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Model selection for modeling the demand for narrow money in transitional economies[1]

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Abstract

The aim of this study was to verify the stability of monetary systems. Systems were measured by aggregate narrow money in selected emerging economies. The United Kingdom's economy was used as a benchmark. The Baumol-Tobin and Friedman monetary models were used as the theoretical basis for the for empirical error-correction models. A Bayesian averaging of classical estimates (BACE) approach was used to incorporate model uncertainty and select the best model. The results show that the monetary systems in 6 of the 11 economies were stable in the long run and that a set of factors changed in the short run. The robustness of the model selection based on the BACE procedure was strongly confirmed.

Keywords: model uncertainty, BACE, jointness, robust variables selection, gretl
JEL: E41, P24, C52

1 Introduction

This paper was motivated by the question of whether Milton Friedman and Anna Schwartz's model of the demand for money (Friedman & Schwartz 1982) is appropriate for contemporary transition economies. This idea comes directly from the works of Hendry & Ericsson (1991*b*), who analyzed the specifications of several money demand models for the United Kingdom (UK) and the USA. The aim of this paper is is to consider both economic and econometric issues. The first aspect, closely related to motivation, focuses on the question of whether economies in transition are affected by the set of money demand factors that was proposed by Friedman & Schwartz (1982) and which of them are robust despite of volatile surroundings. The second aspect, which is related to using an econometric methodology, is to evaluate both the probability of each factor included in the model and the probability of the entire model specification. To do so, Bayesian averaging of classical estimates (BACE), which was proposed by Sala-i-Martin et al. (2004), has been applied. The specification of the demand for money model is based on the approach proposed by Hendry & Ericsson (1991*b*). There is particular interest in the stability of the relation between the negative and significant parameters of the error correction terms.

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The novelty of this research lies in employing the BACE approach to model the demand for money with the equilibrium error correction (EqCM) mechanism. In the autoregressive distributed lags model, which includes many variables, we face high model uncertainty because a large number of variables are potential covariates. The Bayesian approach takes this uncertainty into account, so the inference about the relevance of the individual variables is based on the entire model space rather than just a single specification. To address this issue, we use the above mentioned BACE approach, which allows us to assess the explanatory power of both competing variables and models.

It should be mentioned that econometric modeling of the demand for money is part of a very old tradition because it has a strong economic background in both monetarist and new Keynesian theories (Friedman 1956, Tobin 1956). This type of modeling was very popular in 1980s and 1990s; seminal papers were written by Hendry & Ericsson (1991*a*,*b*), Serletis (1991), Baba et al. (1992), Ericsson & Sharma (1998), Hendry & Mizon (1998), Mulligan & Sala-i-Martin (2000). It is worth mentioning that a special issue of the *Empirical Economics* journal was edited in 1998 to emphasize the most important aspects and examples of modeling money demand. The papers by Hendry & Mizon (1998), Ericsson (1998) addressed the methodological issues of modeling money demand. In eight other papers, the authors discussed the empirical aspects of modeling money demand in several European countries: Ripatti (1998) for Finland, Eitrheim (1998) for Norway, Scharnagl (1998), Lütkepohl & Wolters (1998) for Germany, Vega (1998) for Spain, Ericsson et al. (1998*a*) for the UK, Ericsson & Sharma (1998) for Greece, Peytrignet & Stahel (1998) for Switzerland and Juselius (1998), Fagan & Henry (1998), Fase & Winder (1998) for the European Union.

Many papers contributed new ways of modeling money demand. Haug & Tam (2007) analyzed alternative linear and nonlinear specifications for modeling the demand for different aggregates of money in the USA. The volatility effect on money demand was investigated by Choi & Oh (2003) and Schmidt (2007), among others. There are many examples of analyses carried out on the stability of the demand for money function in the Euro area (see, for example, Kontolemis 2002, Dreger & Wolters 2010).

An important stream of analysis is the application of econometric techniques for modeling money demand in emerging economies, contributing to country-specific explanations of long- and short-run tendencies. Choudhry (1995) looked for a stationary long-run money demand function for M1 and M2 aggregates in Argentina, Israel and Mexico. His results confirmed that there is a stationary money demand function in the long run in all three countries conditional on the effect of currency substitution in the money demand function. This is in line with the fact that in dollarized economies, money growth and inflation are related to the movement of exchange rates. An interesting example was also discussed by Oomes & Ohnsorge (2005), who considered the demand for broad money in Russia, considered here as a dollarized economy demonstrated by the possibility of using US dollars and the euro as the means of payment when large transactions are made. These scholars found that extending the Russian ruble broad money aggregate with foreign cash holdings helps improve the stability of both the money demand model and the model of inflation. Bahmani-Oskooee is an author who was very focused on the demand for money in emerging economies in Asia, Africa and Central and Eastern Europe. For example, in Bahmani-Oskooee & Rehman (2005), the demand for money in India, Indonesia, Malaysia, Pakistan, the Philippines, Singapore and Thailand was estimated. It was shown that while in India, Indonesia and Singapore, the M1 monetary aggregate is cointegrated with its determinants, in the remaining countries, the M2 aggregate is cointegrated. Bahmani-Oskooee et al. (2013) considered the experiences of certain emerging countries: Armenia, Bulgaria, the

Czech Republic, Hungary, Poland, Russia, Bolivia, South Africa, Colombia, and Malaysia. These scholars tested the stability of the money demand models and showed that their GARCH-based measures of uncertainty had more short-run effects than long-run effects in most countries. On the other hand, Haider & Mohammad (2016) analyzed the money demand functions for Gulf Cooperation Council countries and Saatçioğlu & Korap (2005) estimated a vector error correction (VEC) model. The results indicated that in Turkey, inflation is responsible for the instability of aggregate M2 in the long run.

