

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 monetary assets in 13 transition economies of Central and Eastern Europe and the CIS. The 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. We compare the results with those obtained for several emerging countries of Latin America, Asia and the Middle East. Our study shows that the strong preference for cash -a feature of transition economies- is related to the extent of the informal sector, the low efficiency of the banking sector and the strong currency substitution. The higher share of time deposits compared to demand deposits is explained by the inefficiency of the banking sector and the underdevelopment of alternative financial markets.

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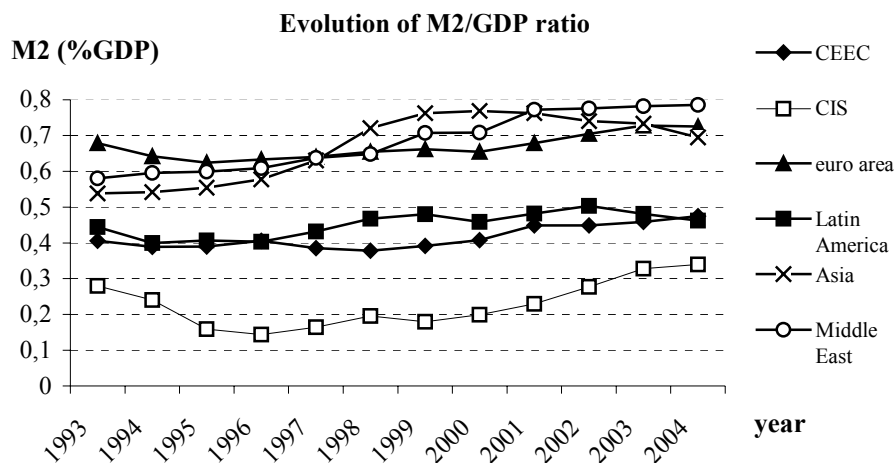
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1. Introduction

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, in the early 90s, together with high inflation and the disruption of production and of payments systems, the velocity of money increased significantly, as households and firms sought to keep to a minimum the nominal assets denominated in local currency; they turned to value-keeping, often physical, means of preserving wealth¹. 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 on a convergence track towards developed economies, albeit at various degrees and still significantly backward (see chart below: average M2/GDP for CEECs, CIS, Euro area, Latin America, Asia and Middle East).

Graph 1



Source: Authors' calculation, based on the *Annual Statistical Bulletins* of the National Central Banks and the IFS (IMF). *CIS countries*: non-weighted average of Russia and Ukraine' data. *Latin America*: non-weighted average of Argentine, Brazil, Chile, Mexico, Peru and Uruguay' data. *Asia*: non-weighted average of Thailand, Indonesia and Korea' data. *Middle East*: non-weighted average of Egypt, Turkey, Israel, Morocco and Tunisia' data.

This widely accepted story 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 (M2) to output between transition and developed economies, the convergence disappears when splitting M2 into its components. For instance, the ratio cash/GDP remains much above the average of the EU countries. In counterpart, time deposits have a larger share of total deposits than in EU². Beyond the usual debate about the overall 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? Are these patterns going to persist in the long run, or are

¹ Money, in this conception, would exclude the so-called "exotic" means of payment such as barter operations and payment arrears, as well as cash or deposits in foreign currency.

² See **Appendix A**.

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 the analysis of cash and of various types of deposits in transition economies is an exercise that 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) studies on the estimation of the 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). 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 demand for cash are: the real value of the industrial output, the nominal interest rate and the inflation rate. More generally, inflation, interest and exchange rates remain, along with a transactions index, the basic ingredients of the money demand function. Little is said about the structure of that demand for money; one exception, but rather ancient, is the analysis of Barro and Santomero (1972) for the United States' case. 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 it is inversely dependent on the interest rate on demand deposits. And, finally, the ratio of cash to total money holdings is independent of income.

The second line of research is that of the shadow economy; we take as a main reference the survey of Schneider and Ernste (1998). It refers to the well-known methods developed by Feige (1979) and Guttman (1977). Feige's method of estimating the shadow economy consists in subtracting the official GNP from a transaction-based calculated GNP. This last relies on the implicit hypothesis that there is a constant ratio between the transactions volume and the nominal GDP. The tenet that the money velocity is constant is not justified. In Feige's world, a decrease in the apparent velocity of money (as it appears when monetary aggregates grow more than nominal GDP, a very frequent situation in most transition countries for the last ten years) means a growth of the shadow economy, which is of course not the case. Guttman'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 evidence for the authorities. It has been adapted to the study of transition countries by Hanousek and Palda (2003, 2004); the authors show that the currency demand methods are useless because of intensive financial innovation during the transition process. 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 to the underdevelopment of the banking system at the outset of transition.

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 number of studies on the financial development - economic growth link; empirical studies 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 in the topic related to 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 topics such as competition, concentration, legal environment and banking supervision; but they do not link these industry structures and banks behaviours 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. We thus formulate the following hypotheses: first, “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, fiscal, social or regulatory evasions may 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 illustrating the banking system quality (which all depend on the degree of competition between banks), also might influence holding deposits with these institutions.

The main contribution of the present paper is empirical. It consists in using the panel data approach to test these hypotheses and measure the influence of each factor involved; we seek to explain the structure of monetary assets in transition economies, taking the Euro zone and some emerging countries as a benchmark in order to get a comparative view. As far as we know this methodology has not been used so far in this topic. The vast majority of studies on money demand used the Johansen co-integration method and the Vector Error Correction Models; these are time series analysis, and they are applied to several transition economies on a case-by-case basis³. The methodology we apply proceeds with many countries together and 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. The methodology is presented in the Section 3. Section 4 raises the question of the structure of deposits – demand or time deposits – held with banks. It proposes to explain the share of demand deposits in total deposits using demand for money and savings functions; and tests whether transition countries behave the same way developed or emerging countries do in this respect. Section 5 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 – the interest rate foregone – is the same; in that case, shadow economy plus banking efficiency are proposed as the main variables influencing the choice. Section 6 concludes.

