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. 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.

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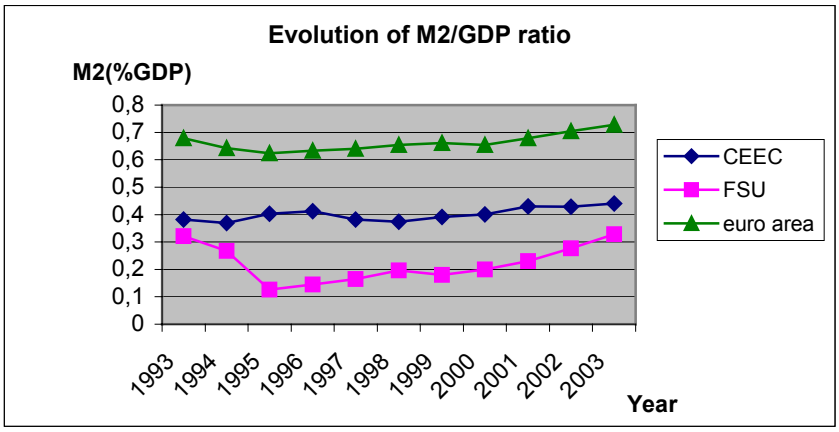
1. Introduction

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).



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 to GDP of cash on the one hand and time deposits 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

[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**.

understanding inflation (or monitoring money supply), (ii) works on the estimation of the informal ("shadow") economy using cash ratios, and (iii) studies on relationships between development and the financial sector, with applications to the banking reform of transition economies. The first line of research is rather classical and has been recently surveyed by Sriram (2001). Kruszka (2003), in a study realised on the Czech Republic, Hungary, Poland and Slovenia, shows that the main determinants of demand for cash are the real value of industry output, the nominal interest rate or the rate of inflation. More generally, inflation, interest and exchange rates remain everywhere, along with a transactions index, the basic ingredients of the money demand function. However, little is said about the structure of that demand; one exception, but rather ancient, is 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 interest return between savings and demand deposits. Another conclusion of their study is that demand for cash is insensitive to the interest rate on alternative liquid assets but is inversely dependent on the 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 form total 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 in Staerh (2003) or Meyendorff and Thakor (2002) focus on problems of competition, concentration, legal environment and banking supervision, but 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 specificities of the 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 the 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 money assets in the transition economies' case. 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 seek to apply proceeds with many countries together, also with a chronological dimension.

Section 2 of the paper 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 the listing of the quite famous "Washington consensus", a document which was established

[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.

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 build.

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 securities markets which provides little capital. Although each transition country chose its own 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 which 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 Fundacion 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.

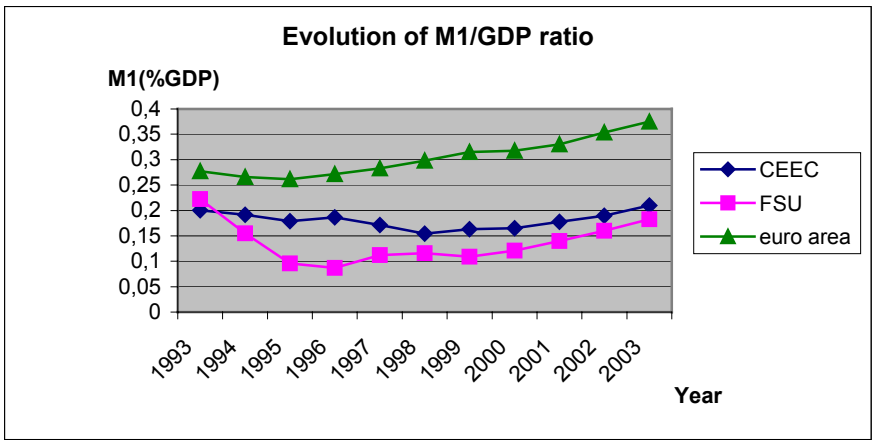
a crucial role in the development of transition countries, higher and sustained growth rate will be obtained in the long run through a build-up of domestic savings.

