are equal and the devaluation potential (considered in the "skeptical" scenario) is zero. This is possible when authorities keep their depreciation goal constant. Then the "believing" scenario coincides with the "skeptical" one and the credibility of the policy becomes irrelevant. The RER is constant. Nominal money supply grows at the rate d, so that the real money balances are constant.

$$\frac{\Delta P_{t+1}}{P_t} = \frac{\Delta e_{t+1}}{e_t} = E_t^b\left\{\frac{\Delta P_{t+1}}{P_t}\right\} = E_t^s\left\{\frac{\Delta P_{t+1}}{P_t}\right\}$$

$$= E_t^b\left\{\frac{\Delta e_{t+1}}{e_t}\right\} = E_t^s\left\{\frac{\Delta e_{t+1}}{e_t}\right\} = \frac{\Delta M_{t+1}}{M_t} = d$$

(for all t)

Perfectly Credible Stabilization

Imagine that the model economy is in equilibrium and the rate of depreciation is 100%. In period 0 the Government announces its intention to hold the devaluation at a new rate 0% beginning with the next period. If that policy is perfectly credible, then the expected inflation for period 1 also falls to 0%. Therefore the actual inflation in period 1 falls to zero too and the real exchange rate remains the same as it had been in period 0. No depreciation potential arises and even if the credibility of the policy falls in the next period, it is irrelevant, because the economy is already in the new equilibrium at the zero inflation.

If the new exchange rate policy announced at the end of period 0 is credible, then by definition the expected depreciation for period 1 falls down to zero. Therefore, the money demand should immediately, already in period 0, switch to its potential level (which means that the monetization ratio K jumps to exp(α)).

Stabilization Which Lacks Credibility

If, in the case of the same policy change, the credibility of the Government is zero, then both inflation and depreciation expectations remain at 100%. Thus, in period 0 money demand is the same as before and in period 1 inflation remains at 100%. However, if the exchange rate is really held constant during period 1, this means a real appreciation of 100%. Depreciation expectations increase, and the demand for money falls to an even lower level. If the credibility remains at zero, in the subsequent periods the real exchange rate explodes as the exchange rate and the price level diverge.

In the model there is no constraint on the part of foreign exchange reserves of the authorities, so the scenario of the real exchange rate exploding infinitely is sustainable. In the real life this scenario corresponds to an exchange rate regime which collapses as soon as, or even before, the reserves leak out. The reserves are going to leak out, because 1) there is speculation against the home currency (real money demand falls) and 2) the exploding real exchange rate is bound to cause balance of payments problems.

New Policy Gradually Gaining Credibility

In a typical situation the Government policy would win some confidence either immediately, or after some period of trial. As the new exchange rate policy is implemented consistently and other credibility enhancing policies are realized, the confidence would gradually grow. The model enables to make a projection of the dynamics of inflation and domestic money supply depending on the path of the credibility of the Government's exchange rate policy. The graphs below show the evolution of the model economy under two scenarios of θ: scenario A, in which credibility grows systematically until it reaches almost 1, and scenario B, where credibility grows more slowly and with a setback.

In both cases the stabilization of inflation is successful. The rate of inflation converges to the new rate of depreciation which has been set at zero. However, when credibility is lower:

– Disinflation takes longer.
– Inflation rates during disinflation are higher.
– As a result, the real appreciation is stronger and the new equilibrium is reached at a higher real exchange rate.
– Money demand grows more slowly and monetization is lower. People are reluctant to hold much domestic money when because they fear devaluation.

In fact, when credibility grows slowly enough the level of monetization can actually fall in the early phase of stabilization. In scenario B monetization in period 1 is lower than in 0, although credibility grows in this time. This results from the fact, that as the real exchange rate appreciates, the depreciation feared by the economic agents under "skeptical" scenario is deeper.
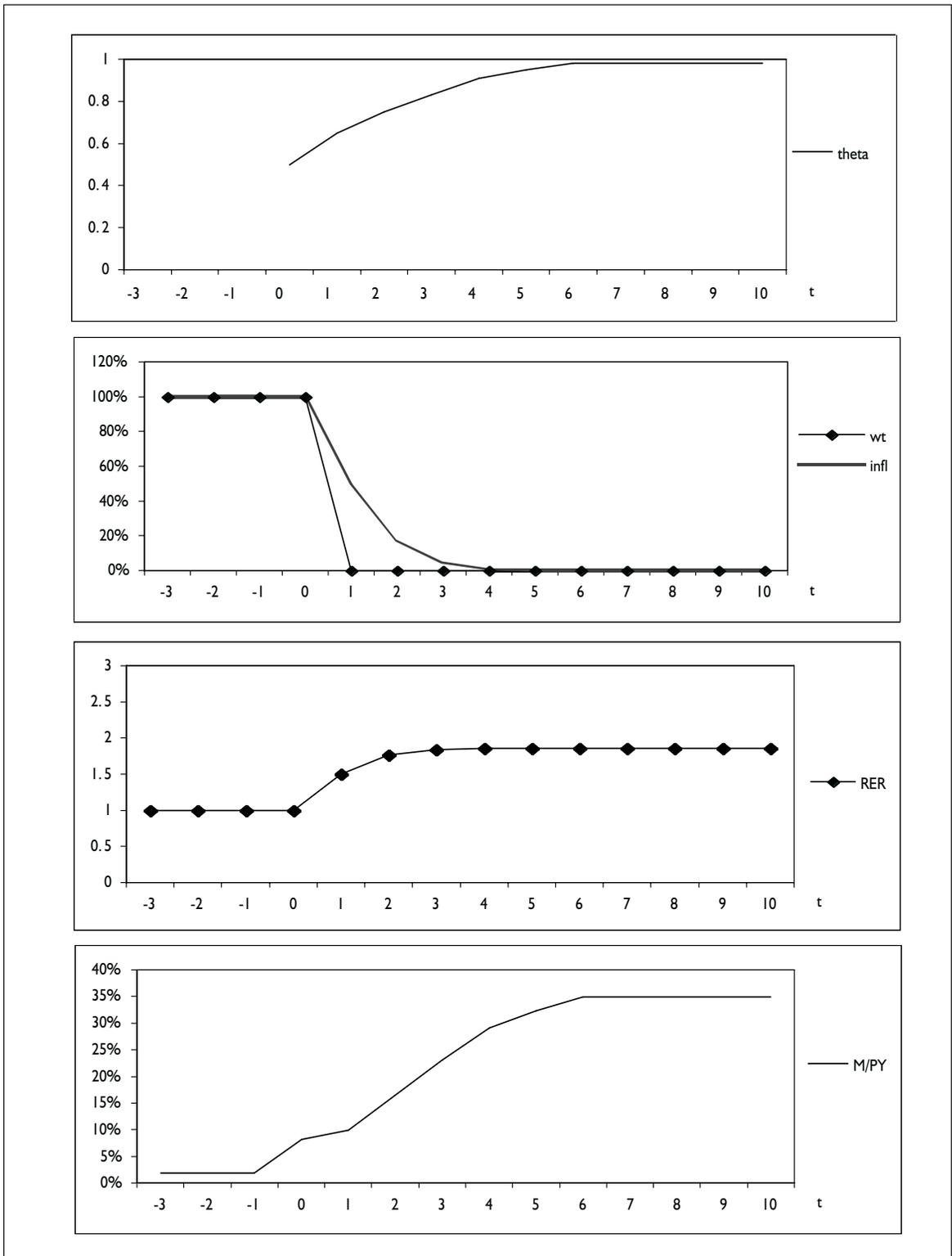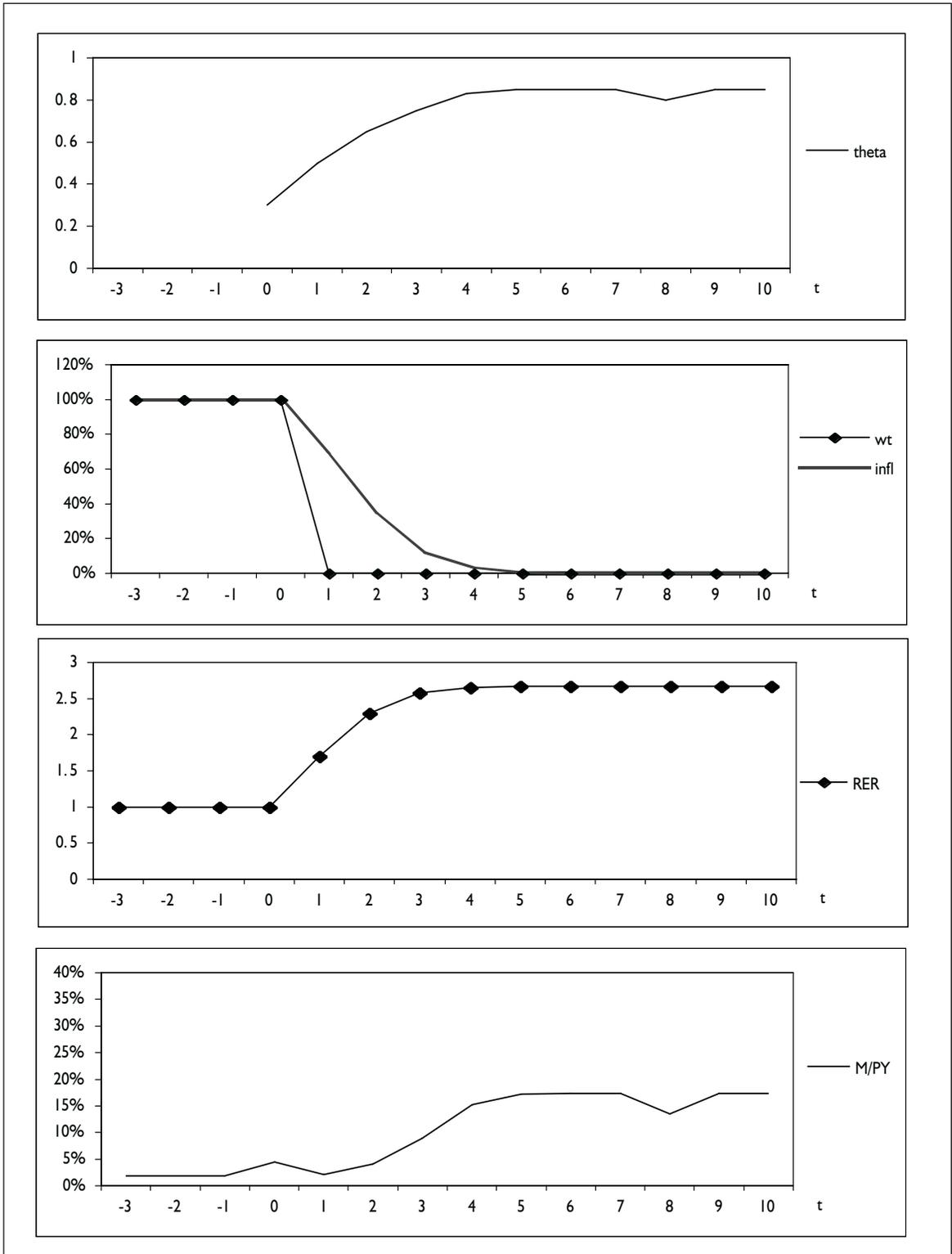
Figure 2.1. Credibility Model: Scenario A

Figure 2.2. Credibility Model: Scenario B

2.3. Conclusions from the Model

The model illustrates how credibility of the exchange rate policy affects the performance of an economy undergoing a stabilization program. A lower credibility leads to a slower disinflation and a stronger real appreciation, which can increase the output cost of disinflation and undermine the credibility of the exchange rate policy in the future (although the latter two aspects are not reflected in the model). The model is capable of reproducing the phenomenon of a fall of monetization in the early phase of stabilization, which has puzzled economists [see: DeBroeck et al. (1997)].

Apart from illustrating the advantages of a more credible exchange rate policy, the model has implications for the empirical investigation of credibility. It allows to formalize it in terms of the parameter θ and examine it in real life economies, as long as we accept the model assumptions.

The model suggests that the speed of disinflation, the scope of real appreciation and the dynamics of the level of monetization can be used as indicators of credibility. The first two factors are difficult to work with in practice, because the assumptions of the model are too strong. There are many factors, apart from credibility, which can influence the speed of disinflation. These are for example: exogenous price shocks, institutional arrangements (backward looking vs. forward looking indexation), relative price adjustments in conditions of downward price rigidity. Both the behavior of inflation and the real exchange rate will be significantly influenced by the degree of over- or undervaluation of the real exchange rate in the beginning of stabilization. This degree is not straightforward to assess, and the Purchasing Power Parity is likely to change along with the real transformations underway in the economy.

More promising is the use of the level of monetization as a source of information about credibility. Of course, the level of monetization can be, in a real life economy, also influenced by factors not featuring in the model:

The inertia of changing habits of the population, entrenched customs regarding the use of domestic and foreign money can carry over to the level of monetization. It should be kept in mind that actual evolution of credibility can be more volatile, than what would be implied by the evolution of the monetization level.

Level of development of the banking sector can also influence the level of broad money monetization. A more efficient, safer and more customer friendly banking sector can attract more deposits, and thus contribute to a higher broad money monetization. The characteristics of the banking sector can evolve over time, influencing the dynamics of monetization regardless of depreciation expectations. However, in the short and medium term this effect should not change the dynamics of monetization in a dramatic fashion.

The third potential problem lies in the speed of clearing of the money market. The model bases on the assumption that the money market is in equilibrium, i.e. that the money supply is adjusted to the money demand (the exchange rate is fixed, so money supply becomes endogenous). Violation of this condition distorts the information about credibility that is inferred from the money demand. This problem can be partially controlled for by looking at the rate of inflation. A high rate of inflation accompanying a rapidly falling monetization can mean, that the adjustment of the real money balances is not complete, and is occurring both by reducing money holding and by a price growth. Such situations happen often in the early phase of stabilization. A growth of monetization accompanied by a fall in inflation suggests the opposite situation: that an upward adjustment of real balances might still be underway.

With these caveats in mind one can check how much information on credibility of exchange rate policies is contained in the monetization figures of transition economies.

Part 3
Credibility of the Exchange Rate Policy in Poland

3.1. Poland's Stabilization Program and the Policy of the National Bank of Poland

Poland's ambitious "shock therapy" was initiated on January 1st 1990. Along with radical liberalization of prices and deregulation of the economy, a number of restrictive monetary measures were introduced. One of the pillars of the stabilization program was internal convertibility of zloty along an stabilizing of the official exchange rate. These were augmented by the policies of the central bank aiming to control money supply: rationing credit to enterprises, active use of reserve requirements and open market operations.

The stabilization program was designed using the guidelines of the IMF and its approval by the Fund enabled Poland to take advantage of the stand-by program in 1990 and several consecutive years. This program besides providing vital tranches of credit, undoubtedly gave Polish stabilization efforts external credibility. Additionally, the credibility was enhanced by establishing the so-called stabilization fund of $ 1 billion made up of contributions by a number of Western countries. By far, the biggest measure supporting and legitimizing Polish path to the free market was a deep cut of Polish external debt. The eventual debt reduction of about US$20 billion provided a clear signal to institutions worldwide and constituted an important pre-condition for Poland's long-term external viability and growth [1].

The National Bank of Poland was re-established in 1989 after passing the new Law on the National Bank by the Parliament. The main task of the Bank, as outlined in the document, is to strengthen the Polish currency and to cooperate with the Government in carrying out its economic policy. The Law of the National Bank of Poland obliged the Bank to formulate "projects of guidelines of the state's monetary policy specifi-

cally setting growth of money supply, deposit and credit interest rates, **exchange rate and exchange rate policy** and policies concerning external credit relations" [2]. Although Polish monetary policy was most visibly focused on controlling money supply during early 90s, exchange rate policy was viewed as extremely important and at times assumed dominant role. This is particularly understandable in light of recent research on transmission mechanisms of monetary policy in Poland which indicates that the exchange rate channel is by far the strongest and shortest in its impact on inflation [3].

3.2. Inflation, Exchange Rates and Money

Inflation in Poland began to rise significantly as soon as 1987 but it wasn't until 1989 that it became one of the most apparent threats to macroeconomic stability. Figure 3.1 presents gradual rise in monthly inflation until its peak in January 1990. This outburst of inflation was to a significant extent the effect of comprehensive price liberalization coupled with monetary overhangs that have been built in the form of forced savings during years of rationing and shortages.

Thus, the stabilization program introduced in January 1990 had inflation curb as one if its main goals. Three major disinflation measures were employed: the policy of positive interest rate, the special tax on income increases (the so-called popiwek) and freezing exchange rate. The latter was one of the most significant elements of the stabilization program introduced with the objective to anchor nominal magnitudes in the economy. The exchange rate was set at 9500 zloty to 1 US$ with the formal commitment to keep it for 3 months. The rate at which zloty was anchored was com-

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[1] Gomółka (1995).
[2] Law of the National Bank of Poland in Szpunar (2000, p. 211).
[3] See for example, Rybiński (2000).

Figure 3.1. Inflation in Poland 1989–1992
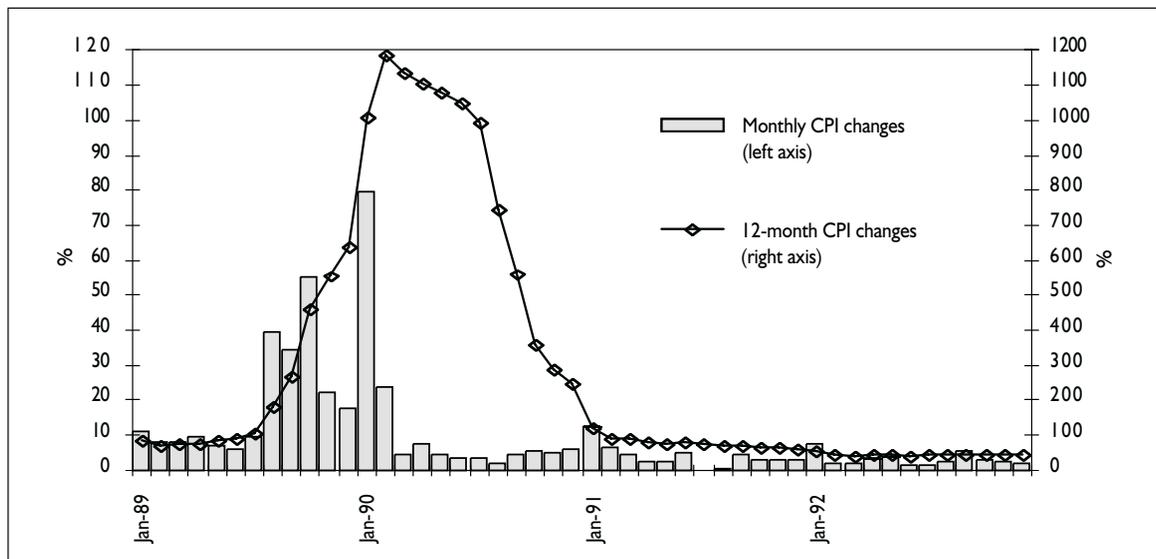
Source: National Bank of Poland

Table 3.1. Poland 1990–1999: Selected Economic Indicators (% change)

	1990	1991	1992	1993	1994	1995	1996	1997	1998
CPI Inflation	249.3	60.3	44.4	37.7	29.4	21.6	17.8	13.2	8.6
PLN/USD (period average)	560.1	11.3	28.8	32.9	25.4	6.7	11.2	21.6	6.0
PLN/USD (end of period)	46.2	15.3	43.9	35.4	14.2	1.3	16.5	22.3	-0.4
Real Effective Exchange Rate	-15.8	55.7	6.4	7.3	0.8	8.2	8.8	2.5	6.0
M2	160.1	37.0	57.5	36.0	38.2	35.0	30.8	29.2	25.2

Source: Main Statistical Office(GUS), National Bank of Poland, own calculations

Figure 3.2. Exchange Rate Policy Changes in Poland 1990–2000 (Monthly Rate of Crawl and the Width of the Deviation Band)
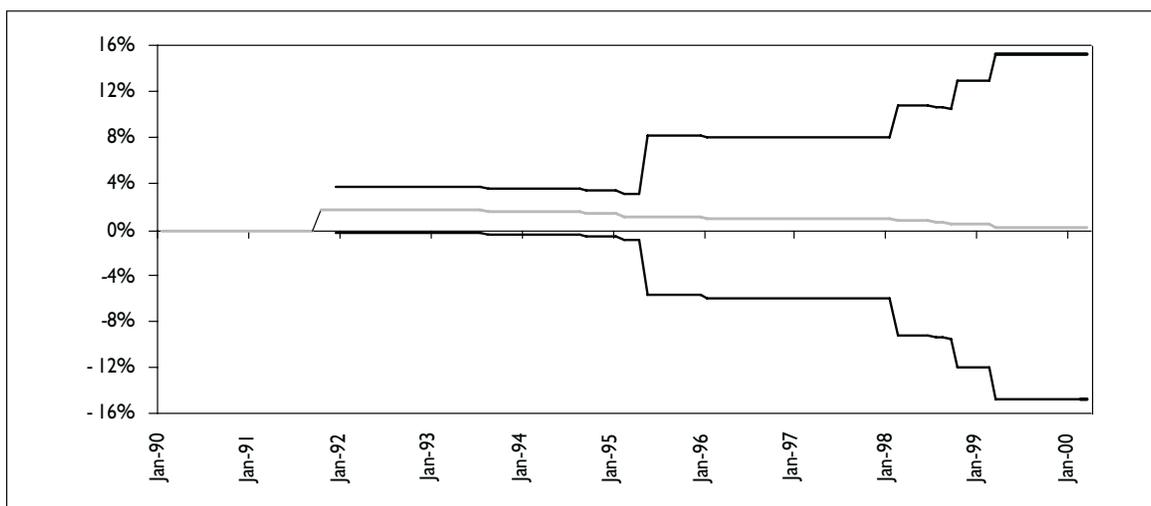
Source: National Bank of Poland

Figure 3.3. Quarterly GDP at Current Prices – Change over Previous Quarter (in billions of PLN)
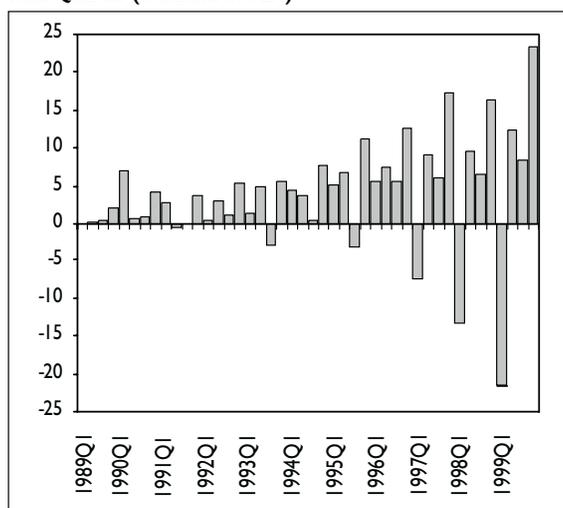
Source: Main Statistical Office – GUS

monly thought to be even below the market value (7500 zloty), and most likely this was the main factor that enabled the NBP to hold it constant much longer than the 3 months to which it formally committed itself to. Inflation went down significantly in early 1990, but the trend was partly reversed in the second half of 1990 and prices grew faster again in late 1990 and early 1991.

High price inflation dynamics (250% in December 1990) combined with stable exchange rate caused dramatic real appreciation (see Table 3.1) and gradual worsening of the trade deficit. This forced the authorities to devalue zloty by 16.8% in May 1991. Along with the devaluation, the US$ was substituted as the anchor currency with the basket of 5 currencies including US$, German Mark, British Pound, French

Figure 3.4. Quarterly M2 Growth (vis a vis Previous Quarter) PLN
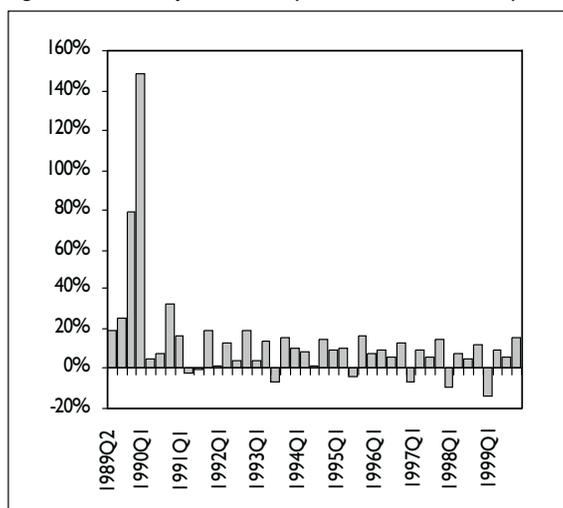
Source: National Bank of Poland

Franc and Swiss Franc. In October 1991 the policy of a stable exchange rate adhered to since January 1990 (with no formal commitment after April 1990) was officially abandoned and replaced with crawling peg. Initially the rate of crawl was set at 1.8% per month and was subsequently reduced by 0.2% gradually until freeing the exchange rate in March 2000. Figure 3.2 illustrates these regime changes: rate of crawl is depicted together with the width of the deviation band.

The policy of crawling peg with the ever-widening deviation band was praised by some (mostly producers) for preventing even bigger real appreciation than the one that actually occurred and thus allowing to promote exports. By others (most economists) it was criticized for introducing a substantial source of inertia that made Polish disinflation so slow and protracted. In fact, the crawling peg regime has become a very important element of inflationary phenomena throughout most of the decade. At most times the rate of crawl served as an approximation of the depreciation to the financial sector (at least in medium to long horizons) and has thus shaped exchange rate expectations in the economy.

3.3. Output Dynamics vs. Broad Money Changes

Seasonality

Polish GDP exhibits a significant degree of seasonality. Figure 3.3 below presents quarterly GDP in current prices for the period 1989–1999. It is very well visible that third and especially fourth quarter GDP is generally higher than second and first quarter. The cyclical pattern is more pronounced in recent years than it used to be in the early 90s.

Broad money supply growth also exhibits significant seasonality. Fourth and first quarter values tend to be higher than second and third quarter values. Figure 3.4 presents quarterly growth of M2.

3.4. Evolution of Monetization

Figure 3.5 presents dynamics and structure of end-year monetization in Poland. Three measures of monetization are depicted based on three definitions of money supply:

– RM– reserve money includes cash in circulation (incl. banks), banks' current accounts and domestic banks' reserve requirements

– M1– includes cash in circulation (without banks) and domestic currency demand deposits,

– M2 – includes M1 and foreign currency demand deposits all time deposits.