2. Financial systems in transition countries

Transition involves a fundamental transformation not only of the economic system but of the political system as well. The politics of transition, the quality and the extent of structural reforms, the different developments in the financial sector are important elements of the monetary policy context in transition⁴.

Transition is usually defined as a long-term process by which, according to the EBRD:

- Enterprises are being privatized, their governance is improved and hard budget constraint is imposed.

³ See Van Aarle and Budina (1995), Cuthbertson and Bredin (2001), Kruszkza (2003), Duchêne and Goujon (2006).

⁴ See Ganey, Molnar, Rybinski and Wozniak (2002).

- Markets (both internal and foreign) are liberalized, together with the setting up of the necessary regulation agencies.
- Financial markets are organised, both with the banking system and with securities markets.
- Infrastructures are restructured.

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”⁵. Unfortunately, EBRD methodology has not been applied so far to emerging non-transition countries.

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 marks obtained by certain emerging *market* economies be very different from the ones of emerging *transition* economies? Judging from the listing of the quite famous “Washington consensus”, the reform agenda of developing market economies looked very similar to the one that would be set up a few months later for transition countries⁶. This consensus is a document that 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).

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 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 started from scratch, everything had to be built.

The development of banks during transition had its specific characteristics. First, most of the transition countries had to establish the traditional two-tier banking systems in parallel with the initial stages of other structural reforms. Second, in the initial stages of transition the banking systems in all transition countries were dominated by the state through the ownership of banks and through administrative instruments.

In the region, the number of banks quickly increased after liberalization of the banking sector. Poor equipment in capital, inexperience and non-competitiveness were the main features of the new banks. They had to compete to attract business in the condition of the automatic financing and soft budget constraint inherited from socialist times, coupled with the dramatic fall of the real economic activity due to the early-transition recession. In most

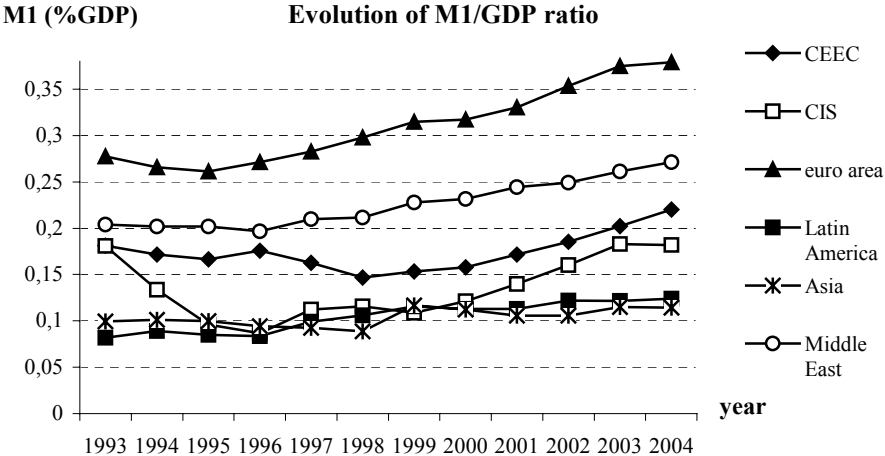
⁵ Poland is at 34, Czech Republic and Hungary are at 35. Slovenia is far behind at 31,5. Figures drawn from Transition Report 2004, p6; the methodology of calculation of the 9 reform indicators is on pages 199-200.

⁶ 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.

transition countries the banking systems were not able to overcome these problems without crises. All these problems can be traced back to lending and borrowing practices that were unrestrained, expansionary and often fraudulent. For most of the countries the banking systems operated in near-crisis environment during several years at the beginning of transition.

Despite major progresses in the reform of banking sector, 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 slightly below Latin America, the worst performer among market economies), and the situation is similar for M1. In 2004, the ratio of M1 to GDP was 17 percent in Russia, 20 percent in Hungary and 35 percent in the Czech Republic (the most advanced transition country from that point of view), compared to 38 percent as an average for the euro area, as can be seen in the graph below. Here, Asia and Latin America fare worse than transition countries.

Graph 2



Source: Authors' calculation, based on the *Annual Statistical Bulletins* of the National Central Banks and the IFS (IMF). *CIS countries*: non-weighted average of Russia and Ukraine' data. *Latin America*: non-weighted average of Argentine, Brazil, Chile, Mexico, Peru and Uruguay' data. *Asia*: non-weighted average of Thailand, Indonesia and Korea' data. *Middle East*: non-weighted average of Egypt, Turkey, Israel, Morocco and Tunisia' data.

The uneven evolution of overall monetization in transition economies came together with a specific structuring of money balances. The weakness of the banking sector and of financial markets led economic agents to behave in a particular way concerning their decisions about which assets (cash, demand 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) in the case of transition economies. We do not intend to analyze the emerging countries; we present them only for purpose of comparison.

Most data series used in this analysis come from the International Monetary Fund's *International Financial Statistics Database*. Alternatively, if the data were not available in the IFS, the following databases and sources were used: the *Annual statistical bulletins* of the National Central Banks, the European Central Bank' publication *Blue Book*, the World Bank'