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 crisis 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 roll-over 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 monetisation 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 monetisation 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's *Blue Books*, the World Bank's *World Development Indicators*, the IMF *International Financial Statistics*, the EBRD *Transition Reports* [6] and includes 12 countries[7] over the period 1993-2003. 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):

	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 various kinds of money balances, we start from the demand for money model:

$$M_{i,t} = P_{i,t} * L\left(Y_t, R_{i,t}\right) \quad (1),$$

where $M_{i,t}$ –the nominal money balances; $P_{i,t}$ – an index of the price level; $Y_{i,t}$ - 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 real interest rate and

[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 10 CEECs (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia and Slovakia) and 2 FSU countries (Russia and Ukraine).

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

compensation for expected inflation, so that there is no need to consider the rate of inflation $\pi_{i,t}$ as a specific factor of demand for real cash balances.

If we split money in different components we will have the following demand functions:

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

(2),

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

(3),

where $M_{a,t},M_{b,t}$ –the demand for the assets a or b; $P_{i,t}$ – an index of the price level; $Y_{i,t}$ - the real income; $R_{a,t}$ and $R_{b,t}$ - the opportunity cost of holding the assets a or b versus another alternative assets.

The ratio of these 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 other factors influencing the demand of assets a or b.

The 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.

We can write the equation (5) in a more simple way:

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

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

In the present study we analyze the determinants of the ratio of demand deposits to total deposits in the national currency and of the ratio of cash to M1 in national currency. The two ratios will take the form of the equation (6).

In the case of demand deposits to total deposits ratio:

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

where $R_{1,t}$ - the opportunity cost of detaining the asset M1 versus an alternative benchmark asset; $R_{2,t}$ - 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 differential of interest between time and demand deposits, the volatility of stock exchange prices, the development of the financial market). We expect a negative value for the coefficient of the interest rate and a non-significant value for the coefficient of the inflation rate.

For the cash to M1 (in national currency) ratio:

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

where $R_{0,t}$ the opportunity cost of detaining 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 1.3). 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 and the inflation 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 measure of income used is the real GDP per capita. The nominal interest rate was used as an opportunity cost of holding money; it is the deposit rate. Additionally, the rate of inflation expressed in CPI (annual) was taken into account[9]. The results of the estimations are presented in sections 3 and 4.

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

Table 1.1. The determinants of the ratio of demand deposits to total deposits in national currency ratio

DDN/TotDN (demand deposits in national currency to total deposits in national currency)	GLS (RE)	GLS (RE)	GLS(RE)
	(1)	(2)	(3)
Real GDP per capita	-0.041	-0.086	-0.474
	(-0.54)	(-1.03)	(-9.11)
Interest rate on time deposits	-0.113		
	(-2.44)		
Interest rate differential			-0.514
			(-9.36)
Inflation rate		0.01	
		(0.34)	
Intercept	-0.465	-0.185	4.06
	(-0.69)	(-0.25)	(7.74)
Fixed/random effects			
Hausman(chi2)	0.82	2.81	5.42
Prob>chi2	0.6636	0.2451	0.0665
Correlation			
Wooldridge (F)	5.915	5.975	3.770
Prob>F	0.0379	0.0346	0.0881
Panel correlation	*0.7262*	*0.8003*	
Heteroskedasticity			
LR chi2	32.34	41.48	47.07
Prob>LR chi2	0.0002	0.000	0.000
Observation no.	98	110	82

& t-statistic in parenthesis.

For the estimations of the equations, the Feasible General Least Square (FGLS) method has been used. The Hausman test indicates the appropriateness' use of random effects. There is a serial correlation in our panel data, as the Wooldridge test shows (0,7262 for the equation (1) and 0,8003 for the second one). The heteroskedasticity test (the LR test) shows the presence of heteroskedasticity in all the estimations.

As one can see:

- in the two cases the real GDP per capita is not significant.
- analyzing the signs of the coefficients of interest rate and inflation rate show us that they are consistent with theoretical postulates. Taking into account the nominal deposit rate[10], one can expect that its growth should encourage saving money on bank

[9] Data are obtained from statistical bulletins of central banks of the analyzed economies.

