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THE STRUCTURE OF MONETARY ASSETS IN TRANSITION ECONOMIES: FINANCIAL INNOVATION AND STRUCTURAL TRANSFORMATION

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Abstract

Using a panel data set we investigate the specificities of the structure of monetary assets in transition economies. This analysis reveals the main factors standing behind the structure of deposits held with banks (demand or time deposits), as well as the determinants of the trade-off between cash and demand deposits in Central and Eastern European Countries and in Former Soviet Union countries. We show that the strong preference for cash, which appears in transition countries, is related to the extent of the informal sector, to the low efficiency of the banking sector as well as to the massive currency substitutions. The relatively high share of time deposits compared to demand deposits is due to the inefficiency of the banking system and to the low level of development of alternative financial markets.

JEL Classification: C23, E41, E44

Keywords: transition economics, money demand, cash ratio

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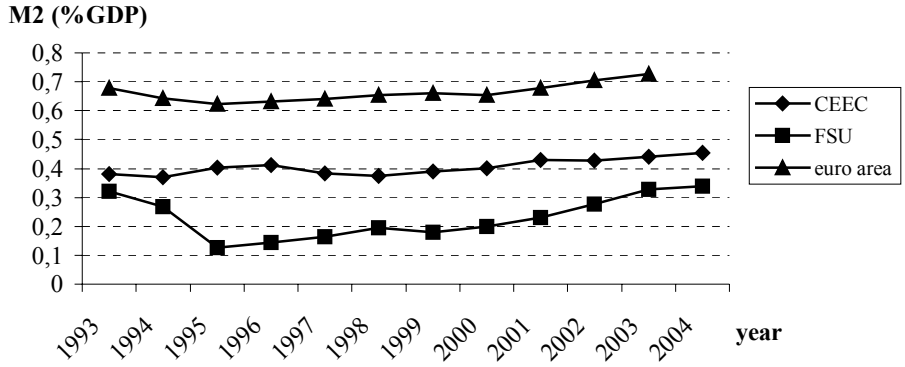
1. Introduction

It is well established that transition countries have typically experienced a two-stage process of de-monetisation and re-monetisation in the course of the past 15 years (Berglof and Bolton (2002), Bonin and Wachtel (2002)). First, together with high inflation and the disruption of the production and exchange systems in the early 90s, the velocity of money increased significantly, as households and firms sought to keep the nominal assets in local currency to a minimum, and turned to value-keeping, mainly physical, means of preserving wealth[1]. In a second stage, starting from mid-90s to post-1998 crisis with the success of macro-economic stabilisation policies and along with the implementation of financial reforms and the restructuring of the banking system, domestic liquid assets became more and more attractive, pushing upwards the ratio of broad money to GDP. Accordingly, transition countries appear to be on a convergence track towards developed economies, albeit at various degrees and still significantly backward (see chart below: average M2/GDP for CEECs, CIS and Euro area).

Evolution of M2/GDP ratio



Source: Authors' calculation, based on the *Annual statistical bulletins* of the national central banks and the IFS (IMF). FSU countries: non-weighted average of Russia and Ukraine.

This widely accepted story however rests entirely on a broad money concept and does not give account of the composition of that aggregate. As a matter of fact, if there is a global convergence of the ratio of broad money (say M2) to output between transition and developed economies, that convergence disappears when splitting M2 into its components. For instance, the ratios cash/GDP on the one hand and time deposits/GDP on the other hand, are both growing in the course of transition, whereas they show a declining trend in most developed economies[2]. Beyond the usual debate about monetization, the questions we raise in this paper seek to analyse the reasons and potential persistence of such a divergence. Why do people in transition countries keep cash money in preference to demand deposits, more than it is the case in the developed world? Why do they hold larger time deposits (controlling for the income level)? Are these patterns going to persist in the long run, or are they mostly a residual and transitory phenomenon? What are the variables that would explain the monetary assets structure and their evolution in the context of transition?

Going deeply into cash and various types of deposits in transition economies is an exercise, which has not been tried much so far. There are three lines of research which might deal with the questions we raise, namely (i) studies on the demand for money aimed at understanding inflation (or monitoring money supply), (ii) works on the estimation of the

[1] Of course, money in this conception would exclude the so-called "exotic" means of payment such as barter operations and payment arrears, as well as foreign currency cash or deposits.
[2] See **Appendix A**.

informal ("shadow") economy using cash ratios, and (iii) studies on the relationship between economic growth and financial sector' development, with applications to the banking reform in transition economies. The first line of research is rather classical and has been recently surveyed by Sriram (2001). The analysis promotes easy understanding of the approaches followed in studying the demand for money in a wide range of countries. In a study realised in the context of several Central and Eastern European Countries (Czech Republic, Hungary, Poland and Slovenia), Kruszka (2003) shows that the main determinants of cash demand are the real value of the industrial output, the nominal interest rate or the rate of inflation. More generally, inflation, interest and exchange rates remain , along with a transactions index, the basic ingredients of the money demand function. However, little is said about the structure of that demand for money; one exception, but rather ancient, is the analysis of Barro and Santomero (1972). The authors distinguish three means of holding liquid assets: cash, demand deposits and savings deposits; they show that the demand for money is inversely related to the differential of interest return between savings and demand deposits. Another conclusion of their study is that demand for cash is insensitive to the rate of return on alternative liquid assets, but is inversely dependent on the interest rate on demand deposits. And, finally, the ratio of currency to total money holdings is "independent" of income.

The direction of the shadow economy has been surveyed by Schneider and Ernste (1998) and refers to the well-known methods developed by Feige (1979) and Guttmann (1977). Feige's transaction approach consists in assuming that there is a constant relation over time between the volume of transactions and the GNP. The GNP in the shadow economy can be calculated by subtracting the official GNP from the nominal GNP. Guttmann's currency demand method is one of the most commonly used approaches. It assumes that the shadow (or hidden) transactions are undertaken in the form of cash payments, so as to leave no observable traces for the authorities. It has been adapted to the treatment of transition countries by Hanousek and Palda (2003, 2004), who show that the currency demand methods are useless for the transition economies because of intensive financial innovation during transition. Financial innovation can destabilize money demand as these forces interfere with the motives of holding cash. The preference for cash may not be entirely due to tax-fraud (or regulation-by-passes), but more simply to the inefficiency of certain financial services and the underdevelopment of the banking system.