The remainder of this paper is organized as follows. In Section 2, the model foundations are explained, and the BACE methodology is briefly presented. Section 3 describes the data characteristics and empirical model specifications. In Section 4, the empirical results are shown and discussed. The robustness check results are presented in Section 5. Finally, Section 6 concludes.

2 Methodological backgrounds

The tradition of studying the demand for money in econometrics spans back to the concept introduced by Fisher, who, at the beginning of the 20th century, formulated the foundations of the quantitative theory of money that was was developed by Friedman in the 1950s and 1960s. In its original form, the demand for money was generated by the demand for cash and bank deposits, while the circulation of money was described by Fisher's equation of exchange. According to Friedman's theory, wealth, understood as the discounted source of any income and consumer goods, is an essential motive for the actions of man.

The factors determining income and leading directly to an increase in wealth are money, bonds, shares, physical goods and human capital. Because Friedman's monetary theory concerns real terms, nominal changes cannot interact with the demand for money. This assumption ensures the stability of Friedman's theory.

The contemporary approach used for the econometric modeling of the demand for money assumes that an examination of the co-integration between the processes has been taken into account in the analysis, which means that both long-run and short-run paths are considered (see Engle & Granger 1987). Here, co-integration is considered as a measure of stability of monetary processes in the long run. The results of empirically modeling the demand for money have been published in several papers. From our perspective, the most interesting papers are those for which the equilibrium error-correction (EqCM) mechanism was used. In the articles of Hendry & Ericsson (1991*a*), Ericsson et al. (1998*a*,*b*), the authors analyzed congruent single equation error-correction models using an annual time series, while Hendry & Mizon (1998) used a bivariate VAR system. Univariate EqCM models for quarterly time series can be found in Hendry (1988), Hendry & Ericsson (1991*b*), Ericsson (1998), Ericsson & Sharma (1998), while the use of multivariates can be found in Kontolemis (2002).

Assuming that M represents nominal money demand and P stands for its deflator (price level), we follow the general specification so that money demand might be explained by the following function:

$$M/P = f(Y, IR), \tag{1}$$

where IR is a measure of the opportunity cost of holding money represented by the nominal interest rate (understood as an alternative cost for keeping money) and Y is real economic activity (for example: the GDP or consumer expenditures). Taking variables in logarithms (lower cases hereafter), we assume that function 1 can be written as a basic equation of the demand for money in the following form (see Hendry & Ericsson 1991*b*):

$$mp = \delta \cdot y + \gamma \cdot IR, \tag{2}$$

where $mp = m - p$. It should be noted that the mentioned variables can be expressed by different economic measures. In the present study the following variables are analyzed: Y is real total final expenditures (TFE), M represents the nominal narrow money supply (M1), P is the consumer price index (CPI), and IR is a combination of short-term and immediate (interbank call money) interest rates. Taking the above into account, relation 2 can be written as an error-correction general unrestricted model (GUM) in the following form:

$$\Delta mp_t = \beta_0 + \sum_{s=1}^{4} \beta_{1,s} \Delta mp_{t-s} + \sum_{s=0}^{4} \beta_{2,s} \Delta y_{t-s} + \sum_{s=0}^{4} \beta_{3,s} \Delta p_{t-s} + \beta_4 ECM_{t-1} + \sum_{s=0}^{4} \gamma_s IR_{t-s} + \alpha I_t + \varepsilon_t, \tag{3}$$

where ECM_{t-1} represents the error-correction term, I_t is a matrix of country-specific dummy variables, α, β_i and γ_s are slope coefficients, $\varepsilon_t \sim IID$ is an error term and $\Delta x_t = x_t - x_{t-1}$ for any variable x_t. The lag order is the same for all variables (excluding the error-correction term and the deterministic variables) and is set to 4 because we use a quarterly time series. This is in line with the work of Hendry & Ericsson (1991*b*).

One of the basic problems in econometric modeling is the identification of the determinants of the dependent variable. Building a model with a large number of explanatory variables results can potentially lead to decision-making problems that can greatly complicate this process. It is difficult to determine which model includes the most appropriate number of explanatory variables. Moreover, different types of modeling approaches can lead to to different estimates and conflicting conclusions.

One potential solution to overcome this issue is using the BACE approach, which enables the measurement of the importance of particular potential determinants. This method was suggested by Sala-i-Martin et al. (2004) and is is a rough approximation of the earlier Bayesian model averaging (BMA) technique presented by Fernández et al. (2001). The main difference between the BACE and BMA approaches is that one has less restrictive a priori assumptions regarding the parameters of interest. Instead of using a proper prior distribution of parameters, BACE is performed with noninformative priors. As a consequence of the estimation method, BACE uses the Schwarz model selection criterion, so the posterior weights of the estimated models are proportional to the natural logarithm of the likelihood function corrected for degrees of freedom (see Lamla 2009, Simo-Kengne 2016).