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

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 0.113 percent. The second testes measure of an opportunity cost of holding money is the rate of inflation. It should be noticed that the relationship containing both $R_{i,t}$ and $\pi_{i,t}$ was not estimated. The inflation doesn't affect the ratio of demand deposits to total deposits.

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. If we take into account the existence of the interest rate on demand deposits in national currency[11], we introduce in our estimations the interest rate differential or spread (as a difference between the interest rate on time deposits and the interest rate on demand deposits) and we get the results presented in the **table 1.1**, regression (3). The differential of interest between demand deposits and time deposits is a factor explaining this trade-off. The larger is the differential, the smaller is the ratio of demand deposits to total deposits. This conforms to the intuition that the larger the interest paid on time deposits, the smaller is the incentive of holding demand deposits. The interest rate differential may be interpreted as the opportunity cost of holding demand deposits.

Second, does the development of the financial market influence the agents' choice between demand and time deposits? In order to answer that question, we propose to use an indicator that captures the financial market development. 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. These are questions to be treated in a future version of our study.

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 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.

In transition countries money demand can change for the following reasons:

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 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 negative, since holding cash gives a zero nominal

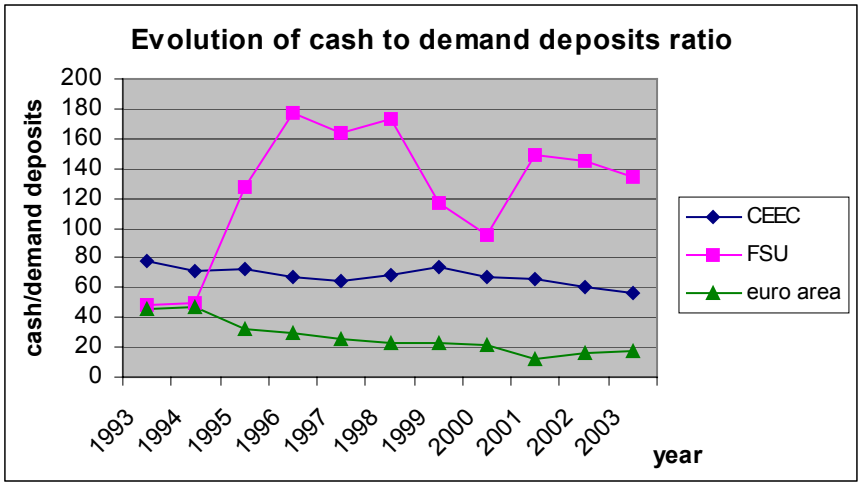
[11] Data is not available for Romania and Ukraine.

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 in ways 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:



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.

We estimate the determinants of the ratio M0 over M1. When GDP per capita is high, cash is less used then demand deposits. As for the equation (4)- (7) a higher income per capita increases the savings opportunities. 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 and the inflation rate don't seem to affect the analyzed ratio. If we introduce the informal sector, we find a positive and significant effect of this variable on the analyzed ratio (see equations (6) and (7)). 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.

Table 1.2. Trade-off between cash and demand deposits in national currency

M0/M1n (cash to M1 in national currency)	GLS (RE)	GLS (RE)	GLS (RE)	GLS(RE)
	(4)	(5)	(6)	(7)
Real GDP per capita	-0.135	-0.135	-0.145	-0.142
	(-1.91)	(-2.11)	(-2.13)	(-2.19)
Interest rate on time deposits	0.028		-0.0008	
	(1.00)		(-0.03)	
Inflation rate		0.012		-0.001
		(0.61)		(-0.08)
Informal			0.164	0.103
			(3.67)	(2.67)
Intercept	0.429	0.482	0.019	0.184
	(0.69)	(0.84)	(0.03)	(0.32)
Fixed/random effects				
Hausman(chi2)	6.71	0.55	1.53	0.18
Prob>chi2	0.721	0.7603	0.6762	0.9806
Correlation				
Wooldridge (F)	25.069	28.124	26.155	29.367
Prob>F	0.0005	0.0003	0.0005	0.0002
Panel correlation	*0.7456*	*0.7394*	*0.6989*	*0.6904*
Heteroskedasticity				
LR chi2	36.76	56.49	36.09	56.43
Prob>LR chi2	0.0001	0.0000	0.0001	0.000
Observation no.	116	128	116	128

& t-statistic in parenthesis.