World Development Indicators and the *EBRD Transition Reports*⁷. All data series are in annual frequency and cover the period 1993-2004, for a sample of 28 countries⁸. 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	2004
M0/M1												
CEEC	0,41	0,41	0,41	0,39	0,39	0,41	0,43	0,40	0,40	0,37	0,35	0,32
CIS	0,42	0,46	0,55	0,59	0,57	0,63	0,60	0,56	0,58	0,59	0,58	0,59
Euro area	0,22	0,22	0,21	0,20	0,20	0,18	0,18	0,17	0,11	0,14	0,15	0,16
Latin America	0,45	0,47	0,47	0,46	0,42	0,40	0,41	0,40	0,40	0,41	0,41	0,42
Asia	0,51	0,51	0,51	0,51	0,54	0,52	0,53	0,47	0,49	0,49	0,46	0,46
Middle East	0,40	0,41	0,42	0,40	0,40	0,40	0,41	0,41	0,40	0,42	0,40	0,39
Demand deposits to total deposits ratio												
CEEC	0,36	0,35	0,35	0,35	0,35	0,31	0,30	0,29	0,29	0,32	0,35	0,37
CIS	0,50	0,39	0,42	0,40	0,48	0,36	0,36	0,41	0,39	0,36	0,34	0,32
Euro area	0,24	0,25	0,33	0,35	0,38	0,39	0,42	0,43	0,45	0,45	0,47	0,48
Latin America	0,16	0,15	0,14	0,14	0,16	0,15	0,16	0,16	0,15	0,16	0,17	0,18
Asia	0,12	0,12	0,12	0,10	0,09	0,07	0,07	0,07	0,08	0,08	0,09	0,10
Middle East	0,26	0,25	0,24	0,24	0,25	0,25	0,24	0,24	0,24	0,24	0,25	0,25

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 introduced⁹. 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 from 1993 to 2002 (at 40-41%), followed by a decrease to 32% in 2004. The stable evolution, even though at a larger scale, is also observed in Latin America and the Middle East countries. In the other group of emerging countries –Asia- the ratio is higher (51%) and rather stable. The higher level of this ratio is in the CIS countries, with a peak of 63% in 1998 – when the Russian banking crisis has occurred. The share of demand deposits in total deposits has slowly reduced in the CIS countries. The same descending evolution is observed in the CEECs until 2001, followed by a slowly ascending trend. We observe an ascending evolution in the Euro area, while the ratio is much reduced in the emerging countries. This implied that the households and enterprises put progressively their savings in banks instead of keeping them in demand deposits. The underdevelopment of the stock market in transition countries suggests that there is no major alternative investment, so that time deposits are preferred as a means of storing value. The euro zone and the emerging countries are presented in order to have a benchmark –the euro zone- and a comparative trend. Compared to all the countries under analysis, in the Euro zone cash is still on a very low and decreasing trend (because of

⁷ See **Appendix C** for a more precise description of the data set (both on the way indicators were built and on data sources).

⁸ The analysis is realized over 11 CEECs (Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia and Slovakia), 2 CIS countries (Russia and Ukraine), the euro-zone (as an average for the 15 countries), 6 Latin American (Argentine, Brazil, Chile, Mexico, Peru and Uruguay), 3 Asian (Thailand, Indonesia, Korea) and 5 Middle Orient’ countries (Egypt, Turkey, Israel, Morocco and Tunisia).

⁹ See Willem F. Duisenberg (2002).

the substitution of non-cash (check, credit and debit cards) payments for cash transactions), time deposits are decreasing due to alternative more profitable investment, as for example in stock markets.

3. Methodology

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. This goes for cash and demand deposits; however, as far as time deposits are concerned, the interests paid on these assets make them appear more as a kind of savings than as standard 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. As mentioned before, the main contribution of our paper is empirical; it consists in analyzing the structure of monetary assets in transition economies by the use of the panel data method. Until now, the large majority of studies on demand for money were time series analysis and they have used the Vector Error Correction Models or the Johansen co-integration approach. As far as we know the methodology we apply has not been used so far in this area.

We take as main references the studies of Ericsson (1998) and Sriram (2001). Ericsson (1998) has provided a practical "checklist" for empirical studies of money demand. The main issues concern the economic theory, data measurement, parameter constancy, the opportunity cost of holding money, co-integration, model specification, exogeneity and inferences for policy. Most of these issues arise in empirical modeling of time series.

Sriram (2001) offered a reference tool for the research on demand for money in various countries. In his study, Sriram surveyed a selected number of studies that evaluated the demand for money using the error-correction model approach across a range of industrial and developing countries. The objective was to extract relevant information from these studies and provide it in a readily useable and comparable framework.

We start from the transactions demand approach. Consequently, the function of money demand that we use in our analysis takes the following form:

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

where $M_{i,t}$ is the nominal money balances of type i in period t ; P_t is the price level index; Y_t - the real income; $R_t - R_{i,t}$ is the short-run nominal interest rate foregone by type i asset, that is the differential between posted interest rate on deposits R and the interest rate $R_{i,t}$ on type i asset (% 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 or deposit 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:

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

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

where $M_{a,t}, M_{b,t}$ is the demand for monetary assets of type a or b ; P_t is the price level index; Y_t is the real income; $R_t - R_{a,t}$ and $R_t - R_{b,t}$ -the opportunity costs of holding the monetary asset a or b .

There are some strong simplifying assumptions we introduce here. The first is that of independence of the monetary assets a and b . In fact, the forms under which money is kept depend on one another, and we will develop a more complex model of assets choice in a further paper. However, the simplified formulation which is proposed below allows a preliminary assessment of the structure of monetary assets. Second, economic theory does not provide any rationale as to the correct mathematical form of the money demand function. There is a consensus that the log-linear version is the most appropriate functional form (Zarembka, 1968). Thus, we will consider that the money demand function takes the form of a Cobb-Douglas function. Last, in order to be compatible with this functional form, we introduce the interest rate variable modulo 1 (as a discount factor). The ratio of the two monetary assets will eventually be:

$$\frac{M_{a,t}}{M_{b,t}} = \frac{P_t * La(Y_t, 1 + R_t - R_{a,t})}{P_t * Lb(Y_t, 1 + R_t - R_{b,t})} = \frac{Y_t^{\alpha_1} * (1 + R_t - R_{a,t})^{\alpha_2} * \theta_t^{\omega_1}}{Y_t^{\beta_1} * (1 + R_t - R_{b,t})^{\beta_2} * \theta_t^{\omega_2}} \quad (4),$$

$$\dots = Y_t^{(\alpha_1 - \beta_1)} * (1 + R_t - R_{a,t})^{\alpha_2} * (1 + R_t - R_{b,t})^{(-\beta_2)} * \theta_t^{(\omega_1 - \omega_2)}$$