Since we use diffuse the priors for all parameters of interest, we have to define only the prior expected model size $\mathrm{E}(\Xi)$, which represents our belief concerning model size Ξ. One plausible approach is using $\mathrm{E}(\Xi) = \bar{k}/K$ to obtain a uniform prior of the model space (in this Case, all linear combinations are a priori equally probable). For the BACE Approach, the posterior odds ratio between the two competitive models M_0 and M_1 is given by:

$$\frac{\Pr(M_0|y)}{\Pr(M_1|y)} \approx \frac{\Pr(M_0)}{\Pr(M_1)} T^{(k_1-k_0)/2} \left(\frac{SSE_0}{SSE_1}\right)^{-T/2} \tag{4}$$

where $\frac{\Pr(M_0)}{\Pr(M_1)}$ is the prior odds ratio, k_i is the number of parameters, and SSE_i is the sum of the squared errors in model M_i. The general formula of the posterior probability of model M_l

is given by:

$$\Pr(M_l \mid y) \approx \frac{\Pr(M_l) T^{-k_l/2} SSE_l^{-T/2}}{\sum_{r=1}^{2^K} \Pr(M_r) T^{-k_r/2} SSE_r^{-T/2}}, \tag{5}$$

where 2^K denotes the total number of all linear combinations of the explanatory variables and $\sum_{l=1}^{2^K} \Pr(M_l \mid y) = 1$.

In addition to calculating the posterior probability of the models, we obtain a few interesting posterior measures that help us to understand the estimation results such as the posterior mean of the model parameters and posterior inclusion probability (PIP), which are model uncertainty measures. The posterior mean of the model parameters across the model space is a weighted average of the posterior means of the individual models:

$$\mathrm{E}(\beta \mid y) \approx \sum_{r=1}^{2^K} \Pr(M_r \mid y) \hat{\beta}_r, \tag{6}$$

where $\hat{\beta}_r$ represents the OLS estimates.

The posterior inclusion probability $\Pr(\beta_i \neq 0 \mid y)$ is The probability that, conditional on the data but unconditional with respect to a specific model, x_i, which is associated with β_i, is the relevant explanatory variable used in (see Leamer 1978, Doppelhofer & Weeks 2009) The posterior inclusion probability is calculated as the sum of the posterior model probabilities for all the models including explanatory variable x_i:

$$\Pr(\beta_i \neq 0 \mid y) = \sum_{r=1}^{2^K} \Pr(M_r|y), \tag{7}$$

Based on the BACE results, we can also calculate one more useful characteristic: a jointness measure. According to Ley & Steel (2007), jointness is the posterior odds ratio of the models including both x_i and x_j explanatory variables versus that of the models that include them separately, We can express this measure using the following equation:

$$J = \ln \left\{ \frac{\Pr(x_i \cap x_j|y)}{\Pr(x_i|y) + \Pr(x_j|y) - 2\Pr(x_i \cap x_j|y)} \right\}, \tag{8}$$

where $\Pr(x_i \cap x_j|y)$ is the sum of the posterior probabilities of the models containing both variables: x_i and x_j. Table 1 represent the different variants of jointness of the variables (see Doppelhofer & Weeks 2009):

Table 1: Classification of the strength of the jointness measures

Evidence	Jointness statistics
strong substitutes	$J \leq -2$
significant substitutes	$-2 < J \leq -1$
not significantly related	$-1 < J < 1$
significant complements	$1 \geq J < 2$
strong complements	$J \geq 2$

One can easily notice that this jointness measure is symmetric.

3 Model specification and data characteristics

In this paper, we use two different model specifications in three variants each for selected transition economies and the UK, which plays the role of the benchmark economy. Among the transition economies, we consider two different groups: (1) new member states of the European Union coming from Central and Eastern Europe, such as the Czech Republic (CZE), Hungary (HUN) and Poland (POL); (2) dollarized economies struggling to develop very fast, which results in many ups and downs observed in the longer period. These are: Brazil (BRA), India (IND), Indonesia (IDN), Mexico (MEX), Russia (RUS), Turkey (TUR) and South Africa (ZAF).

Because of the unobservability of the demand for money, it is proxied by the real money supply, assuming that the money market is balanced. Taking the above into account, money demand is defined here as the demand for narrow money and is measured as aggregate M1. The rationale for the selection of this aggregate comes from the fact that it contains the same monetary categories across the entire sample for all economies being investigated. According to Hendry (1995), the narrow money category is appropriate when the stability in the long run is checked.

The sample covers the years 1995-2017, using quarterly observations. Using this time frame ensures the comparability of both the data and the results. From 2008-2009, all the economies experienced deep economic recession; a dummy variable for this period was also employed.

The following macroeconomic time series were collected from the OECD.Stat database:

- GDP_t – nominal gross domestic product, expenditure approach: seasonally adjusted annual levels in current prices (national currency).
- P_t – price deflator of the GDP: a seasonally adjusted index with reference year 2010 = 100.[1]
- M_t – narrow money aggregate: a seasonally adjusted index with reference year 2010 = 100.
- IMP_t – imports of goods and services: national currency, current prices, annual levels, seasonally adjusted.
- R_t – short-term interest rates: the three-month interbank offer rate expressed in percent per annum.[2]
- imR_t – immediate interest rates: the money interbank rate expressed in percent per annum.

Based on the original time series, the following variables were calculated. Real TFE according to formula: $Y_t = (GDP_t + IMP_t)/P_t$, which is equivalent to TFE, as defined by Hendry & Ericsson (1991*b*). Then, the following interest rate was defined as $dR_t = R_t - imR_t$, which is the premium of holding money in three-month deposits. This variable corresponds to Friedman's differential yield on money (see Friedman & Schwartz 1982, pp. 259-280). Additionally, for the period of low short-term interest rates, the following dummy was introduced:

$$R08_t = \begin{cases} R_t, & \text{from 2008Q2 to 2013Q4,} \\ 0, & \text{in other periods.} \end{cases}$$

[1] Data are not available for the full sample for Brazil (from 1996Q1), The Czech Republic (from 1996Q1), India (from 1997Q1), Turkey (from 1998Q1) and Russia (from 2003Q1).