We introduce now some indicators illustrating the efficiency of the banking system, such as the EBRD index of banking reform (regressions (8) and (9)) and the interest rate spread (regressions (10) and (11)). We have the following results:

Table 1.3. Trade-off between cash and demand deposits in national currency

M0/M1n (cash to M1 in national currency)	GLS (FE)	GLS (RE)	GLS(RE)	GLS(RE)
	(8)	(9)	(10)	(11)
Real GDP per capita	-0.105	-0.07	-0.149	-0.122
	(-2.24)	(-0.99)	(-3.94)	(-2.12)
Interest rate on time deposits	-0.013			
	(-0.76)			
Inflation rate		-0.002	-0.033	
		(-0.11)	(-4.00)	
EBRD bank reform index	-0.114	-0.126		
	(-2.87)	(-2.08)		
Interest rate spread			0.040	0.061
			(1.93)	(1.68)
Intercept	0.639	0.345	0.559	0.227
	(1.77)	(0.60)	(1.81)	(0.44)
Fixed/random effects				
Hausman(chi2)	819.08	0.53	0.48	0.44
Prob>chi2	0.000	0.9129	0.9224	0.8031
Correlation				
Wooldridge (F)	24.701	28.698	27.979	27.287
Prob>F	0.0006	0.0002	0.0003	0.0003
Panel correlation	*0.7471*	*0.7335*	*0.7421*	*0.7357*
Heteroskedasticity				
LR chi2	39.45	56.63	55.73	45.31
Prob>LR chi2	0.000	0.0000	0.000	0.000
Observation no.	116	128	126	126

& t-statistic in parenthesis.

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 regressions (8) and (9)). The people's confidence in the banking system is higher and, consequently, they rely more on the banking system. For the interest rate spread (equations (10) and (11)), the bigger this spread, the bigger 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)).

If we introduce the indicator of dollarisation[12] (see regressions (12) –(14)), we have the results presented in **table 1.4.** 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)[13] (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)).

[12] We use as a proxy for the dollarisation the ratio of foreign currency deposits to the total of deposits (both in foreign and national currency).

[13] 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.

Table 1.4. Trade-off between cash and demand deposits in national currency

M0/M1n (cash to M1 in national currency)	GLS (RE)	GLS (RE)	GLS(FE)
	(12)	(13)	(14)
Real GDP per capita	-0.103	-0.092	-0.160
	(-3.21)	(-2.78)	(-6.08)
Interest rate on demand deposits		-0.013	
		(-1.06)	
Interest rate on time deposits			-0.014
			(-0.88)
Dollarisation	0.292	0.486	0.423
	(6.48)	(14.71)	(13.18)
Intercept	0.482	0.695	1.226
	(2.02)	(2.66)	(5.38)
Fixed/random effects			
Hausman(chi2)	1.06	0.38	9.45
Prob>chi2	0.5901	0.9837	0.0238
Correlation			
Wooldridge (F)	8.984	7.853	8.517
Prob>F	0.0134	0.0231	0.0171
Panel correlation	*0.7249*	*0.7437*	*0.7332*
Heteroskedasticity			
LR chi2	26.33	39.98	33.92
Prob>LR chi2	0.0033	0.000	0.0001
Observation no.	110	82	98

The coefficient of the dollarisation ratio is significant and positive. This means that the larger is 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. Interest rate is not significant as soon as it remains very low for demand deposits, and is not sufficiently attractive, in comparison with other factors, to stimulate the transformation of cash into bank deposits. So, the deeper is the monetary instability (which appears in high dollarisation ratios), the larger is the use of cash.

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. A future version of our study will consider the use of the cashless payment instruments in transition economies.