Figure 3.5. Monetization: Share of End-year Reserve Money, M1 and M2 in GDP

Source: National Bank of Poland, own calculations

Figure 3.6. Quarterly and 4-quarter M2 Monetization
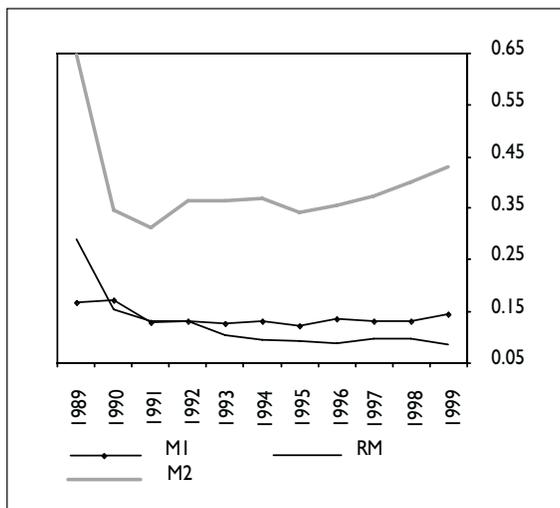
Source: National Bank of Poland, own calculations

Monetization figures calculated using different measures of money tell contrasted stories. The broadest measure of money, M2 fell as a percent of GDP from 65% in 1989 to a record low of 32% in 1991. From then on, monetization got on a slow but generally uninterupted long-run growth path. Compared to the initial fall in 1990, subsequent increases 1991–1999 seem rather small. Consequently, the end-1999 monetization amounts to 43% which is a mere 67% of the end-1989 value and only 33% higher than the 1991 low.

A different picture emerges when one looks at narrower measures of money. M1 monetization fell from the 1989–1990 level of 17% to stabilize around 12–13% during 1993–1999. On the other hand, reserve money monetization has been declining consistently during the entire decade. Cumulatively it fell from 30% in 1989 to 8% in 1999 with the biggest fall taking place in the early 1990s.

The difference between the magnitudes and dynamics of monetization figures follows from underlying differences in money supply measures (numerator in the formula). Specifically, large and growing distance between M2 and other money measures points to the development of Polish financial markets and rising level of financial intermediation.

End-year monetization series is free of GDP seasonality by construction. Quarterly monetization which is measured as a share of money supply in quarterly annualized GDP is sensitive to seasonality both in GDP and money series. Therefore, the quarterly monetization series has been subjected to seasonal adjustment based on multiplicative procedure "ratio to moving average" in Eviews. Additionally, for comparison "4-quarter monetization" was calculated as a share of money supply in 4-quarter GDP. The GDP series is defined as the sum of 4 consecutive
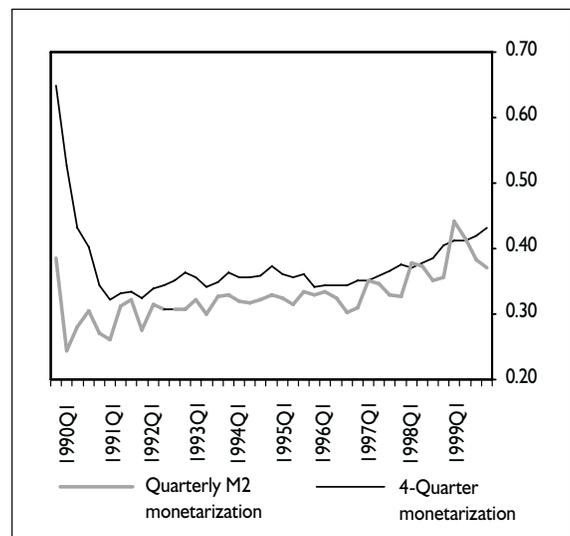
quarterly GDP values with the last quarter being the index for the series. Consequently, 4th quarter values of this series correspond to end-year GDP and values of 4th quarter monetization are identical to the series presented in Figure 3.5. Figure 3.6 presents both series.

Two main messages emerge form the figure:

– There is considerable and rather systematic difference between the two series (4-quarter monetization is above quarterly monetization). This distance tends to disappear as we move towards the end of the sample but is very pronounced at the beginning of the sample.

– Seasonal adjustment did not purge the quarterly monetization series efficiently. Clear seasonal pattern is easily discernible especially from 1996 on.

The fact that the quarterly monetization series is consistently below the 4-quarter monetization follows directly from the denominator of the indicator, i.e. from the differences in GDP definition. While 4-quarter series uses the sum of quarterly GDP in 4 consecutive quarters, the quarterly series uses only the last value and annualizes it(i.e. multliplies by 4). Thus, whenever the quarterly GDP series (in current prices) exhibits upward trend, annualized GDP will always be an upwardly biased estimate of the annual (4-quarter) GDP. As a result, monetization based on annualized GDP will be lower than that based on 4-quarter GDP. Specifically, this discrepancy may be responsible for the significant difference between the two monetization series between 1989Q4–1990Q4 when near-hyperinflation drove current-price GDP up (even though real GDP was falling).

In the calculation we will be consistently using monetization figures based on quarterly annualized GDP adjusted for seasonality (thick line in Figure 3.6).

3.5 The "Theta" Indicator

Below we calculate the series of the indicator of credibility, θ as suggested by the theoretical model (chapter 2) to confront it with other evidence on credibility of exchange rate policy in Poland.

The value of interest, i.e. money demand elasticity with respect to expected depreciation can be directly obtained from the regression of the log of monetization on expected depreciation as the coefficient by expected depreciation. Estimation yields a highly statistically significant coefficient of -4.64 (absolute value of the t-statistic equals 3.40).

Figure 3.7. Expected and Actual Quarterly Depreciation 1994Q4–1999Q4
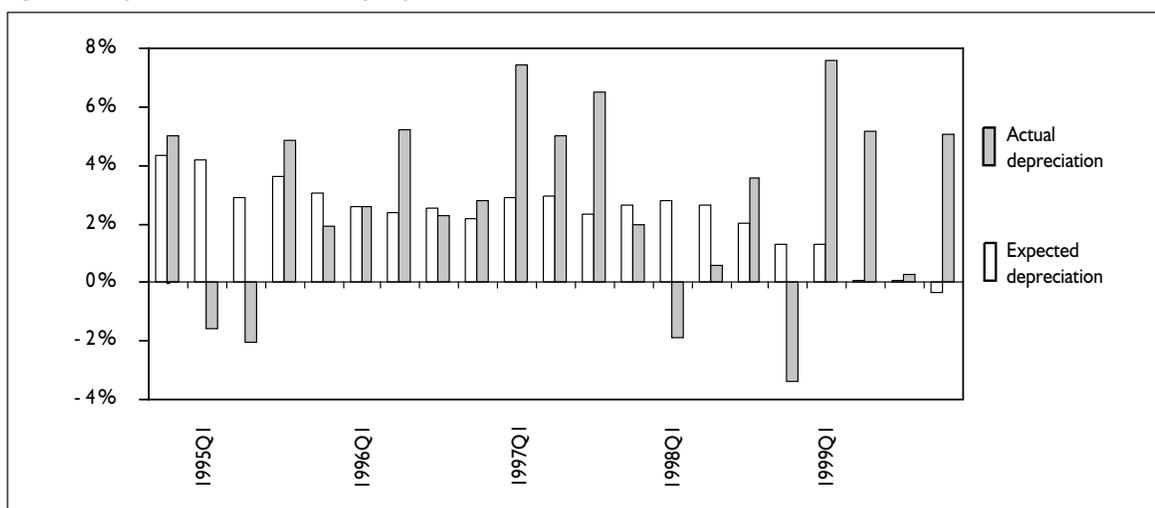
Source: Monthly Poll of Selected Economic Indicators, National Bank of Poland, own calculations

Calibration of the parameters of the money demand relationship

α – constant term

According to the model, we calibrate this parameter as the value of monetization to which a country with Poland's macroeconomic characteristics would converge in the situation of credible exchange rate stability. We take this level of monetization to be 70%. This yields the value of α equal to -0.35.

β – elasticity of money demand with respect to expected depreciation

Poland is the only country covered by this study for which we managed to obtain data on expected depreciation for the 5 years' period of 1994Q4–1999Q4. It is the data collected from the Reuters monthly survey of about 25 major banks operating in Poland in which they are asked about, among other things, their expectation of the exchange rate at the end of the current month, at the end of the current year and in 12 months' time. Our measure of quarterly depreciation expectation was obtained from the latter series as the respective root of the annual depreciation. The resulting series can seen in Figure 3.7 along with actually realized depreciation.

The "θ" series

The theta series calculated using the above values is plotted in Figure 3.8 below.

Figure 3.8. Poland 1990–1999: "Theta" – Indicator of Credibility of the Policy of Stable Exchange Rate Policy
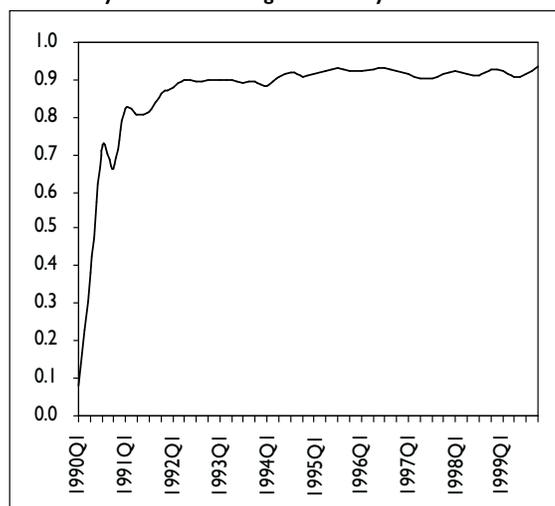
Source: own calculations

It is important to bear in mind that the dynamics of the model relies on several assumptions:

– Growth of monetization is ascribed to the growth of public confidence in zloty.

– When inflation slows down, the expectations of devaluation abate. If, nevertheless, monetization does not growth correspondingly, this is ascribed to a weak credibility of the central bank

– When inflation accelerates, the risk that the exchange rate would become unstable increases. If, nevertheless, economic agents do not reduce their zloty holdings, this is ascribed to the growth of public confidence in zloty.

Even though the above figure presents developments of q during the 9-year-long period, our focus should be on the first 2–3 years for which the model is suited. Credibility as defined by theta, was extremely low at the outset of reforms, but grew substantially very quickly. The growth path during the first 3 years of stabilization program is virtually uninterupted with one minor setback in 1990Q4. Most of the growth occurs during first 3 quarters of 1990. 1991Q1–1992Q4 is the period of slower growth and 1993Q1–1999Q4 marks near-stabilization at the level slightly above 0.9.

The figure suggests that credibility was essentially gained during the first year of the shock therapy. The fact that it grew so significantly during such a short period of time is the consequence of a variety of policies and factors. Some of them will be disussed below to augment the analysis.

3.6. Central Bank Foreign Exchange Reserves and Poland's Debt Reduction

Holdings of foreign reserves are certainly one of the most crucial factors in building credibility of any non-floating exchange rate regime. In the intial period of reforms they amounted to slightly more than 2 billion USD. However, in 1990 reserves grew by more than 100% and stabilized at this level for the next couple of years. In terms of imports, reserves grew quickly from the equivalent of 2.2 months of imports in December 1989 to 5–6 months throughout 1990. Figure 3.9 shows official gross reserves during 1989–1999.

An invalueable contribution to credibility of the stable exchange rate was the so-called stabilization fund set up by several Western European governments. The 1 billion USD

Figure 3.9. National Bank of Poland Official Gross Reserves (in billions of USD)
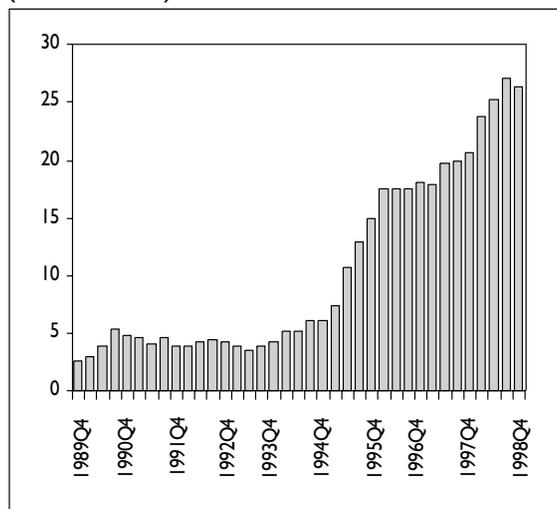
Source: National Bank of Poland

fund was meant to augment official reserves in the event of the endangered stability of zloty. Although such critical situation did not materialize and the central bank has never made use of the fund, its existence boosted credibility considerably.

Furthermore, continous cooperation with the IMF in the form of stand-by and extended facility programs raised public and external confidence in the success of the Polish stabilization. Also, radical external debt reduction by the Paris Club contributed to the overall credibility by legitimizing Polish efforts in the eyes of Western governments.

3.7. Public Finances and Credibility

Table 3.2 presents general government balance as a percent of GDP. It indicates that in spite of a deep recession of 1990, public finances registered a sizable surplus of 3.7%. The fiscal situation worsened radically in the subsequent years resuling in deficits since. Figure 3.10 presents the cumulative monthly surplus/deficit in billions of zloty to emphasize the budgetary balance dynamics in the critical months following the shock therapy.

Table 3.2. Poland 1989–1999: General Government Balance (as % of GDP)

	1989	1990	1991	1992	1993	1994	1995
Total Revenues	33.8	47.3	42.3	45.1	47.6	48.3	47.8
Total Expenditures	39.9	43.6	48.9	51.8	49.9	50.5	49.7
Budget Balance	-6.0	3.7	-6.7	-6.7	-2.3	-2.2	-1.9

Source: GUS

Figure 3.10. Cumulative General Government Balance (in billions of PLN)

Source: GUS

can also cautiously ascribe public finances some role in enhancing credibility during this crucial period. That subsequent deficits did not visibly harm this credibiliy (as our analysis seems to suggest) may be attributed to the fact that overall credibility of Poland's economic course (including credibility of exchange rate policy) was so firm and unshaken that it became immune to negative signals from public finances.

3.8. Dollarization of Deposits

One of the most direct signals of trust in the exchange rate stability are public's decisions regarding deposits. Choosing the deposit currency involves weighing the interest rate offered on one hand and the depreciation expectation on the other. Poland has been traditionally a highly dollarized economy where opening dollar deposits or even holding dollar cash was the most common way of fighting domestic inflation and political and economic uncertainty. Therefore, observing dollarization ratios can be very useful as part of investigating credibility. Figure 3.11 presents the share of household's deposits in foreign currencies (mainly USD and DEM) in all household's deposits.

The figure points to a very clear pattern of continuously falling dollarization, albeit with a period of stabilization. Specifically, first quarters of the stabilization program and later on 1995–1996 saw a dramatic increase in domestic currency deposits relative to foreign currency deposits. On the other hand, years 1992–1994 are marked by relative stabilization or even increase in dollarization of deposits. However, the period of 1989–1991 – crucial from the cre-

First 14 months of the operation of the frozen exchange rate policy are marked by surpluses. In March 1991 general government balance turned negative and remained negative thoughout the decade. Deficits came down from relatively high levels 1991–1992 (-6.7%) to moderate levels from 1993 on.

Thus, general government budget balances provided mixed signals of the state of public finances. For all but one year, budgets registered deficits that were rather high at times. However, during first 14 months of the stabilization program, the government managed to generate surpluses which might have had conducive effect on the general outlook of the economy and thus on the perspectives of the program and the overall economic policy. Therefore, we

Figure 3.11. Dollarization of Deposits* (Share of Foreign Currency Deposits in Total Deposits – %)

Source: National Bank of Poland
* Prior to 1991Q4 data on deposits included accrued interest.

Figure 3.12. Zloty Deposits, Foreign Currency Deposits and Dollarization Ratio (in billions old zloty)
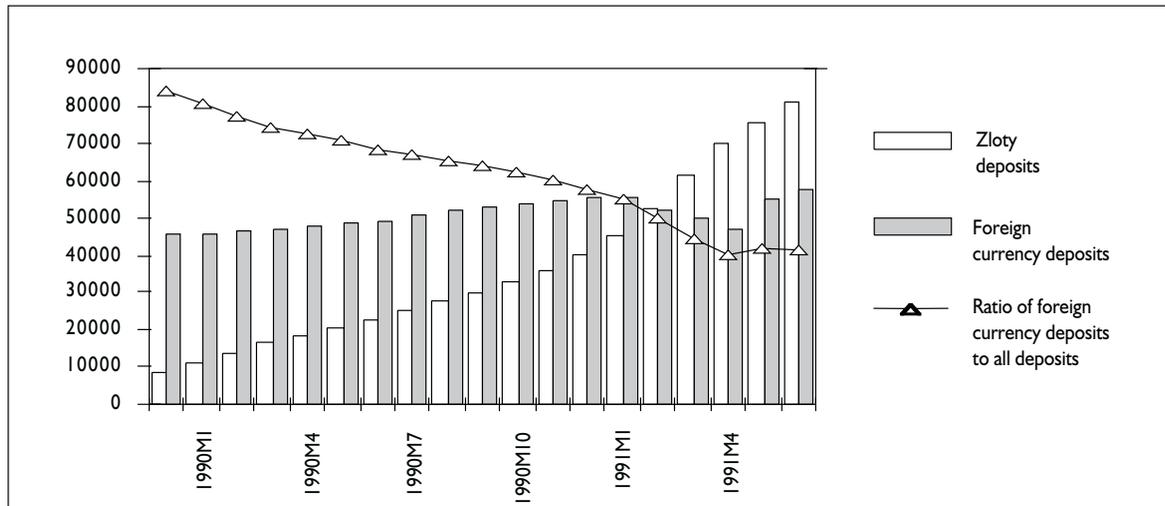
Source: National Bank of Poland

dibility point of view clearly indicates growing trust in the announced policy of the stable exchange rate. To investigate this period in more detail, figure 3.12 presents developments in these two types of deposits along with the dollarization ratio at monthly frequency during 1989:12–1991:6.

As a consequence of a stable exchange rate during 1990:1–1991:4 foreign currency deposits during this period can be treated as representing constant "real" value. A stable but slow growth path of foreign currency deposits is reversed in early 1991. This might suggest that the full year of constant exchange rate eventually convinced most households that the policy is credible and it pays off to hold zloty. Another swing occurred in May 1991– mainly as a result of step devaluation made by NBP which increased zloty value of foreign currency deposits. Nevertheless, dollarization ratio kept going down.

The time path of dollarization ratios mirrors developments in credibility indicator fairly well. Specifically, during the first 18 months of the stable exchange rate, surge in θ is accompanied by visible reversal of the growth trend of foreign currency deposits.

3.9. Conclusions

Poland has launched its stabilization program in January 1990 with the end-1989 monetization at a high level of over 60%. Early 1990 saw a considerable drop in monetization after which a slow but consistent re-monetization process began. Our model suggests that public confidence in the announced stability of zloty rose sharply during a relatively short period of time. We believe that these results find sup-

port in the number of political and economic phenomena:

– Foreign official reserves increased significantly in 1990 and 1991 from the very low level of 2 billion USD in the beginning of the stabilization program.

– 1 Billion USD stabilization fund established to support zloty was a significant credibility-enhancing factor. Continous cooperation with the IMF in the form of stand-by and extended facilities programs raised public and external confidence in the success of the Polish stabilization. Also, radical external debt reduction by the Paris Club contributed to the overall credibility by legitimizing Polish efforts in the eyes of Western governments.

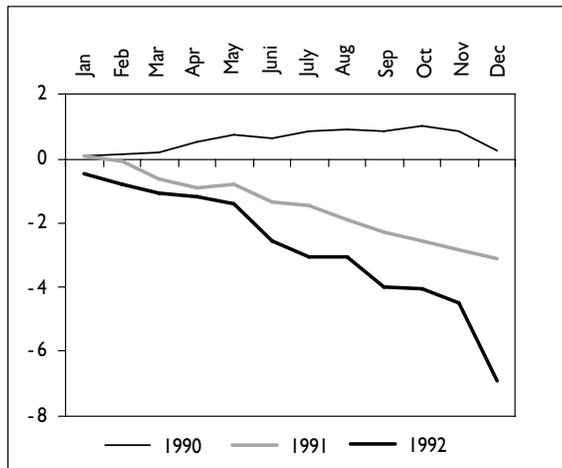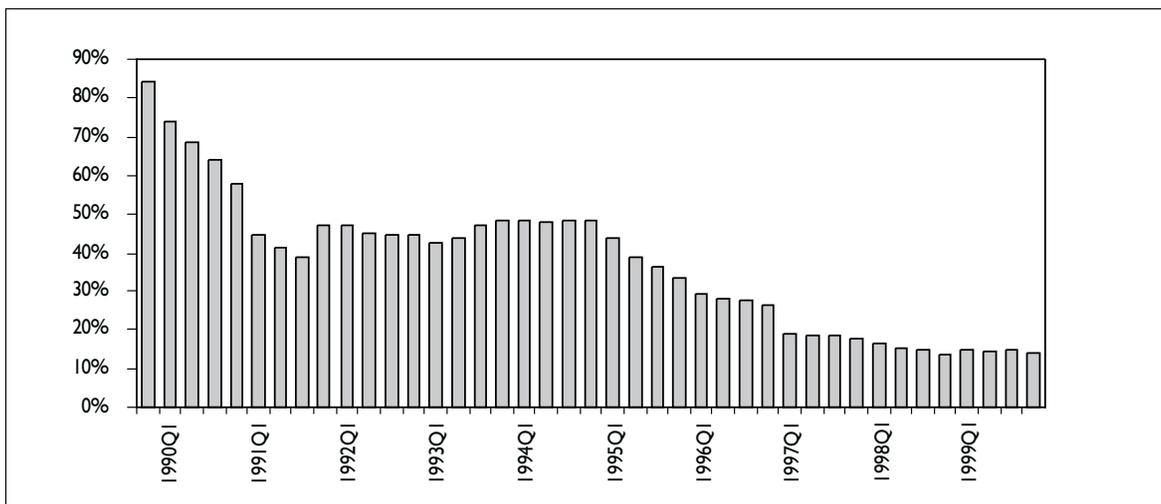– Credibility of the stable exchange rate policy might have been enhanced by initial budget surpluses. At the same time there are no sign of adverse impact of subsequent deficts.

– Dollarization of deposits fell sharply during 1990–1993 which indicates growth of the public confidence in the stability of zloty.

Part 4
Credibility of the Exchange Rate Policy in Bulgaria

4.1. The Policy of the Bulgarian National Bank

The Bulgarian banking system was established as a two-tier system gradually during the 1980-s, and by 1990 was already in place. With the Bulgarian National Bank (BNB) Act of 1991 and the Banking and Credit Act of 1992 the system was established with the traditional relationships between the national bank and the commercial banks. The main goal of BNB was legislatively set to be "to take actions to maintain the internal and external stability of the national monetary unit" [4]. The BNB was explicitly trying to achieve this goal throughout the period 1991–1997, and the stability of the exchange rate of the Bulgarian lev was regularly mentioned as one of the main goals of BNB, even though explicit targets were never set during this period.

In the second half of 1996 and the beginning of 1997 Bulgaria experienced a severe financial crisis, which combined high inflation, sharp and sustained currency depreciation, and failure of a large portion of the banking system. The policy response to this development was the introduction of a currency board arrangement (CBA) in Bulgaria on July 1, 1997. The benchmark of the CBA is the extremely institutionalized fixing of the exchange rate of the Bulgarian lev with respect to the Deutsche mark – the nominal exchange rate is set in art. 29 of the 1997 BNB Act, and the BNB is obliged to sell or buy Deutsche marks at this rate to everyone who wants to buy or sell Bulgarian leva. Except for setting the minimal reserve requirement, the BNB is not able to conduct monetary policy, as it is forbidden by law to hold assets which are obligations for domestic economic agents and therefore cannot give out loans to Bulgarian banks and cannot hold a portfolio of Bulgarian treasuries.

Figure 4.1 shows the dynamics of the BNB interventions on the foreign exchange market through most of the transition period. It can be seen how the crisis of 1996 was preceded by significant net sales of foreign currency, depleting BNB's foreign reserves, and how the announcement of the CBA, supported by the IMF, led to large net purchases.

It is obvious, that the behavior of the BNB with respect to its support of the national currency went through different periods and so the confidence of the public in its real intent may have varied significantly.

Figure 4.1. Bulgaria 1991–1999: Annual and Semiannual Net Purchases of Foreign Currency by the BNB from Customers and Banks (in USD million)
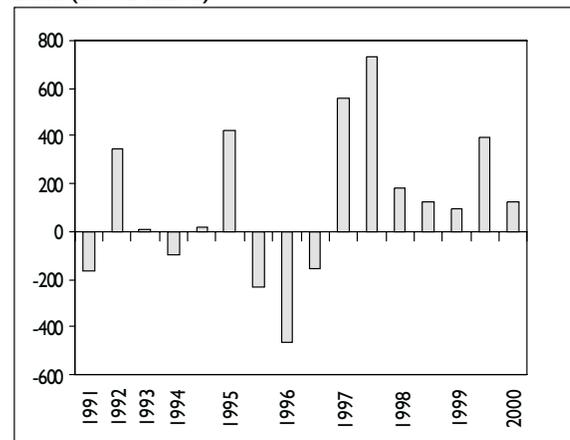
Source: Source: BNB annual and semiannual reports, 1991–2000

4.2. Inflation, Exchange Rates, and Broad Money

Looking at the main macroeconomic indicators of Bulgaria shown in Table 4.1, it can be inferred that the basic financial indicators exhibit significant instability. Bulgaria has

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[4] Art. 2 of the 1991 BNB Act, repealed with the 1997 BNB Act.

Table 4.1. Bulgaria 1991–1999: Inflation, USD Exchange Rate, Real Exchange Rate, Money (% change)

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Inflation	335.0	79.5	72.8	95.1	62.8	123.1	1082.2	22.3	0.3
BG lev/USD		24.0	18.5	96.2	23.8	161.8	853.5	5.0	4.4
Real eff. exch. rate		34.0	45.2	-5.1	18.5	-10.3	28.3	18.1	-2.0
broad money	124.8	42.1	47.6	78.6	39.6	124.5	359.3	9.6	11.4

Source: BNB, National Statistical Institute of Bulgaria (NSI), Bank for International Settlements – Basle

gone through periods of relative calming down of the indicators, and through periods of great turbulence and insecurity. The data, however, suggest several observations, which are relevant for the calibration of the public confidence in the exchange rate regime.

Before the introduction of a CBA in 1997, inflation has been rampant in Bulgaria. However, it has been growing consistently faster that both the nominal exchange rate (except during the currency crisis episodes) and the quantity of money in the economy. Besides illustrating the process of real loss of living standards in the Bulgarian economy, this observation indicates that broad money growth exceeded inflation only in 1996, when the financial crisis hit the economy, and in 1999, when the economy went through a short period of deflation while the financial sector was still recovering the public confidence under the CBA.

Bulgaria started economic reforms in 1991 with the declared goal to preserve the exchange rate stable, and reconfirmed this goal in 1997 at the introduction of a currency board. In both cases these announcements, made in the beginning of important structural changes, were followed by a significant real appreciation. To make this possible for longer periods (more than one or two quarters), it requires a relatively high confidence on the part of the public, which leaves the national currency without speculative attacks.