[2] Data are not available for the full sample for Brazil (from 1996Q3), Mexico (from 1997Q1) and Russia (from 1997Q1).

The variables M_t, P_t, Y_t are taken in logs and denoted as m_t, p_t, y_t, respectively. We also defined the following dummy variables:

- *Cr_Asia97* equals 1 at 1997Q2 and 0 otherwise; this variable indicates the 'Asian financial crisis'
- *Cr_Ecu98* equals 1 at 1998Q2 and 0 otherwise; this variable indicates the 'Ecuador financial crisis'
- *Cr_RusArg98* equals 1 at 1998Q3 and 0 otherwise; this variable indicates the 'Russian financial crisis' and the 'Argentine Great Depression'
- *Cr_Bra99* equals 1 at 1999Q1 and 0 otherwise; this variable indicates the so-called 'samba effect' that was a spin-off of the '1997 Asian financial crisis'
- *Cr_Tur01* equals 1 at 2001Q1 and 0 otherwise; this variable indicates the 'Turkish economic crisis'
- *Cr_Uru02* equals 1 at 2002Q3 and 0 otherwise; this variable indicates the 'Uruguay banking crisis'
- *Cr_Fin* equals 1 at 2008Q1 and 0 otherwise; this variable indicates the 'World Financial crisis of 2007–2008'
- *Cr_Euro09* equals 1 at 2009Q4 and 0 otherwise; this variable indicates the 'European debt crisis'
- *Cr_RusBra14* equals 1 at 2014Q3 and 0 otherwise; this variable indicates the 'Russian financial crisis' and the 'Brazilian economic crisis'
- *Cr_Chi15* equals 1 at 2015Q2 and 0 otherwise; this variable indicates 'Chinese stock market turbulence'
- *UEexpand* equals 1 at 2004Q2 and 0 otherwise; this variable indicates the enlargement of the European Union.

These dummies are related to different shocks that might affect the demand for money in the analyzed economies. The applicability of the specified dummies is presented in table 2.

Table 2: Applicability of the dummy variables

	CZE	POL	HUN	RUS	MEX	BRA	TUR	IDN	IND	ZAF	UK
Cr_Asia97								✓	⋆		✓
Cr_Ecu98					✓	✓					
Cr_RusArg98				⋆	✓	✓					
Cr_Bra99					✓	✓					
Cr_Tur01							✓				
Cr_Uru02					✓	✓					
Cr_Fin	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cr_Euro09											✓
Cr_RusBra14				✓	✓	✓					
Cr_Chi15	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
UEexpand	✓	✓	✓								✓

⋆ means that a dummy variable cannot be used due to the size of the sample.

Following Hendry & Ericsson (1991*b*), we allow two alternative assumptions regarding parameter δ in relation 2. If $\delta = 0.5$, the Baumol-Tobin square-root model for the transaction demand for cash is applied (see Baumol 1952, Tobin 1956)[3] and the case when $\delta = 1.0$ corresponds to Friedman's quantity theory (see Friedman 1956). Hendry & Ericsson (1991*b*) found that for the UK, Friedman's model should be applied, while in the case of the United States, the Baumol-Tobin model should be used. Since that time, we analyze transition economies using different levels of prices, magnitude of outputs, levels of unemployment and growth mechanisms. We cannot exclude either of these two theories; therefore, we use both. Taking the above into account, an error-correction term in model 3 can be defined as:

$$ECM_t = \begin{cases} m_t - p_t - \frac{1}{2}y_t, & \text{for Baumol-Tobin model (specification type 1 in our research),} \\ m_t - p_t - y_t, & \text{for Friedman model (specification type 2 in our research).} \end{cases} \tag{9}$$

The interest rates in model 3 may be included in different ways. In our research, IR is a set of 4 different combinations of interest rate measures. It takes one of the following forms:

$$IR_t = \begin{cases} \sum_{s=0}^{4} \gamma_{1,s} R_{t-s} + \sum_{s=0}^{4} \gamma_{2,s} imR_{t-s} + \sum_{s=0}^{4} \gamma_{3,s} \Delta R08_{t-s}, & \text{specification type `a',} \\ \sum_{s=0}^{4} \gamma_{1,s} \Delta R_{t-s} + \sum_{s=0}^{4} \gamma_{2,s} \Delta imR_{t-s} + \sum_{s=0}^{4} \gamma_{3,s} \Delta R08_{t-s}, & \text{specification type `b',} \\ \sum_{s=0}^{4} \gamma_{1,s} dR_{t-s} + \sum_{s=0}^{4} \gamma_{2,s} \Delta R08_{t-s}, & \text{specification type `c',} \\ \sum_{s=0}^{4} \gamma_{1,s} \Delta dR_{t-s} + \sum_{s=0}^{4} \gamma_{2,s} \Delta R08_{t-s}, & \text{specification type `d'.} \end{cases} \tag{10}$$

In the specification 'a' – two interest rate levels are assumed, while in the specification 'b', their dynamics are taken into account. In specifications 'c' and 'd', the interest rate premium of holding money for 3 months is considered, in levels and first differences, respectively. These four specifications are in line with those in Friedman & Schwartz (1982) and Hendry & Ericsson (1991*b*). In our research, the dummies for 3 months of interest rates were used beginning with the second quarter of 2008 until the last quarter of 2013, which corresponds to a low interest rate period.