This, in turn, leads to banking reforms, the third research topic which might be pertinent for the analysis of the structure of monetary assets. There is a huge set of works on the relations between financial development and economic growth; empirical works go in both directions: Levine, Loayza and Beck (2000) show that the relation is positive, but Loayza and Ranciere (2002) show the opposite in the case of Latin America. In the case of transition economies, Neimke (2003) shows convincingly that there is a significant impact of financial development on economic growth. This however does not help us with the structure of money demand, since financial development is often measured by a ratio of broad money to GDP. More specific studies of the banking sector reforms in transition economies like those of Staerh (2003) or Meyendorff and Thakor (2002) focus on problems of competition, concentration, legal environment and banking supervision, but they do not link these industry structures and banks behaviour to the performance of the system in terms of the forms taken by money held by non-bank agents; for instance, nothing is said about the impact of the lack of competition between banks on the preference of households and firms to detain cash instead of deposits.

To sum up, the question of the specific structure of money demand in transition countries, although not treated directly in the literature, might draw insights from the three lines of research mentioned above: first, it is clear that "classical" variables such as interest and/or inflation rates may have an influence on choosing the form under which liquid assets

should be held: non- (or little-) remunerated demand deposits, or often highly remunerated time deposits. Second, it is also probable that fiscal, social or regulatory evasions play a role in the choice between cash and any kind of deposit. Third, banking sector efficiency, for instance the existence (or not) of modern means of payments, credit facilities and other factors making the quality of a banking system, which all depend on the degree of competition between banks, also play a role in holding deposits with these institutions.

The main contribution of the present paper is empirical. It consists in using the panel data approach to explain the structure of monetary assets in the transition economies case, taking the Euro zone as a benchmark. As far as we know this topic has not been dealt with so far. The vast majority of studies on money demand use the Johansen co-integration method and the Vector Error Correction Models; these are time series analyses, and they are applied to many transition economies, however on a case-by-case basis[3]. The methodology we apply proceeds with many countries together, also with a chronological dimension.

Section 2 deals with a descriptive outlook (including a presentation of the data base), together with a brief history of financial systems in transition countries. Section 3 raises the question of the structure of deposits – demand or time deposits – held with banks; it proposes to explain the share of time deposits in total deposits using a function of demand for money, and tests whether transition countries behave the same way developed countries do in this respect. Section 4 deals with the question of the distribution of M1 between cash and demand deposits: both assets do not yield any interest and the cost of holding them – inflation – is the same; in that case, shadow economy plus banking efficiency are proposed as the main variables influencing the choice. Section 5 concludes.

2. Financial systems in transition countries

Are financial systems specific in transition countries, and in what way? Transition is usually defined a long term process by which, according to the EBRD:

- Enterprises are being privatized, their governance is improved and hard budget constraint is imposed.
- Markets are liberalized, both internal and foreign, together with the setting up of the necessary regulation agencies.
- Financial markets are liberalized, both with the banking system and with securities markets.
- Infrastructures are reformed.

It is on the basis of these orientations that the EBRD calculates the so-called "reform indicators" which are attributed to each transition country. Summing (arithmetically) the nine corresponding indicators leads to a spectrum of 9 (minimal note) to 40,5 (maximum) ; the least advanced country (Turkmenistan) hardly reaches 12 in 2004; Belarus, another well known laggard, has 17,5. That transition is really a long term process is shown by the fact that, after 14 years of transition, the most advanced countries – Poland, Czech Republic and Hungary – have not yet reached the maximal note, which is defined as "standards typical of advanced industrial economies"[4].

Now, what is the role of transition in this institutional backwardness, and what is the role of underdevelopment (the GDP per capita of the most advanced transition countries remains at half the level of high income countries). Would the notes of the bulk of emerging *market* economies be very different from the ones of emerging *transition* economies? Judging from

[3] See Van Aarle and Budina (1995), Cuthbertson and Bredin (2001), Kruszka (2003).

[4] Poland is at 34, Czech Republic and Hungary are at 35. Slovenia is far behind at 31,5. Figures drawn from Transition Report 2004, p6; the methodology of calculation of the 9 reform indicators is on pages 199-200.

the listing of the quite famous "Washington consensus", a document which was established by John Williamson before the fall of the Berlin wall and was targeted to pinpoint the necessary reforms in the developing world (particularly Latin America), the reform agenda of developing market economies looked very similar to the one which would be set up a few months later for transition countries[5].

There is however a matter of degree in these reforms. The Washington consensus has among its ten proposed "reforms" a line called "financial liberalization"; on the EBRD's list of reform indicators, this line is also present, even if it is sub-divided into the two main compartments of the financial sector, banks and securities markets. But J. Williamson's financial liberalization is aimed at establishing market-determined interest rates, and two measures on which he insists is on the scheduling (premature opening of the capital account with banks not robust enough to intermediate capital inflows efficiently has proved disastrous for certain countries) and on reinforcing prudential supervision. In contrast, financial reform in transition countries starts from scratch, everything has to be built.

Before transition, the banking system of communist countries was organized under the form of a 'mono-bank'. The 'mono-bank' took deposits from households but decisions on the distribution of credit belonged to the central planning office. Credit was underwritten by the state, and bank officials had no incentive to stop or develop credit. Credit was available nearly for free, so that there was practically no time constraint on performances of firms. The mono-bank created as much credit as was required without being constrained by the opportunity cost of funds or the need to evaluate lending risk. Consequently, the flow of funds involving households, the mono-bank, planning agencies and industrial firms led to the gradual increase of bad and unserviceable loans. As a result, inflation pressure increased, first under the form of shortages, later in an open form.

With transition, the financial sector reform in CEECs and the CIS began by the separation of the banking sector into two tiers: central and commercial banks. The aim was to separate the sovereign functions of monetary policy and banking supervision on the one side, from the commercial activity of lending and deposits transformation on the other side. Commercial banks remained however mainly state-owned at that initial stage, and the practice of directed credits and control on interest rates persisted extensively. Thus banking systems were confronted with much of the same old problems: bad loans, low savings and investment levels, illiquid security markets that provide little capital. Although each transition country chose its approach in progressing with the reforms of the financial sector, many countries gradually cut or reduced subsidies to enterprises, making them more reliant on non-state financial sources. For instance, in Romania and the Czech Republic, the outside financing became more important after the beginning of the financial sector reform.

The key issues relating to bank restructuring in the second stage of transition include the following actions: solving the banks' bad loans issue and limiting instruments of "soft budget constraint"; developing financial markets for equities and other securities; and building institutions aimed at the supervision of banks and regulation of financial markets. Starting from a relatively low rate of savings, transition economies have both to enhance an efficient transformation of domestic savings into long-term investments order, and attracting as much foreign capital as possible. Whereas capital flows and foreign direct investments play

[5] Up to the point that many specialists believe that the Washington Consensus is something that has been devised primarily for transition countries (it is then presented in a caricatural way with the triad "liberalization / stabilization / privatization") and is often associated with the so-called "shock therapy". See John Williamson, "A short History of the Washington Consensus", Paper commissioned by Foundation CIDOB for the Conference "From the Washington Consensus towards a New Global Governance", Barcelona, September 24-25, 2004. And John Williamson, "The Washington Consensus as Policy Prescription for Development", a lecture in the series "Practitioners of Development" delivered at the World Bank on January 13, 2004.