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 is the main explanation 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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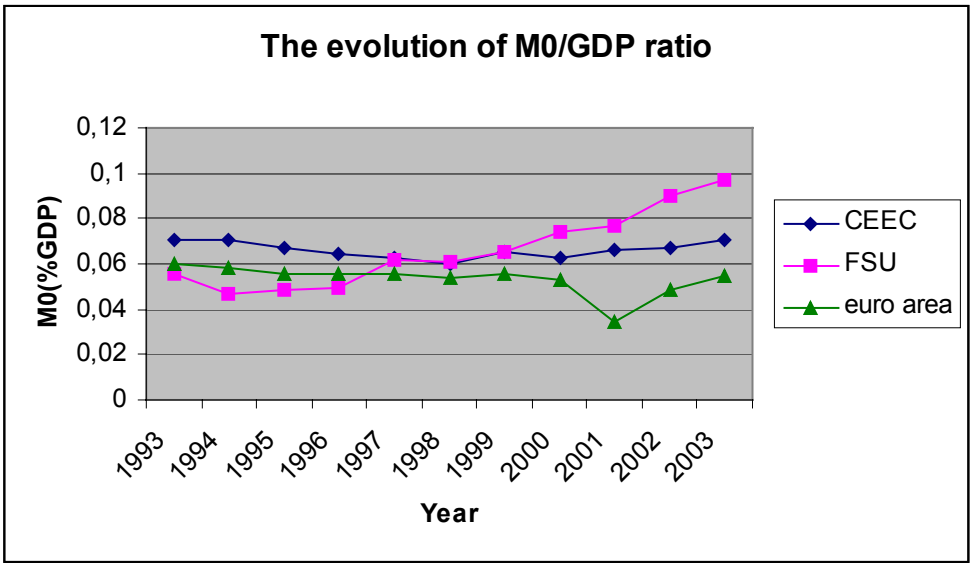
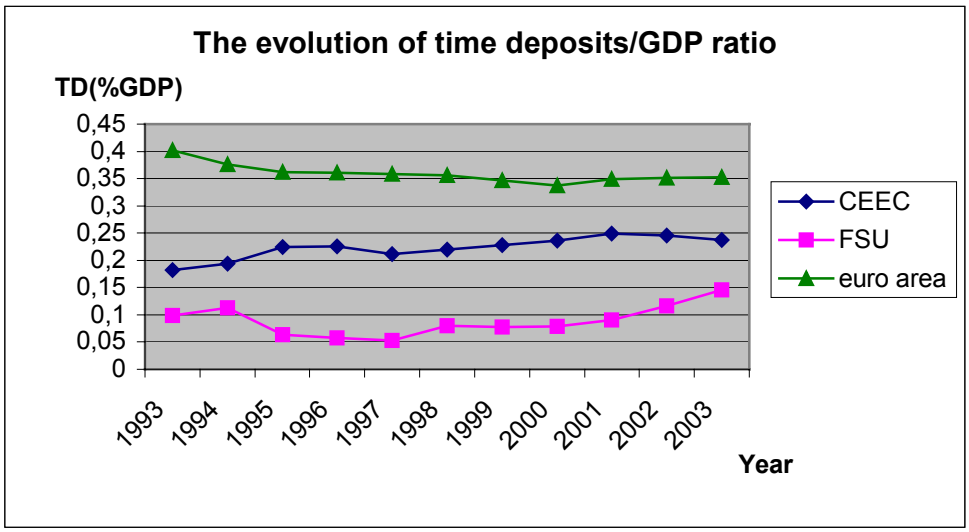
Appendix A.