Taking into account the relations 9 and 10 we have 8 possible forms of a general unrestricted model defined in 3 for each analyzed country. Since the number of possible coefficients in each GUM is at least 28, we decided to use the Bayesian model selection approach in our research. We employed the BACE approach proposed by Sala-i-Martin et al. (2004) for variable selection. In this case, the BACE analysis was performed for all possible GUMs using the BACE 1.1 package[4] (see Błażejowski & Kwiatkowski 2018) for the gretl program[5] (see Cottrell & Lucchetti 2018). The following parameters for the MC^3 algorithm were set:

- total number of Monte Carlo iterations: 1,000,000, including 10 percent burn-in draws
- model prior distribution: binomial with prior average model size equal to $k/2$ (where k is number of variables in given GUM), which means that all possible specifications are equally probable
- significance level for the initial model $\alpha = 0.6$, which means that we dropped the most statistically nonsignificant variables in the initial model at the beginning of the procedure
- number of the top ranked models: 30
- it is allowed that constant may be removed from or added to any model.

[3]Although this formula is called the 'Baumol-Tobin' model, there are some differences between these two authors (see Jao 1978).

[4]The BACE 1.1 package is available at http://ricardo.ecn.wfu.edu/gretl/cgi-bin/gretldata.cgi?opt=SHOW_FUNCS.

[5]Gretl is an open-source software that is used for econometric analysis and is available at http://gretl.sf.net.

4 The empirical results

In this section, the empirical results obtained using the research strategy described in sections 2 and 3 are presented and discussed. Before starting the procedure of model selection, all the time series were tested for stationarity. The ADF-GLS test (see Elliott et al. 1996) confirmed that the series $m_t, p_t, y_t, R_t,$ and imR_t are integrated at order 1 ($I(1)$) at the 0.05 significance level. The only exceptions are R_t for India and the UK and imR_t for India and Brazil, which are stationary ($I(0)$). Then, we assumed that two co-integration relations, as defined in 9, exist. Because the error-correction term (ECM) is included in the model 3 and we have 8 possible specifications for each country, we have defined the minimum conditions that must be met by the posterior results for a given specification to be taken into account in the next steps. The conditions for ECM variable are as follows: the sign of the mean value of coefficient estimate must be negative and, at the same time, the minimum value of PIP must exceed 2/3 (0.66). In table 3, the mean values of the coefficient estimates and the posterior inclusion probabilities for the ECM variable in all model specifications are shown. The values of PIP are interpreted as uncertainty measures.

Table 3: Mean of the coefficient estimates and the posterior inclusion probabilities for ECM variables

		CZE	POL	HUN	RUS	MEX	BRA	TUR	IDN	IND	ZAF	UK
1a	Mean	**-0.016**	-0.004	0.000	0.003	-0.002	-0.011	-0.006	-0.003	-0.020	-0.025	0.001
	PIP	**0.981**	0.622	0.264	0.455	0.355	0.244	0.605	0.360	0.331	0.618	0.502
1b	Mean	-0.004	-0.003	0.006	-0.004	-0.003	-0.004	-0.004	-0.002	-0.004	**-0.060**	**-0.009**
	PIP	0.547	0.583	0.486	0.233	0.519	0.217	0.610	0.328	0.295	**0.991**	**0.784**
1c	Mean	**-0.006**	**-0.006**	-0.001	-0.006	-0.002	-0.007	**-0.009**	-0.003	-0.005	**-0.032**	**-0.007**
	PIP	**0.784**	**0.791**	0.369	0.489	0.471	0.254	**0.788**	0.511	0.327	**0.885**	**0.681**
1d	Mean	**-0.007**	**-0.006**	-0.001	-0.045	**-0.005**	-0.008	**-0.008**	-0.006	-0.004	**-0.042**	**-0.007**
	PIP	**0.820**	**0.794**	0.401	0.641	**0.788**	0.287	**0.752**	0.575	0.300	**0.964**	**0.713**
2a	Mean	**-0.029**	-0.002	0.002	0.000	-0.001	-0.001	-0.005	-0.016	-0.032	-0.050	-0.009
	PIP	**0.967**	0.527	0.503	0.525	0.495	0.132	0.610	0.387	0.420	0.627	0.441
2b	Mean	-0.002	-0.001	**0.012**	-0.004	-0.001	-0.001	-0.003	-0.011	-0.009	**-0.121**	**-0.019**
	PIP	0.595	0.504	**0.680**	0.195	0.556	0.142	0.594	0.383	0.480	**0.992**	**0.965**
2c	Mean	**-0.003**	**-0.005**	0.004	-0.002	-0.001	-0.002	**-0.013**	-0.040	-0.010	**-0.083**	**-0.017**
	PIP	**0.669**	**0.672**	0.536	0.466	0.467	0.157	**0.724**	0.623	0.490	**0.907**	**0.935**
2d	Mean	**-0.004**	**-0.004**	0.003	-0.038	**-0.003**	-0.003	**-0.014**	-0.047	-0.010	**-0.108**	**-0.017**
	PIP	**0.712**	**0.667**	0.546	0.455	**0.690**	0.171	**0.723**	0.647	0.501	**0.977**	**0.962**

Results with $PIP > 0.66$ are in bold.

The results in table 3 show that for Brazil, Russia, Indonesia and India we cannot find a specification that meets the minimum conditions for the ECM variable defined above, while Hungary, the only one ECM variable with $PIP > 0.66$ has a positive sign. This apparent instability results from massive financial problems experienced in 2008 and the immense rescue package that Hungary received from several institutions: 6.5 billion euros from the European Union, 12.5 billion euros from the International Monetary Fund and 1 billion euros from the World Bank (see Csáki 2013). On the other hand, for 6 countries, more than 1 specification satisfies these conditions. For those countries, the ranked total probability of the models was used as the criterion for selecting the best specification. The results are presented in table 4.