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

Passing to logs leads to:

$$\ln \frac{M_{a,t}}{M_{b,t}} = (\alpha_1 - \beta_1) \ln Y_t + \alpha_2 \ln(1 + R_t - R_{a,t}) + (-\beta_2) \ln(1 + R_t - R_{b,t}) + (\omega_1 - \omega_2) \ln \theta_t \quad (5),$$

However, this equation may be simplified in the two cases we are interested in. First, if we compare cash and demand deposits, both types of assets do not bring any interest ($R_a = R_b = 0$); the opportunity cost of holding a or b is the same and reduces to $1 + R_t$. Second, if we compare demand deposits and time deposits, the foregone interest is in principle zero for time deposits ($R_t = R_{bt}$), whereas the foregone interest on demand deposits is simply R_t .

In both cases, equation (5) can thus be re-written in a simple way:

$$\ln \frac{M_{a,t}}{M_{b,t}} = \gamma_0 + \gamma_1 \ln Y_t + \gamma_2 \ln(1 + R_t) + \gamma_3 \Pi_t + \varepsilon_t \quad (6),$$

where Π_t stands for some other factors influencing the demand for the monetary assets a or b and ε_t - the error term.

The income elasticity of the money demand is generally positive¹⁰. It is stated that its coefficients (α_1, β_1) should be situated between 0.5 and 1.0 and the one of the interest rate elasticity (α_2, β_2) 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 (ω) depends on the choice of their measure. Now, as far as equation 6 is concerned, coefficients γ result from a difference between α, β , and ω and there is no a priori indication on the value they should take. What can be predicted is that coefficient γ_2 should be small when comparing cash and demand deposits (because α_2 is close to β_2) and significantly negative when comparing demand deposits with time deposits (because β_2 disappears from the picture). As for coefficients γ_1 , in principle they should also be small (because α_1 is close to β_1); however, there are reasons why the elasticity of various assets to income may differ (especially, we may expect that the ratio of cash to total assets decreases with income more than holding deposits); that makes γ_1 difficult to guess.

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

¹⁰ When the money demand is the monetary aggregate M1 or M2.

system. We will therefore first analyze the determinants of the ratio of demand deposits to total deposits, and, secondly, those of the cash to M1 ratio.¹¹ These ratios take the form of 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.¹² We use the Feasible General Least Square (FGLS) method for the estimation of the equations; this method allows controlling for the residuals heteroskedasticity and autocorrelation. The results are presented in Sections 4 and 5.

The issue of comparability between countries

Are transition countries being similar to emerging countries in terms of the financial sector features? Any eventual similarities would impose a classification into several groups and then a separate estimation of the regressions for each of these groups. We have a sample of 28 countries: 13 transition, the Euro area and 14 emerging countries. We have to apply a procedure so that to take into account all these countries, controlling in the same time for the eventual similarities and/or differences between them.

We consequently proceed to a Principal Component Analysis¹³. This data analysis method is a technique of statistical description of simultaneous links between variables and of individuals' similarities and differences. In our case, it allows us to delimitate individuals (countries) sharing the same characteristics in terms of banking and financial system features.

As we can see in **graph 3** below, there is an obvious distinction of two main groups: the CEECs and the CIS countries (in red) -on the one hand and the other countries –on the other hand (Latin American in green, Asian in yellow, Middle East in bleu and euro area in black).

Following the results of the Principal Component Analysis, in the empirical part of our study we will estimate the regressions by taking into account the existing difference between the two groups: the CEECs and CIS countries -on the one hand- and the other countries (euro area, Latin America, Asia, Middle East) – on the other. Thus, we choose as a base group the CEECs and the CIS countries –our group of interest- and we create a dummy variable for the second group. The introduction of this dummy variable in the regressions allows us to control for the existence of the two separate groups. The sections that follow will take into account these aspects.

¹¹ The two ratios are calculated by dividing indicators expressed in national currency.

¹² The span of time covers 12 years and the sample consists of 28 countries.

¹³ See **Appendix B** for a detailed presentation of the method.

however, several analysis that include simultaneously several interest rates, like those of Cooley and LeRoy (1981), Goldfeld and Sichel (1990), Ericsson (1998). Another alternative return on money is the interest on treasury bills (regression 3). The influence of credit transfers (as % of GDP) is shown in the regression 4.

Table 1. The ratio of demand deposits to total deposits¹⁴ (in national currency)¹⁵

<i>Dependent variable:</i>	(1)	(2)	(3)	(4)
Demand deposits/total deposits	FGLS	FGLS	FGLS	FGLS
<i>Scale variable</i>				
GDP per capita	-0.009 (0.22)	0.077 (1.01)	-0.128 (3.45)***	-0.261 (3.29)***
<i>Opportunity cost of holding money</i>				
Interest rate	-0.130 (5.17)***			-0.169 (3.75)***
Government bonds yield^a		-0.137 (3.65)***		
Treasury bills yield^{a1}			-0.085 (2.64)**	
<i>Other influencing factors</i>				
Credit transfers (% of GDP)				0.039 (1.41)
Dummy 2nd group	-0.723 (8.98)***	-0.521 (2.56)**	-1.54 (19.64)***	-0.68 (3.66)***
Intercept	3.95 (10.02)***	3.31 (5.00)***	4.80 (14.17)***	6.09 (8.73)***
<i>Tests</i>				
Hausman test^b (p-value)	0.8689	0.6643	0.3957	0.4965
Breusch-Pagan LM test^c	0.0000	0.0000	0.0000	0.0000
Wooldridge test^d	0.0000	0.0082	0.0000	0.0156
LR test^e	0.0000	0.0000	0.0000	0.0000
Observations	297	141	137	116
Number of countries	25	15	14	13

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 (CEECs); Argentine, Brazil, Chili, Peru and Uruguay (Latin America); Indonesia (Asia) and all Middle East countries..