It is obvious that the defense of a claim that inflation in Bulgaria may have been caused primarily by the movements in the money supply is problematic – broad money has grown at consistently lower speed than the price level. Bulgaria may have been experiencing a severe restructuring of its domestic prices, which is consistent with the sharp drop in output in the first years of transition. This fact is also consistent with the speculation that inflation was a major redistributive tool in the early transition period in Bulgaria. At the same time, the starting level of monetization in the country was relatively high for transition country standards, and it was only after the "disappearance" of a significant amount of deposits, and a large chunk of public confidence in the banking sector with them, in a series of failed banks in 1996–1997 that the level of monetization went down to a level quite consistent with the standing of the Bulgaria as a transition economy and with its level of income per capita. Thus movements in monetization may reflect public attitudes to a very large extent.

4.3. Output Dynamics vs Broad Money Changes

Seasonality

Bulgarian output is highly seasonal. Even though agriculture constitutes less than 20 percent of GDP throughout the transition period with the exception of the crisis ridden 1997, the "agricultural" third quarter is regularly the strongest, and during the post-crisis period outperforms even the traditionally strongest fourth quarter.

Figure 4.2. Bulgaria 1994–1999: Quarterly Real GDP Index, 1997=100
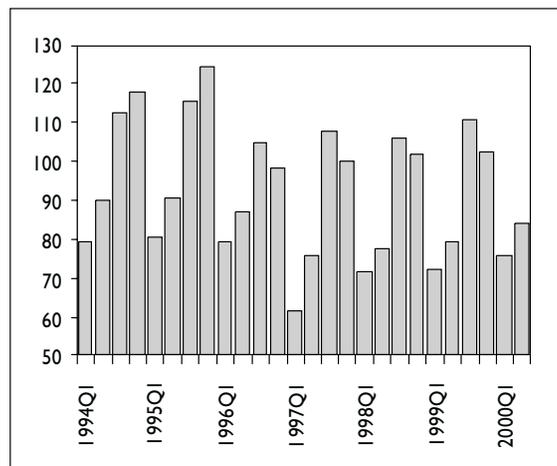
Source: NSI

In terms of making inferences about the level of monetization, this highly seasonal dynamic of output needs to be compared with the seasonality of broad money, which is exhibited on Figure 4.3. The movements in nominal money do not indicate a strong seasonal pattern. The same inference can be made after looking at real money growth for the same period.

The comparison suggests two main things. First, broad money in Bulgaria exhibits an uncharacteristic lack of seasonality [5]. This lack of seasonality in Broad money and

[5] A formal multiplicative seasonal adjustment procedure yields seasonal factors which are small, and are probably most influenced by a single quarter – 1997-1.

Figure 4.3. Bulgaria 1991–1999: Change in Nominal Broad Money in Bulgaria Compared to Previous Quarter (in %)
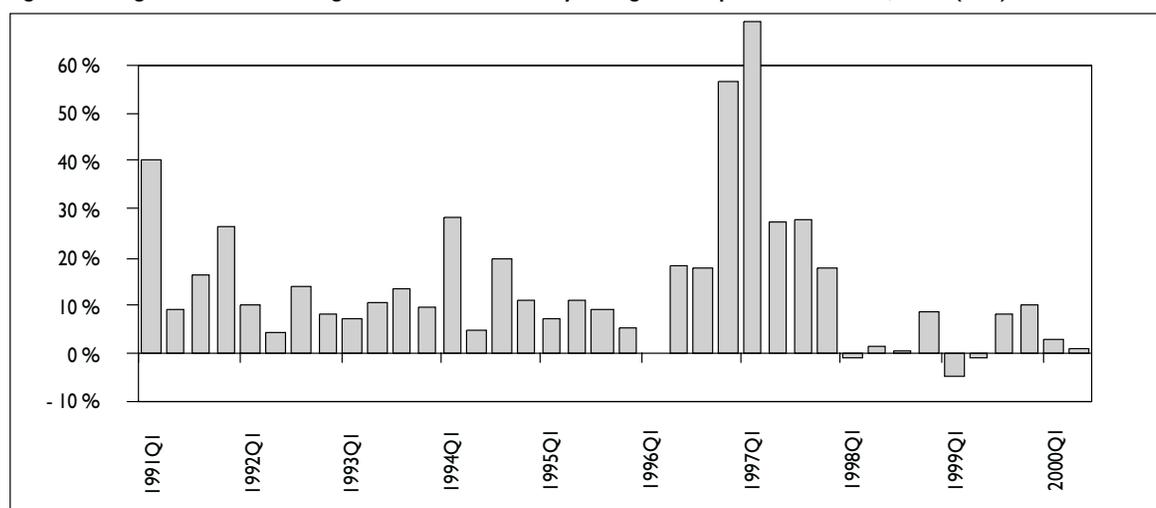
Source: BNB, NSI
Note: the value for quarter 1997-1 is 153%

Table 4.2. Bulgaria 1991–1999: Real GDP and Monetization Annual Growth Rates (%)

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Real GDP growth	-8.4	-7.3	-1.5	1.8	2.9	-10.1	-7.0	3.5	2.4
Growth in monetization		-14.1	3.5	-7.1	-13.3	-10.7	-28.2	-9.5	0.0

Source: BNB, NSI

presence of significant seasonality in output means that the quarterly monetization measures for Bulgaria will be strongly seasonal mainly due to output. Second, monetary dynamic is a weak explanatory variable for seasonal changes in output.

As a result of these observations, the measurement of confidence in the exchange rate regime, which is based on observations in monetization, should deal with the seasonality problem. On the one side, confidence is an inert variable, which should not be affected by seasons. On the other side, monetization is an important measuring tool for confidence, but is highly seasonal. This problem is resolved by using seasonally adjusted data for the level of monetization in Bulgaria.

Dynamics

Output performance in Bulgaria after the beginning of economic reforms in 1991 has been mixed. Bulgaria exhibited a peculiar double-dip transition recession, when after the initial drop in output in 1990–1993 was followed by a brief and very weak recovery in 1994–1995, after which the lack of reforms and the internal and external imbalances led to a severe recession in 1996–1997. The introduction of CBA as a response has led to a stabilization of the economy and three consecutive years of positive, even if modest, growth which in 2000 exhibits signs of acceleration.

Due to the start from a very high level in Bulgaria, monetization has been dropping throughout the transition period, and no clear relationship between its dynamics and the dynamics of output can be inferred. The quarterly and seasonally unadjusted movements in monetization are much weaker than in real output, but the annual fluctuations in monetization are of a higher magnitude than in real output. The Bulgarian data suggest that the hypothesis of a unit elasticity of money demand with respect to output is not unrealistic, and that the movements in monetization and in output are to be explained by different factors and cause-effect relationships.

4.4. Evolution of Monetization in Bulgaria

The data on monetization come from the Bulgarian National Bank (BNB) for the monetary aggregate, and from the National Statistical Institute of Bulgaria (NSI) for the GDP data. For the first three years of observations an interpolation procedure was applied to the annual GDP data to obtain quarterly observations. Then the end-of-quarter measure of broad money (M3) was used to calculate the level of monetization for the respective period.

The level of monetization thus obtained was seasonally adjusted using EViews, ratio to moving average – multiplicative procedure. The resulting seasonally adjusted variable is the measure of monetization in Bulgaria. Its dynamics since the start of economic transition in Bulgaria are shown on Figure 4.4.

Figure 4.4. Bulgaria 1991–1999: Monetization, Share of Broad Money in GDP, Annualized, Seasonally Adjusted
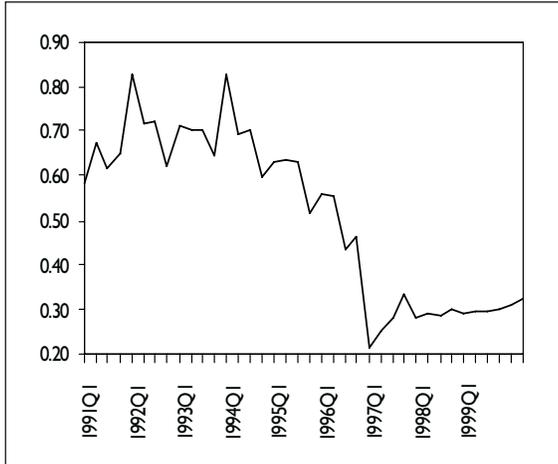
Source: BNB, NSI

Except for the initial transition recession, Figure 4.4 tracks the fundamental dynamics of the Bulgarian economy quite well. Initially Bulgaria maintained levels of monetization which were not typical for countries emerging from the communist bloc. However, these levels of monetization reflected the severe lack of budget discipline and the activities of strategic elites extracting resources from the rest of society through the banking system. This involved a banking sector actively releasing loans to various businesses very often with no intention of repayment.

After the first exchange rate crisis in the second quarter of 1994 the level of monetization started dropping consistently until the meltdown of the financial system during the second half of 1996 and the first quarter of 1997. A currency board arrangement (CBA) was introduced in Bulgaria on July 1, 1997 as a way to deal with the crisis, as a result of which over the following three years the level of monetization has recovered somewhat, but is still far from its pre-crisis levels. It is around levels which are quite typical for most transition countries.

Thus, looking from a longer term perspective, monetization in Bulgaria has followed a particularly interesting pattern. It started at levels uncharacteristically high for a transition country, and was preserved as domestic credit expanded under conditions of total lack of financial discipline. Only after the process of redistribution through the abuse of soft budget constraints, which was the dominant elite project in

Bulgaria in the mid-90s, became unsustainable did the policy reaction and the ensuing de-monetization take place.

4.5. Central Bank Foreign Exchange Reserves

The foreign reserves of the Bulgarian National Bank (BNB) are a very valuable leading indicator for the Bulgarian economic dynamics. An important aspect of this indicator is the fact that in March 1990 Bulgaria announced a unilateral moratorium on its foreign debt service. Thus it started transition in an extremely unfavorable external environment where its only access to foreign financing was on an official level, and only at the door of the international financial institutions. Figure 4.5 traces the changes in the Bulgarian foreign reserves, and a closer look shows clearly how the two most significant financial sector crises in Bulgaria – the currency crisis of the spring of 1994 and the comprehensive financial crisis of the second half of 1996 were preceded by relatively long periods of dropping foreign reserves.

The two periods of more or less significant increases of foreign reserves were the international support after the closing of the foreign debt deal in July 1994, and the reemergence of Bulgaria as a subject on the international capital market scene, and the introduction of the CBA in 1997.

Figure 4.5. Bulgaria 1991–1999: BNB Foreign Reserves (USD mln.)
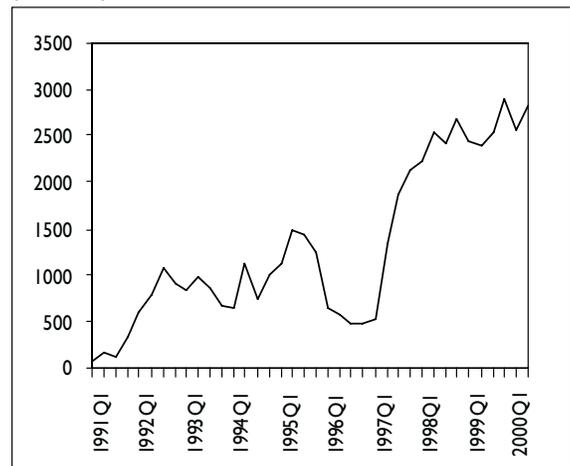
Source: BNB

The dynamic of foreign reserves is markedly different from the dynamic of monetization in Bulgaria, as well as from the highly seasonal pattern of real GDP. Thus it will be interesting to see whether the monetization-based indicator of the confidence in the exchange rate regime will reflect

some of the dramatic increase in foreign reserves after the introduction of the CBA.

4.6. The "Theta" Indicator

The values of the indicator for the level of public confidence in the exchange rate regime in Bulgaria θ are obtained using the already presented theoretical framework. The successful execution of this task requires two things: calibration of parameters, and specification of relevant data series.

Calibration of the parameters of the money demand relationship

The calibration involves attributing values to the two parameters: "α", indicating the potential maximal level of monetization given the structure of the economy, and "β", indicating the elasticity of money demand with respect to expected depreciation. The approach towards achieving this is based on observing the actual behavior of the variables in Bulgaria and adopting values which seem to realistically reflect it.

Thus, the potential, or maximal, level of monetization for Bulgaria a is chosen to be 0.9, which approximates the highest levels actually achieved in practice – in the first quarters of 1992 and 1994 it has been at a seasonally unadjusted 0.96, i.e. broad money stood at 96% of GDP. After seasonal adjustment these values stand at around 0.83.

With respect to the elasticity of money demand with respect to expected depreciation parameter β, calibration is a bit more complicated. In the case of Bulgaria it was

assumed that if the expected appreciation of the USD (depreciation of the lev) is 300%, the level of monetization will drop from 0.9 down to 0.2. These values are taken to roughly reflect the actual events in Bulgaria during the currency and financial crises of 1994 and 1996.

Time series

Two data series are needed for the calibration of the confidence series θ, and these are monetization and potential depreciation. The construction of the monetization series for Bulgaria was explained above, while the depreciation potential is constructed using the assumption that under normal conditions, i.e. if it is left alone by policy makers, the nominal exchange rate will return to a level at which the real exchange rate will be equal to the real exchange rate at a base period. For Bulgaria the base period is taken to be the last quarter of 1990, so that under the devaluation scenario agents expect that the domestic currency will depreciate so that the real exchange rate returns to the level it had at the very beginning of economic reforms. As unrealistic as such an assumption may be, it still provides a useful benchmark for comparison.

The data needed for the calculation of this series are the same as what is needed to calculate the PPP – the domestic price level, obtained from NSI, the foreign price level, obtained in this case from the US Bureau of labor statistics website, and the nominal exchange rate. The devaluation potential is shown on Figure 4.6.

The dynamics of this variable reflect the process of real appreciation of the Bulgarian lev throughout the transition period. Domestic inflation has been consistently much higher than foreign inflation and this has not been reflected in the nominal exchange rate except for the two episodes involving currency crises – March–April 1994, and April

Figure 4.6. Bulgaria 1991–1999: Devaluation Potential
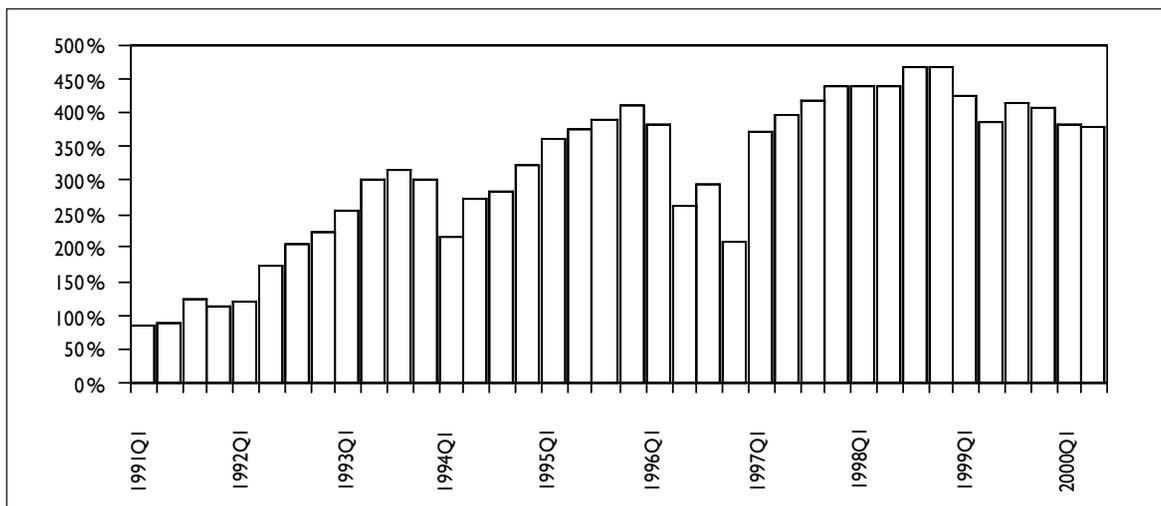
Source: BNB, NSI, US Bureau of Labor Statistics, own calculations

1996–February 1997. The tendency for real appreciation has been broken after the introduction of a CBA in 1997 and especially after the country went through a deflationary period in the first half of 1999.

The last variable needed for the calculation is the announced exchange rate policy goals. The stability of the exchange rate has always been an explicit goal for the BNB, and no crawling pegs or targeted depreciation have been announced or can be inferred from the data. For this reason, the announced exchange rate policy goal has been assumed to involve a rate of depreciation equal to 0 for all time periods.

It is important to note once again that the series of the indicator θ reflect mostly the assumptions of the theoretical model, and that most of the movements in θ are based and caused by changes in the monetization level. However, macroeconomic variable such as inflation and foreign reserves may sieve through.

The θ indicator series

The final result of the calibration of the confidence in the exchange rate regime in Bulgaria for the period of transition are presented on Figure 4.7. Looking at the series so obtained, it is obvious that it is strongly correlated with the dynamics of monetization, but that there is also a dynamic of its own which may tell an interesting story about the public confidence in the exchange rate regime in Bulgaria.

Figure 4.7. Bulgaria 1991–1999: the "θ" indicator of Credibility of the Exchange Rate Regime
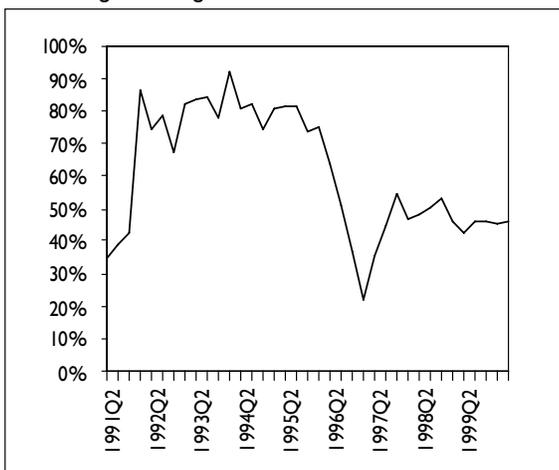
Source: own calculations

The series presented on Figure 4.7 reflect information about several processes in the Bulgarian economy during the transition period. These include monetization, inflation, exchange rate movements. The dynamic of the confidence indicator q follows the dynamic of the monetization variable, but only to some extent. The initial rise in confidence in the

first quarter of 1992 when there was an increase in monetization and no marked slowdown change in inflation dynamics translated into a large jump in the confidence indicator, which stayed at relatively high levels and suffered only little during the currency crisis of the second quarter of 1994. The large and steep drop in confidence in 1996 followed a longer period of slower drop in monetization and reflects the more and more obvious inability of the BNB to secure a stable exchange rate. The recovery in confidence after the announcement in the first quarter of 1997 and the actual introduction of the CBA in the third quarter of 1997 is, again, larger than the rebound in monetization. This development reflects, first, the fact that public confidence may have dropped to an "undeservedly" low level due to the currency and banking panic of 1996–1997, and, second, the fact that foreign reserves grew at a very high pace and quickly exceeded by large amounts even the highest levels ever reached during transition.

Measuring public confidence is by definition a difficult task. It involves concepts that are difficult to quantify and political developments that may often have nothing to do with neoclassical economics. However, the picture drawn by the confidence measure for Bulgaria presented in Figure 4.7 does not seem unrealistic. The measure reflects the dynamics of different variables which are to a smaller or greater degree dependent on public attitudes and political processes, and thus even these difficult-to-measure developments sieve through and are reflected, albeit imperfectly, in the θ indicator.

4.7. Public Finances and Credibility

Public finances reflect to a significant degree the reasonability and the sustainability of different policies and actions of the government. They present an image of what public attitudes are and of what is politically possible in a given society, and when political possibilities are not in harmony with economic realities, problems of sustainability usually ensue. Tables 4.3 and 4.4 illustrate this point for Bulgaria, clearly mapping the country's peculiar foreign debt position.

Budget deficits in Bulgaria were unsustainable in the transition period before the introduction of a CBA. Even the two years of economic growth – 1994 and 1995 – witnessed deficits of above 6% of GDP. At the same time the country was excluded from the international capital markets and was unable to borrow from abroad until the second half of 1994, when the foreign debt was restructured in a Brady deal, and Bulgaria received some support from the international financial institutions. So the deficits were financed by internal government borrowing, and by the end of 1996 domestic public debt exceeded 60% of GDP. At the same

Table 4.3. Bulgaria 1991–1999: Budget Deficits (in % of GDP)

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Budget deficit (actual)	-6.3	-5.8	-10.8	-6.6	-6.8	-10.9	-3.7	1.3	-1.0

Source: BNB, National Statistical Institute of Bulgaria (NSI), Bank for International Settlements – Basle.

Table 4.4. Bulgaria 1991–1999: Foreign and Domestic Debt (in % of GDP)

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Gross foreign debt	161.1	160.5	130.5	118.1	78.1	102.9	96.0	83.7	81.3
Domestic public debt	7.2	19.9	37.2	52.1	39.2	60.2	25.8	22.1	22.7

Source: BNB, Bulgarian Ministry of Finance, own calculations

time, under the Brady deal Bulgaria could not afford any rescheduling of the tight schedule for foreign debt payments. In retrospect, the financial crisis of the second half of 1996 and the hyperinflationary episode of January and February 1997 seem like a logical and natural consequence.

Figure 4.8. Bulgaria 1991–1999: Base Interest Rate (in percent annually)
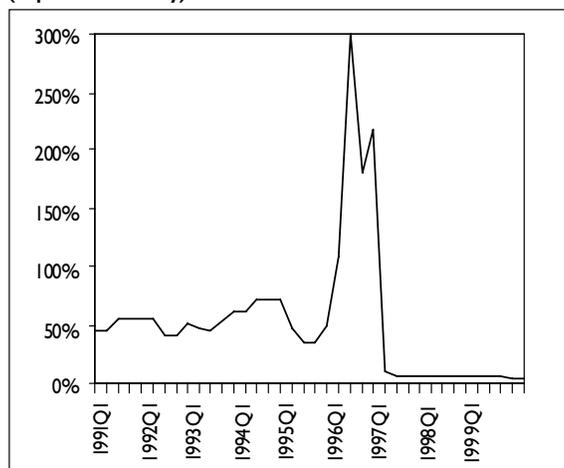
Source: BNB

As a response to the highly uncertain and volatile internal public finance environment, interest rates were erratic – see Figure 4.8. While the BNB was able to overcome the

currency crisis of 1994 and the ensuing inflation with a significant, but not extreme, tightening of the interest rates, the interest rate behavior during the financial crisis of 1996 exhibits signs of hopelessness. After an initial attempt to fight the inevitable by raising the base interest rate up to 300% in the third quarter of 1996, the BNB eased in the following two hyperinflationary quarters and allowed the domestic public debt to shrink, devoured by the inflation and the extremely low real interest rates. It is only after the introduction of a currency board that interest rates quickly converged to single digit levels and have even been lower than German rates at times.

Another indicator of the unstable and unsustainable development of the financial position of the Bulgarian state can be found in the country's balance of payments, shown in Table 4.5.

Before the introduction of a CBA, there were large discrepancies in the balance of payments due to highly volatile current account and to low levels of foreign direct investments in Bulgaria. Overall, for the first six years of transition a small and unstable country had registered a more than half a billion USD balance of payments deficit, while at the same time it had experienced a 1/3 drop in real GDP. Only after the stabilization of the economy under the CBA, and after a clearly and actively expressed political will for actual market reforms, Bulgaria became an average attractor of foreign investments and, after the initial accumulation of foreign reserves, has registered relatively small balance of payments imbalances. Presently, the balance of payments gives no rea-

Table 4.5. Bulgaria 1991–1999: Balance of Payments (USD mln)

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Current account	-77.0	-360.5	-1097.9	-31.9	-140.6	-56.5	426.7	-61.4	-664.0
Capital account	0.0	0.0	0.0	0.0	0.0	65.9	0.0	0.0	-2.4
Financial account, of which:	-428.6	613.4	759.2	1.0	360.0	-699.3	598.6	266.8	725.4
Direct investments	55.9	41.5	40.0	105.4	90.4	109.0	504.8	537.3	783.0
Portfolio investments	0.0	0.0	0.0	-231.8	-65.7	-129.4	132.8	-241.4	-199.4
Reserves*	273.9	-269.7	322.1	-40.8	-478.5	724.2	-1283.3	94.7	-96.2
Errors, omissions	231.7	16.8	16.7	71.7	259.1	-34.3	258.0	-300.0	37.2

Source: BNB

*Note: a negative value for "Reserves" indicates and increase in reserves.

son to expect that there may be any increased public expectations for unsustainability of the exchange rate regime and for nominal depreciation.

However, the Bulgarian public remains cautious. As Figure 4.9 indicates, the percentage (in the case of the Bulgarian lev this should probably be called "levovization") of all deposits which are denominated in the domestic currency, relative to those denominated in foreign currencies, has not returned to its pre-crisis level. At the same time, the "levovization" level resembles the Bulgarian θ indicator very closely, and for the period of the CBA the two variables move almost together, which may mean that they capture roughly similar developments in the behavior of the public.

Figure 4.9. Bulgaria 1991–1999: "Levovization" of Deposits (in percent)
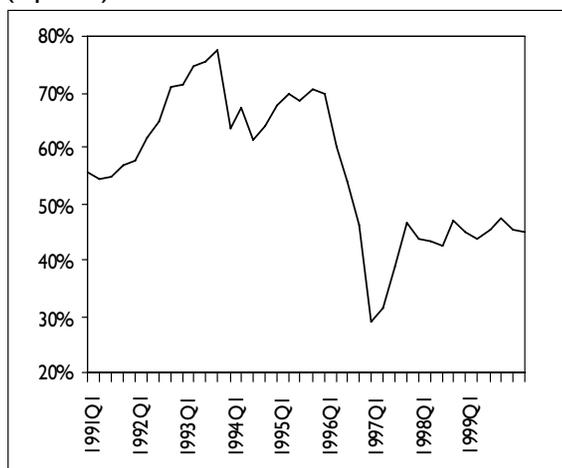
Source: BNB

4.8. Conclusions

Bulgaria has made two attempts at stabilization since the beginning of its transition. The first one, started in 1991, can be viewed as a good example of reform failure, as it did not achieve a drop in inflation, sustainable public finances or overall fiscal discipline. The second one started in early 1997 after a devastating financial crisis and brief hyperinflation with the announcement and then the introduction of a currency board arrangement. This second attempt proved to be successful, and so far the macroeconomic dynamics of the country do not exhibit signs of unsustainability.

The beginning of both stabilization programs was greeted by the public with sharp rises in public confidence in the exchange rate regimes and the related policies. The first stabilization program crashed due to the preservation of unsustainable policies including lack of fiscal discipline, continued extraction from the state, high budget deficits, low foreign

investment and the consequent low overall investment and de-capitalization of the economy. After the crash of this approach to reforms, a much stricter currency board regime was introduced, but the level of public confidence in the explicit and highly institutionalized currency peg has not returned to pre-crisis levels, at least after the first three years of its implementation.

Thus the case of Bulgaria can be characterized with the following observations:

– Bulgaria started transition with very high levels of monetization, but towards the end of its first attempt at stabilization this reflected mostly a rampant lack of financial discipline and of hard budget constraints.