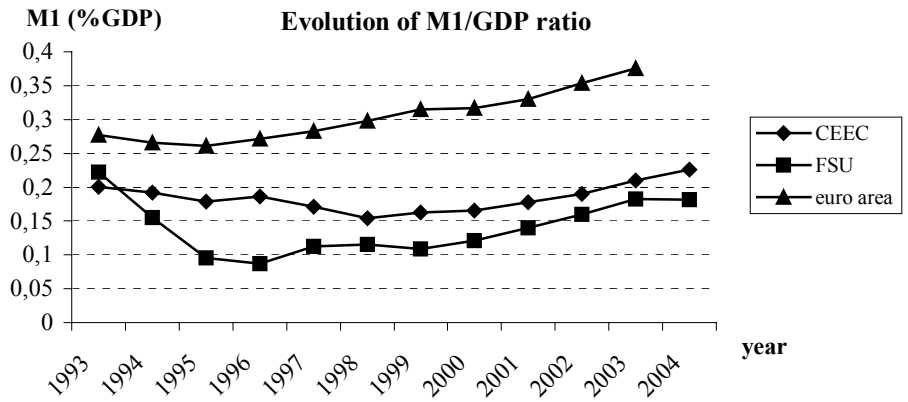
a crucial role in the development of transition countries, higher and sustained growth rate will be obtained in the long run through a build-up of domestic savings.

In order to realise this scenario, the banking sector has to be restructured and it has to be independent from the political regime. This means privatisation of banks, enhancing competition and plugging the financial system to international financial markets. In the course of implementing this programme, the bulk of transition countries have encountered one or several crises (of various degrees of severity) during the 90's. Several factors have triggered these financial crises in the transition economies:

- in certain cases, after the East Asian crisis of 1997, international investors who had previously transferred large amounts of short term capital to transition economies withdrew these investments and, by a movement which has been coined as "flight to quality", moved them to developed countries financial markets. Consequently, several transition countries have been touched by some external idiosyncratic shocks (cases of Russia and Ukraine in 1998). In that case, there is a similarity with the crisis of non-transition emerging economies.

- in other cases however, the crisis was the effect of transition itself: several commercial banks were created on the basis of old state-owned banks. They inherited large portfolios of credits to state-owned enterprises, which permanently rolled over theirs debts. The transition process, by which subsidies were gradually removed and internal and external competition rose, drastically reduced the firms profitability. The rollover of credits became clearly non-sustainable, which triggered a crisis both in the industrial and in the banking sectors (cases of Bulgaria in 1996 and the Czech Republic in 1997).

Despite major progresses in the reform of banking sectors in these economies, including the privatization of many state-owned banks, the entry of successful *de novo* competitors and the development of regulatory and supervisory capabilities, there was little financial deepening, as reflected in the level of monetization which remained at a low level. Graph 1 above showed that the ratio of M2 to GDP remained at approximately half of the Euro area average, and the situation is similar for M1. In 2003, the ratio of M1 to GDP was 16,4 percent in Russia, 19,3 percent in Hungary and 33,6 percent in the Czech Republic (the most advanced transition country from that point of view), compared to 37,5 percent as an average for the euro area, as can be seen in the graph below.



Source: Authors' calculation, based on the *Annual statistical bulletins* of the national central banks and the IFS (IMF). FSU: see graph 1

This choppy evolution of overall monetization in transition economies came together with a specific structuring of money balances. The weakness of the banking sector and financial markets led economic agents to behave in a particular way when decisions about which assets, cash, demand deposits or time deposits, should be held. We focus in this paper

not on the global degree of monetization of the economies but rather on its structure. Our topic is the structure of monetary assets (cash and various deposits held with banks).

The data set we are using in this analysis is built as a panel of yearly country observations drawn from the *Annual statistical bulletins* of the National Central Banks, the European Central Bank' *Blue Book*, the World Bank' *World Development Indicators*, the IMF *International Financial Statistics*, the EBRD *Transition Reports* [6] and includes 14 countries[7] over the period 1993-2004. In this respect, the table below shows a descriptive and summary outlook of the situation of the countries under review (averages for the two categories of transition countries are non weighted averages; the line 'euro area' is not an average but the data for the whole area). The first part of the table shows the structure of liquid assets (share of cash in M1) and the second part of the table shows the structure of deposits (share of demand deposits in total deposits):

Table A.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
M0/M1											
CEEC	0,38	0,38	0,39	0,37	0,37	0,39	0,40	0,39	0,38	0,36	0,34
FSU	n.a.	n.a.	0,55	0,59	0,57	0,63	0,60	0,56	0,58	0,59	0,58
Euro area	0,22	0,22	0,21	0,20	0,20	0,18	0,18	0,17	0,11	0,14	0,15
Demand deposits to total deposits ratio											
CEEC	0,44	0,41	0,38	0,39	0,38	0,34	0,33	0,32	0,32	0,35	0,38
FSU	n.a.	n.a.	0,42	0,40	0,48	0,36	0,36	0,41	0,39	0,36	0,34
Euro area	0,24	0,25	0,33	0,35	0,38	0,39	0,42	0,43	0,45	0,45	0,47

Source: Authors' calculations, based on the *Annual statistical bulletins* of the national central banks and the IFS (IMF).

As can be seen, over the period, the euro area countries reduced by almost a third the share of cash in M1. The larger decrease is taking place in 2001 when cash Euros were introduced[8]. As the banking system has done the major part of the conversion, some of the cash came on the deposits. The evolution of this ratio is rather stable in the CEECs and in the FSU countries, but at a much bigger scale. The share of demand deposits in total deposits has slowly reduced in the CEECs and in the FSU countries, but we observe an inverse evolution of this ratio in the euro area. This implied that the households and enterprises put progressively their savings in banks instead of keeping them in demand deposits. The little development of the stock market in transition countries suggests that there is no major alternative investment. The euro zone is presented in order to have a benchmark and a comparative trend. In the euro zone cash is still on very low and decreasing trend, time deposits are decreasing due to alternative more profitable investment, as for example in stock markets.