^{a1} data missing in the case of Estonia, Croatia, Slovak Republic, Ukraine (CEECs and CIS); the Euro-area; Argentine, Peru and Chili (Latin America); all Asian countries; Morocco and Tunisia (Middle East).

^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.

As one can see from Table 1:

- the income elasticity is not significant in the first two regressions and negative and significant in regressions (3) and (4). The first two regressions may correspond to the idea, suggested above by the theoretical analysis, that income elasticities of various kinds of deposits may be very close. The results of regressions 3 and 4, which show a significantly negative income elasticity, may be due to the dropping of a large number of observations, which may change the influence of the “second group dummy”: due to data availability, there is only one “second group” country (Mexico) which appears in both regressions 2 and 3. It is thus difficult to ascertain that the income elasticity of the deposits ratio is significantly different from zero.

¹⁴ The Hausman and Breusch-Pagan LM tests indicate the appropriate use of random effects. The Wooldridge test shows the presence of serial correlation in all the regressions. The heteroskedasticity (LR) test shows its presence in all the estimations. In order to control for these aspects, we use the FGLS method.

¹⁵ The estimations including inflation rate and those related to the market capitalization of listed companies (as % of GDP) are not significant.

- analysing the interest rate elasticities, we see that they are consistent with theoretical postulates. The interest rate on time deposits is expected to influence significantly and negatively the share of demand deposits. Taking into account the nominal deposit rate¹⁶, one can expect that its growth should encourage saving money on bank accounts - that is getting rid of the most liquid monetary assets. Negative signs of the coefficient support entirely this conclusion (see regressions 1 and 4). The increase of this interest rate by 1 percent decreases the ratio of demand deposits to total deposits by 0,13 to 0,17 percent. However, there are other measures of interest rate than the rate on time or savings deposits: one may recourse to the bonds market and chose as a measure of interest rate either the Government Bonds or the Treasury Bills yield. The use of these alternative measures does not change the results significantly (see columns 2 and 3).

We use the 2nd group of countries (the Euro area, Latin America, Asia and the Middle East) as a “benchmark” by means of a dummy variable. The coefficient of this variable is negative and significant in all the regressions, confirming the data in **table A** - the use of demand deposits is less in the 2nd group of countries. The coefficient of this dummy variable gives us the average difference in the ratio of demand to total deposits between CEECs and CIS, on one hand, and the euro-area, Latin America, Asia and Middle East on the other hand, given the same amount of the other explanatory variable (GDP per capita, deposit rate, government bond yields, treasury bills yield, credit transfers).

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 – even a low one – 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. That may be the market capitalization of listed companies (as % of GDP) which is provided by the World Bank; normally, a developed financial market reduces the intermediating role of banks and should provide more profitable opportunities of savings than a mere time deposit with a bank. The estimations show however that the results are not significant, and this variable has been withdrawn from the tables. This is rather disappointing as there is an intuition that in transition countries, the weak development of equity markets is the cause of the accumulation of deposit accounts with banks. 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 13 countries (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia and Slovakia from the 1st group and Brazil, Mexico, Korea and Turkey from the 2nd one). This estimation (see regression (4)) shows the expected positive but non-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 demand deposits.

5. 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

¹⁶ Deposit rate is the rate offered to resident customers for demand, time, or saving deposits (IFS (IMF) definition).

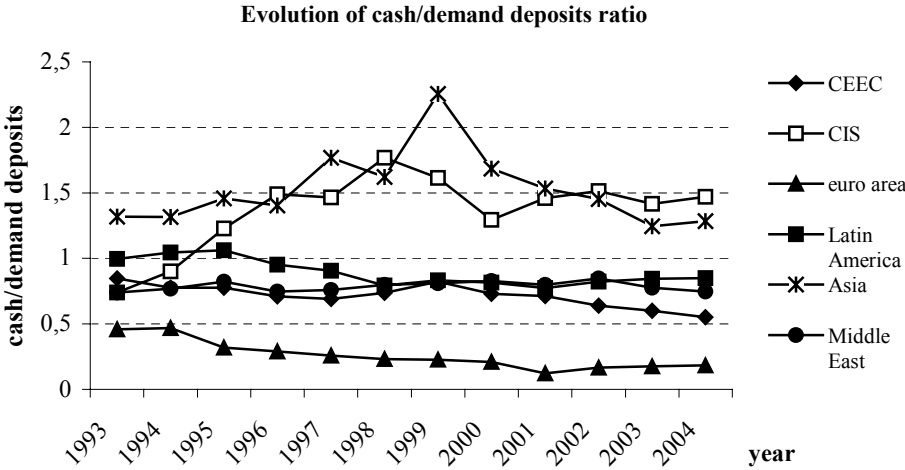
services was very limited. Following transition, foreign banks have entered financial markets and introduced competition. Competition narrows the gap between the level of financial services provided in transition and in the developed economies. Some products, such as cheques were never introduced in transition countries, as they were already outdated and superseded 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 cash 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 cash to demand deposits ratio in ways that are hard to measure.