– Unsustainable policies led to a currency crisis, and later to a comprehensive financial crisis, accompanied by a sharp drop in monetization, and even sharper drop in public confidence in the exchange rate policy.

– The level of monetization, the θ credibility indicator, and the "levovization" of Bulgarian deposits follow a roughly very similar path.

– Presently the Bulgarian economy operates under a currency board arrangement, which imposes strict fiscal rules and budget constraints on all economic agents, coupled with an institutionalized commitment to a fixed exchange rate. As a result, the macroeconomic data indicate that the policies have become sustainable, and that the level of public confidence has recovered, although not completely.

Part 5
Credibility of the Exchange Rate Policy in Bulgaria – Extensions

5.1. Justification

The values of the indicator θ for the level of public confidence in the exchange rate regime in Bulgaria obtained in the previous section were derived through a calibration based on a simple theoretical model and on quarterly GDP data representing the level of economic activity. As with any other calibration exercise, the results should be taken with a necessary degree of caution, since the parameter values are strongly dependent on subjective judgement. There may be different ways to check whether calibration provides acceptable results. Here two of them are used for the case of Bulgaria. One involves a slight change in the underlying theoretical equation, and the other involves different data representing economic activity.

The slight change in theory is in fact an addition of domestic interest rates as a part of the decision of the representative agent, more precisely as a variable relevant for the opportunity cost of holding domestic money. This addition may make a significant difference if interest rates are an important omitted variable in the original specification, or if the calibration involves unrealistic assumptions about the parameters.

Changing the data series representing economic activity allows for two additional checks. First, it makes it possible to use higher frequency observations, which may put the realism of the assumptions behind the model and behind the assumed parameter values under a more severe test. Second, using a different measure for economic activity by itself puts the assumed parameters and the obtained results to the test by checking whether they are qualitatively dependent on the choice of variable.

5.2. Inclusion of Interest Rates

Interest rates as a part of domestic money's opportunity cost

The reason for the introduction of the currency depreciation in the money demand equation is to have a repre-

sentation of the opportunity cost of holding domestic money instead of other currencies as a store of value and even for everyday transactions. Depreciation increases the return on holding foreign currencies. However, domestic interest rates, if they are high enough relative to expected depreciation, create an incentive to hold domestic currency denominated assets. At the same time, assets in foreign currencies also bring a yield of their own. Thus, what is relevant for domestic economic agents, is the differential between returns from holding domestic currency denominated assets and holding foreign currency denominated assets.

The return on domestic currency denominated assets is measured by the domestic interest rate, represented by the Bulgarian base interest rate. The return on foreign currency denominated assets is a composite one. It consists of the return due to the depreciation of domestic currency relative to the foreign one, and to the own yield of the asset. In the analysis here foreign currency denominated assets are represented by USD denominated deposits of Bulgarian economic agents in Bulgarian banks, which are by far the dominating form of foreign currency saving in Bulgaria. As a result, the relevant opportunity cost of holding domestic money consists of expected depreciation and of the interest rate differential between domestic and dollar deposits.

It is precisely in this manner that interest rates can be introduced in the money demand equation:

$$\ln M - \ln P = \alpha + k \ln y - n \left[E\{de/e\} - (rd - rf) \right]$$

In this specification, "n" is the elasticity of money demand with respect to changes in the relative expected return on holding foreign currency denominated assets. The reason why inclusion of this measure may be relevant for measuring confidence in the exchange rate regime is that high domestic interest rates may be an important means for attracting public holding of domestic currency and overcoming the public "nervousness" about the credibility of the exchange rate regime. Thus omitting the interest rate differential may lead to an overestimation of the level of public confidence in the exchange rate regime – the public may

be holding domestic currency deposits not because it believes the exchange rate regime, but because of the relatively high interest rates.

Formalization

Provided that the real income elasticity of money demand is 1, and that monetization is denoted by "k", the resulting expression for the expected rate of depreciation is:

$$E\{de/e\} = [(\ln(k) - \alpha)/(-n)] + (rd - rf),$$

and the equation for the calculation of the confidence indicator θ becomes:

$$\theta = [(\ln(k) - \alpha)/(-n) + (rd - rf) - \text{DevScen}] / [\text{NoDevScen} - \text{DevScen}]$$

It can be seen from this specification how relatively higher domestic interest rates mean that people are holding domestic money because of them, and not because of high confidence in the sustainability of the exchange rate. Intuitively, the lower the confidence in the domestic currency, the higher interest rates are needed to entice domestic economic agents to hold deposits in domestic currency. Formally, the derivative of θ with respect to domestic interest rates is negative due to the fact that the denominator [NoDevScen-DevScen] is negative.

Results

It is to be expected that high domestic interest rates are pulling the confidence measure down relative to the measure of confidence which ignores the interest rate differential. This effect is clearly demonstrated on Figure 5.1, which shows the two measures for Bulgaria and makes obvious the fact that for the periods when the Bulgarian domestic interest rates were significantly higher than foreign currency interest rates, the resulting confidence measure is lower than the benchmark measure omitting domestic interest rates. After the introduction of the currency board arrangement in Bulgaria and the convergence of Bulgarian interest rates to the levels close to the ones characteristic for foreign currency deposits, the two measures of public confidence in the exchange rate regime become almost overlapping.

At the same time, the two measurements are not different enough to lead to qualitatively different results, and both of them capture generally the same dynamic, and convey approximately similar pictures. This means that the general approach is not vulnerable to this slight theoretical refinement, and that the choice of parameter values may be considered reasonable.

5.3. Alternative Economic Activity Data and Frequency

Retail sales as a measure of economic activity

GDP is the usual candidate for a representation of the overall level of economic activity, but it does not have to be the only one and in the case of transition countries has two deficiencies. First, the highest frequency of GDP data is quarterly, and many transition countries have a history which is not long enough to provide even the opportunity for interpolation of earlier annual data using estimated seasonal factors. Second, transition economies are less stable and with less inertia than the more highly developed countries, and their internal economic dynamic may involve

Figure 5.1. Bulgaria 1991–1999: Two Measures of the Confidence Indicator: with Interest Rates and without Interest Rates
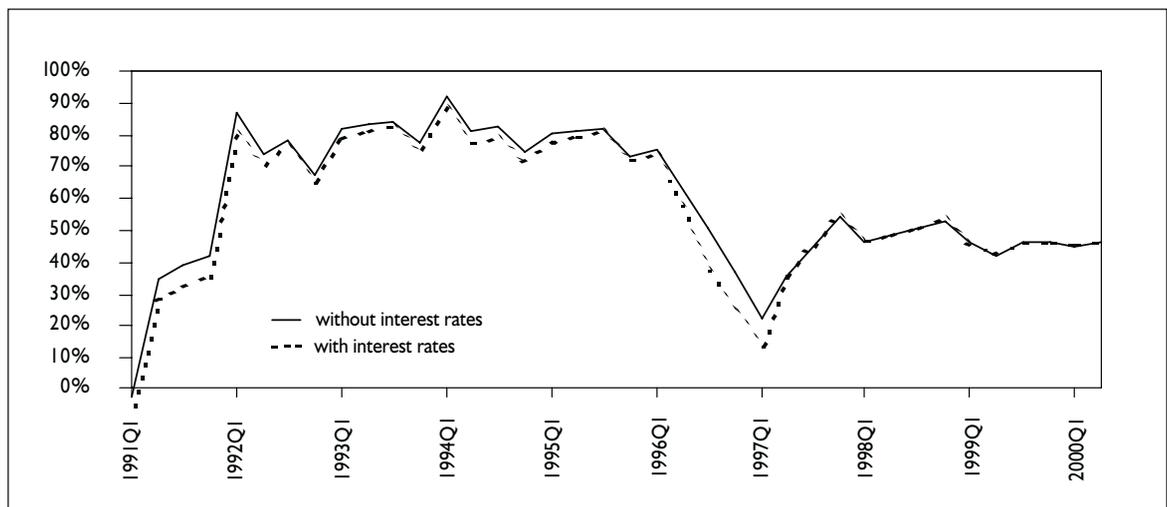
Source: own calculations

important developments within each quarter. Thus the measure of public confidence in the exchange rate regime presented up to now may be skewed because of few observations and may be omitting important for the given economy changes and shifts.

This concern is dealt with using Bulgarian data of higher frequency. This makes both the number of observations greater, and helps capture eventual short term fluctuations. The series used is the monthly retail sales. The reasons for this choice are several. Retail sales are an approximation for the consumption of the public for a given month, while at the same time they do not suffer from a severe distortion due to the shift in economic structure during transition as, for example, industrial output or sales. The data on retail sales are monthly, and capture both seasonal fluctuations, and short-term changes in the environment which affect agents' behavior. Finally, the data are relatively consistent for the period of transition in Bulgaria. The series of real retail sales is presented in Figure 5.2.

The retail sales data indicate a very strong seasonality throughout the period. It is especially pronounced in 1993, 1994, and 1995. It is absent in 1996, when the financial crisis hit the economy, but is resumed, albeit more smoothly, in the following years. This is consistent with the fact that before 1996 the fourth quarter was the strongest in terms of GDP, and after the crisis the third quarter dominates. Thus, the retail sales series, similarly to GDP, indicates that the monetization data will need seasonal adjustment.

Data transformations

The retail sales data needs to become the basis for the monetization variable "k" used calculate the confidence indicator θ, and this requires several transformations. Retail sales reflect only partially barely one component of GDP, namely consumption. Thus they are significantly smaller in absolute value than GDP, which is the most comprehensive measure of economic activity. Therefore if the money stock is applied to the raw retail sales data, the values will necessarily be much larger than the monetization values obtained when the annualized GDP is used. Here there are two possible approaches.

The first is to annualize the monthly retail sales data and obtain the monetization values regardless of the change in the scale, and then change the calibrated parameters so that they reflect the fact that retail sales are a proportion of overall economic activity. The second is to re-scale the retail sales data by a coefficient based on the ratio of retail sales to GDP for the given year, and then used the re-scaled data to obtain the values for monetization. Both approaches were used, so that the stability of the approach could be additionally tested.

Under the first approach, which keeps the retail sales data completely separate from the values of GDP, the seasonally adjusted values of monetization often exceed 1, and sometimes exceed 2. Given the actual values obtained, the parameters α and β were re-scaled to reflect the average ratio of GDP to retail sales, which is approximately 2.5 for the whole period. Thus the maximal level of monetization ? becomes 2.2, and the elasticity of money demand with respect to expected depreciation is based on the proposition that if the expected appreciation of the USD (depreciation of the lev) is 300%, the level of monetization will drop from 2.2 down to 0.5.

Under the second approach, the retail sales data are multiplied by the ratio of GDP for a given year to the sum of retail sales for the same year, and the resulting series is used to obtain the seasonally adjusted monetization values. Under this approach there is no need to re-scale the parameters α and β.

Figure 5.2. Bulgaria 1991–1999: Retail Sales (in March 1991 leva)
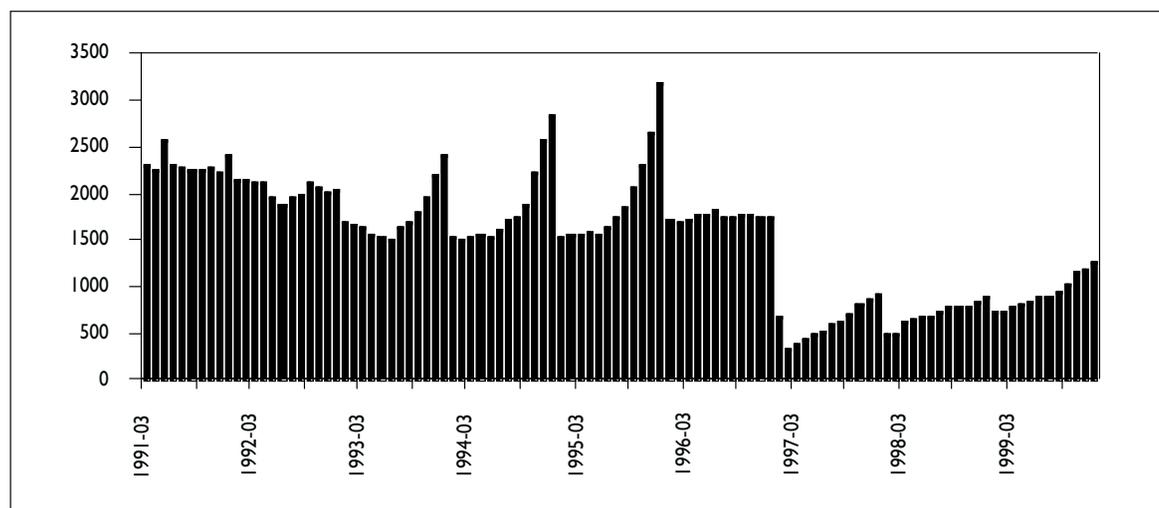
Source: NSI

Figure 5.3. Bulgaria 1991–1999: Retail Sales Based Monetization: with and without Re-scaling to GDP
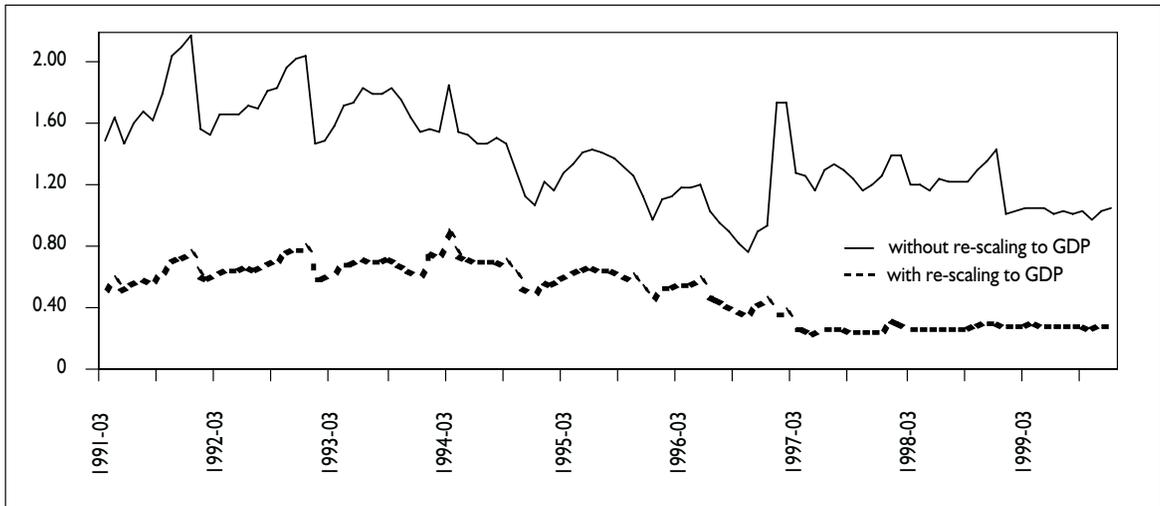
Source: BNB, NSI, own calculations

The resulting monetization series based on monthly retail sales data are adjusted for seasonal fluctuations, and are presented on Figure 5.3.

Having in mind that the series which is not re-scaled to GDP is naturally the more volatile of the two, the two series are broadly consistent before 1997, but seem to have different dynamics after that. As will be seen below, this is reflected in the respective confidence measures. The major reason for this is that retail sales decreased more than overall GDP during the crisis of the second half of 1996 and the first quarter of 1997. Especially in January and February 1997 the economic agents responded to the adverse conditions by severely limiting consumption, which makes the

level of monetization measured in this manner increase significantly due to a sharp drop in the denominator. After this episode retail sales rebounded, but not to the previous levels with respect to GDP, which reflects the changing structure of GDP towards a greater share of investment and of consumption of services.

Another important observation to be made at this point is the similarity in the overall dynamics of the two retail sales based monthly monetization measures and in the GDP based quarterly measure. In both cases the initial monetization levels are high, then starting with the first currency crisis of 1994 they begin to decline, bottoming out in the beginning of 1997, and then recovering more or less signifi-

Figure 5.4. Bulgaria 1991–1999: Retail Sales based θ indicator with and without Re-scaling to GDP
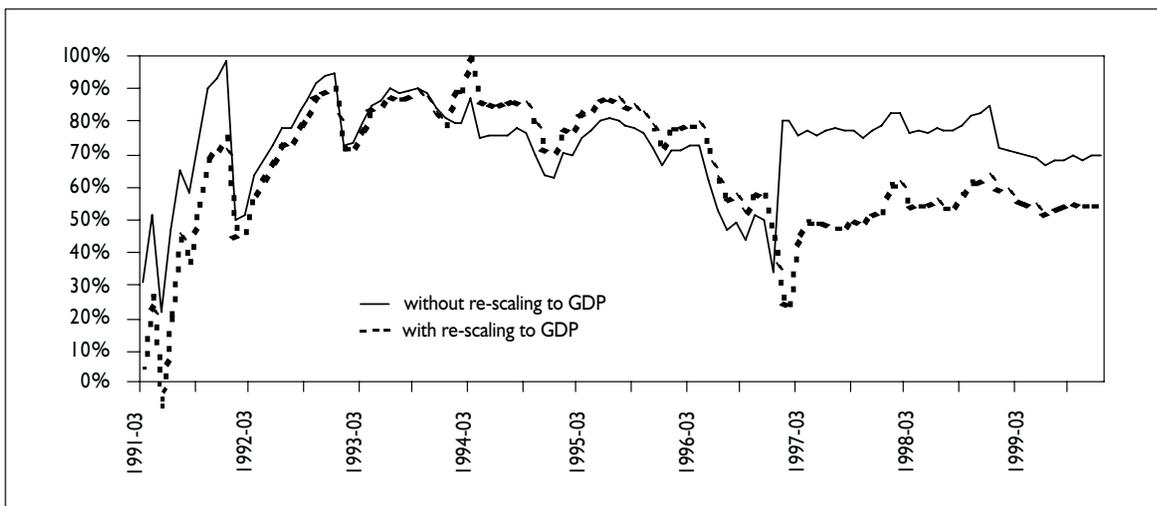
Source: own calculations

cantly before stabilizing at relatively low levels compared with the pre-crisis period. This is a preliminary indication that using the different, higher frequency data, does not lead to qualitatively different results.

Results

It should be expected, looking at Figure 5.2, that the two measures of the q indicator based on retail sales data will be approximately the same until 1997, and then will diverge due to the different monetization levels obtained by the two approaches. At the same time, given the fact that both monetization measures based on retail sales have roughly similar dynamics with the monetization measure based on GDP data, it is expected that the resulting measures of the level of confidence in the exchange rate regime based on retail sales data will be similar and will not qualitatively differ from the already obtained measure based on quarterly GDP. Both these expectations are confirmed after the actual calculation of the two measures of the q indicator based on retail sales data, which are presented graphically in Figure 5.4.

The two series are quite close until 1997, when they diverge for the first three months of 1997, and then follow similar dynamics at different levels. This is due mainly to the manner of calculation of the two series. The real drop in retail sales in the first two months of 1997 is much more significant than the real drop in money demand, thus sharply increasing the level of monetization calculated on the basis of simple annualization of monthly retail sales figures. At the same time, the drop in retail sales is not so significant, if the retail sales data are re-scaled to GDP, and monetization does not increase as promptly and as sharply.

Despite the divergence in the first quarter of 1997, both retail sales based measures of the confidence indicator q are qualitatively consistent with the results based on quarterly GDP data. On the one hand, this means that the approach to the measurement is stable under different specifications and observation frequencies. On the other, it allows for several interesting political-economic observations.

The monthly θ indicators of the confidence of the public in the exchange rate regime show a remarkable closeness with both economic and political developments in the country. The initial rise in confidence, related to the first launching of economic reforms in February 1991 was followed by a somewhat skeptical acceptance of the first non-communist government in the Bulgarian transition, which took office in November 1991. This government gradually built up the public confidence, which faltered after the government's resignation in October 1992. The following government also enjoyed a high degree of trust by the public until the first currency crisis which started in late March, 1993. Credibility was partially restored with the inauguration of a new government in January 1995, enjoying a full majority in Parliament. Once again, confi-

dence started to dwindle approximately a year after the government took office, and actually this decline preceded the beginning of the financial crisis in late April, 1996.

The financial crisis of 1996–1997 was treated radically in Bulgaria, and a currency board arrangement was introduced as a way to resolve fundamental structural problems of the Bulgarian economy, the most important one being the lack of hard budget constraints. This change was met with another marked increase in public confidence in the exchange rate regime. Thus the Bulgarian public has demonstrated a tendency to grant a strong credit of trust to new governments. The fact that three times its expectations have been disappointed can go a long way towards explaining why the level of confidence under the CBA has not returned to its historical maxima, and has not reached levels which are observed in other transition economies with CBA, such as Estonia and Lithuania. Whether this will happen remains to be seen.

5.4. Conclusions

Two extensions of the original calculation of the level of public confidence in the exchange rate regime indicator θ for Bulgaria were performed with the purpose to see if the results are dramatically changed by slight modifications in specification. The general conclusion is that they are not, and that the original approach is relatively stable with respect to the inclusion of other potentially relevant variables, and to the use of higher frequency data for monetization.

The introduction of an interest rate spread as an additional variable defining the opportunity cost for domestic economic agents for holding domestic money allows for a slight correction in the resulting θ indicator. The correction is due to the fact that one response of policymakers in Bulgaria during the period in transition before the crisis of 1996–1997 to pressure on foreign reserves and to dollarization was to hold interest rates high. Even though this had limited impact on money growth, it provided an incentive for the public to hold some portion of its deposits in domestic currency, instead of in hard currency cash. This inducement resulted in higher monetization, which, however, cannot be attributed to high level of confidence in the exchange rate regime – agents were very quick to respond to any sign of a currency crisis by immediately switching to hard currency cash holdings, showing they did not believe the government can preserve the then prevailing exchange rate.

Including an interest rate spread in the money demand equation as a component of the opportunity cost of domestic money helps separate to some extent the effects of confidence and of interest rate policy on monetization, and may be useful in overcoming a possible upward bias in the origi-

nally proposed measurement of the θ indicator. At the same time, results for Bulgaria indicate that the behavior of the θ indicator does not change qualitatively after the introduction of an interest rate spread as a relevant variable, and that its dynamics remain almost unchanged, thus confirming the soundness of the original approach and the relative stability of the specification.

Using monthly retail sales data instead of quarterly GDP as a measuring tool for the level of monetization allows for two additional checks of the stability of the original specification. First, it provides an opportunity to see if monthly dynamics are substantially different from quarterly movements in the θ indicator. Second, it provides an opportunity to see if a different "crop" of data will render both the originally calibrated values of the maximum level of monetization and the elasticity of money demand to expected depreciation parameters unreasonable by leading to widely divergent results for the confidence indicator. The answer to both inquiries is "no" for the case of Bulgaria. The monthly dynamics of the θ indicator based on retail sales are broadly consistent with the quarterly dynamics based on GDP,

after taking into account some idiosyncrasies of the Bulgarian retail sales variable in the first quarter of 1997. The values of the two calibrated parameters remain unchanged, and the results are stable.

At the same time, the monthly data bring to the surface an interesting point. The level of public confidence in the exchange rate regime in Bulgaria is closely connected with political developments. Usually new governments are greeted with a credit of trust, which in the pre-CBA period dwindled away as lack of reforms and lax financial behavior government. Banks and businesses led to continuous difficulties and pressures on the exchange rate. This link may be direct – economic agents observe and react. It may also be indirect, resulting from the impact of unreasonable and unsustainable policies on other macroeconomic variables, such as inflation, depreciation, money supply.

As a whole, the extensions of the original model for the calculation of the level of public confidence in the exchange rate regime indicator θ, based on Bulgarian data, provide evidence that the original approach is stable and is not qualitatively influenced by different specifications.

Part 6
Credibility of the Exchange Rate Policy in Estonia

6.1. The Policy of the Bank of Estonia

After the pronouncement of Estonian political independence from the USSR in 1991, the country quickly moved towards establishing an independent economic policy and implementing reforms. An important component of the institutional framework of economic policy was the establishment of a currency board arrangement in April 1992. The CBA was a major part of the design of the newly established Estonian financial system, and has constituted its integral element throughout transition. It is important to note that the Estonian CBA was not caused by reform failure or by a crisis, but was a political decision made in the wake of independence. Achieving public confidence in the newly restored Estonian kroon was among the arguments in favor of the introduction of this highly institutionalized and committed fixed exchange rate regime with automatic adjustment mechanisms and very few degrees of freedom in terms of monetary policy.

One result of the operation of a currency board is the practical loss of ability to conduct monetary policy. The exchange rate regime is dominated by a fixing of the exchange rate, in the case of Estonia at the level of 8 kroon to 1 Deutsche mark, which precedes all other dimensions in policy, and thus monetary sovereignty is lost to the policymakers in the country of the anchor currency. The exchange rate regime in Estonia throughout its transition has been characterized with a strictly fixed exchange rate and the targeted depreciation has been explicitly set to 0.

6.2. Inflation, Exchange Rates, and Broad Money

Estonian financial macroeconomic indicators present an interesting picture for a country with a currency board. Inflation has been subsiding gradually, and as many as 6 years after the introduction of the CBA was still substantially higher than in the anchor country. The nominal exchange rate, naturally, has reflected the changes in the DM to USD exchange rate, but the real effective exchange rate has been constantly appreciating, reflecting the high inflation. These developments are presented in Table 6.1.

The expansion of broad money in Estonia has been significant. With the exception of the first two years of initial stabilization, and 1998 dominated by the Russian crisis, money has grown faster than the price level, leading to an increasing monetization of the economy.

Holding other things constant, under a CBA such a development of the financial indicators would mean that Estonia should experience a deterioration of external balances and should go through internal adjustments in the real sector through the interest rate channel, when there is a fall in foreign reserves followed by a fall in money supply. However, other things need not be equal, and rising productivity and persistent influx of foreign direct investment may offset the real effective exchange rate appreciation, bringing stability to the external balances. This seems to be precisely the case in Estonia, and even the adjustment during the last quarter of 1998, followed by a visible slowdown of inflation and by a mild recession in 1999, were more likely

Table 6.1. Estonia 1993–1999: Inflation, USD Exchange Rate, Real Exchange Rate, Money (% change)

Year	1993	1994	1995	1996	1997	1998	1999
Inflation	90.1	47.7	29.0	23.1	11.2	8.2	3.3
EEK/USD		-1.8	-11.7	5.0	15.2	1.5	4.3
Real eff. Exch. Rate		40.8	25.8	19.1	6.9	10.5	1.9
Broad money	57.7	30.8	30.5	36.6	42.3	0.1	23.6

Source: Bank of Estonia, Statistical Office of Estonia, Bank for International Settlements – Basle

caused by the Russian crisis, than by the internal dynamic of Estonian financial developments.

6.3. Output Dynamics vs Broad Money Changes

Seasonality

Estonian quarterly real GDP is visibly seasonal, with a strongest fourth quarter, a very strong second quarter, a weaker third quarter, with the first quarter being the weakest. One inference from this observation is that the Estonian economy follows a pattern consistent with more developed industrial economies. This seasonality is visible on Figure 6.1.