In order to explain the share of different kinds of money balances, we take as a starting point the demand for money function. Money demand has been the center of the macro-policy debate since Keynes' General Theory has become the standard macroeconomic version of the theory. According to Keynes, there are three motifs that generally justify the economic agents money holdings. First, there is the facility that they introduce in transactions. This approach is called *the inventory money demand*. The amount of money holdings is determined by the

[6] See **Appendix B** for a more precise description of the data set (both on the way indicators were built and on data sources).

[7] The analysis is realized over 11 CEECs (Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia and Slovakia), 2 FSU countries (Russia and Ukraine) and the euro-zone (as an average for the 15 countries).

[8] See Willem F. Duisenberg (2002).

trade-off between the implicit cost of holding it (the interest lost) and the transaction costs carried out by the conversion of interest gain assets into money. The inventory theory of money demand can be enlarged to capture the uncertainty of receipts and spending flows and the lack of liquidity risk. Called *precautionary motive*, this second factor generally leads to a prediction of a positive link between money demand and the uncertainty of the economic climate. A third approach is based on *the theory of portfolio management*; it considers money as an asset amongst many others. The agents diversify their assets on the basis of their returns (inexistent for the cash balances, nominal return for the bonds) and the related risks. According to Keynes, uncertainty plays an important role in decision – taking process, so that the precautionary and speculative demand for money should be considered very instable. On the opposite, monetarists insisted on the stability of money demand; in their view the transaction motif is the base of the demand for money (Burda and Wyplosz (2003)).

Duca and Vanhoose (2004) offer a brief summary of the models promoted in the demand for money analysis. These are grouped in three categories: the overlapping-generations models, the shopping-time models and the cash-in-advance models. All these models present some inconvenients. The overlapping-generation models are unsuitable for explaining the demand for assets as means of exchange. Shopping time models produce predictions that can be obtained from money-in-the-utility-function approaches. Cash-in-advance models have been the easiest to incorporate into dynamic macro theories, but the approach of money as a residual is at odds with explaining agent rational decisions. Recently, there is a rebirth of interest in the inventory approach of money demand.

It has been stated over the years that a stable money demand function is a necessary condition so that money exerts a predictable influence on the economy (Friedman). Since "stability" does not necessarily mean "simplicity", it becomes accepted that this demand function should be linear (or linear in the logs) and should have a small set of variables as arguments; these arguments should represent significant links to spending and economic activity in other economic sectors (see Laidler (1974), Judd and Scadding(1982), Barnett, Fisher and Serletis (1992)).

There are certain controversial aspects related to the money demand function. First, there is the definition of money: should it be the narrow money so that it includes only the current means of payment (this is the transaction theory case) or should it be enlarged to capture some liquid substitutes such as the saving deposits? At the beginning, the last aspect was considered impossible by the general theory of assets. The second and third controversial aspects concern the arguments of the money demand function. First, there is the question of choosing the scale variables. According to the transaction theory this variable is represented by a measure of transaction; the assets theory considers the wealth as appropriate. Then, there is the measure of the opportunity cost of holding money. Generally, transaction theories suggest that the short-run securities (the treasury bills) are the closest alternative for holding money. Assets theories considered impossible the returns on long-run financial assets or even on equities or real capital, as all these constitute potential substitutes for money.

The empirical modeling of money is typically based on the transactions demand (see Ericsson (1998)). We will therefore proceed with this approach in our analysis and, consequently, the function of money demand takes the following form:

$$M_{i,t}=P_t*L(Y_t,R_{i,t}) \qquad (1),$$

where $M_{i,t}$ –the nominal money balances; P_t – the price level index; $Y_{i,t}$ - the real income; $R_{i,t}$ -the short-run nominal interest rate (% per annum). We adopt the Fischer hypothesis according to which the nominal interest rate, $R_{i,t}$, consists of the real interest rate and the compensation for the expected inflation; there is no need to consider the rate of inflation $\pi_{i,t}$ as a specific factor of demand for real cash balances.

It is stated in the theory that money demand (measured by M1 or M2) increases with the real income and decreases with the nominal interest rate. When proceeding to a desegregation of money into different monetary components, we have the following functions:

$$M_{a,t}=P_t*La(Y_t,R_{a,t}) \quad (2),$$

$$M_{b,t}=P_t*Lb(Y_t,R_{b,t}) \quad (3),$$

where $M_{a,t}, M_{b,t}$ –the demand for monetary assets a or b; P_t – the price level index; $Y_{i,t}$ - the real income; $R_{a,t}$ and $R_{b,t}$ -the opportunity costs of holding the monetary assets a or b.

The ratio of these monetary assets will be:

$$\frac{M_{a,t}}{M_{b,t}}=\frac{P_t*La\,(Y_t,R_{a,t})}{P_t*Lb\,(Y_t,R_{b,t})}=\frac{Y_t^{\alpha 1}*R_{a,t}^{\alpha 2}*\theta_t^{\omega 1}}{Y_t^{\beta 1}*R_{b,t}^{\beta 2}*\theta_t^{\omega 2}}=Y_t^{(\alpha 1-\beta 1)}*R_{a,t}^{\alpha 2}*R_{b,t}^{(-\beta 2)}*\theta_t^{(\omega 1-\omega 2)} \quad (4),$$

where θ_t represent some other factors influencing the demand for the monetary assets a or b.

The log-linear form of the equation (4) is:

$$\ln\frac{M_{a,t}}{M_{b,t}}=(\alpha 1-\beta 1)\ln Y_t+\alpha 2\ln R_{a,t}+(-\beta 2)\ln R_{b,t}+(\omega 1-\omega 2)\ln\theta_t+\varepsilon_t \quad (5),$$

where ε_t - the error term.

The equation (5) can be written in a simple way:

$$\ln\frac{M_{a,t}}{M_{b,t}}=\gamma_0+\gamma_1\ln Y_t+\gamma_2\ln R_{a,t}+\gamma_3\ln R_{b,t}+\gamma_4\Pi_t+\varepsilon_t \quad (6),$$

where Π_t - some other factors influencing the demand for the monetary assets a or b.

The income elasticity of the money demand is generally positive[9]. It is stated that its coefficient (γ_1) should be situated between 0.5 – 1.0 and those of the interest rate elasticity (γ_2,γ_3) in an interval going from –0.1 to –0.5. The coefficient of the other factors influencing the demand for monetary assets a and b (γ_4) depends on the choice of their measure.

We proceed with a two steps analysis. First, we analyze the trade-off between detaining money as a store of value or as a means of transaction. Secondly, we focus on the means of transaction and we seek to determine if this means is used inside or outside the banking system. Consequently, we first analyze the determinants of the ratio of demand deposits to total deposits, and, then, those of the cash to M1 ratio.[10] These ratios take the form of the equation (6). According to the transaction approach of money demand, we use the real income as a scale variable, here approximated by the real GDP per capita. The nominal interest rate is the opportunity cost of holding money; we use the deposit rate (from the International Financial Statistics (IMF)). The empirical method applied is the panel data analysis.[11] We use the Feasible General Least Square (FGLS) method for the estimation of the equations, which allows controlling for the residuals heteroskedasticity and autocorrelation. The results are presented in the Sections 3 and 4.