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

Graph 4



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

The pattern of cash to demand deposits ratios is diverse in the analyzed countries. In the CEECs the average ratio is descending from 82.7 percent in 1993 and reaching 55 percent in 2004. The ratio is significantly volatile in the FSU countries, reaching the higher level at the outset of the banking crisis (176.7 percent). The countries of the euro area experienced a decline in the ratio, from 45 percent in 1993 to 18 percent in 2004. The significant volatility is also observed in the Asian countries, where, in average, the ratio is superior to 100%. In the Middle East this ratio is rather stable, being situated between 70 and 85 percent. Latin America countries have some higher ratio, but with a stable evolution. The volatility in the

cash 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):

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

where R_t is the interest rate and 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 (**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 is expected to be non-significant, as stated above in the theoretical section). There is no return for the cash in circulation and, generally, the return for demand deposits, when it exists, is quite small¹⁷. The interest on time deposits, the government bond yield and the treasury bills yield, which are the opportunity cost of holding either cash or demand deposits, will thus have the same impact on both assets, and should not influence their relative share. The results of the estimations are presented in the **table 2**. The structure of the estimated equations is quite similar to that of the previous section. First, the explanatory variables are the real GDP per capita, the interest rate on time deposits and the 2nd group dummy. Then, we introduce the interest rate on government bonds (regression (6)). In regression (7) 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)¹⁸

<i>Dependent variable:</i>	(5)	(6)	(7) ^{a1}
Cash/M1	FGLS	FGLS	FGLS
<i>Scale variable</i>			
GDP per capita	-0.147 (8.62)***	-0.252 (8.97)***	-0.171 (6.89)***
<i>Opportunity cost of holding money</i>			
Interest rate on time deposits	-0.008 (0.72)		
Government bonds Yield ^a		0.017 (1.15)	
Treasury bills Yield ^{a1}			-0.004 (0.36)
<i>Other influencing factors</i>			
Dummy 2 nd group	0.075 (1.63)	0.167 (2.78)***	-0.030 (0.45)
Intercept	5.15 (33.52)***	5.96 (24.91)***	5.37 (24.63)***
<i>Tests</i>			
Hausman test ^b (p-value)	0.5760	0.7541	0.0793
Breusch-Pagan LM test ^c	0.0000	0.0000	0.0000
Wooldridge test ^d	0.0000	0.0009	0.0008

¹⁷ Hess (1971) shows that interest rates do not have any significant effect on cash holdings.

¹⁸ The Hausman and Breusch-Pagan LM tests indicate the appropriateness' use of random effects. The Wooldridge test shows the presence of serial correlation in all the estimations. The heteroskedasticity (LR) test shows its presence in all the estimations. In order to control for these aspects we use the FGLS method.

LR test^e	0.0000	0.0000	0.0000
Observations	297	141	137
Number of countries	25	15	14

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 (CEECs); Argentine, Brazil, Chili, Peru and Uruguay (Latin America); Indonesia (Asia) and all Middle East countries.

^{a1} data missing in the case of Estonia, Croatia, Slovak Republic, Ukraine(CEECs and CIS); the Euro-area; Argentine, Peru and Chili (Latin America); all Asian countries; Morocco and Tunisia (Middle East).

^b the null hypothesis is that of the absence of fixed effects.

^c the null hypothesis is that of no random effects ($\text{var}[u]=0$).

^d the null hypothesis is that of no first-order serial autocorrelation.

^e the null hypothesis is that of homoskedasticity.

As we can see:

- the income elasticity is negative and significant (going from -0.14 to -0.25). When GDP per capita is high, cash is less used than 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 – whatever its form – presents a non-significant coefficient, as predicted by the theoretical model. (see regressions (5), (6) and (7)).
- The dummy variable for the 2nd group is not significant in regressions (5) and (7), but it is positive and significant in regression (6), showing that, in average, the ratio of cash to M1 in national currency is higher in the 2nd group of countries compared to the CEECs and the CIS countries.

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 (8)). The efficiency of the banking sector is another determining factor. Consequently, we introduce the index of restrictions on banks (*banking*) published by the Heritage Foundation¹⁹ and the interest rate spread (regression (9) and (10)). 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)²⁰ (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 (11)). There is no need to introduce the interest rate as soon as it is not significant (see regressions in table 2) and additionally the interest rate on demand deposits is close to zero. We realize the empirical analysis for determining the potential influence of all these “other” factors (see **table 3**).

¹⁹ See **Appendix C** for the definition of this index.

²⁰ 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 3. The ratio of cash to monetary aggregate M1 (in national currency)²¹

<i>Dependent variable:</i>	(8)	(9)	(10) ^a	(11)
Cash/M1	FGLS	FGLS	FGLS	FGLS
<i>Scale variable</i>				
GDP per capita	-0.141 (8.61)***	-0.130 (8.53)***	-0.173 (12.59)***	-0.088 (6.09)**
<i>Other influencing factors</i>				
Informal sector	0.041 (1.97)**			
Banking restrictions		0.019 (2.69)**		
Interest rate spread ^a			0.022 (1.74)*	
Dollarisation				0.088 (8.16)***
Dummy 2 nd group	0.092 (2.05)**	0.106 (2.44)**	0.069 (2.02)**	0.154 (3.78)**
Intercept	5.043 (34.21)***	4.92 (37.72)***	5.27 (42.50)***	4.36 (34.55)***
<i>Tests</i>				
Hausman test ^b (p-value)	0.7612	0.6605	0.3636	0.7707
Breusch- Pagan LM test ^c	0.0000	0.0000	0.0000	0.0000
Wooldridge test ^d (p-value)	0.0000	0.0000	0.0013	0.0000
LR test ^f (p-value)	0.0000	0.0000	0.0000	0.0000
Observations	299	299	283	299
Number of countries	25	25	24	25

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

^a data missing in the case of the Turkey and Tunisia.

^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.

The results are the following:

- we find a positive and significant effect of the informal sector on the analyzed ratio (regression (8)). Usually, the bigger the informal sector in the economy, the larger is the use of cash compared to demand deposits. Not surprisingly cash is more used in the informal sector, in order to avoid taxes and state controls –regulations-- in such activities. We can add that small activities and self entrepreneurs usually do not have access to the banking sector.
- the higher the control of the government in the banking system, illustrated by a high index of restrictions on banks, the higher the ratio of cash to M1 in national currency (see regression (9)). People's confidence in the banking system is reduced and, consequently, they do not rely 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 --or a low level of competition-- and this explains the reduced use of the banking services and products (see also Duchêne, Jimborean and Najman (2005)). The spread is also a proxy for the cost of using banking services; hence the higher is the spread the higher is the incentive to use cash instead of bank money. The estimations confirm the expectations (regression (10)).