Figure 6.1. Estonia 1993–1999: Quarterly Real GDP (in 1995 kroons)

Source: Statistical Office of Estonia

1998, with the second quarter exhibiting the strongest growth in broad money, this pattern seems to have disappeared, or at least visibly changed after the Russian crisis of August 1998. The presence of seasonal factors in the dynamics of both GDP and money makes a seasonal adjustment of monetization necessary, if it is to serve as a basis for the measurement of a highly inertial concept such as public confidence.

Dynamics

Output in Estonia has followed a pattern specific for a country with a CBA. GDP declined for two consecutive years after the introduction of the CBA, which means that the desirable effects of the arrangement were affecting the economy with a long lag. This, of course, may be entirely attribut-

Figure 6.2. Estonia 1993–1999: Change in Nominal Broad Money Compared to Previous Quarter (in percent)

Source: Bank of Estonia

To illustrate the highly seasonal character of monetization, the jigsaw pattern of Estonian real GDP needs to be compared with the dynamics of Broad Money, which are shown on Figure 6.2.

Due to the relatively low fluctuations in inflation, the dynamic of nominal and real broad money are roughly similar. While there is a discernible seasonal pattern before
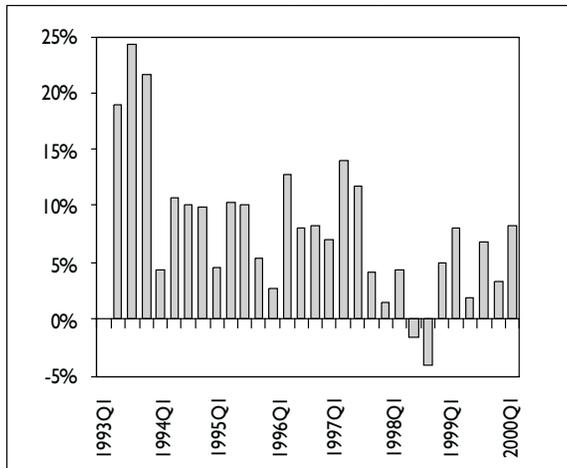
able to the usual post-communist recession. Then, four years of robust growth in real GDP were recorded, roughly coinciding with similar levels of growth in monetization [6].

The annual data for Estonia indicate a relatively close relationship between real GDP and the level of monetization, rendering the assumption of a unit elasticity of money demand with respect to output reasonable.

Table 6.2. Estonia 1993–1999: Real GDP Monetization Annual Growth Tares (% change)

Year	1993	1994	1995	1996	1997	1998	1999
Real GDP growth	-8.5	-1.8	4.3	4.0	10.6	4.7	-1.1
Growth in monetization		4.4	3.3	5.1	16.2	-4.5	15.3

Source: Bank of Estonia, Statistical Office of Estonia

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[6] The discrepancy in 1998 is entirely due to the last quarter, when after the Russian crisis money decreased rapidly relative to GDP, but the weakness of GDP in the last quarter was not enough to affect the growth for the whole year.

6.4. Evolution of Monetization in Estonia

The data on monetization for Estonia come from the Bank of Estonia for the monetary aggregate, and from the Statistical Office of Estonia for quarterly nominal GDP. The end-of-quarter measure of broad money was divided into quarterly nominal GDP to calculate the level of monetization for the respective period. This raw calculation of the level of monetization was seasonally adjusted using EViews, ratio to moving average – multiplicative procedure. The seasonally adjusted monetization series is shown on Figure 6.3, and gives ground for several initial observations about the overall process of monetization in Estonia.

Monetization in Estonia started from a very low level, associated with the lack of confidence in the Russian ruble, and in the Estonian kroon after its adoption, due to the very high inflation during the first year of independence. At the same time the trend of monetization has been positive throughout the period in review. Within this general trend, several periods can be singled out.

An initial rise in monetization followed the introduction of a CBA, and the corresponding increase in confidence due to the institutionalization of the exchange rate peg. The peak in the third quarter of 1993 is due not so much to a rise in broad money, but to a weak quarterly GDP. 1995 and most of 1996 saw monetization essentially constant, reflecting the settling down of the economy, the implementation of market reforms, and beginning of growth. The takeoff of the Estonian economy in 1997 is coincident with a sharp rise in monetization. Under a CBA this means that the country has been able to attract enough foreign investment, and financial intermediation has developed enough for the mo-

netary aggregate to grow faster than a quickly rising GDP. This trend continues after a brief response to the Russian crisis, and by the year 2000 Estonia's monetization is in the upper range for a transition country with its level of GDP per capita.

6.5. Central Bank Foreign Exchange Reserves

The dynamics of foreign currency reserves of Estonia reflect the successful operation of the CBA. The foreign reserves backing the kroon are increasing as a result of the credible commitment of the government to the fixed exchange rate and of the implementation of market reforms which have made Estonia one of the leading candidates for EU membership.

It is noteworthy that after 1997 the fluctuations in the upward trend of Estonian foreign reserves are much more significant than in the period before 1997. This can be attributed to the impact of the Asian and the Russian crises, as well as to the fluctuations in the inflow of foreign investment. The fact also illustrates the operation of the CBA, under which the fundamental adjustment to shocks starts with a change in foreign reserves.

6.6. The "Theta" Indicator

Obtaining the θ indicator for the level of public confidence in the exchange rate regime in Estonia according to the theoretical framework adopted here requires calibra-

Figure 6.3. Estonia 1993–1999: Monetization, Share of Broad Money in GDP, Annualized, Seasonally Adjusted
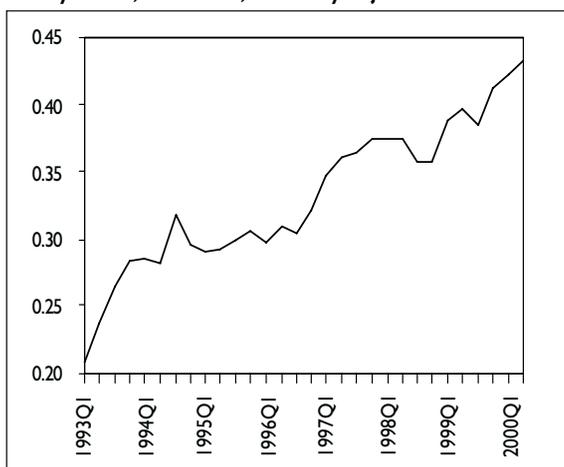
Source: Bank of Estonia, Statistical Office of Estonia

Figure 6.4. Estonia 1994–1999: Foreign Reserves Backing the Estonian kroon (in USD million)
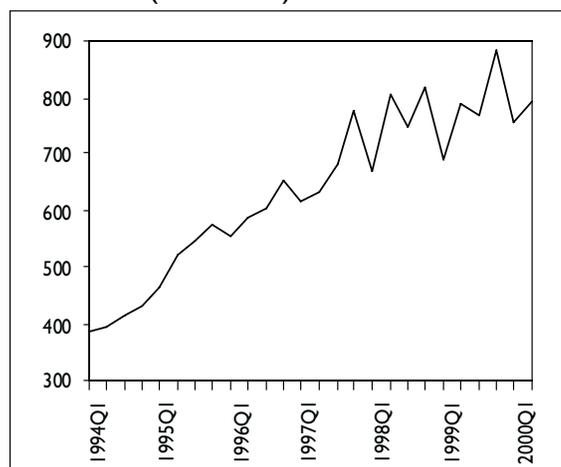
Source: Bank of Estonia

tion of parameters and specification of the relevant data series.

Calibration of the parameters of the money demand relationship

Calibration involves assigning values to the parameter α, which represents the potential maximal level of monetization for the respective economy, and the parameter β, which represents the elasticity of money demand with respect to expected depreciation.

The maximal level of monetization is taken to correspond to the highest one achieved so far in Estonia, and is set at 0.45. This parameter value fits the current sample, but since the overall monetization trend in Estonia is positive, it may become too restrictive in the near future.

Selecting a value for β for Estonia necessarily involves a high degree of discretion, as over the period of observation the country has not had a significant depreciation, nor a large drop in monetization. Different values of this parameter were tried, and none of them changes the results in any substantial way, except for the first three observations, for which the starting level of confidence was very low and changes in the parameter did have a slight impact. The value actually chosen corresponds to a relatively high sensitivity of the public towards depreciation, corresponding to the relatively high level of development of the financial system which is capable of enabling economic agents to flee in a case of a crisis. Thus it is assumed that a certain 30% depreciation will make monetization drop to one tenth of its potentially maximal level.

Figure 6.5. Estonia 1993–1999: Devaluation Potential
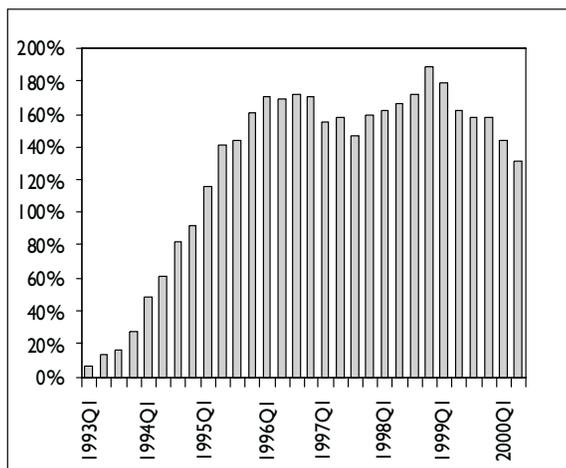
Source: Bank of Estonia, US Bureau of Labor Statistics, own calculations

Time series

There are three data series needed for the calculation of the confidence indicator θ. The first is the monetization, which was derived above. The second is the potential depreciation. It is based on the assumption that if left alone by policymakers, the nominal exchange rate will return to a point where the real exchange rate is equal to the real exchange rate of a base period, where the base period is chosen to be the beginning of the observed period. This choice of a "fall-back" scenario is definitely unrealistic, and renders other approaches possible and even desirable, but is useful as a starting point for comparison. Any other approach would also require some strong assumptions.

Thus the data needed to calculate the potential depreciation coincide with the data needed for the calculation of the purchasing power parity, i.e. the domestic price level (taken from the Statistical Office of Estonia), the foreign price level (US Bureau of labor statistics), and the nominal exchange rate (Bank of Estonia). The resulting series is shown on Figure 6.5, and presents no surprises given the facts about the inflation rate in Estonia after the introduction of the CBA.

The Estonian kroon has been appreciating in real terms consistently during the first three years of observation, and then with the slowdown of inflation in Estonia has remained at fairly constant levels [7]. Since there have been no episodes of significant attack against the kroon, the dynamics of this series is fairly smooth.

The last series, needed for the calculation of the confidence indicator, is the announced exchange rate policy goals. Due to the CBA, which has been operational throughout the period in question in Estonia, this goal can be assumed to be an explicitly stated exchange rate stability, i.e. 0 percent depreciation in all periods.

The θ indicator series

The results of the calibration of the Estonian indicator of the level of public confidence in the exchange rate regime are presented on Figure 6.6. The series reflects the strong commitment of the monetary authority to the adopted CBA and the relatively good macroeconomic results achieved by the Estonian economy.

After starting at a very low level, corresponding to the political and economic turbulence related to the separation from the USSR, and to the restoration of statehood, of the currency and of the financial system, confidence grew quickly to very high levels in 1993, and has been gradually converging towards full confidence since then.

It is interesting to note that a very high level of confidence was reached in periods (i.e. 1993) when the level of monetization (Figure 6.3) was still quite low for a transition country with the Estonian GDP per capita. This can be

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[7] The real depreciation at the end of the observed period is due mainly to the strength of the US dollar relative to other, especially the European, currencies. The same effect is observed in all other countries whose currencies are not pegged to the US dollar.

Figure 6.6. Estonia 1993–1999: the "θ" Indicator of Credibility of the Exchange Rate Regime

Source: own calculations

Figure 6.7. Estonia 1994–1999: Interbank Money Market Interest Rate (in percent annually)

Source: Bank of Estonia
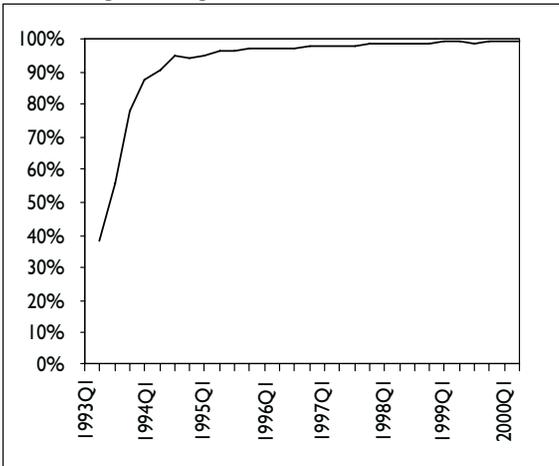
explained by the overall political environment of the Estonian exchange rate regime, and by the fact that monetization was increasing even in a period of a still high inflation under an explicit currency peg, which indicates that the public responded favorably to the introduction of the regime.

Another interesting observation is that confidence in the Estonian kroon does not seem to have been affected by the Asian and the Russian crises, even though these crises caused external imbalances and led to increases in the interest rates. The flexibility of internal, mainly financial and the labor, markets, as well as the progress toward improving the functioning of the market economy and toward EU accession were enough to offset the external pressures.

6.7. Public Finances and Credibility

One of the reasons for the quick recovery of confidence in the exchange rate regime in Estonia, and for its subsequent gradual increase, is the reasonable fiscal stance of the country and the relatively low level of foreign indebtedness. As illustrated in Tables 6.3 and 6.4, Estonia has been able to sustain a low level of budget deficits, and to hold the increase of its gross foreign debt to a manageable level.

The trend for Estonia to have a relatively balanced budget is broken to some extent only in 1999, when the country experienced a mild recession after the Russian crisis, and a somewhat larger, even though still very mild for transition country standards, budget deficit was one means for alleviation.

Under the CBA, the major way for the Estonian economy to respond to external shocks is through the interest rates, shown on Figure 6.7.

The dynamics of interbank money market rates show that the Estonian economy is responding to external difficulties precisely in this manner. Both the Asian and the Russian crises resulted in sharp increases in short term interbank rates, which are quite representative for the Estonian economy. These fluctuations indicate that the financial sector bore the brunt of the crises, and as a result it was restructured through bank purchases by foreign investors in 1998. But this flexibility made the adjustment in the real sector relatively mild: real GDP was not visibly affected by the Asian crisis, and fell by 1.1% in the year following the Russian crisis.

Table 6.3. Estonia 1993–1999: budget deficits (in % of GDP)

Year	1993	1994	1995	1996	1997	1998	1999
Budget deficit (actual)	0.9	0.9	0.3	-1.6	1.6	-1.9	-4.7

Source: Bank for International Settlements – Basle

Table 6.4. Estonia 1993–1999: Foreign debt (in % of GDP)

Year	1994	1995	1996	1997	1998	1999
Gross foreign debt	8.9	9.4	10.7	25.2	29.0	23.0

Source: Bank of Estonia

The Estonian balance of payments, presented in Table 6.5, offers an interesting look at the sustainability of the Estonian growth path.

Estonia has registered periods of very high current account deficits, but they have been always more than off-set by significant capital inflows. Thus the real appreciation of the kroon has not made the external imbalances unsustainable, and as a consequence has not been seen as a threat to the exchange rate regime. On the contrary, the country's openness, relatively flexible financial and labor markets, and favorable business climate have made it attractive for capital inflows, and this has enhanced its ability not only to manage the trade and current account deficits, but to register constant increases in foreign reserves and to preserve the credibility of its commitment to the stable exchange rate.

6.8. Conclusions

After the restoration of its independence and of its economic system, Estonia stabilized the economy with the introduction of a CBA, and proceeded with the implemen-tation of economic reforms aimed at market liberalization and EU integration. Estonia has developed as a small and very open economy which has been able to sustain relative-ly high growth rates, to attract foreign investment, and to overcome some significant external shocks such as the Asian and the Russian crisis. The financial system has been deve-loping, improving intermediation and attracting foreign investment as well, and as a result the confidence in the Estonian exchange rate regime has been constantly growing.

Thus the case of Estonia can be characterized with the following observations:

– Estonia started transition in a serious economic crisis related to the self-destruction of the ex-USSR, but due to its institutionalized exchange rate stabilization it was able to restore confidence and implement reforms in a credible and successful manner.

– Economic policies towards liberalization and opening of the economy have been sustainable.

– The θ indicator has recovered more swiftly than mo-netization due to the demonstrated ability of the Estonian economy to increase foreign reserves despite current account deficits due to real appreciation and continued mild inflation.

Table 6.5. Estonia 1993–1999: Balance of Payments (USD mln)

Year	1993	1994	1995	1996	1997	1998	1999
Current account	21.6	-166.5	-157.9	-397.9	-563.4	-478.1	-294.4
Capital account	0.0	-0.6	-0.8	-0.6	-0.3	1.7	1.3
Financial account, of which:	218.8	167.3	246.1	560.3	784.2	488.0	450.1
Direct investments	162.2	214.6	201.5	150.5	266.7	580.6	305.1
Portfolio investments	-0.2	-14.1	-22.1	145.4	262.4	-9.7	21.0
Reserves*	-194.7	-30.7	-105.5	-101.0	-196.5	-11.1	-140.7
Errors, omissions	-45.8	30.5	18.1	-30.8	-24.0	-0.5	-16.3

Source: Bank of Estonia
*Note: a negative value for "Reserves" indicates and increase in reserves.

Part 7
Credibility of the Exchange Rate Policy in Lithuania

7.1. The Policy of the Bank of Lithuania

As early as 1990 the Bank of Lithuania was re-established after being a branch of the Soviet Gosbank for 60 years, with an act of the Lithuanian Parliament. In the following two years, it was decided to introduce a provisional currency (talonas) as a substitute for the Russian Ruble, and in 1993 the Lithuanian Litas became the national currency.

After initially following a policy of a managed float, the Lithuanian authorities decided to follow the example of Estonia, and to establish a currency board arrangement (CBA), with the lit tied to the US dollar at a rate of 4 litas for 1 dollar. The Lithuanian currency board was introduced on April 1, 1994. An interesting feature of the Lithuanian CBA is the ability of the central bank to have discretion over decisions to appreciate the lit, but not to depreciate it.

Since 1994 the Bank of Lithuania has followed the monetary rules of the CBA, without appreciating the currency,

7.2. Inflation, Exchange Rates, and Broad Money

In 1993 the Lithuanian economy experienced high inflation, resulting from the use of the provisional currency and the close ties with the highly inflationary zone of the Russian ruble. This performance was one of the reasons for the adoption of a CBA in 1994. After the start of the CBA, inflation subsided significantly, but did not come down to single digits annually until 1997. In this manner, as illustrated in Table 7.1, Lithuania experienced a real effective exchange rate appreciation throughout the period under observation.

At the same time as the price level was growing relatively quickly, and the Lithuanian currency was appreciating, the broad money aggregate was growing at a slower pace than prices until 1997, when this trend was reversed. As a result the monetization of the economy was decreasing until 1996, and increasing, albeit more slowly, after that.

Table 7.1. Lithuania 1993–1999: Inflation, USD Exchange Rate, Real Exchange Rate, Money (% change)

Year	1993	1994	1995	1996	1997	1998	1999
inflation	410.2	72.2	39.6	24.6	8.9	5.1	0.8
LTL/USD		-8.2	0.6	0.0	0.0	0.0	0.0
real eff. exch. rate	250.0	75.6	23.1	25.8	19.9	5.5	3.3
broad money	100.2	63.0	28.9	-3.5	34.1	14.5	7.7

Source: Bank of Lithuania, Bank for International Settlements – Basle

so the exchange rate has remained fixed. However, a weak banking sector has continuously caused imbalances in the Lithuanian financial system and has contributed to pressures on the fixed exchange rate regime. On several occasions the political establishment in Lithuania has expressed an intention to abandon the CBA [Chankova, 1999], and this behavior kept the level of uncertainty and from there interest rates relatively high.

Normally, the real appreciation of the currency and the dropping monetization may be expected to bring about external imbalances, which may hold back, and even suffocate the growth of the economy. As in the case of Estonia, however, Lithuania was able to register robust growth rates before the Russian-crisis-ridden 1999, when most of the decline of GDP can be attributed to unfavorable external factors.

7.3. Output Dynamics vs Broad Money Changes

Seasonality

Lithuanian quartely GDP, shown on Figure 7.1, exhibits a highly seasonal behavior, with a slow first quarter (the only exception being 1994Q1), a very strong third quarter, and approximately equal second and third quarters. An interesting feature of the series is the fact that after the Russian crisis of the third quarter of 1998, the following two years saw a fourth quarter which was weaker that the second quarter. As in the case of Bulgaria, the strength of the fourth quarter may be attributed to agricultural factors and possibly to tourism.

The seasonal character of quarterly GDP, when compared to the dynamics of Lithuanian broad money (shown on Figure 7.2) suggests that the monetization level is also highly seasonal, because broad money growth does not exhibit any pattern based on the calendar quarter. Besides a roughly observable slow money growth in the first quarter, Lithuanian money do not seem to depend on the season.

The strong presence of seasonal factors in Lithuanian GDP dynamics, and the relative lack of seasonality in Lithuanian money growth means that the raw monetization data will exhibit seasonal patterns which need to be adjus-

ted before the series can serve as a tool for measuring public confidence in the exchange rate regime.

Dynamics

GDP in Lithuania experienced an extremely sharp drop in 1993 (see Table 7.3). The very low base and the financial stabilization closely following the introduction of a CBA led to the opportunity for the Lithuanian economy to register growth immediately after the institutional change, in a way similar to which the Bulgarian economy started a recovery simultaneously with the introduction of a CBA three years later.

Economic growth was not only positive, but accelerating between 1994 and 1997, which was later decreased, and was negative in 1999. At the same time, monetization was falling substantially until 1997, but then was rising faster than output in the following three years. Overall, even though for the whole period the unit elasticity of money demand with respect to output assumption can be maintained, the Lithuanian data exhibit significant differences in individual years.

7.4. Evolution of Monetization in Lithuania

The data on monetization for Lithuania come from the Bank of Lithuania for the monetary aggregate, and from the

Figure 7.1. Lithuania 1994–1999: Quarterly Real GDP Index (in 1995 litas)
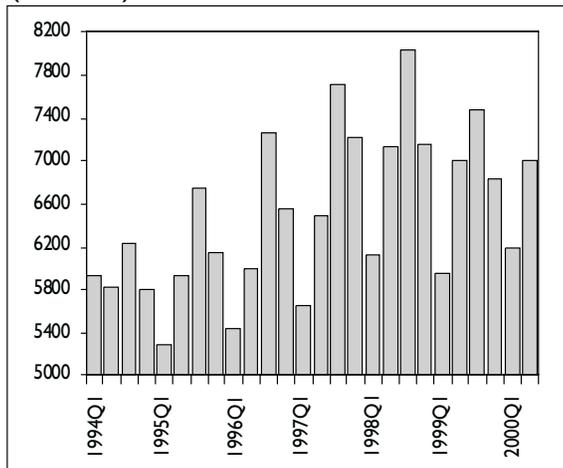
Source: Lithuanian Department of Statistics

Figure 7.2. Lithuania 1993–1999: Change in Nominal Broad Money Compared to Previous Quarter (in percent)
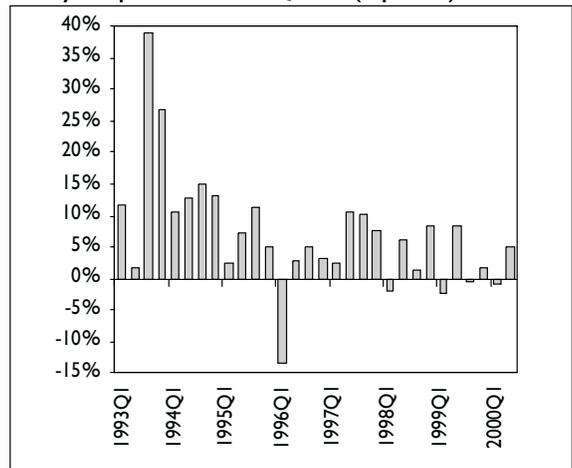
Source: Bank of Lithuania

Table 7.2. Lithuania 1993–1999: Real GDP and Monetization Annual Growth Rates (%)

Year	1993	1994	1995	1996	1997	1998	1999
Real GDP growth	-30.4	1.0	3.0	4.7	7.3	5.1	-4.2
Growth in monetization		-1.7	-13.6	-23.5	9.4	10.4	10.8

Source: Bank of Lithuania, Lithuanian Department of Statistics, own calculations

Lithuanian Department of Statistics for quarterly nominal GDP. The value of the monetary aggregate at the end of each quarter was divided into the value of GDP, and the resulting series was seasonally adjusted using Eviews, ratio to moving average – multiplicative procedure. The adjusted series representing the level of monetization in Lithuania is shown on Figure 7.3.

Figure 7.3 indicates that monetization in Lithuania was very low throughout the period of observation, remaining in the range between 15 and 25 percent. Initially, it increased in the first three quarters of 1994, reflecting a recovery from a deep economic crisis and a period of very high inflation after which it was decreasing together with the constant gap between money growth and nominal GDP growth. From 1997 onwards, monetization has been constantly and slowly increasing, but by the second quarter of 2000 it was still lower than the historical maximum, and remains low by international standards for a country of Lithuania's size and income level. This has affected the parameters assumed in the calculation of the confidence indicator.

7.5. Central Bank Foreign Exchange Reserves

Lithuania started its independent monetary policy with very low level of international reserves, but by the time of introduction of the CBA they were high enough to sustain the arrangement. As a result of the commitment of the monetary authorities to the regime as well as due to reasonable fiscal position and economic growth, the reserves have grown constantly and substantially. Consequently, by the end of the period under observation they are at high levels, even after the drop caused by the balance of payments deficit following the Russian crisis and the resulting worsening of the external environment. The main reason for the growth in reserves, shown in Figure 7.4, is the influx of foreign investment.

7.6. The "Theta" Indicator

The computation of the θ indicator for Lithuania requires calibration of the parameters derived in the theoretical framework adopted here, and a specification of the relevant data series.

Calibration of the parameters of the money demand relationship

Calibration involves assigning values to the parameter α, which represents the potential maximal level of monetization for the respective economy, and the parameter β, which represents the elasticity of money demand with respect to expected depreciation.

The potential level of monetization for Lithuania is taken to be 0.40. The reason for this choice is not so much the history of actual monetization, which has been lower, but the necessity to have a more realistic value for the elasticity parameter β. It has been assumed to correspond to a drop in monetization to one-tenth of its previous level if there is a certain future depreciation by 50%.