3. The structure of deposits held with banks: why do people choose the demand deposits or the time deposits?

By analyzing the arbitrage between money as a store of value and money as a means of transaction, we actually explore the structure of deposits held with banks. The ratio of demand deposits to total deposits takes the following form:

[9] When the money demand is the monetary aggregate M1 or M2.
[10] The two ratios are calculated by dividing indicators expressed in national currency.
[11] The span of time covers 12 years and the sample consists of 14 countries.

$$\ln\frac{M_{1,,t}-M_{0,t}}{M_{2,t}-M_{0,t}}=\gamma_0+\gamma_1\ln Y_t+\gamma_2\ln R_{1,t}+\gamma_3\ln R_{2,t}+\gamma_4\Pi_t+\varepsilon_t \quad (7),$$

where $R_{1,t}$ -the opportunity cost of holding the asset M1; $R_{2,t}$ -the opportunity cost of holding the asset M2; Π_t - refers to some other variables which may influence the ratio of demand to total deposits (the interest differential between time and demand deposits, the stock exchange prices volatility, the financial market development).The results of the estimations are presented in the table below (**table1**). First, we estimate the simple regression of money demand. This includes as explanatory variables the real GDP per capita, the interest rate on time deposits and the dummy euro- area variable. We gradually introduce the opportunity costs of detaining demand deposits relative to other alternative assets – here the government bonds (regression 2). As Judd and Scadding (1982), we consider inappropriate to include in the estimations, simultaneously, the two interest rates because of the high colinearity (0,8126). However, there are analysis that include simultaneously several interest rates, like those of Cooley and LeRoy (1981), Goldfeld and Sichel (1990), Ericsson(1998). In the regression 4 we take the interest on treasury bills as the opportunity cost of holding demand deposits. Regression 4 shows the influence of the credit transfers (as % of GDP).

Table 1. The ratio of demand deposits to total deposits (in national currency) [12]

Dependent variable:	**(1)**	**(2)**	**(3)**	**(4)**
Demand deposits/total deposits	**FGLS**	**FGLS**	**FGLS**	**FGLS**
Scale variable				
GDP per capita	**-0.223**	**-0.113**	**-0.163**	**-0.818**
	(3.33)***	**(2.35)*****	**(2.12)*****	**(11.03)*****
Opportunity cost of holding money				
Interest rate	**-0.147**			**-0.353**
on time deposits	**(4.53)*****			**(8.55)*****
Government bonds		**-0.088**		
Yield[a]		**(2.39)****		
Treasury bills			**-0.110**	
Yield[a1]			**(2.61)*****	
Other influencing factors				
Credit transfers				**0.045**
(% of GDP)				**(3.08)*****
Dummy euro area	**0.181**	**0.290**		
	(1.20)	**(2.62)*****		
Intercept	**1.13**	**-0.029**	**0.552**	**6.42**
	(1.93)*	**(0.07)**	**(0.79)**	**(9.52)*****
Tests				
Hausman test[b] (p-value)	**0.6927**	**0.9290**	**0.6705**	**0.1039**
Breusch-Pagan LM test[c]	**0.0000**	**0.0000**	**0.0000**	**0.0000**
Wooldridge test[d]	**0.0029**	**0.0659**	**0.0000**	**0.0895**
LR test[e]	**0.0000**	**0.0001**	**0.0000**	**0.0065**
Observations	**163**	**106**	**93**	**86**
Number of countries	**14**	**12**	**9**	**9**

Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] data missing in the case of Hungary and Croatia.
[a1] data missing in the case of Estonia, Croatia, Slovak Republic, Ukraine and the Euro-area.
[b] the null hypothesis is that of the absence of fixed effects.
[c] the null hypothesis is that of no random effects (var[u]=0).
[d] the null hypothesis is that of no first-order serial autocorrelation.
[e] the null hypothesis is that of homoskedasticity.

[12] The estimations including inflation rate and those related to the market capitalization of listed companies (as % of GDP) are not significant.

The Hausman and Breusch-Pagan LM tests indicate the appropriate use of random effects. The Wooldridge test shows the absence of serial correlation in the regressions (1) and (4), while in others there is serial correlation. The heteroskedasticity test (LR test) shows its presence in all the estimations. In order to control for these, we use the FGLS method.

As one can see:

- the income elasticity is negative and significant (going from –0.11 to –0.81). Usually a high GDP corresponds to a developed financial and banking system. Consequently, a larger use of banking and financial market products and services may explain the negative sign of the coefficient.
- analysing the interest rate elasticities, we see that they are consistent with theoretical postulates. Taking into account the nominal deposit rate[13], one can expect that its growth should encourage saving money on bank accounts -that is getting rid of the most liquid monetary measure. Negative signs of coefficients of $R_{i,t}$ support entirely this conclusion. The increase of $R_{i,t}$ by 1 percent should not decrease the ratio of demand deposits to total deposits by more than 0.353 percent. The second tested measure of an opportunity cost of holding money is the interest on government bonds (regression (2)). The interest elasticity associated to this measure is negative and significant (-0.088), as expected. The higher the interest paid on government bonds, the smaller the incentive of detaining demand deposits. We introduce another measure for the opportunity cost of holding money – the treasury bills yield (regression (3)); the higher this interest, the smaller the incentive of detaining demand deposits.

We use the Euro area as a "benchmark" by the means of a dummy variable. The coefficients of this variable are positive and significant in the regression (2), confirming the data presented in the **table A**; the use of demand deposits is larger in the Euro area countries. The dummy variable does not appear in the last two regressions ((3) and (4)) because of the lack of data for the euro-area.

There are some other determinants of the ratio of demand deposits to total deposits in national currency. First, we wonder whether demand deposits provide an adequate return. The existence of an interest rate on demand deposits will definitely influence the choice between the two categories of deposits. We couldn't introduce it in our estimations because of the data unavailability. Second, does the development of the financial market influence agents' choice between demand and time deposits? In order to answer this question, we propose to use an indicator that captures the financial market development. This is the market capitalization of listed companies (as % of GDP); normally, a developed financial market offers a large sample of services so that the use of demand deposits is reduced. The estimations show that the results are not significant. And, last not least, we wonder whether credit transfers that are "feeding" the current account influence one way or another the trade-off between demand and time deposits. Due to lack of data, we estimate the influence of credits transfers (as % of GDP) on the demand to total deposits ratio for only 9 countries (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia and Slovakia). This estimation (see regression (5)) shows the expected positive and significant coefficient for the value of credit transfers (as % of GDP). The larger the value of these payment orders the larger is the use of current accounts (demand deposits).