²¹ Once again, the Hausman and Breusch-Pagan LM tests indicate the appropriateness' use of random effects. 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 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 2nd group is positive and significant only in all the regressions confirming that cash is more used in this 2nd group of countries.

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 terminals²². 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), then of the number of ATMS with a card dispensing function per 1000000 inhabitants, of the number of credit and debit cards per 1000 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.

6. 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 preferred in the CIS countries more 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.

²² Duca and Whitesell (1995) show that credit card ownership is associated with lower transactions deposits.

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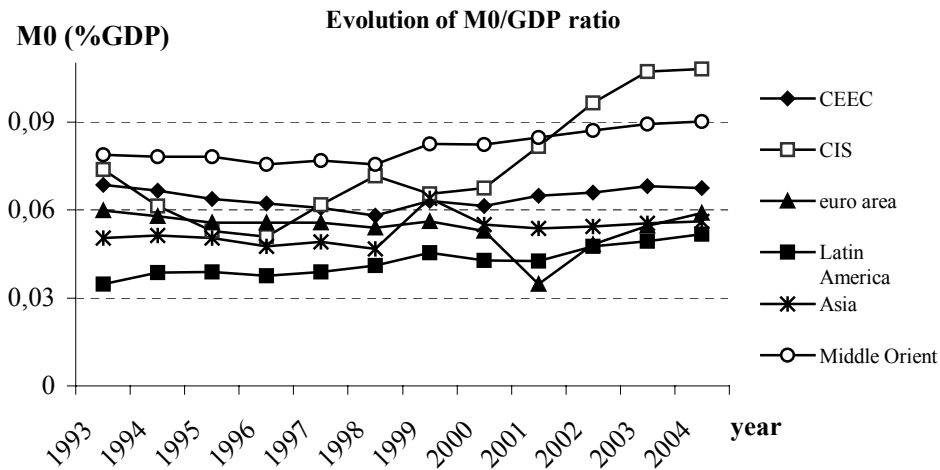
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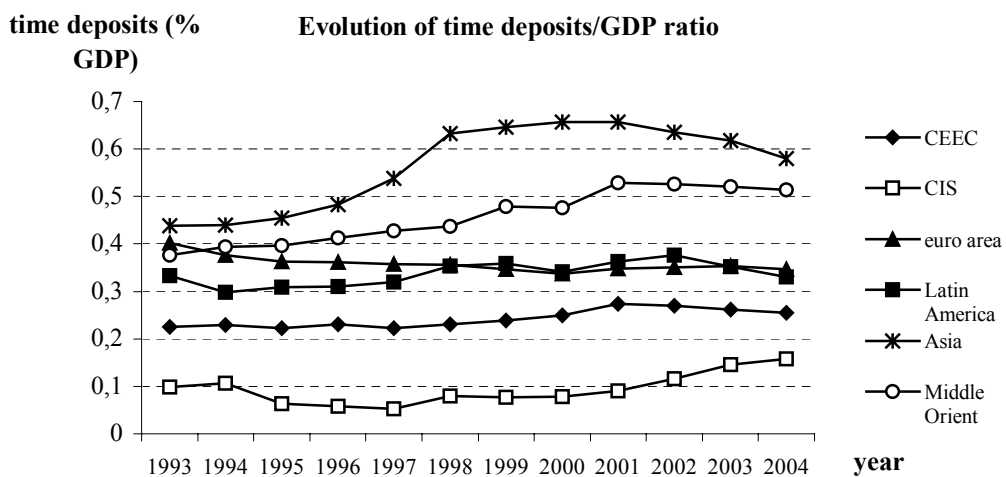
Appendix A.

Graph 5



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

Graph 6



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

Appendix B. Principal Component Analysis

The objective of this analysis consists in examining the main features of the banking systems in the CEECS and the CIS countries compared with those from the euro area, the Latin America, Asia and the Middle East for a period of time going from 1993 to 2004. We use the same database. The active variables used for the Principal Component Analysis are: inflation rate (CPI, annual), exchange rate volatility, informal banking, domestic credit to the private sector (% GDP), government expenditures (% GDP), government bond yields, treasury bill yields, deposit rate, lending rate, market capitalisation (% GDP), cash/GDP, demand deposits/GDP, time deposits/GDP, GDP per capita, population, number of ATM with a card dispensing function per 1000000 inhabitants, number of POS terminals per 1000000 inhabitants, number of cards with a credit function per 1000 inhabitants.

The analysis is realised with the SPAD data analysis program. We determined the number of the main axis (i.e. the axis revealing the most important information from the initial database). And we retain then the first two axis. The factor analysis is first explained in relation with the variables and then with the individuals.

Concerning *the variables*:

- the **1st axis**: the variables *domestic credit to the private sector(% GDP)*, *GDP per capita*, *market capitalisation(% GDP)*, *informal* and *time deposits/GDP* constitute the group of variables with the higher contribution to the 1st axis forming. They have coordinates close to the unity, these coordinates being of 0.75; 0.68; 0.63; -0.63 and 0.53 respectively. The variable *informal* has a negative contribution (-0.63).
- the **2nd axis**: the variables *exchange rate volatility*, *inflation* and *deposit rate* constitute the variables which contribute the most, positively, to the 2nd axis forming. They have coordinates of 0,52 and 0,50 respectively.