Time series

The first time series, necessary for the calculation of the confidence indicator θ, is the already derived level of monetization. The second series is potential depreciation,

Figure 7.3. Lithuania 1994–1999: Monetization, Share of Broad Money in GDP, Annualized, Seasonally Adjusted
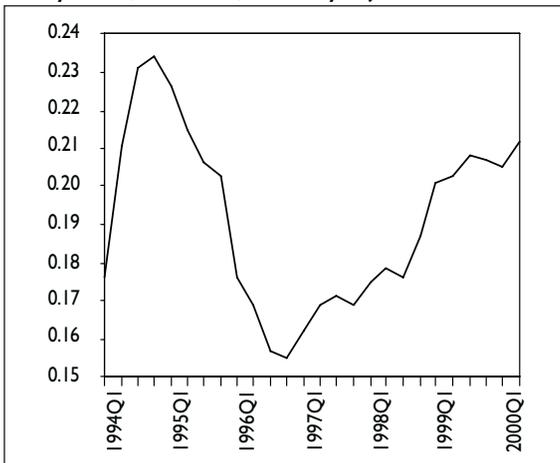
Source: Bank of Lithuania, Lithuanian Department of Statistics, own calculations

Figure 7.4. Lithuania 1993–1999: International Reserves (in USD million)
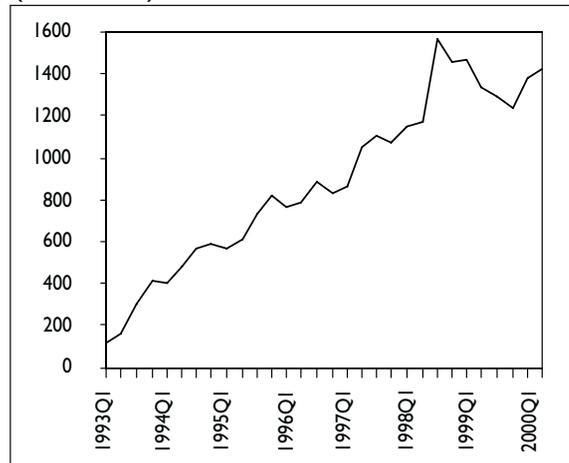
Source: Bank of Lithuania

which, as in other cases, is taken to be equal to the depreciation necessary to reach the real exchange rate of the initial period, so that the series corresponds to a purchasing power parity series. This series is shown in Figure 7.5. After the fall in Lithuanian inflation since 1998, the series is relatively constant, reflecting the parity between the lit and the US dollar.

The third necessary series is the announced policy goal with respect to the dynamic of the exchange rate, which in the case of Lithuania under a currency board is 0 for all periods.

The θ indicator series

The results of the calibration of the Lithuanian indicator of the level of public confidence in the exchange rate regime are presented on Figure 7.6.

The series reflects the fact that the Lithuanian monetary authorities abide by the CBA rules, and are limited in their ability to devalue the currency. Thus, after recovering from very low levels from the period when the currency was not yet established, and the economy was experiencing severe problems, the confidence level has been steadily growing towards very high values. As in the case of Estonia, the CBA is probably the best explanation of this performance of the confidence indicator.

An interesting observation for the case of Lithuania is the fact that the dynamic of the confidence indicator (Figure 7.6) is different from the dynamic of the monetization series (Figure 7.3). More precisely, the fall in monetization in 1995–1996 did not result in a drop of the θ indicator. Also, as in the case of Estonia, the Lithuanian θ indicator does not seem to respond in a visible way to the Russian crisis, even though the effect of this crisis on the macroeconomic performance of Lithuania is visible and significant. Again, this ability to draw confidence even when other indicators move in unfavorable direction, can be attributed to the institutionalization of the exchange rate peg under a CBA.

7.7. Public Finances and Credibility

One of the consequences of adopting a CBA is that fiscal discipline increases. Similarly to Estonia, Lithuania has followed reasonable fiscal policies even before the introduction of a CBA, and has not been burdened by a high foreign debt – see Tables 7.3 and 7.4.

Figure 7.5. Lithuania 1994–1999: Devaluation Potential
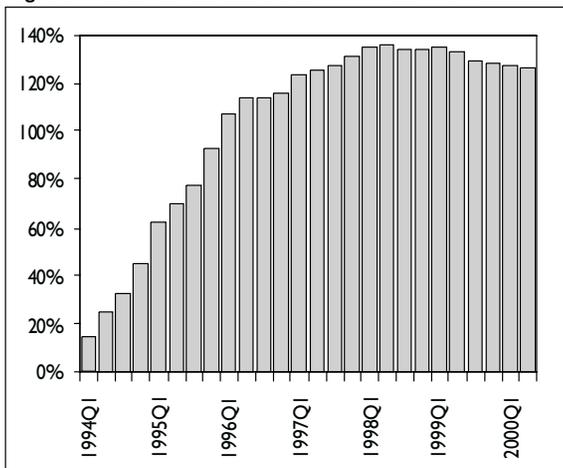
Source: Bank of Lithuania, US Bureau of Labor Statistics, own calculations

Figure 7.6. Lithuania 1994–1999: the "θ" Indicator of Credibility of the Exchange Rate Regime
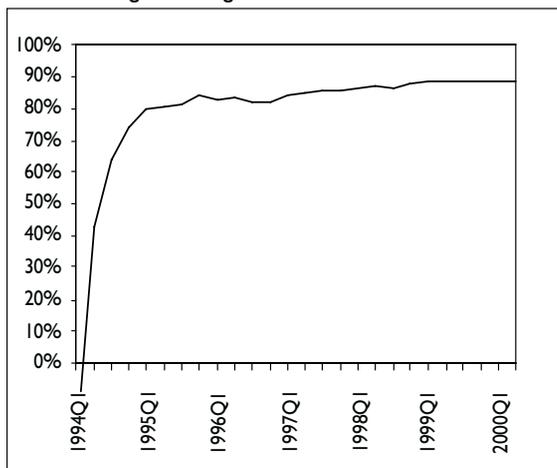
Source: own calculations

Table 7.3. Lithuania 1993–1999: Budget Deficits (in % of GDP)

Year	1993	1994	1995	1996	1997	1998	1999
Budget deficit (actual)	0.8	-1.8	-1.8	-2.5	-1.0	-1.3	-0.3

Source: Bank for International Settlements – Basle

Table 7.4. Lithuania 1995–1999: Government Foreign Debt (in % of GDP)

Year	1995	1996	1997	1998	1999
Gross foreign debt	13.9	15.2	14.6	15.0	22.8

Source: Bank of Lithuania, Lithuanian Department of Statistics, own calculations

Throughout the observation period, budget deficits in Lithuania have existed, but have been small and manageable. Also, even though foreign debt has grown as a percentage of GDP, the proportion remains low and does not indicate any difficulties for its servicing.

Reflecting the fiscal prudence and the strict rule of the monetary policy, interest rates in Lithuania have converged relatively slowly to low levels – see Figure 7.7.

As opposed to the Estonian economy, the Lithuanian economy has not responded to the shock of the Russian crisis through a sharp increases in interbank interest rates. Obviously, adjustment took another form, which is also obvious from the fact that the real GDP drop in Lithuania in the year following the crisis was more severe than in Estonia. This means that the Lithuanian economy preserves some rigidities, which make adjustment more pronounced in the real sector than on the money market.

The Lithuanian balance of payments, presented in Table 7.5, shows that the Lithuanian growth path is defined by the ability of the country to attract foreign investment. The large current account deficits have been more than covered by the influx of foreign investments. This influx has allowed the Lithuanian economy to increase its productive capacity, its productivity, and from there to preserve its external balances despite the real appreciation of the currency.

A peculiar feature of the Lithuanian public behavior is the dollarization of deposits, shown on Figure 7.8. Dollarization actually decreased together with the drop in monetization, and then increased with the rise in monetization and with economic growth. As opposed to the case of Bulgaria, the level of dollarization of deposits does not seem to be related to the level of confidence in the exchange rate regime. One reason for this is that when the currency is pegged to the dollar, and when there is domestic inflation causing higher domestic interest rates, the opportunity cost for holding dollar deposits increase, and then decreases as domestic inflation and interest rates fall.

7.8. Conclusions

After achieving its independence, Lithuania introduced a CBA as a means of achieving credibility of its monetary po-

Table 7.5. Lithuania 1993–1999: Balance of Payments items (USD mln)

Year	1993	1994	1995	1996	1997	1998	1999
Current account	-85.7	-94.0	-614.4	-722.6	-981.4	-1298.1	-1194.1
Capital account		12.9	-39.0	5.5	4.1	-1.7	-3.3
Financial account, of which:	17.4	124.5	365.7	662.7	779.6	1014.9	1239.8
Direct investments	207.22	334.9	645.0	875.2	1256.0	1452.2	1237.1
Portfolio investments	0.6	4.6	86.7	214.6	180.6	-42.7	507.5
Reserves*	-284.2	-183.8	-231.8	-15.3	-237.8	-399.0	195.7
Errors, omissions	68.36	-43.42	287.7	54.5	197.7	285.0	-42.4

Source: Bank for International Settlements – Basle

*Note: a negative value for "Reserves" indicates and increase in reserves.

Figure 7.7. Lithuania 1995–1999: Interbank Money Market Interest Rate, in percent annually
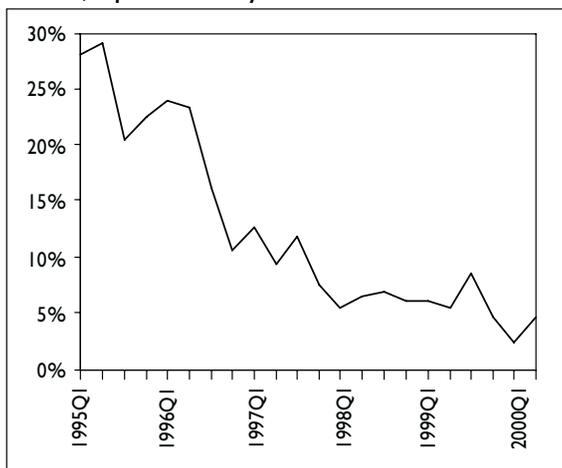
Source: Bank of Lithuania

Figure 7.8. Lithuania 1995–1999: Dollarization of Deposits (in percent)
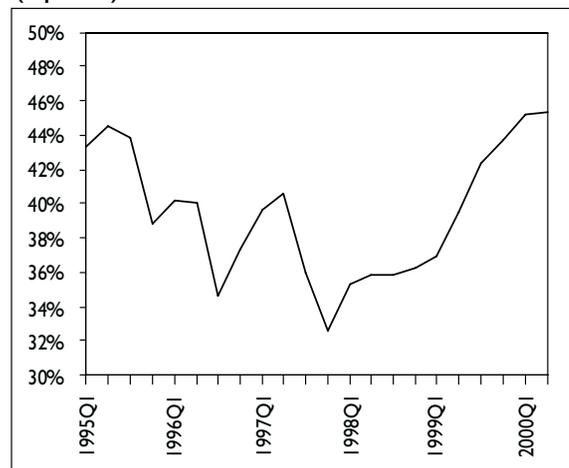
Source: Bank of Lithuania

licy and of building confidence in its new currency. The reforms of the economy, and the demonstrated ability to record economic growth have made Lithuania an attractive place for foreign investment, and as a result the country has been able to maintain the fixed exchange rate, and to enjoy a growth in the level of public confidence in the exchange rate regime.

The case of Lithuania can be characterized with the following observations:

– After the severe crisis at the start of transition, Lithuania has been able to register significant progress in reforms, and in economic growth, a part of which can be attributed to the following of a simple CBA monetary rule.

– Economic policies have been sustainable, but the data indicate that some rigidities may exist which make real adjustment to external shocks more pronounced.

– The Lithuanian θ indicator does not follow monetization dynamics as close as in other countries studied, but is closely related to the ability of the country to attract foreign investment and to increase its international reserves.

Part 8
Credibility of the Exchange Rate Policy in Latvia

8.1. The Policy of the Bank of Latvia

The Bank of Latvia was restored as an independent entity in 1990, and later assumed the functions of a Latvian central bank in the wake of the dissolution of the former USSR. In 1992 Latvia separated itself from the Russian ruble zone, and introduced the Latvian ruble as a national currency. This currency was completely separated from the Russian ruble later as the only legal tender in the same year, and a year later a new national currency, the Latvian lat, was intro-

8.2. Inflation, Exchange Rates, and Broad Money

The inherited output drop and inflation from the USSR preserved their influence over the Latvian economy in 1993. However, the start of the exchange rate based stabilization program saw rapid disinflation and a beginning of growth in the real sector. The relative price stabilization and the exchange rate peg that followed has meant a stable nominal exchange rate, as can be seen in Table 8.1.

Table 8.1. Latvia 1993–1999: Inflation, USD Exchange Rate, Real Exchange Rate, Money (% change)

Year	1993	1994	1995	1996	1997	1998	1999
inflation	109.2	35.9	25.0	17.6	8.4	4.7	2.4
LVL/USD		-17.3	-5.7	4.4	5.4	1.7	-1.0
real eff. exch. rate		53.0	17.2	13.2	12.4	3.9	5.8
broad money		47.4	-23.1	19.9	38.7	5.9	8.0

Source: Bank of Latvia, Bank for International Settlements – Basle

duced as a means for the country to implement independent economic policy.

In 1993 Latvia started a stabilization program anchored by the exchange rate, and in February 1994 an explicit peg of the Latvian lat to the SDR basket of currencies was introduced at a level of 1 SDR = 0.8 lats. This rule has been followed since, and the Latvian monetary policy has been dominated by the fixed exchange rate regime. An interesting feature of the Latvian policy is the peg to a basket of currencies, and the fact that it is not institutionalized in a currency board arrangement as in the other two ex-Soviet Baltic republics. This gives ground to expect that due to the lack of a tangible anchor currency, and due to the possibility of surprisingly reneging the policy, the overall level of confidence in the exchange rate regime in Latvia may be lower than in Estonia and Lithuania.

An important observation regarding the success of the Latvian stabilization approach is the fact that inflation in Latvia after the beginning of stabilization has been lower than in Estonia and Lithuania (who have adopted a much more rigid currency board arrangement as a policy rule) in every year between 1994 and 1999 except for inflation in Lithuania in 1999. This means that with its commitment to a fixed exchange rate, the Latvian monetary authority, the Bank of Latvia, has been able to curb down inflation very successfully.

However, since inflation was still high with respect to the SDR currency countries, the Latvian lat experienced real appreciation, which may be considered by the public as an implicit threat to the Bank of Latvia's commitment to the peg. Another important feature of the Latvian macroeconomic dynamics is the fact that broad money growth is persistently higher than inflation, except for 1995 when the country experienced a significant banking crisis. This fact may increase and

confirm the perception that the fixed rate may become unsustainable in the future, although it may reflect a normal re-monetization after the crises of the early 1990s.

8.3. Output Dynamics vs Broad Money Changes

Seasonality

The seasonal pattern of the Latvian GDP is easy to spot, and not very complicated – see Figure 8.1. Its most important feature is a weak first quarter and approximately equal other three quarters – the only exception is the last quarter of 1998, when the Latvian economy reacted to the Russian crisis.

This pattern suggests that other than a correction for the first quarter, the GDP dynamics may not introduce any seasonality into the level of monetization in Latvia.

Likewise, the seasonal pattern in broad money growth, shown on Figure 8.2, does not indicate a strong seasonality. This observation leads to the expectation that the monetization obtained by the simple ratio of broad money to GDP may not exhibit strong seasonal patterns.

Dynamics

Output dynamics in Latvia followed the pattern typical for a transition country – sharp recession followed by slow resumption of growth (Table 8.2). After a somewhat slow stabilization of output in 1994 and 1995, Latvian GDP grew robustly in 1996–1998, and registered growth even in 1999, which was the year following the Russian crisis and in which the other two Baltic countries recorded recessions.

Except for 1995, when the banking crisis in Latvia [8] affected the creation of money and led to a severe drop in monetization, the level of monetization has had a similar dynamic to the level of output, and the assumption of a unit elasticity of the demand for money with respect to output can be realistically maintained.

8.4. Evolution of Monetization in Latvia

The data for the level of monetization in Latvia come from the Bank of Latvia for both the monetary aggregate and the nominal quarterly GDP. Seasonal adjustment was performed, using the EViews ratio to moving average

Figure 8.1. Latvia 1994–1999: Quarterly Real GDP Index (in 1993 lats)

Source: Bank of Latvia

Figure 8.2. Latvia 1995–1999: Change in Nominal Broad Money Compared to Previous Quarter (in percent)
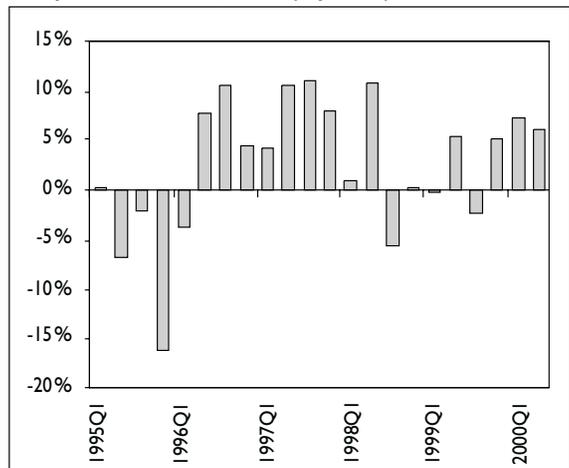
Source: Bank of Latvia

Table 8.2. Latvia 1993–1999: Real GDP and Monetization Annual Growth Rates (%)

Year	1993	1994	1995	1996	1997	1998	1999
Real GDP growth	-14.9	0.6	-0.8	3.3	8.6	3.9	0.1
Growth in monetization		-8.5	-29.5	-0.7	20.2	-2.4	6.0

Source: Bank of Latvia, own calculations

[8] The banking crisis was caused mainly by bad lending practices of banks which were not sanctioned in time by the Bank of Latvia and the depositors. The results of the crisis were a worsening of the credit conditions and the revoking of 15 bank licenses during the year. See Bank of Latvia Annual Report for 1995.

mulitplicative procedure, to smooth possible seasonalities due to the particular dynamic of GDP in the first quarter of every year. The resulting series is shown on Figure 8.3.

Closely following the dynamic of the monetary aggregate and its nominal growth, monetization in Latvia fell sharply as a result of the banking crisis and the restrictions to crediting in 1995. Afterwards, it began a recovery which, however, has not resulted in levels of monetization as high as the ones achieved before the crisis. The overall level of monetization in Latvia is somewhat lower than its size and income per capita would suggest in light of international standards.

8.5. Central Bank Foreign Exchange Reserves

The international reserves of the Bank of Latvia have grown (Figure 8.4) as a result of the ability of the economy to generate growth and of the continuing market reforms, which has raised the level of confidence in the economy and has contributed to favorable external flows. It should be noted, however, that the overall increase in international reserves in Latvia from around USD 400 million to around USD 900 million during the period under observation is smaller in scale (in per capita terms) than in all the currency board countries in transition. On the one side, this fact confirms the hypothesis that institutionalization of the exchange rate peg brings in higher reserves due to higher credibility. On the other side, it may mean that the public in Latvia may remain more cautious in its expectations about the success of

the fixed exchange rate regime than if the regime was institutionalized more formally.

8.6. The "Theta" Indicator

The computation of the θ indicator for Latvia according to the theoretical framework adopted here requires calibration of parameters and specification of the relevant data series.

Calibration of the parameters of the money demand relationship

Calibration involves assigning values to the parameter α, which represents the potential maximal level of monetization for the respective economy, and the parameter β, which represents the elasticity of money demand with respect to expected depreciation. For the case of Latvia, α is assumed to be 0.40, reflecting a level which is a little higher than historically achieved levels of monetization, and corresponds to a level of monetization which Latvia may reach in the medium term. The parameter β is assumed to have a value which corresponds to a drop in the level of monetization to one-tenth of its previous level if a perfectly credible 50% depreciation is announced.

Time series

The seasonally adjusted time series for the level of monetization was derived using monetary aggregate and nominal GDP data in the manner already described. Potential depreciation, which is the series describing the depreciation scenario entering the economic agents' expectation forma-

Figure 8.3. Latvia 1995–1999: Monetization, Share of Broad Money in GDP, annualized, seasonally adjusted
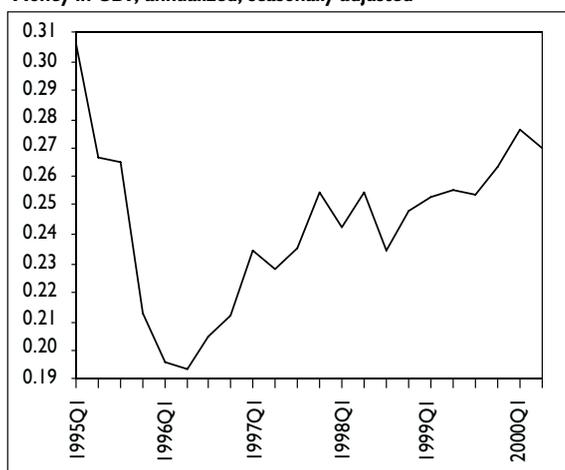
Source: Bank of Latvia, own calculations

Figure 8.4. Latvia 1995–1999: International Reserves (in USD million)
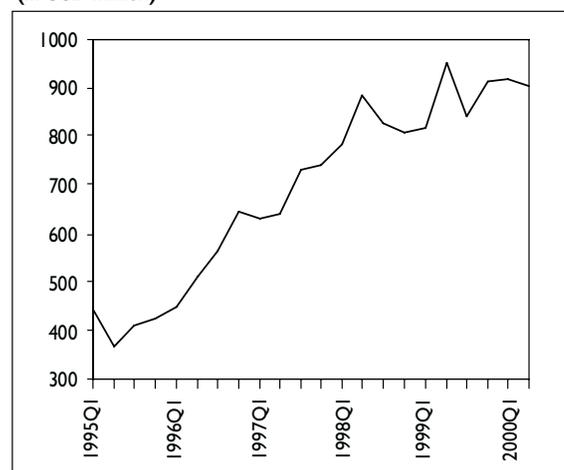
Source: Bank of Latvia

tion, is provided by the adopted method. It is equal to the depreciation necessary to restore the real exchange rate from the base period (the first period of observation), and is obtained by a calculation of a purchasing power parity variable. This variable is shown on Figure 8.5.

The most interesting fact about the potential depreciation series for Latvia is the relatively low level of potential depreciation, which is related to the relatively good inflation performance in Latvia and the relatively low real appreciation.

The third series reflects the announced policy scenario, which in the case of Latvia is a 0 percent depreciation explicitly announced by the Bank of Latvia.

The θ indicator series

The result of the calibration of the θ indicator for Latvia is shown on figure 8.6.

The first impression from the calculated confidence level of the public in the exchange rate regime in Latvia is that it is quite constant throughout the observation period, with a slight upward tendency after 1996. Confidence remains significantly lower and increases in a much less pronounced manner in Latvia than in the currency board Baltic countries, even though the inflation and growth performance of the Latvian economy has been similar or even better.

The de-monetization and the banking crisis of 1995 did lead to a decrease in confidence, but it recovered relatively quickly, and was affected only marginally by the Russian crisis in the third quarter of 1998. Thus in the case of Latvia the relatively low levels of monetization according to international standards do result in relatively low levels of the θ indicator, which is not the case for the other two Baltic countries in transition having similar levels of monetization, but operating under a currency board. It seems that the currency board Baltic countries enjoy a higher level of confidence in the exchange rate regime than Latvia, which is following only an explicit peg.

In the case of Latvia, the confidence indicator approximately follows the dynamics of monetization, with confidence recovering somewhat more robustly than the level of monetization. This can be explained with the fact that the banking crisis of 1995 affected the ability of the Latvian financial sector to monetize the economy more than it affected the confidence of the public in the announced exchange rate peg. Also, confidence may be boosted by factors other than money growth, such as the relatively stable output performance and the continuing market reforms, which are reflected in lower inflation and lower real appreciation.

8.7. Public Finances and Credibility

The confidence of the public in the exchange rate regime followed by the Bank of Latvia is receiving substantial backing by the reasonable fiscal and debt position of the Latvian government, which has maintained relatively low deficits during the period of observation – see Tables 8.3 and 8.4.

On one hand, on two occasions (in 1995 and 1999) Latvia accepted somewhat high budget deficits, which may be seen as a threat to the exchange rate peg, but on the other hand government foreign debt has been very low and stable as a proportion of GDP. In 1999, though, Latvia experienced both a relatively high budget deficit, and an increase in the government foreign debt to GDP ratio by 3.7 percentage points. This, combined with the observation that the gradual decrease in interbank interest rates (Figure 8.7) was not interrupted by a strong interest rate adjustment to the Asian and Russian crises (an increase of 3 to 5 percentage points in both cases) indicates that the adjustment to

Figure 8.5. Latvia 1995–1999: Devaluation Potential
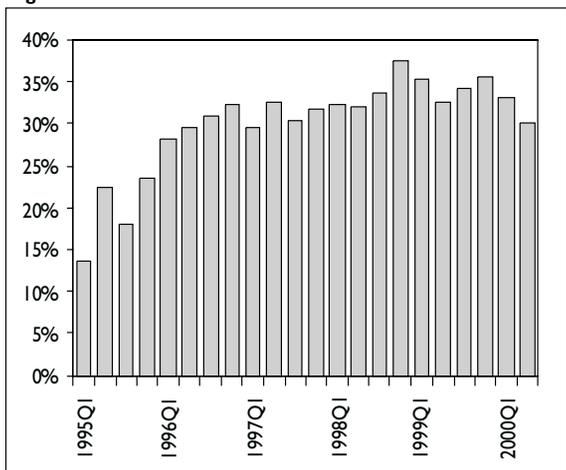
Source: Bank of Latvia, US Bureau of Labor Statistics, own calculations

Figure 8.6. Latvia 1995–1999: the "θ" Indicator of Credibility of the Exchange Rate Regime
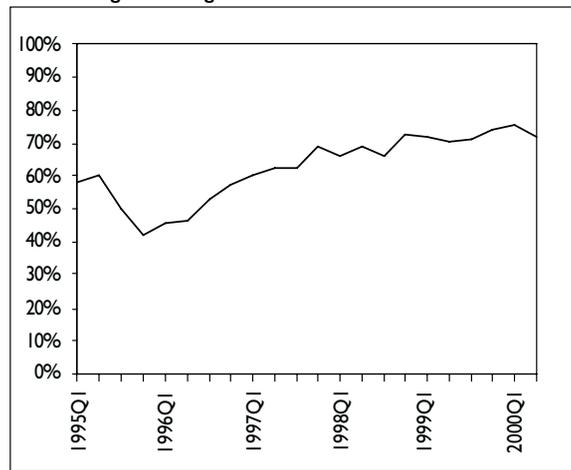
Source: own calculations

Table 8.3. Latvia 1993–1999: Budget Deficits (in % of GDP)

Year	1993	1994	1995	1996	1997	1998	1999
Budget deficit (actual)	-0.2	-1.9	-3.8	-0.8	1.2	0.2	-3.1

Source: Bank for International Settlements – Basle

Table 8.4. Latvia 1993–1999: Government Foreign Debt (in % of GDP)

Year	1993	1994	1995	1996	1997	1998	1999
Gov. foreign debt	9.5	9.7	9.8	8.0	6.8	6.1	9.8

Source: Bank of Latvia, own calculations

the shock in Latvia was through the budget. In this manner the budget deficit and the increase in government foreign debt may be seen as legitimate policy outcomes.