[13] Deposit rate is the rate offered to resident customers for demand, time, or saving deposits (IFS (IMF) definition).

4. The distribution of M1 between cash and demand deposits in national currency

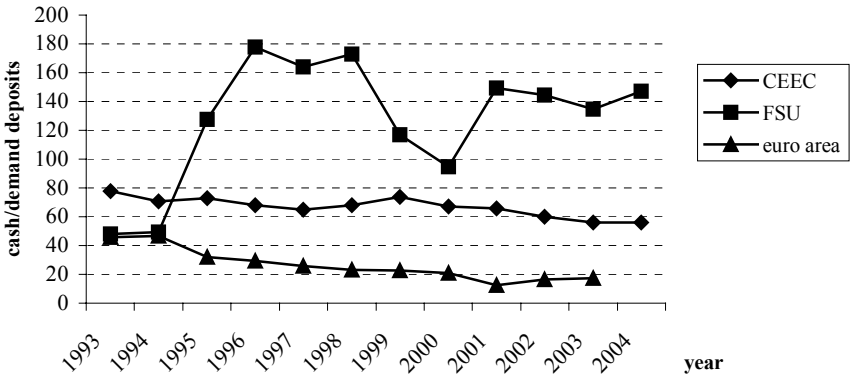
In the pre-transition period, the banking sector was made up by a handful of state-owned savings and loans type banks. Due to lack of competition, the scope of banking services was very limited. Following transition, foreign banks have entered financial markets and introduced competition. Competition narrows the gap between the level of financial services provided in transition and in the developed economies. Some products, such as cheques were never introduced in transition countries, as they were already outdated and superceded by credit and debit cards.

There are a lot of situations in which money demand changes during transition:

a) a lack of credit is a feature of early transition economies and forces people to hold cash. As credit widens, cash balances fall. Bank failures during transition can force agents to change their cash-holding strategies towards holding increasing amounts of cash. At the same time, transition economies experience great ups and downs in taxes. These taxes will in turn move people to transact in cash in order to avoid their obligations to government.
b) At certain periods, the real interest rate was negative in several transition economies. Does a negative real interest rate stimulate people out of demand deposits and into cash holdings? The answer is clearly "no", since holding cash gives a zero nominal return which is anyway inferior to the positive – although low – nominal return given by deposits.
c) Changes in bank regulation determine changes in the currency to demand deposits that are hard to measure. Many transition countries changed their regulations quite frequently.
d) Banking crises occurred in almost all transition countries in the 1990s. The loss and return of depositor confidence was bound to at first raise, and then depress the currency to demand deposits ratio in ways that are hard to measure.

To get a feeling for the volatility of currency to demand deposits consider the figure below:

Evolution of cash/demand deposits ratio



Source: Authors' calculation, based on the *Annual statistical bulletins* of the national central banks and the IFS(FMI).

The pattern of currency to demand deposits ratios is diverse in the analyzed countries. In the CEECs the average ratio is volatile, starting from 82,7 percent in 1993 and reaching 61,4 percent in 2003. The ratio is significantly volatile in the FSU countries, reaching the higher level at the outset of the banking crisis (177,7 percent). The countries of the euro area experienced a decline in the ratio, from 34,9 percent in 1993 to 8 percent in 2003. The

volatility in the currency to demand deposit ratio, in the transition economies, is explained by shocks in monetary and financial sector.

As stated before, we are interested in the money demand as a means of transaction The analysis of money as a means of transactions imposes the comparison between money used through the banking system and money used outside the banking system. Consequently, we focus on the determinants of the ratio of cash to M1 (in national currency):

$$\ln\frac{M_{0,t}}{M_{1,t}}=\gamma_0+\gamma_1\ln Y_t+\gamma_2\ln R_{0,t}+\gamma_3\ln R_{1,t}+\gamma_4\Pi_t+\varepsilon_t \qquad (8)$$

where $R_{0,t}$ the opportunity cost of holding cash; $R_{1,t}$ the opportunity cost of holding the asset M1; Π_t refers to other variables influencing the trade-off between cash and demand deposits, such as the informal economy, the efficiency of the banking sector (test in **table 3**). The expectations are of a negative value for the coefficient of the GDP per capita (γ_1). The banking intermediation is increasing with the income level. In principle the interest rate should not affect this ratio (γ_2 and γ_3 are expected to be non-significant). There is no return for the cash in circulation and, in general the return for demand deposits, when it exists, is quite small. The results of the estimations are presented in the **table 2.** We keep exactly the same structure of the estimates equations. First, the explanatory variables are the real GDP per capita, the interest rate on time deposits and the dummy for the euro area. Than, we introduce the interest rate on government bonds (regression (7)). In the regression (8) we have the treasury bills yield as an opportunity cost of holding money.

Table 2. The ratio of cash to monetary aggregate M1 (in national currency)

Dependent variable:	**(6)**	**(7)**	**(8)[a1]**
Cash/M1	**FGLS**	**FGLS**	**FGLS**
Scale variable			
GDP per capita	**-0.218**	**-0.253**	**-0.284**
	(6.24)***	**(5.83)*****	**(8.04)*****
Opportunity cost of holding money			
Interest rate	**-0.019**		
on time deposits	**(1.20)**		
Government bonds		**0.027**	
Yield[a]		**(1.68)**	
Treasury bills			**-0.022**
Yield[a1]			**(1.28)**
Other influencing factors			
Dummy euro area	**0.035**	**0.032**	
	(0.19)	**(0.14)**	
Intercept	**1.145**	**1.138**	**1.697**
	(3.79)***	**(3.55)*****	**(5.47)*****
Tests			
Hausman test[b] (p-value)	**0.5295**	**0.9337**	**0.0278**
Breusch-Pagan LM test[c]	**0.0000**	**0.0000**	
Wooldridge test[d]	**0.0005**	**0.0009**	**0.0143**
LR test[e]	**0.0000**	**0.0000**	**0.0000**
Observations	**163**	**106**	**93**
Number of countries	**14**	**12**	**9**

Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] data missing in the case of Hungary and Croatia.
[a1] data missing in the case of Estonia, Croatia, Slovak Republic, Ukraine and the Euro-area.
[b] the null hypothesis is that of the absence of fixed effects.
[c] the null hypothesis is that of no random effects (var[u]=0).
[d] the null hypothesis is that of no first-order serial autocorrelation.
[e] the null hypothesis is that of homoskedasticity.