Evolution of the cash to GDP ratio



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

Evolution of the time deposits to GDP ratio



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
Demdep	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
demdephous	overnight deposits households, end-of-year
demdepbus	overnight deposits businesses, end-of-year
demdepins	overnight deposits of insurance companies, end-of-year
H	monetary base, end-of-year, Annual bulletins of the National banks
M1	monetary aggregate M1, end-of-year, Annual bulletins of central banks
M2	monetary aggregate M2, end-of-year, Annual bulletins of central banks
Timedep	quasi-money, end-of-year; or time deposits =M2-M1
timefordep	time deposits in foreign currency (end-of-year), Annual bulletins of central banks
tfdhouseh	time deposits in foreign currency of households(end-of-year), Annual bulletins of central banks
tfdbusines	time deposits in foreign currency of business (end-of-year), Annual bulletins of central banks
ddev	the share of time-deposits in foreign- currency in the total of time-deposits, own calculations
savings	populations savings as a part of the quasi-money, end-of-year (Romania). Observation: for Slovenia, in savings are government's time deposits at the national bank
timedepnat	time deposits in national currency (end-of-year), Annual bulletins of central banks
tdnhouseh	time deposits in national currency of households (end-of-year), Annual bulletins of central banks
tdnbusines	time deposits in national currency of businesses (end-of-year), Annual bulletins of central banks
tdninscomp	time deposits in national currency of insurance companies (end-of-year), Annual bulletins of central banks
	Rural population (% of total population): The data on urban population shares used to estimate rural population come from the United Nations, World Urbanization Prospects.
Poprur	Total population figures are World Bank estimates. World Bank data
infl CPI, PPI	inflation rate, CPI and PPI (annual %, end-of-period), Estonia - BERD
Sscen	School enrollment, secondary (% gross): United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics. World Bank data
Open	trade openness ((exports+ imports)/GDP), own calculations based on World Bank data
Chom	unemployment rate (% of labor force, end-of-year), Transition Report BERD. For most countries data reflect official employment records from the labor registries. In many countries, small enterprises are not recorded by official data. A number of countries have moved towards ILO-consistent labor force surveys in recording changes in labor force, employment and unemployment. Where available these data are presented.
Badloans	ratio of non-performing loans to total loans. Non-performing loans include sub-standard, doubtful and loss classification categories for loans, but excludes loans transferred to a state rehabilitation agency or consolidation bank, end-of-year. Transition Report data - source: EBRD survey of central banks.
Forbk	the share of foreign-owned banks in the total number of banks, own calculations based on the Transition Report data
Exchrate	exchange rate (per US dollar), end-of-year - IFS, FMI
Volexch	standard deviation, in %, of the average nominal exchange rate related to US dollar, in the last 3 years.

Informel	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)
pricelib	EBRD index of price liberalization
competpol	EBRD index of competition policy
tradelib	EBRD index of forex and trade liberalization
ssp	EBRD index of small-scale privatization
lsp	EBRD index of large-scale privatization
entrref	EBRD index of enterprise reform
Cd	Domestic credit to private sector, % of GDP- World Bank data
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
assets	asset share of state-owned banks (in per cent), transition report data
govexp	general government expenditure, in % of GDP, BERD Transition Report data
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.
M0/GDP	the ratio of cash to GDP
DD/GDP	the ratio of demand deposits to GDP
TD/GDP	the ratio of time deposits to GDP
GDP	IFS(FMI) the Gross Domestic Product, current, in national currency, end-of-year
M1/GDP	own calculations, the rapport between the monetary aggregate M1 and the GDP
DD/M1	the ratio of demand deposits to M1
DDFC/M1	the ratio of demand deposits in foreign currency to M1
DDFC/DD	the ratio of demand deposits in foreign currency in demand deposits

population	population (thousands), ECB(Blue Book)
cardcash	number of cards with a cash function, ECB (Blue Book)
cardc	number of cards with a cash function per 1000 inhabitants, end of year, own calculation
ATMcash	number of ATMs with a card dispensing function, ECB (Blue Book)
ATMc	number of ATMS with a card dispensing function per 1000000 inhabitants, end of year, own calculation
carddebit	number of cards with a debit function, ECB (Blue Book)
cardd	number of cards with a debit function per 1000 inhabitants, end of year, own calculation
terminals	number of terminals, ECB (Blue Book)
termin	number of POS terminals per 1000000 inhabitants, end of year, own calculation
cardcredit	number of cards with a credit function, ECB (Blue Book)
cardcr	number of cards with a credit function per 1000 inhabitants, end of year, own calculation
checks	cheques, ECB (Blue Book)
paycarddebit	payments by debit cards, ECB (Blue Book)
paycardcredit	payments by credit cards, ECB (Blue Book)
credittransfer	credit transfers, ECB (Blue Book)
directdebit	direct debits, ECB (Blue Book)
branches	number of branches of credit institutions , ECB (Blue book)