Lastly, the level of dollarization of deposits in Latvia (Figure 8.8) follows closely the dynamics of monetization, and of the θ indicator. The public responded to the banking crisis of 1995 by gradually increasing the proportion of dollar denominated deposits, and then as confidence returned and the policies gained credibility the level of dollarization gradually fell.

8.8. Conclusions

The approach of Latvia towards its monetary and exchange rate policy after the country achieved independence was to set up an exchange rate based stabilization program, and to maintain the explicitly announced peg after growth resumed. Due to the good inflation performance, the recorded growth as well as the progress in market reforms, the country has been able to sustain the fixed exchange rate regime.

The case of Latvia can be characterized with the following observations:

– Besides the initial transition recession, Latvia experienced a severe banking crisis in 1995, which delayed the resumption of economic growth. However, the successful stabilization anchored in a fixed exchange rate regime has led to growth and enabled the country to adjust relatively well to external shocks such as the Russian crisis.

– The economic policies of the Latvian government have been sustainable. But the adjustment to the Russian crisis, done through the budget may indicate a tendency to accept fiscal deficits, which may endanger the sustainability.

– The θ indicator for Latvia follows closely the dynamics of monetization and the increase in international reserves. Its overall lower level than in the other two Baltic countries in transition suggests, that the institutionalization of the fixed exchange rate regime in a currency board arrangement may lead to higher confidence even when the general performance of the respective economies is similar.

Figure 8.7. Latvia 1995–1999: Interbank Money Market Interest Rate (in percent annually)

Source: Bank of Latvia

Figure 8.8. Latvia 1995–1999: Dollarization of Deposits (in percent)

Source: Bank of Latvia

Part 9
Credibility of the Exchange Rate Policy in Moldova

9.1. The Policy of the National Bank of Moldova

A two tier banking system, with a separate Central Bank, had been established in Moldova already in 1991. However, until 1993 Moldova belonged to the rouble zone and suffered from its chaos and very high inflation (1670% in 1992 and 2706% in 1993). The National Bank of Moldova (NBM) started issuing Moldovan coupons in 1992. Initially they were equivalent of roubles and circulated in parallel. Only since August 1993 Moldovan rouble coupons started to be quoted independently and soon afterwards Moldovan Interbank Currency Exchange was founded. Starting in the second half of 1993 a stabilization program was implemented, with the support of the Standby Arrangement with the IMF. In the framework of the program, on November 29, 1993 Moldova introduced the national currency: the Moldovan leu.

The National Bank of Moldova never explicitly announced any exchange rate peg. However, the policy of stabilizing the exchange rate (which, in conditions of a deep current account deficit means mainly intervening in support of the leu) was both announced and, as long as the situation allowed it, conducted. The 1997 Annual Report of the National Bank of Moldova states this clearly:

"The main objective of the National Bank of Moldova is the maintenance of the national currency stability. This objective can be achieved through the implementation of a severe monetary and credit policy and through the implementation of a foreign exchange policy that corresponds to the situation of the market of the Republic of Moldova. *In the condition of deterioration of external balance of payments* and absence of a durable economic growth, *the stability of the Moldovan Leu exchange rate is one of the main pillars* that contribute to the stability of the national currency and attraction of foreign investments." (our italics) [9].

Reserves of the NBM, used up for the support of the exchange rate were being repleted by subsequent tranches of the IMF loans. The figure below presents NBM net purchases of foreign currency on the interbank market (negative for most of the period), which were executed in pursue of the goal of exchange rate stability.

We are stressing the above circumstances with two goals in mind. First, to defend the analysis of the credibility of the Moldovan Central Bank in the context of the fixed exchange rate model, although officially the exchange rate regime was classified as a managed float. Second, to justify the appropriateness of another assumption of the model: namely that money supply is fully determined by the demand, i.e. by the willingness of people to hold domestic currency. As long as the Central Bank had access to financing from the IMF it could defend the currency on the forex

Figure 9.1. NBM Net Purchases of Foreign Currency on the Chisinau Interbank Currency Exchange (USD million)

Source: National Bank of Moldova
Note: The NBM has been a net purchaser of USD in 1999, but the exact data for this period is missing.

[9] National Bank of Moldova, 1997 Annual Report, NBM Internet site: http://www.bnm.org

market. At the same time nothing prevented (at least technically) money creation, so current account deficits did not have to lead ultimately (and in fact they did not) to shrinking of domestic monetary base, although immediately, in the moment of intervention, the Central Bank was removing lei from circulation.

9.2. Inflation, Exchange Rates and Broad Money

Basic macroeconomic indicators, interpreted in the context of the theoretical model presented in chapter 2, suggest some intuitions about the credibility of the Central Bank policy. Table 9.2 presents inflation, nominal exchange rate and two measures of the real exchange rate.

The policy of a stable exchange rate was applied successfully since 1994 until the crisis in 1998. The currency peg was not announced and, as can be seen in the table above, in fact, in 1994 a 17% devaluation was tolerated. However, in the context of the fast inflation rate (above 100%) the exchange rate was "almost" stable.

The data suggest that assumption in our model, which treats money supply as endogenous, and largely determined by the demand, is appropriate. Two significant episodes of disconnection between the broad money and inflation can be observed: in 1995 and in 1998. In 1995 inflation fell significantly in comparison with the previous year, while the exchange rate was stable. Fast money growth in the same period seems to be induced by the increased demand, which could be plausibly related to the perceived credibility of the Central Bank policy. In 1998 broad money was shrinking while the exchange rate proved impossible to defend, and inflation increased.

In light of the consistently applied policy of maintaining the exchange rate almost fixed, the initial disinflation success was rather moderate, inflation was more than 100% per annum during the first year of a "stable" exchange rate regime. As a result, the real exchange rate appreciated strongly. This poor record can be ascribed to low initial credibility of the stabilization policies, although, as mentioned in the discussion of the model, other forces

can be at work here, such as big changes in the relative prices structure or some initial real exchange rate misalignment (although deep current account deficits in that period do not suggest an undervaluation).

Independent movements of inflation and monetary aggregates suggest that the dynamics of monetization was interesting. Since this is the key parameter in our analysis, we discuss it in more detail. First, we turn to output dynamics, which is connected with the monetization figures and thus influences our analysis of policy credibility.

9.3. Output Dynamics vs Broad Money Changes

Seasonality

Moldova is an agricultural economy. Agriculture constitutes around 25% of GDP and exerts an enormous influence on the dynamics of quarterly output figures, as it generates demand and supplies inputs to other sectors.

This output dynamics cannot be indifferent to monetary phenomena. Inspection of quarterly changes in monetary aggregates confirms this. As in most countries, money sup-

Figure 9.2. Quarterly GDP in 1995 Prices
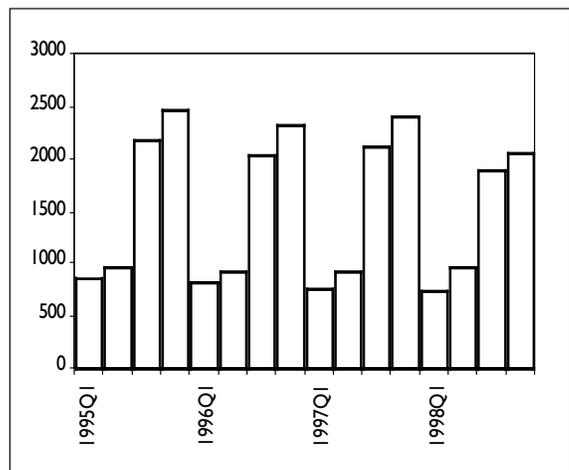
Source: Moldovan Economic Trends

Table 9.1. Moldova 1993–1998: Inflation, USD Exchange Rate, Real Exchange Rates, M2 (% change)

Year	1993	1994	1995	1996	1997	1998
Inflation	2706	105	24	15	11	18
MDL/USD	778	17	6	3	0	83
real exchange rate (MDL/USD)	211	70	14	8	9	-36
REER			-17	6	11	-12
M2	311	128	64	17	35	-22

Source: Moldovan Economic Trends

ply exhibits a significant degree of seasonality. M2 tends to decrease in the first quarter; its growth is strongest in the second and third quarters and slows down in the fourth quarter. The crisis year 1998 is a striking exception from this pattern.

Monetization figures (M2/GDP), which are important in our analysis, are influenced significantly by output seasonality. In these figures, the influence of fluctuations of monetary aggregates is completely dominated by large seasonal variations of output in the denominator. As a result, monetization varies greatly from quarter to quarter. Since these changes are very regular and completely reversible, we do not believe that they convey significant information about evolution of money demand and credibility of monetary policy. In order to abstract from these seasonal effects and concentrate on the underlying trends in monetization, seasonally adjusted data on monetization are used further.

Medium Term Dynamics of the Real Output

Output performance in Moldova since independence has been very bad. Except for the year 1997, when a 1.6% real growth was noted, GDP was falling every year in the examined period. The steepest fall was observed in 1994, when the real GDP shrank by more than 30%.

On average, the years of better output performance were also periods of the strongest monetization growth (the year 1993 is special, as the country was only emerging from high inflation). However, in general the Moldovan case

seems to suggest that bad output performance does not prevent some monetization growth, at least in the medium term.

Inspection of co-movements of money and GDP seems not to undermine the assumption about unit elasticity of money demand with respect to real output made in our analyses. In the quarterly frequency, it is obvious from the figures that variations of money are much weaker in percentage terms than variations in output. In annual data, monetization figures vary much more. The association between money and output is irregular and more likely to be explained convincingly by influence of third party factors, especially the economic policies conducted.

9.4. Evolution of Monetization in Moldova

Monetization of Moldovan economy has followed a typical pattern: unsustainably high in the period of a fast money supply growth, reduced sharply in the moment of stabilization and gradually growing afterwards. In 1997 Moldova reached the level of monetization of about 20% of GDP, which did not differ significantly from many other low-income countries. However, stabilization proved to be fragile and after a peak in the late 1997 monetization started to decrease again. By mid-1999, when the effect of the regional crisis could already be

Table 9.2. Real GDP Growth and Changes in Monetization, annually, in % w.r.t. the previous year

Year	1993	1994	1995	1996	1997	1998
Real GDP Growth	-1.2	-30.9	-1.4	-7.8	1.6	-8.6
Change of monetization	-61.8	-12.2	19.8	-1.8	16.2	-23.8

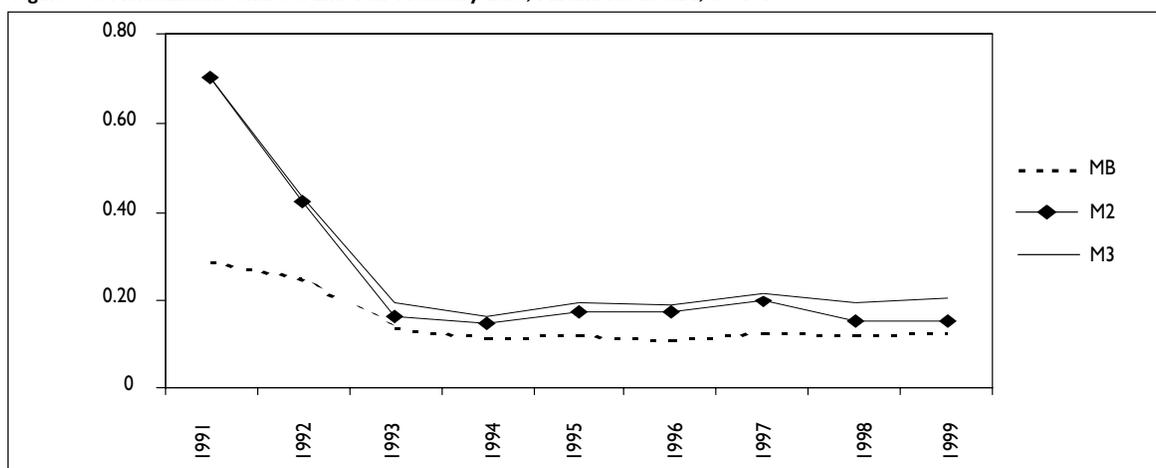Source: Moldovan Economic Trends, own calculation

Figure 9.3. Percentage Change of M2 in Comparison with the Previous Quarter
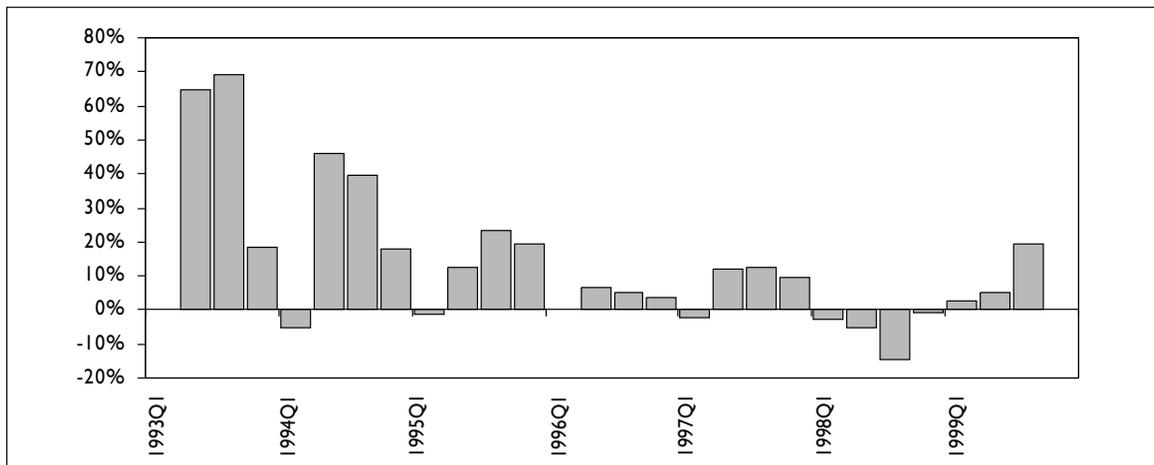
Source: Moldovan Economic Trends
Note: 1993Q1 data is missing

Figure 9.4. Monetization: Share of End Year Monetary Base, M2 and M3 in GDP, 1991–1999
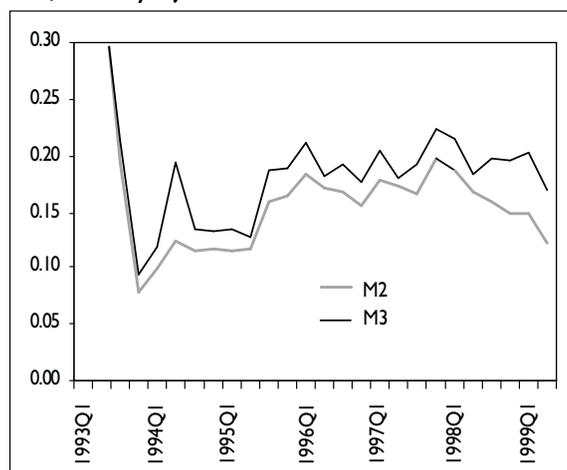

Source: MET, own calculations

experienced strongly, Moldova was again close to countries with the lowest monetization by world standards.

In the period of fast monetary expansion prior to first stabilization attempts Moldova had a high but artificial and unsustainable level of monetization. This phenomenon has been observed in all transition economies. Money supply was growing so fast that growth of prices (and, as a result, of nominal GDP) did not fully catch up with it. Additionally, price adjustment to money supply was distorted by administrative regulations. The increasing rate of inflation (151% in 1991, 1670% in 1992 and 2706% in 1993) was a clear signal of the unsustainability of the situation.

In 1993 monetary expansion slowed down for the first time (from 348% M2 growth in 1992 to 263% growth in 1993). This enabled prices to finally reflect all the past

Figure 9.5. Monetization: Share of M2 and M3 in GDP, annualized, seasonally adjusted

Source: MET, own calculations

excessive money supply growth. As a result, inflation exceeded significantly the current money growth and thus real money balances were reduced (and so was money share in GDP). In 1994 inflation was already broadly in line with the monetary growth (105% inflation vs. 128% M2 growth), which means that the equilibrium between money supply and demand was more or less restored. The sustainable level of money supply, which corresponded to the demand, proved to be very low, less than 10% of GDP.

Between 1994 and 1997 a gradual growth of monetization has been observed. This means that the rate of inflation plus real GDP growth was slower than the rate of money supply growth. Part of the monetary expansion was accepted by the economy without inducing price increases. Seasonally adjusted data show the fastest remonetization in the second half of 1995 and the beginning of 1996. Then the trend became less clear, with minor decreases and increases. In the end of 1997 the peak was reached.

The Russian crisis triggered a crisis in Moldovan economy in the second half of 1998. However, the reversal of the remonetization trend happened much earlier, already in the end of 1997 / beginning of 1998. It was a clear signal of some unfavorable structural change taking place and it provided an early warning. We interpret this trend reversal as a strong signal of a falling credibility of the policy of the Central Bank.

9.5. Central Bank Foreign Exchange Reserves

The level of foreign exchange reserves of the Central Bank are certainly an important factor of credibility of the exchange rate regime. In the beginning of the stabilization program they were low, a rapid growth started in the second half of 1995. In 1996 they were growing gradually. In 1997 the cooperation with

international financial institutions was suspended and no new credit tranches fulfilled the reserve stock. However, Moldova managed to attract significant portfolio investments (placed Eurobonds) and reserves reached a peak in the late 1997. Since the beginning of 1998 they were dropping at a fast rate.

9.6. The "Theta" Indicator

Below we apply the framework developed in the context of the theoretical model. We calculate the values of θ for each period. In order to do that we assign values to the parameters of the money demand function.

Calibration of the parameters of the money demand relationship

α – constant term was chosen so that in the situation of the credible exchange rate stability monetization increases to about 30% of GDP. This value is high in comparison with many other post soviet countries and less than average by international standards.

β – elasticity of the money demand with respect to the expected depreciation was chosen so, that in the situation of a certain 80% quarterly depreciation, monetization decreases to 7% of GDP. These values correspond to the extreme situation that was observed in the 1993, just before the stabilization.

The series

Qualitative characteristics of the resulting series of θ values do not depend crucially on parameter values in reasonable range. The series reflects the assumptions of the model:

– Growth of monetization is ascribed to the growth of public confidence in leu.

– When inflation slows down, the bandwagon expectations of devaluation abate. If, nevertheless, monetization does not growth correspondingly, this is ascribed to a weak credibility of the Central Bank

– When inflation accelerates, the risk that the exchange rate would become unstable increases. If, nevertheless, economic agents do not reduce their lei holdings, this is ascribed to the growth of public confidence in leu.

The time series of θ values calculated with all the above assumptions is plotted in the Figure 9.7.

The approach implied by our model allows to combine the information on monetization developments, inflation and real exchange rate, to draw inferences about credibility of the Central Bank policy (conditionally on the validity of the model assumptions). According to the calculated theta values, initially the performance of the stable exchange rate policy was mixed. Confidence was apparently bolstered most strongly in the second half of 1995, when inflation fell to very low values. The years 1996 and 1997 witnessed a stagnation of the monetization growth. The peak was reached in late 1997 and after this the credibility indicator plunges down.

The events that have taken place in Moldova since the early 1998, prior to the emergence of an open crisis are, in our opinion, closely connected with the issue of credibility. Below, we present the public finance stance and how it ultimately, at the end of the discussed period, undermined the credibility of the stable exchange rate policy.

9.7. Public Finances and Credibility
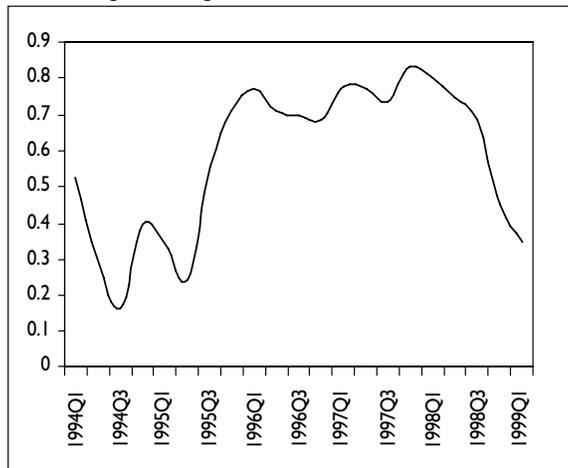
Data presented in Tables 9.3 and 9.4 leave no doubt that the unsustainable fiscal policy and explosion of public debt was leading straight to a collapse – a balance of payments

Figure 9.6. NBM International Reserves (mln of US dollars)
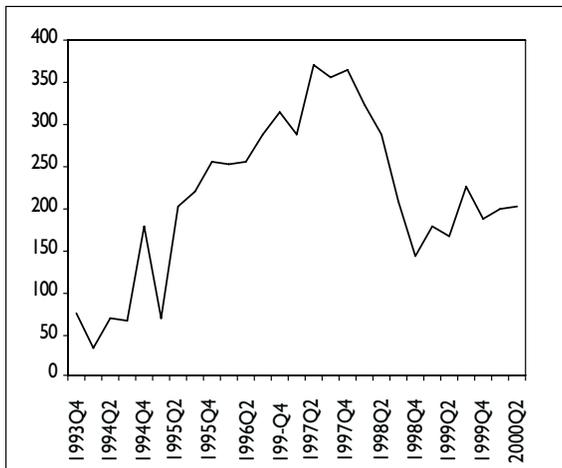
Source: NBM (website)

Figure 9.7. Moldova 1994–1999: the "θ" Indicator of Credibility of the Exchange Rate Regime

Source: own calculations

crisis. In 1996 and partly in 1997 conditions were favorable for raising capital on the world markets, which made it possible for Moldova to fall deep into the trap of indebtedness. In the middle of 1997 the Asian crisis began and the climate on financial markets changed, especially with respect to investing in emerging market economies. Radziwiłł et al. (1999) note the following facts that preceded the debt catastrophe:

– In mid–1997 the IMF stopped disbursing credits to Moldova, which was followed by the withholding of World Bank loans. After that Moldova could rely only on a much more expensive commercial capital. Budget deficit was financed with the help of the sale of Eurobonds.

– At the end of 1997 Moldova was forced to reschedule credits from Russia, totaling over $30 mln. In 1998 debt arrears amounted already to $50 mln and energy payment arrears to $103 mln. [IMF, 1999]

– The spread on Moldovan Eurobonds increased from 380 basic points to 800 at the end of 1997.

– Foreign participation on the T-bill market decreased from 38% to 22%.

– Interest rates on 3 month T-bills increased from 21% in 1997 Q3 to 31% in 1998 Q1 in spite of stable (only seasonally fluctuating) inflation.

Beginning in early 1998 Foreign Assets of the NBM, which had been growing since the start of the stabilization program, began to leak out. This was immediately accompanied by shrinking of domestic currency in circulation on the liability side of the Central Bank balance sheet.

Direct reasons of the shrinking of Foreign Reserves can be found in the Balance of Payments. In the beginning of 1998 the Current Account deficit increased and simultaneously the Capital and Financial Account deteriorated. An outflow of Portfolio investments, which had begun already in the last quarter of 1997, accelerated. The asset position under Other Investment, which shows mainly

non-repatriation of export receipts, increased [10] (with the minus sign in the B.o.P.). Part of the increase of the liabilities position reflects accumulation of arrears. All these phenomena are a clear signal of an undermined confidence in the stability of the Moldovan economy and, especially, in its currency.

Another signal of increasing expectations of depreciation was the growth of deposits' dollarization. Early 1998 witnessed a rapid and unprecedented growth of dollarization.

So, the credibility crisis: contraction of demand for Moldovan leu and outflow of capital, had begun already about 8 months before the Russian crisis. Its reasons were, therefore, mainly internal and were related to unsustainable public finances.

Figure 9.8. Interest Rates on 3-month T-bills (quarterly weighted average – % per annum)
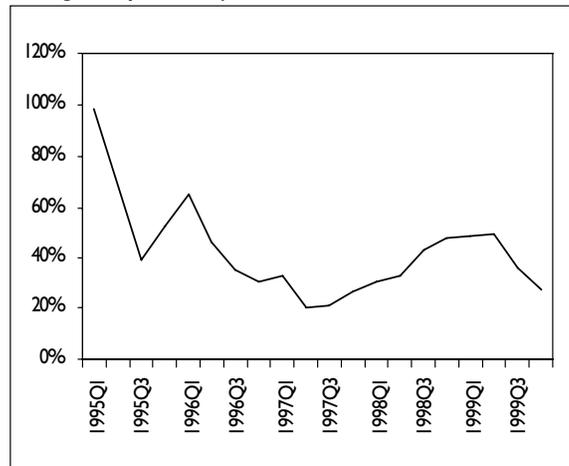
Source: MET, own calculations

Table 9.3. Moldova: Budget Deficits (in % of GDP)

	1993	1994	1995	1996	1997	1998	1999
Budget Deficit (cash)	-7.5	-5.9	-5.8	-9.7	-7.5	-3.4	-3.0
Budget Deficit (commitment)	-8.9	-8.2	-8.0	-14.3	-4.2	-9.0	-3.1

Source: MET, expenditure arrears – IMF

Table 9.4. Foreign and Domestic Debt 1993–1999

	1993	1994	1995	1996	1997	1998	1999
Foreign debt* USD mln	255	633	840	1070	1286	1390	1462
% GDP	21%	55%	58%	63%	66%	82%	129%
Internal debt MDL mln	105	270	477	737	971	1572	1910
% GDP	6%	6%	7%	9%	11%	17%	16%

Source: Ministry of Finance
*Including energy debt

[10] See: A comment on the Balance of Payments data for 1998 in the NBM internet site: http://www.bnm.org

Table 9.5. Moldova – Balance of Payments 1997–1999 (semiannually, $mln)

	97H1	97H2	98H1	98H2	99H1
Current account	**-148.6**	**-118.8**	**-182.3**	**-151.4**	**-14.5**
Capital and financial account	**155.0**	**101.5**	**179.3**	**127.1**	**35.1**
Capital account	-0.1	-0.1	0.0	1.5	115.5
Financial account	155.1	101.6	179.3	125.6	-80.4
Financial account (excluding change in Reserves)	**177.7**	**131.1**	**101.3**	**-19.0**	**-49.9**
Direct investments (net)	30.2	41.3	45.2	41.1	11.6
Portfolio investments (net)	236.2	0.4	-12.4	-42.4	-141.7
Other investments	-88.6	89.4	68.5	-17.7	80.2
assets (net)	0.5	0.2	-22.8	-26.3	-35.5
liabilities (net)	-89.1	89.2	91.3	8.6	115.7
Reserve assets (net)	**-22.7**	**-29.5**	**78.0**	**144.6**	**-30.4**
Errors and omissions	-6.3	17.3	3.0	24.3	-20.6

Source: National Bank of Moldova, http://www.bnm.org

Figure 9.9. Dollarization of Deposits (Share of Foreign Currency Deposits in Total Deposits – %)
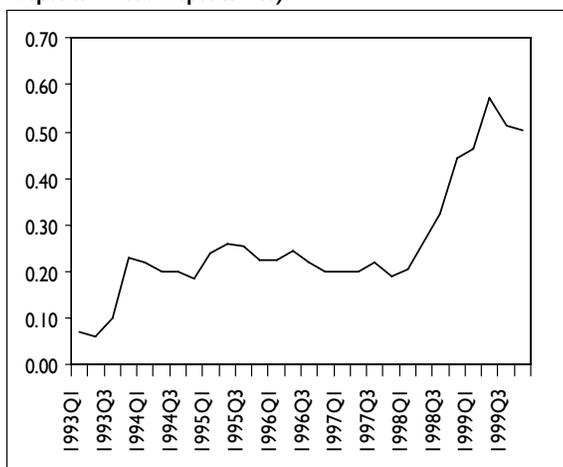
Source: MET, own calculations

9.9. Conclusions

Stabilization in Moldova can be labeled as moderately successful. In spite of the heavy defense of the exchange rate, inflation fell down gradually, which led to a relatively strong real appreciation. The credibility indicator of our design translates this into a slow and fluctuating growth path of the credibility.