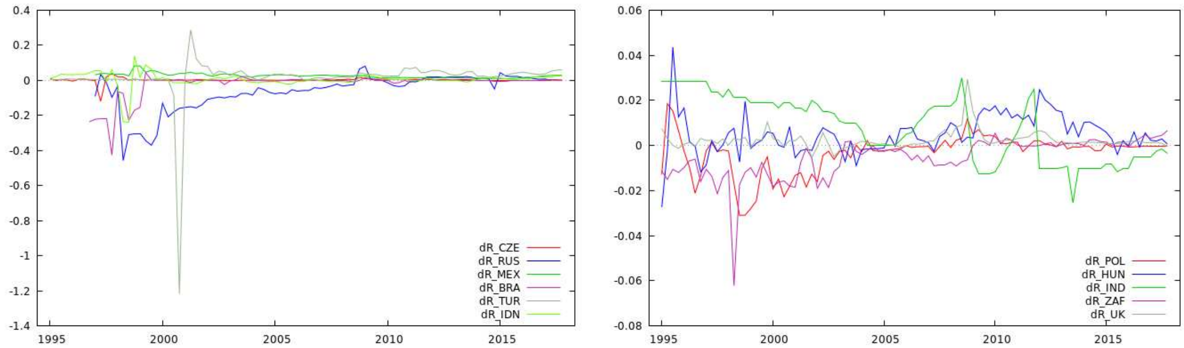
According to table 4, we can state that for the analyzed economies in transition (without the UK) in 4 cases, specification type 1 (Baumol-Tobin's model) is preferred, and in 6 cases, specification type 2 (Friedman's model) outperforms. Moreover, specification type 'd' is selected for 9 cases, with the exception of only Russia, where type 'b' is selected. This result means that the dynamics of the premium of holding money for 3 months (ΔdR_t) is an appropriate measure of the interest rate for modeling the demand for narrow money in the analyzed economies. The type 'a' and 'c' specifications seem to be inadequate. One possible explanation of why the

Table 4: Best specifications according to the rank of the total probability of the models

	CZE	POL	HUN	RUS	MEX	BRA	TUR	IDN	IND	ZAF	UK
1a											
1b											
1c											
1d	✓	✓	⋆				✓				
2a											
2b				⋆							
2c											
2d					✓	⋆		⋆	⋆	✓	✓

⋆ means that the selected specification does not meet all conditions for the *ECM* variable.

Figure 1: Values of the dR variable for analyzed economies



premium of holding money does not work in Russia can be found in figure 1: variable dR has negative values up to the third quarter of 2008. It is worth mentioning that the results for modeling the money demand for the UK are in line with the results presented in Hendry & Ericsson (1991*b*). Although numerous external and internal shocks in the UK economy have occurred since Hendry's model was developed, the proposed model selection procedure confirms that it is still valid: the most likely specification is Friedman's model incorporating a 'spread or net opportunity cost' of holding money (our specification 2d). This result can be interpreted as a confirmation of the accuracy of our approach because the UK served as our benchmark economy. In tables 5-7, the mean values of the coefficient estimates and the posterior inclusion probabilities for the selected model specifications are presented. Since the results for specifications 1a, 1b, 1c, 2a and 2c were not fully satisfactory, they are not presented in this paper; however, they are available upon request.

The output can be summarized as follows. First, we noticed that two alternative model specifications denoted as 1 and 2 were supported by the data. The Baumol-Tobin model was confirmed for the Czech Republic, Poland and Turkey. On the other hand, Friedman's quantity theory was successfully implemented for Mexico, Indonesia, ZAF and the UK. This result means that in the long run, the difference in the proportionality of the demand for money is distinct at both the theoretical and empirical levels.

Concerning the relationships observed in the short run, variable Δp_t is highly probable for each country and each model specification, with the exception of Brazil and India. The lagged values of Δp_{t-s} are weakly probable in all analyzed cases. The variable real TFE (Δy_t) is very likely in such countries as Hungary, Russia, Mexico, Brazil, Turkey, Indonesia and South Africa. All variables are followed by positive signs of the parameter estimates. The lagged values Δy_{t-s} are not likely to be important in the model specifications. In the case of 2b, which is the best for Russia, this variable is not very likely.

The case of interest rates is more complicated because this measure is represented by several variables. The model specifications with interest rates defined as ΔR_t and ΔimR_t are less likely

Table 5: Means of the coefficient estimates and the posterior inclusion probabilities for specification (1d)