The Hausman and Breusch-Pagan LM tests indicate the appropriateness' use of random effects (exception regression(8)). The Wooldridge test shows the presence of serial correlation in all the estimations. The heteroskedasticity test (LR test) shows its presence in all the estimations. In order to control for these aspects we use the FGLS method.

As we can see:

- the income elasticity is negative and significant (going from –0.21 to –0.28). When GDP per capita is high, cash is less used then demand deposits. Usually a high GDP corresponds to a developed financial and banking system, and, as a consequence, to a larger use of the banking system' product and services. Therefore, the use of cash is reduced.
- the interest rate on time deposits presents a non- significant coefficient. As for the interest paid on government bonds, this does not seem to affect the cash to M1 ratio. When we take in consideration the treasury bills yield (regression (8)), this does not influence the detention of cash. The results confirm the expectations – the interest rates do not affect the ratio of cash to M1 (see regressions (6), (7) and (8)).
- The dummy variable for the Euro area is not significant in none of the regressions.

There are some other indicators influencing the ratio of cash to M1. According to Cagan (1958), the informal sector is one of the main determinants of the ratio. We will therefore proceed by introducing the index of the informal sector published by the Heritage Foundation (regression (9)). The efficiency of the banking sector is another determining factor. Consequently, we introduce the EBRD index of banking reform and the interest rate spread (regression (10) and (11)). The currency substitution is also an influencing factor. In transition countries, most studies use the ratio of foreign currency deposits to M2 as a proxy of the level of currency substitution or dollarisation. This measure does not seem adequate however, because it omits the foreign currency cash in circulation, which flaws the extent of dollarisation. Some studies use the ratio of foreign currency deposits to the monetary aggregate M2D (which is the sum of M1 and of time deposits in local currency)[14] (Sarajevs (2000), IMF studies). We consider this measure as inappropriate as the previous one. In total, we prefer to use a measure of dollarisation, which relates foreign currency deposits to total deposits (Mongardini and Mueller (1999)) (regression (12)). We realize the empirical analysis for determining the potential influence of all these "other" factors (**see table 3**).

Table 3. The ratio of cash to monetary aggregate M1 (in national currency)

Dependent variable: **Cash/M1**	**(9) FGLS**	**(10) FGLS**	**(11)[a] FGLS**	**(12) FGLS**
Scale variable				
GDP per capita	**-0.204**	**-0.189**	**-0.167**	**-0.065**
	(7.09)***	**(5.83)*****	**(4.91)*****	**(2.54)****
Other influencing factors				
Informal sector	**0.044**			
	(2.13)**			
EBRD banking reform index[a]			**-0.055**	
			(2.23)**	
Interest rate spread		**0.041**		
		(1.87)*		
Dollarisation				**0.359**
				(11.08)***
Dummy euro area	**0.130**	**0.036**		**-0.450**
	(0.89)	**(0.21)**		**(2.65)****
Intercept	**0.813**	**0.741**	**0.829**	**0.315**

[14] M1 is the sum of cash and demand deposits in local currency, so that the M2D appears as a measure of the domestic supply of money.

	(3.06)**	**(2.55)****	**(3.41)****	**(1.60)**
Tests				
Hausman test[b] (p-value)	**0.0000**	**0.3104**	**0.3636**	**0.5129**
Breusch- Pagan LM test[c]		**0.0000**	**0.0000**	**0.0000**
Wooldridge test[d](p-value)	**0.0004**	**0.0005**	**0.0013**	**0.0009**
LR test[f] (p-value)	**0.0000**	**0.0000**	**0.0000**	**0.0000**
Observations	**165**	**162**	**154**	**165**
Number of countries	**14**	**14**	**13**	**14**

Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
[a] data missing in the case of the euro area.
[b] the null hypothesis is that of the absence of fixed effects.
[c] the null hypothesis is that of no random effects (var[u]=0).
[d] the null hypothesis is that of no first-order autocorrelation.
[f] the null hypothesis is that of homoskedasticity.

Once again, the Hausman and Breusch-Pagan LM tests indicate the appropriateness' use of random effects (exception – regression (9)). The Wooldridge test shows the presence of serial correlation in all the estimations. The heteroskedasticity test (LR test) shows its presence in all the estimations. In order to control for these aspects we use the FGLS method.

The results are the following:

- we find a positive and significant effect of the informal sector on the analyzed ratio (regression (9)). This means that the bigger the informal sector in the economy, the larger is the use of cash compared to demand deposits. Not surprisingly cash is much more used in the informal sector, in order to avoid taxes and state controls in such activities.
- the well-implemented reform, illustrated by a high EBRD index of banking reform, is associated to a small ratio of cash to M1 in national currency (see regression (11)). People's confidence in the banking system is higher and, consequently, they rely more on the banking system. In the case of the interest rate spread the expectations are that the bigger is this spread, the bigger is the use of cash. A high interest rate spread is the synonym of an inefficient banking system and this explains the reduced use of the banking services and products (see also Duchêne, Jimborean and Najman (2005)). The estimations confirm the expectations (regression (10)).
- the coefficient of the dollarisation ratio is significant and positive. This means that the larger the currency substitution, the higher is the ratio of cash to M1 in national currency. What can be the explanations? As stated in the literature, the massive currency substitution was due to hyper- inflation episodes during the transition process in some Central and Eastern European Countries. Keeping deposits in dollars is often used as a way to seek a protection against inflation and exchange rate depreciation risks. So, the deeper is the monetary instability (which appears in high dollarisation ratios), the larger is the use of cash.
- the dummy for the Euro area is negative and significant only in the regressions (12) confirming that cash is less used in the Euro area countries, where there are a lot of alternative ways of placements.

There are some other indicators that can be used in order to reflect the efficiency of the banking system. These are related to the use of payment instruments, such as credit and debit cards, credit transfers and direct debits, ATM's network and POS terminals. In an economy where there is a large use of these instruments there is a smaller need of money to finance the business activities compared to an economy where all the payments are realized in cash. As in the case of the first analyzed ratio (demand deposits/total deposits), we have estimated the cash /M1 ratio as a function of the value of credit transfers (in % of GDP) and then of the number of ATMS with a card dispensing function per 1000000 inhabitants, but the results are not significant. One possible explanation comes from the fact that we do not dispose of data

for the whole sample. In a future version we intend to enlarge the data basis so that the analysis should be ameliorated.

5. Conclusions

Why do people in transition countries keep cash money in preference to demand deposits more than it is the case in the developed world? This was the starting point in our analysis.