Concerning *the individuals*:

- the 1st axis: there are the *euro area*, *Chile*, *Thailand*, *Korea* and *Israel* that are highly correlated to the 1st axis, positively. This group of countries opposes to that formed by *Bulgaria*, *Latvia*, *Lithuania*, *Poland*, *Romania*, *Russia*, *Ukraine*, *Croatia* and *Turkey*.
- the 2nd axis: the individuals highly correlated, positively, with the 2nd axis are the *euro-area*, *Thailand*, *Indonesia*, *Korea* and *Israel*. They oppose to the individuals highly negatively correlated, such as: *Czech Republic*, *Estonia*, *Hungary*, *Latvia*, *Lithuania*, *Slovakia* and *Morocco*.

We can summarize the results as following:

- the 1st axis summarizes 18,66% from the total dispersion. This axis make a delimitation between the individuals (countries) having levels of the domestic credit to the private sector (% GDP), of GDP per capita, of market capitalisation (% GDP) and of time deposits/GDP superior to the mean, but levels of informal sector inferior to the mean (*euro area*, *Chile*, *Thailand*, *Korea* and *Israel*) and the individuals (countries) with levels of informal sector superior to the mean, but inferior levels of the domestic credit to the private sector (% GDP), of GDP per capita, of market capitalisation (% GDP) and of time deposits/GDP (*Bulgaria*, *Latvia*, *Lithuania*, *Poland*, *Romania*, *Russia*, *Ukraine*, *Croatia* and *Turkey*).
- the 2nd axis summarizes 12,64% from the total dispersion. The delimitation is made in terms of the inflation rate, exchange rate volatility and deposit rate and we have on one hand countries with levels of these variables inferior to the mean (*euro area*, *Thailand*, *Indonesia*, *Korea*, *Israel*) and individuals with levels superior to the mean (*Czech Republic*, *Estonia*, *Hungary*, *Latvia*, *Lithuania*, *Slovakia* and *Morocco*).

The **graph 3** confirms the obtained results.

Appendix C. Data sources

cash (M0)	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. For Latvia, Slovakia(1993-1998) and Russia the demand deposits in foreign currencies are calculated as a ratio of the total of demand deposits. This ratio is almost the same as the ratio of time deposits in foreign currencies to the total of time deposits.
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
timedepnat	time deposits in national currency (end-of-year), Annual bulletins of central banks
poprur	Rural population (% of total population): The data on urban population shares used to estimate rural population come from the United Nations, World Urbanization Prospects. Total population figures are World Bank estimates. World Bank data
infl CPI	inflation rate, CPI (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
exchrte	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 (for the euro area the non-weighted average of member's index value)
	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
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	
govexp	general government expenditure, in % of GDP, BERD Transition Report data	
gov. bonds	central national banks statistics, yield on government securities	
treasury bill	central national banks statistics, the rate at which short-term securities are issued or traded in the market	
deposirate	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.	
banking	Index of Economic Freedom, banking and finance grading scale (for the euro area the non-weighted average of member's index value)	
	1 very low	government provides financial sector with prudent regulatory supervision by an independent central bank; government may be active in some financial institutions but must comprise a very minor role in terms of total market share; credit allocated on market terms; foreign financial institutions able to operate freely and treated the same as the domestic financial institutions; banks may engage in all types of financial services
	2 low	limited government involvement in financial sector beyond providing prudent regulatory supervision by an independent central bank; few limits on foreign financial institutions; credit allocated on market terms; government may be active in some financial institutions but must comprise a limited role in terms of total market share; banks may engage in all types of financial services;
	3 moderate	substantial government influence in financial sector; regulatory supervision of financial institutions may be insufficient; government owns or controls banks that have a significant role in terms of market share; government influences allocation of credit; foreign financial institutions face restrictions; country may maintain some limits on financial services; bank formation may face some barriers;
	4 high	heavy government involvement in financial sector; central bank not independent; regulatory supervision of financial institutions poor; banking system in transition or unstable; government owns or controls most financial institutions; government directs allocation of credit; possible corruption; foreign financial institutions discouraged; bank formation faces significant barriers
	5 very high	very heavy government involvement in financial sector; nearly all financial institutions owned or controlled by government; financial institutions in crisis or collapse, or banks operate on primitive basis; nearly all credit controlled by government; most credit extended to state-owned enterprises; corruption widespread; foreign financial institutions prohibited; bank formation virtually nonexistent.
mkc	the market capitalization of listed companies (% GDP), WDI (World Bank)	
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	
population	population (thousands), ECB(Blue Book)	
cardcash	number of cards with a cash function, ECB (Blue Book)	Table6: Payment card functions and accepting devices (end-of-year)
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)	Table6: Payment card functions and accepting devices (end-of-year)

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)	Table6: Payment card functions and accepting devices (end-of-year)
cardd	number of cards with a debit function per 1000 inhabitants, end of year, own calculation	
terminals	number of terminals, ECB (Blue Book)	Table6: Payment card functions and accepting devices (end-of-year)
termin	number of POS terminals per 1000000 inhabitants, end of year, own calculation	
cardcredit	number of cards with a credit function, ECB (Blue Book)	Table6: Payment card functions and accepting devices (end-of-year)
cardcr	number of cards with a credit function per 1000 inhabitants, end of year, own calculation	
checks	checks, ECB (Blue Book)	Table9: Indicators of the use of various cashless payment instruments: volume (total number) of transactions (millions)
paycarddebit	payments by debit cards, ECB (Blue Book)	Table9: Indicators of the use of various cashless payment instruments: volume (total number) of transactions (millions)
paycardcredit	payments by credit cards, ECB (Blue Book)	Table9: Indicators of the use of various cashless payment instruments: volume (total number) of transactions (millions)
credittransfer	credit transfers, ECB (Blue Book)	Table9: Indicators of the use of various cashless payment instruments: volume (total number) of transactions (millions)
directdebit	direct debits, ECB (Blue Book)	Table9: Indicators of the use of various cashless payment instruments: volume (total number) of transactions (millions)
branches	number of branches of credit institutions , ECB (Blue book)	