	CZE	POL	HUN	RUS	MEX	BRA	TUR	IDN	IND	ZAF	UK
Δmp_{t-1}	0.087 [0.463]	0.002 [0.112]	0.122 [0.527]	0.037 [0.230]	**0.442** **[0.996]**	0.014 [0.146]	0.073 [0.392]	−0.077 [0.379]	**−0.509** **[1.000]**	−0.017 [0.171]	0.004 [0.124]
Δmp_{t-2}	0.121 [0.579]	**0.191** **[0.826]**	**0.250** **[0.843]**	−0.009 [0.166]	−0.126 [0.569]	0.006 [0.121]	0.032 [0.239]	−0.028 [0.207]	−0.041 [0.240]	0.014 [0.158]	0.004 [0.120]
Δmp_{t-3}	0.028 [0.231]	**0.313** **[0.982]**	0.000 [0.109]	0.021 [0.202]	−0.041 [0.272]	−0.005 [0.119]	**−0.229** **[0.828]**	0.002 [0.131]	−0.014 [0.143]	0.009 [0.131]	**0.206** **[0.917]**
Δmp_{t-4}	0.013 [0.167]	**−0.148** **[0.698]**	−0.001 [0.115]	−0.043 [0.299]	0.009 [0.138]	0.002 [0.115]	0.005 [0.128]	−0.004 [0.127]	0.003 [0.109]	−0.004 [0.120]	−0.006 [0.126]
ECM_{t-1}	**−0.007** **[0.820]**	**−0.006** **[0.794]**	−0.001 [0.401]	−0.045 [0.641]	**−0.005** **[0.788]**	−0.008 [0.287]	**−0.008** **[0.752]**	−0.006 [0.575]	−0.004 [0.300]	**−0.042** **[0.964]**	**−0.007** **[0.713]**
Δp_t	**−1.623** **[1.000]**	**−1.106** **[1.000]**	**−0.831** **[1.000]**	**−0.527** **[0.922]**	**−0.711** **[1.000]**	−0.111 [0.275]	**−0.304** **[0.817]**	**−0.383** **[0.946]**	−0.190 [0.226]	**−1.481** **[0.994]**	**−0.856** **[0.982]**
Δp_{t-1}	−0.124 [0.304]	0.003 [0.111]	0.056 [0.224]	0.047 [0.246]	0.030 [0.163]	−0.020 [0.129]	−0.005 [0.133]	0.137 [0.393]	−0.352 [0.327]	0.009 [0.107]	0.026 [0.132]
Δp_{t-2}	−0.158 [0.352]	0.023 [0.156]	0.165 [0.482]	0.020 [0.216]	0.033 [0.188]	−0.011 [0.118]	0.001 [0.125]	**−0.243** **[0.671]**	−0.064 [0.143]	−0.206 [0.346]	−0.002 [0.104]
Δp_{t-3}	−0.005 [0.117]	0.141 [0.386]	0.015 [0.131]	0.104 [0.388]	0.040 [0.208]	0.073 [0.237]	−0.013 [0.153]	−0.061 [0.254]	0.052 [0.136]	−0.021 [0.123]	0.018 [0.121]
Δp_{t-4}	0.007 [0.110]	−0.006 [0.131]	0.026 [0.167]	0.064 [0.312]	0.007 [0.121]	0.003 [0.108]	0.059 [0.272]	0.015 [0.149]	0.051 [0.133]	−0.495 [0.613]	−0.003 [0.100]
Δy_t	0.010 [0.121]	0.010 [0.115]	**0.241** **[0.695]**	**0.687** **[0.875]**	**0.297** **[0.905]**	**1.423** **[1.000]**	**0.581** **[0.983]**	**0.482** **[0.859]**	0.032 [0.130]	0.304 [0.611]	0.082 [0.275]
Δy_{t-1}	0.025 [0.175]	−0.008 [0.116]	−0.057 [0.259]	**0.557** **[0.770]**	0.000 [0.116]	−0.059 [0.192]	0.027 [0.173]	0.031 [0.176]	0.013 [0.115]	0.002 [0.113]	−0.028 [0.152]
Δy_{t-2}	−0.011 [0.131]	−0.026 [0.164]	0.008 [0.121]	0.044 [0.216]	−0.010 [0.135]	−0.005 [0.110]	0.027 [0.183]	−0.004 [0.120]	0.013 [0.113]	−0.025 [0.142]	0.046 [0.194]
Δy_{t-3}	0.000 [0.105]	−0.014 [0.126]	−0.002 [0.103]	−0.064 [0.230]	−0.010 [0.139]	0.029 [0.145]	−0.013 [0.132]	−0.003 [0.125]	0.094 [0.201]	−0.022 [0.139]	−0.142 [0.414]
Δy_{t-4}	−0.001 [0.098]	0.003 [0.108]	0.055 [0.284]	−0.019 [0.165]	−0.001 [0.105]	−0.026 [0.140]	−0.007 [0.121]	0.007 [0.111]	0.068 [0.174]	0.026 [0.146]	−0.052 [0.214]
ΔdR_t	**0.718** **[1.000]**	0.006 [0.108]	−0.024 [0.112]	−0.186 [0.528]	−0.086 [0.336]	0.013 [0.174]	0.003 [0.178]	−0.004 [0.163]	0.013 [0.105]	**−1.374** **[0.963]**	0.001 [0.111]
ΔdR_{t-1}	0.188 [0.568]	−0.082 [0.158]	−0.010 [0.105]	0.051 [0.243]	0.073 [0.287]	0.004 [0.131]	−0.001 [0.204]	**0.382** **[0.973]**	−0.041 [0.113]	**−0.678** **[0.668]**	−0.077 [0.173]
ΔdR_{t-2}	−0.175 [0.518]	−0.078 [0.153]	−0.030 [0.124]	0.048 [0.260]	−0.008 [0.118]	−0.001 [0.111]	−0.007 [0.232]	0.020 [0.180]	−0.036 [0.109]	0.050 [0.150]	0.047 [0.153]
ΔdR_{t-3}	0.167 [0.577]	−0.349 [0.390]	0.019 [0.122]	−0.007 [0.181]	**0.393** **[0.863]**	0.000 [0.111]	−0.002 [0.138]	0.111 [0.568]	−0.008 [0.107]	0.027 [0.119]	0.004 [0.103]
ΔdR_{t-4}	0.006 [0.143]	−0.157 [0.256]	0.336 [0.597]	0.000 [0.163]	0.007 [0.118]	0.005 [0.130]	0.013 [0.334]	−0.003 [0.128]	−0.037 [0.113]	−0.009 [0.109]	0.042 [0.129]
$\Delta R08_t$	−0.033 [0.122]	−0.022 [0.116]	**−0.761** **[0.977]**	**−0.230** **[0.662]**	−0.136 [0.513]	−0.028 [0.160]	−0.014 [0.126]	−0.016 [0.107]	−0.028 [0.116]	−0.032 [0.150]	**−0.460** **[0.798]**
$\Delta R08_{t-1}$	0.037 [0.128]	−0.042 [0.149]	−0.043 [0.175]	0.081 [0.348]	−0.005 [0.112]	−0.009 [0.112]	0.002 [0.106]	0.003 [0.099]	−0.092 [0.183]	−0.035 [0.158]	−0.084 [0.252]
$\Delta R08_{t-2}$	−0.026 [0.117]	**−0.537** **[0.720]**	−0.073 [0.215]	−0.218 [0.590]	**0.384** **[0.900]**	0.001 [0.107]	0.006 [0.113]	−0.117 [0.256]	−0.006 [0.107]	−0.009 [0.108]	−0.010 [0.115]
$\Delta R08_{t-3}$	0.057 [0.147]	0.039 [0.146]	0.025 [0.139]	0.029 [0.205]	−0.001 [0.112]	0.088 [0.298]	0.031 [0.175]	0.170 [0.325]	0.009 [0.111]	0.006 [0.113]	−0.078 [0.225]
$\Delta R08_{t-4}$	−0.011 [0.102]	0.021 [0.113]	−0.052 [0.183]	0.171 [0.558]	−0.035 [0.199]	0.022 [0.144]	−0.011 [0.119]	−0.130 [0.272]	−0.010 [0.105]	0.130 [0.330]	**−0.647** **[0.905]**
$const$	0.004 [0.265]	0.002 [0.324]	**0.015** **[0.690]**	−0.122 [0.631]	0.003 [0.310]	−0.034 [0.274]	−0.011 [0.445]	−0.001 [0.451]	**0.035** **[0.750]**	**−0.087** **[0.734]**	**0.045** **[0.956]**
Cr_Asia97_t								0.007 [0.182]			**0.091** **[1.000]**
Cr_Ecu98_t					0.001 [0.127]	0.009 [0.220]					
$Cr\_RusArg98_t$					−0.001 [0.112]	−0.003 [0.127]					
Cr_Bra99_t					0.004 [0.243]	−0.001 [0.113]					
Cr_Tur01_t							**0.080** **[0.710]**				
Cr_Uru02_t					0.001 [0.119]	0.005 [0.159]					
Cr_Fin_t	0.000 [0.100]	0.000 [0.099]	0.000 [0.099]	−0.018 [0.449]	−0.001 [0.122]	**−0.133** **[0.999]**	−0.003 [0.125]	**−0.084** **[0.835]**	0.004 [0.127]	−0.002 [0.117]	**0.078** **[1.000]**
Cr_Euro09_t											−0.005 [0.221]
$Cr\_RusBra14_t$				0.000 [0.181]	0.010 [0.414]	0.000 [0.103]					
Cr_Chi15_t	0.000 [0.099]	−0.001 [0.104]	0.001 [0.102]	0.002 [0.159]	−0.001 [0.132]	−0.002 [0.113]	0.003 [0.133]	−0.001 [0.104]	0.000 [0.103]	0.003 [0.142]	−0.001 [0.116]
$UEexpand_t$	0.001 [0.121]	−0.002 [0.125]	0.001 [0.119]								0.001 [0.112]