As far as the tests and the statistical data show, cash is more preferred in the FSU countries than in the CEECs. The large informal sector, the low efficiency of the banking system and the currency substitution process are the main explanations for the high ratio of cash to M1 in all transition countries.

Demand deposits are not the predominant form of deposits in neither of these countries. Why do people prefer time deposits? The high interest rate paid by the banks can explain this form of detaining money. Another possible explanation is the lack of alternative ways of investment placements, the financial markets being little developed and in an incipient stage in these countries.

Can we speak of an inefficiency of the banking system in transition countries? It is rather an under-development, which is due to a “more recent” banking reform. We assist in these economies at the creation of the two-tiers system only at the end of the 80s; at this time, the developed economies have already had in place well regulated and wealthy banking and financial systems. These specificities of the banking systems in transition can be an explanation of the large use of cash. There are surely some other factors that determine the trade-off between cash and the use of banking services and products; a future analysis will deeply clarify this aspect.

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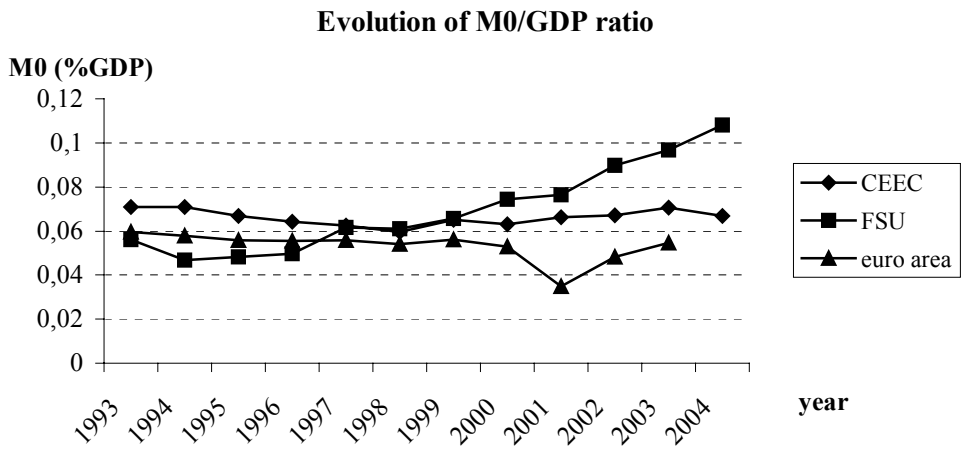
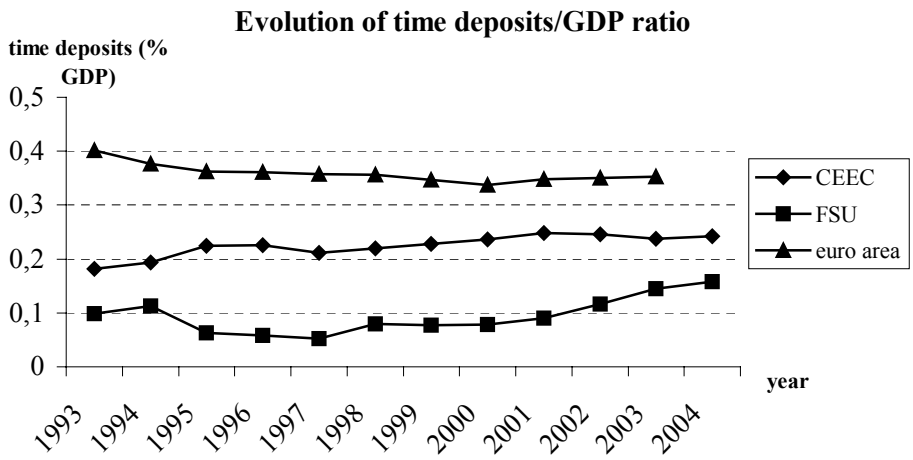
Appendix A.



Source: Authors' calculation, based on the *Annual statistical bulletins* of the national central banks and IFS (IMF).



Source: Authors' calculation, based on the *Annual statistical bulletins* of the national central banks and IFS (IMF).

Appendix B. Data sources

Cash	currency outside banks (end-of-year), Annual bulletins of central banks
Demand deposits	demand deposits (end-of-year), Annual bulletins of central banks
demdepnat	overnight deposits in national currency, end-of-year
demdepfor	overnight deposits in foreign currency, end-of-year
M1	monetary aggregate M1, end-of-year, Annual bulletins of central banks
M2	monetary aggregate M2, end-of-year, Annual bulletins of central banks
Time deposits	quasi-money, end-of-year; or time deposits =M2-M1
Timefordep	time deposits in foreign currency (end-of-year), Annual bulletins of central banks
Timedepnat	time deposits in national currency (end-of-year), Annual bulletins of central banks
infl CPI	inflation rate, CPI (annual %, end-of-period), Estonia - BERD
Informal sector	Index of Economic Freedom, informal market grading scale
1	Very low - country has a free-market economy with informal market in such things as drugs and weapons
1.5 – 2	Low - country may have some informal market involvement in labor or pirating of intellectual property
2.5 – 3	Moderate - country may have some informal market activities in labor, agriculture and transportation and moderate levels of intellectual property rights
3.5 – 4	High - country may have substantial levels of informal market activity in such areas as labor, pirated intellectual property and smuggled consumer goods, and in such services as transportation, electricity and telecommunications
4.5 – 5	Very high - country's informal market is larger than its formal economy
Bankref	EBRD index of banking sector reform (1-little progress beyond establishment of a two-tier system; 2 – significant liberalisation of interest rate and credit allocation; 3-substantial progress in establishment of bank solvency and of a framework for prudential supervision and regulation; 4-significant movement of banking laws and regulations towards BIS standards)
Irs	interest rate spread (lending rate minus deposit rate): Interest rate spread is the interest rate charged by banks on loans to prime customers minus the interest rate paid by commercial or similar banks for demand, time, or savings deposits. World Bank data
Gdpcap	GDP per capita ($), Transition Report
Depositrate	IFS(FMI), rates offered to resident customers for demand, time, or saving deposits. Often, rates for time and saving deposits are classified according to maturity and amounts deposited. In addition, deposit money bank and similar deposit-taking institutions may offer short and medium-term instruments at specified rates for specific amounts and maturities; these are frequently termed "certificates of deposits". for countries where savings deposits are important a Saving Rate (line 60k) is also published.
Lendingrate	IFS(FMI), the bank rate that usually meets the short and medium term financing needs of the private sector. This rate is normally differentiated according to creditworthiness of borrowers and objectives of financing.
ATMc	number of ATMS with a card dispensing function per 1000000 inhabitants, end of year, own calculation
credittransfer	credit transfers value (as % of GDP), ECB (Blue Book)