The persistence of policy paid off with a rapid increase of credibility in the year 1995. This was reflected in remonetization, falling inflation (and thus in improvement of our "θ" indicator) and growth of foreign currency reserves of the National Bank of Moldova. In the years 1996–1997 these positive processes stagnated. Inflation remained moderate, monetization stopped growing.

This period saw continuation of unsustainable policies, which initially could have been seen as only temporary. Apart from causing a macroeconomic disequilibrium, unsustainable fiscal policy and rapid growth of debt undermined credibility of the attained monetary stabilization. The decrease of confidence manifested itself in high interest rates, growing dollarization and an outflow of the NBM foreign reserves. All those signals were observed long before the open balance of payments crisis emerged in the last quarter of 1998.

For several years preceding the crisis Moldova was on an unsustainable path and economic pressures were mounting. The Russian crisis was merely a trigger of an open crisis.

Following observation can be made on the Moldovan case:

– Deep fiscal deficits and growing debt did not prevent certain remonetization and credibility growth, at least as long as Moldova's policies were backed by the international agencies.

– In the longer run the irresponsible fiscal policy undermined the credibility of the stable exchange rate policy. When the critical level of debt burden had been reached, devaluation expectations emerged and the remonetization trend reversed itself.

– Monetization level, foreign reserves and "theta" credibility indicator all evolved similarly in Moldova in the examined period.

– Stabilization in Moldova lacked an aspect of a positive shock. In spite of a consistent monetary policy disinflation was relatively slow. Introduction of a new currency did not cause any spectacular remonetization. Some devaluation was allowed afterwards, in spite of the general commitment to the exchange rate stability. The introduction of the currency could have been premature. Alternatively, a stronger commitment (an officially announced currency peg) could have worked better.

– Strong seasonality of the GDP figures is not fully matched by movements in monetary aggregates. Raw monetization figures reflect the seasonal pattern of GDP. We believe that this does not convey any information on credibility, so for our analysis we used seasonally adjusted monetization figures.

Part 10
Credibility of the Exchange Rate Policy in Georgia

10.1. The Policy of the National Bank of Georgia

Georgia regained independence in 1991. In the years 1991–1994 it suffered from a war, rupture of foreign trade links and a deep economic contraction. Foreign debt exploded from zero to about 150% of GDP in 1994. The government was running a deep fiscal deficit. The National Bank of Georgia was providing almost unlimited credits to the government and to commercial banks. As a result, the growth of prices reached hyperinflationary levels (7488% in 1993 and 6474% in 1994).

First steps towards tightening of the monetary policy were taken in the second half of 1994. Beginning with December of that year Georgia started a stabilization program in cooperation with the IMF and the World Bank, which was supported by the access to the IMF's STF credit facility (and later the ESAF program). A new law on the National Bank of Georgia was adopted, which equipped it with full independence from the government and a responsibility to maintain price and exchange rate stability. Beginning in 1995 the monetary policy of the NBG was almost fully determined by the requirements of the program of stabilization and reforms attached to the foreign credits.

Officially, the exchange regime was classified as a managed float. However, the exchange rate was maintained fixed at 1.3 mln coupons per USD between January and September 1995. In September a new currency – the lari – was introduced. The citizens were massively converting rubles and US dollars into the new currency, which resulted in a 4-fold growth of monetary aggregates while the exchange rate appreciated in response.

Since then, until the Russian crisis in the late 1998, the policy of the NBG relied on the following. In accordance with the agreed program, the Central Bank was financing a certain fiscal deficit with its loans. The size of these loans was equal to the foreign credits expected in the current

period. Thus, the NBG was always able to buy back all the domestic cash it had created with the dollars it had obtained from foreign creditors and thus to sterilize the effect of its lending to the government. Although the demand for domestic money was gradually rising, the current account deficit was sucking in foreign exchange, and the NBG had to intervene and supply dollars almost permanently. This regime, although allowing for small fluctuations of the exchange rate, was almost equivalent to a fixed exchange rate regime. Since the exchange rate stability was always the priority, the effective control over domestic money was null, as in a fixed exchange rate regime.

Figure 10.1. The NBG Interventions on Tbilisi Interbank Exchange Market, USD thousands (net purchases of USD by the NBG)
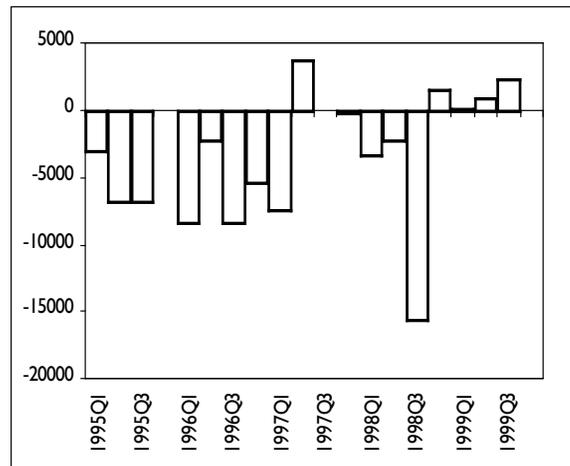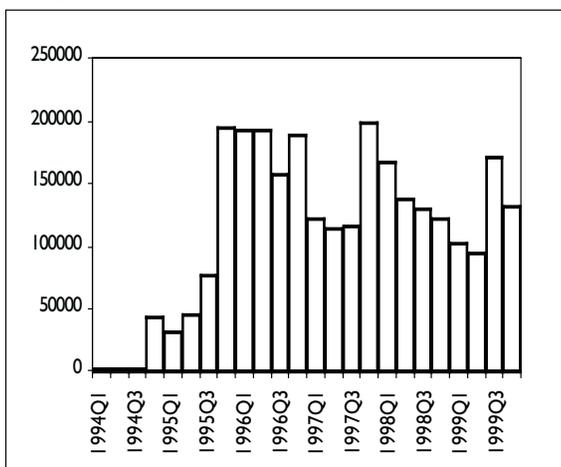

Source: NBG

The stable exchange rate and the resulting low inflation were the symbols of success of the stabilization and reforms program. The central question in our investigation is: to what extent was the policy of defending the stability of the exchange rate credible to economic agents?

10.2. Foreign Exchange Reserves of the NBG

For a central bank, which defends the exchange rate of its currency, the crucial factor of feasibility of this policy is the availability of foreign exchange reserves. As can be seen in the figure below, no direct correlation is visible between the changes of reserves and the size of interventions. This is because fluctuations of foreign reserves were significantly influenced by the operations with the foreign debt. Except for the fourth quarter of 1995, the increases in reserves were usually related to disbursements of consecutive tranches of the IMF and World Bank loans. The decreases were, apart from the interventions on the TICEX, related to servicing of foreign debt obligations.

Figure 10.2. Gross Foreign Reserves of the National Bank of Georgia, 1994–1999 (USD thousands)

Source: National Bank of Georgia

While the balance sheet relationship between the level of gross foreign reserves and level of domestic money is blurred by the foreign debt operations, one can probably more plausibly relate the level of foreign reserves to the credibility of stable exchange rate policy. Interpreted in this way, dynamics of reserves gives ground for an increase of credibility in late 1995. In the subsequent years, reserves were fluctuating, with a clear tendency to shrink. Thus, the dynamics of reserves by itself suggests that the policy was hardly sustainable, and after 1995 stability was not reinforced by the growth of reserves.

10.3. Inflation, Exchange Rates, Broad Money

An idea of efficiency and thus, indirectly, credibility of the monetary policy can be obtained from the basic macroeconomic data. Inflation has been reduced exceptionally quickly, from more than 6000% in 1994 to around 57% after the first year of the operation of the stable exchange rate policy. The real appreciation was significant by measures of standard economies, but for a country emerging from hyperinflation a 75% real appreciation does not seem much (given the possibly high scope of real exchange rate misalignment in the previous, unstable regime). Even more impressive is the fact that such significant slowdown of inflation was achieved with the accompanying over 3-fold increase of monetary aggregates.

The overview of annual data suggests that the stabilization must have been based on the exchange rate anchor, rather than on the money supply policy. It also seems, that the policy must have gained significant credibility since the beginning. However, deeper insights will be gained below, by the analysis of the higher frequency data.

10.4. Output dynamics vs Broad Money Changes

GDP statistics about Georgia are notoriously unreliable because of the record high share of shadow economy in the Georgian GDP (according to World Bank estimates: around 70%). The quarterly GDP series produced by the State Department of Statistics used to be highly seasonal. However, in 1999 the series were revised, which resulted in a much lower seasonality (so we used seasonally unadjusted series) and a significant correction downwards.

Data in the table below allow to informally inspect for the possibility of a income elasticity of money demand dif-

Table 10.1. Georgia 1994–1998: Inflation, Nominal Exchange Rate, Real Exchange Rate and M2 (% change)

Year	1994	1995	1996	1997	1998
inflation	6474.0	57.4	13.7	7.2	10.7
GEL/USD	1254.9	-12.4	3.6	2.0	23.1
real exchange rate (GEL/USD)	1136.0	75.3	6.2	3.3	-11.5
M2	1796.7	319.2	38.3	35.4	-11.5

Source: State Department of Statistics, National Bank of Georgia, own calculations

Table 10.2. Georgia 1994–1999, Real GDP, M2/GDP (% change)

Year	1994	1995	1996	1997	1998	1999
Real GDP growth	-11.4	2.4	10.5	10.8	2.9	3.0
M2 monetization change	-76.6	148.3	5.4	17.8	-15.9	-2.0

Source: State Department of Statistics, National Bank of Georgia, own calculations

fering from unity. The connection between the two figures is obviously very loose. A tentative conclusion can be, that periods of an improving output performance coincide with the periods of remonetization.

Georgia's growth performance in the discussed period was impressive. However, it should be kept in mind that the growth started from an extremely low base.

10.5. Evolution of Monetization

The figure below presents medium term dynamics and structure of monetization in Georgia. The high ratios in the hyperinflation period (1993–1994) are obviously unsustainable and can be interpreted merely as one of the manifestations of a disequilibrium. Since the growth of prices had been extremely fast, the finally reached level of monetization (which we associate with an equilibrium) was extremely low and difficult to restore back to "reasonable" levels.

The quarterly data show that monetization was record low (around 2% of GDP) not during hyperinflation, but only after the introduction of the stabilization program, when inflation already stabilized. Our model explains this possibi-

lity, connecting it with an initially low level of credibility of the stabilization policy. In fact, credibility could have been growing, but in conditions of a fast appreciation of the real exchange rate, the fear of devaluation rises and prevents increased holding of domestic money. The radical change of this attitude is visible in the third quarter of 1995, when the new currency was introduced with a big success in terms of social support and credibility.

Later, in 1996 the monetization ratios stabilized at a level which is higher, but still very low by international levels. Faster growth is observed in 1997. However, after a peak in early 1998 monetization starts to fall. End of 1998 brings a currency crisis, resignation from the previous stable exchange rate policy and rising inflation. However, apparently there was not much room for further fall in monetization in spite of such adverse conditions.

The comparison of the levels of monetization for different monetary aggregates allows to detect two striking features of the Georgian economy: extremely low financial intermediation and very high dollarization.

As can be seen in the Figure 10.4, broad domestic money barely differs from the Monetary Base. The level of bank deposits is extremely low. The confidence in the banking system has been destroyed during the hyperinflation years, when most of the banks' clients lost their savings due to hyperinflation, or bank bankruptcies. Since then, although the banking system underwent a comprehensive

Figure 10.3. Monetization: Reserve Money, M2, M3 (Broad Domestic Money + Foreign Currency Deposits) in Relation to GDP
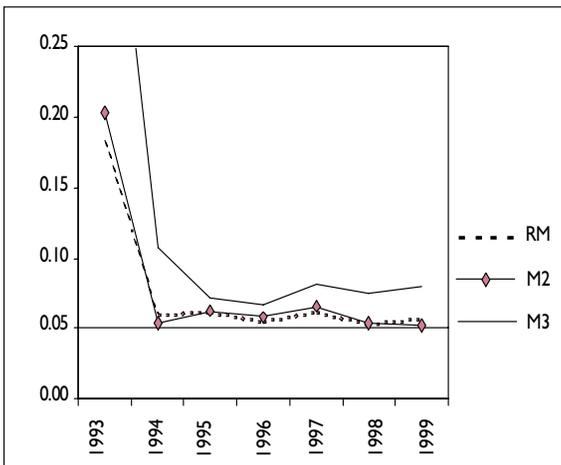
Source: National Bank of Georgia, State Department of Statistics, own calculation

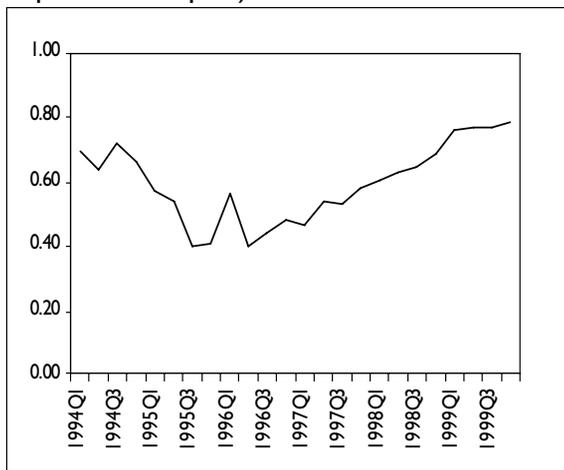**Figure 10.4. Monetization in Georgia in 1994–1999, quarterly**
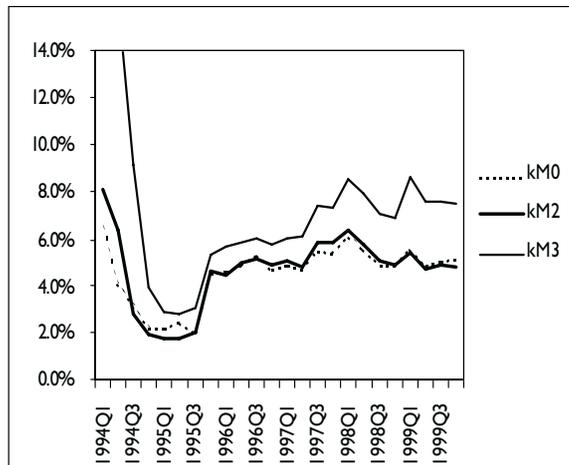
Source: National Bank of Georgia, State Department of Statistics, own calculation

reform, public confidence in it is very low. However, low financial intermediation, although often coinciding with the low confidence in the stability of the domestic currency, is not the same thing, nor are they satisfactory explanations of each other.

The second issue is that of dollarization, which is directly related to the credibility of the exchange rate policy. In the figures it reflected in the large difference between the domestic money monetization (measured by ratios of M0 and M2 to GDP) and the total Broad Money monetization (the aggregate M3 includes also foreign currency deposits). Dollarization measured by the share of foreign currency deposits in all banking system deposits varied between 40% and 80%. After reaching the trough in the end of 1995, following the successful currency reform, dollarization was growing steadily, showing the low trust in the stability of the domestic currency.

Very high dollarization of deposits sheds light also on the reasons of low monetization in terms of domestic money, as it signals the scope of currency substitution. Kakulia et al.(2000) discuss the widespread use of US dollars for transaction purposes, despite the fact that it is forbidden by the Georgian law. According to them, the use of dollars is especially widespread in the real estate, automobiles, furniture, imported construction materials markets and in wholesale transactions, i.e. in the spheres where transactions involve big sums of money. They estimate the amount of cash dollars circulating in the economy at the level close to the value of broad domestic money. Obviously, growth of credibility could lead to a fast or gradual replacement of these by the domestic currency, and thus an almost two-fold increase in monetization. This, however has not been observed.

10.6. The "Theta" Indicator

Below we calculate the series of the indicator of credibility suggested by the theoretical model, to confront it with other evidence on credibility of the stable exchange rate policy.

Calibration of the parameters of the money demand relationship

α – constant term was chosen so that in the situation of the credible exchange rate stability monetization increases to about 30% of GDP.

β – elasticity of the money demand with respect to the expected depreciation was chosen so, that in the situation of a certain 100% quarterly depreciation, monetization decreases to about 1.9% of GDP. These values correspond to the extreme situation that was observed in the late 1994, just before the stabilization.

The series

The resulting series of the "theta" indicator is plotted in the Figure 10.6.

The proposed indicator of credibility takes on negative values in the beginning of the stabilization program. This result is contrary to the initial inferences based solely on the speed of disinflation: since inflation declined very quicky, it seems that the exchange rate regime must have been highly credible. However, according to the model, the result is the opposite: since the rate of devaluation fell from more than 100% per quarter (as in the first half of 1994) to a negative level (an appreciation was noted in the last quarter of 1994 and the very beginning of 1995) any model of money demand would predict a large growth of demand. This was not observed, and money aggregates remained broadly con-

Figure 10.5. Dollarization of Deposits (Ratio of Foreign Currency Deposits to Total Deposits)

Source: NBG, own calculation

Figure 10.6. "Theta" (Indicator of Credibility of the Policy of Stable Exchange Rate), Georgia 1995–1998
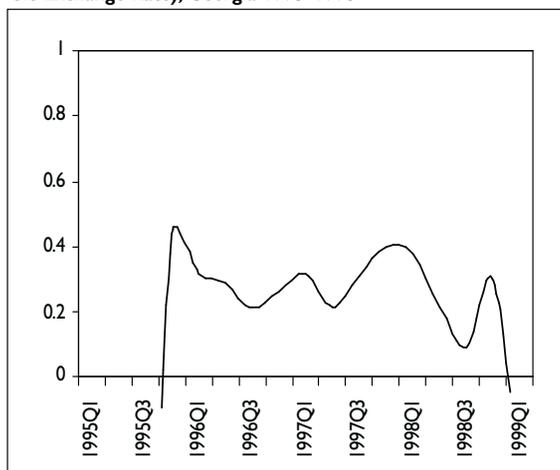
Source: own calculations

stant in the first 3 quarters of 1995. In the model, this behavior of money is matched by an expectation of a depreciation that is much faster than the potential accrued since the exchange rate became officially defended. Only the introduction of the new national currency provided a stimulus for a massive growth of demand for domestic money – which is reflected in the peak of the "θ" indicator in the last quarter of 1995.

The interpretation based on the model, leading to the conclusion that during the first 3 quarters of 1995, when the exchange rate was fixed, the stabilization program lacked credibility, is confirmed in other analyses. Kakulia et al. (2000) point out, that the dollarization, measured as a share of USD deposits to broad money reached the all time high in the middle of 1995 (43.8%). Wang (1999) observes in addition, that inflation started falling before significant credibility enhancing events took place. The new law on the central bank, and other administrative changes were introduced only well after inflation started slowing down. When the formal IMF support, which is another credibility factor, was initiated, inflation was already on a downward path. Wang concludes, that "..hyperinflation was stopped by removing generalized consumer subsidies and tightening of monetary policy, and not by a sudden rush of credibility or imposition of an exchange rate anchor." [Wang, 2000, p.1] As an alternative indicator of credibility, he analyses the gap between the TICEX exchange rate and the average exchange rate in the street Foreign Exchange Bureaus. The gap has been wide since the beginning of 1995 (signaling the expectation of depreciation) and the two rates converged on sooner than in October 1995.

Subsequent lack of growth of the money demand, in spite of a still very low level of monetization, stable exchange rate and low inflation, is interpreted by the model as a loss of credibility. Conclusions, similar to those of the model, are drawn by the analysts of the NBG: Kakulia et al. (2000) base them on the observation that the growth of foreign currency deposits outpaced that of lari deposits ever after the low of dollarization in end 1995.

According to the model the credibility performance has been mixed afterwards. Following a marked slide down beginning in early 1998, when inflation rose and monetization fell, a final plunge occurred accompanied by the dissolution of the stable exchange rate system in the aftermath of the Russian crisis in 1998. The surveys conducted by the State Department of Statistics in 1998 revealed that 30–40% of respondents predicted an acceleration of inflation, and another 30% were classified as not optimistic in this respect [Kakulia 2000]. Surveys for earlier periods, or concerning directly the exchange rate expectations, are not available. The one quoted above can serve as a rough confirmation of the story told by the "theta" indicator. Also, the analysts of the NBG explicitly formulate a similar diagnosis: that the credibility has been low and did not increase significantly since the currency reform [Kakulia 2000, p.9–10].

It is worth noting, that the dynamics of the "theta" indicator is very similar to that of foreign reserves of the central bank.

10.7. Public Finances, Current Account and Credibility

Public finance situation did contribute to enhancing credibility of the monetary policy. In the entire period under examination budget deficits were high, due to notoriously low tax collection. The foreign debt was creeping upwards in USD terms, although fast real growth and real appreciation contributed to its significant reduction in relation to GDP. In spite of a reasonable and stable ratio of foreign debt to GDP, the burden was exceptionally high due to a poor export performance during the entire period.

High budget deficits and problems with tax collection and expenditure arrears certainly contributed to the weakening of credibility of the exchange rate regime. Kakulia et al.(2000) stress the importance of the 1998 fiscal crisis in undermining the confidence in lari.

The persistent deep current account deficit was also putting the credibility of the regime into question. In principle, for a relatively small country like Georgia, sustaining a

Table 10.3. Georgia 1995–1999, Budget Deficit (% of GDP)

	1995	1996	1997	1998	1999
budget deficit commitments	-7.9	-7.4	-7.0	-6.5	-6.7
budget deficit cash	-6.8	-7.2	-6.3	-5.1	-4.9

Source: IMF Recent Economic Developments, 2000, IMF website

Table 10.4. Georgia 1994–1999, Foreign Debt (USD mln)

	1993	1994	1995	1996	1997	1998	1999
total debt outstanding	544	998	1225	1371	1539	1448	1630
total debt in % of GDP		150.0%	60.0%	44.9%	43.6%	47.9%	62.7%

Source: IMF 1998b, IMF website (public information notices), NBG, own calculations

Table 10.5. Georgia 1994–1999: Current Account Balance

	1994	1995	1996	1997	1998	1999
CAB in USD mln	-448	-407	-418	-535	-416	-195
CAB in % of GDP	-	-20.2%	-14.1%	-15.4%	-15.4%	-7.0%

Source: IMF (1998b), NBG

current account of as much as 15% of GDP for several years with the help of foreign concessional loans is not unfeasible. However, this situation certainly did not contribute to credibility, constantly providing arguments to people questioning the sustainability of the exchange rate. Finally the foreign balance improved after the devaluation in the end of 1998, in the aftermath of the Russian crisis.

10.8. Conclusions

– A rapid disinflation need not always result from a credibility of the stabilization program, and need not immediately induce credibility in the national currency, even if accompanied by strengthening of the central bank independence and support of the international financial organizations. Our credibility indicator, as well as other studies, reveals a lack of credibility of the fixed exchange rate regime in Georgia during the first 3 quarters of 1995.

– Introduction of the new national currency (lari) provided a big boost to confidence in the stability and allowed the authorities to discount the credibility enhancing influence of the preceding legal and institutional changes. Credibility growth was manifested in massive exchanging of USD and RUR into lari, which led to 4-fold increase in broad domestic money almost without inflationary consequences.

It is worth noticing, that the lari was introduced after three quarters of maintaining a fixed exchange rate and introducing other reforms. Judging by the success of the operation, the relatively long period of waiting seems to have been a right decision.

– In the years 1996–1998 the economy exhibited two negative features: very low monetization ratio and very high dollarization of deposits and credits (and, probably, of the day to day exchange). Both these features are signals of a low credibility of the stable exchange rate regime. Our model captures this in a fluctuating time path of the "theta" indicator without any growth tendency.

– The dynamics of the level of foreign exchange reserves of the National Bank of Georgia is very similar to the dynamics of the "theta" indicator of credibility, calculated using data on monetary aggregates, output and inflation rate. This reinforces interpretation of both data series as reasonable indicators of credibility.

– Permanent fiscal deficits, extremely low tax collection and expenditure arrears reinforced the sense of fragility and long run unsustainability of the attained stable macroeconomic situation. This was aggravated by permanent current account deficits.

– On average, periods of better output performance coincided with the periods of growing monetization of the economy. We attribute this to the credibility-enhancing influence of output growth.

Part 11
Conclusions

Our paper attempted to shed new light on analysis of credibility of exchange rate policy in transition economies. Our intention was to apply the theoretical model to the data from 7 countries that actively used exchange rate policy in their stabilization programs. Although the entire group is composed of post-socialist transition economies it is far from being uniform. These countries have had different stabilization paths, transition experiences and achievements. Some of them are now members of OECD and candidates for EU accession while others still cannot declare their macroeconomic stabilization complete and are suffering from near-crisis conditions.

Application of our model to this diverse group of countries yielded interesting results. Credibility indicator θ turned out to be a very informative measure of public confidence in official exchange rate policies. It usually coincided with our subjective opinions on the developments of credibility in particular countries. The analysis reinforced gene-ral notions about high and stable credibility in Poland and the Baltic states and proved that the processes of gaining credibility were relatively short and generally uninterrupted (with the possible excpetion of Latvia). On the other hand, "theta" drew a very dynamic and non-monotonic picture of public confidence in exchange rate policy in Bulgaria, Moldova and Georgia. Tracking the developments of these series helps establish interesting and sometimes novel findings about the timing, precedence and causality relationships among events in the countries' recent economic and political history.

The diversity of experiences notwithstanding, analysis of confidence carried out in this paper makes it possible to discern the following facts:

– Irresponsible fiscal policies lead to lowering of the credibility of exchange rate policies. Economic agents are usually very sensitive to prolonged and unsustainable budget deficits or growing debt burdens and react by turning away from domestic currencies.

– International reserves constitute the most apparent tool for enhancing credibility. All countries in the study enjoyed increased credibility when they demonstrated the ability to accumulate foreign reserves.

– Support of international organizations such as the International Monetary Fund and the World Bank helps boost credibility (sometime despite the lack of necessary fundamentals, e.g. Moldova).

– Countries that have enjoyed high and stable credibility for longer periods (e.g. Poland, Estonia) are less vulnerable to adverse impact on credibility of budget and current account deficits.

– For most countries the dynamics of our measure of credibility mirrors the dynamics of dollarization ratios and monetization.

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