Posterior inclusion probabilities (PIP) appear in square brackets []. The results with $PIP > 0.66$ are bolded.

than the specifications where interest rates premium are included. The only exception is Russia, where interest risk premiums were negative over a large portion of the analyzed time period; this can be observed in figure 1. In table 6, the most likely model for the demand of M1 in Russia is presented. This model includes the dynamics of the interest rate over 3 months, the immediate interest rate (time distributed) and the lagged dynamics of $R08_t$. The signs of the parameters are in line with theory, with the exception of ΔimR_{t-1}. On the other hand, the variable ΔdR_t has a fairly high probability for Mexico, Indonesia, South Africa and the UK (1d and 2d). For Brazil, India and Turkey, the interest rate premium is always not very likely. The case of Turkey is interesting because although specification 2d was selected, in 2b, the immediate interest rate

Table 6: Mean of the coefficient estimates and the posterior inclusion probabilities for specification (2b)

	CZE	POL	HUN	RUS	MEX	BRA	TUR	IDN	IND	ZAF	UK
Δmp_{t-1}	0.012 [0.157]	−0.024 [0.217]	0.044 [0.279]	**0.507 [0.962]**	**0.320 [0.944]**	0.009 [0.133]	0.037 [0.289]	−0.126 [0.509]	**−0.507 [1.000]**	−0.026 [0.219]	0.001 [0.118]
Δmp_{t-2}	0.096 [0.509]	**0.194 [0.802]**	**0.185 [0.715]**	0.001 [0.177]	−0.088 [0.443]	0.007 [0.120]	0.007 [0.142]	−0.015 [0.167]	−0.042 [0.242]	0.004 [0.113]	−0.002 [0.122]
Δmp_{t-3}	0.109 [0.567]	**0.390 [0.992]**	0.006 [0.123]	0.019 [0.214]	−0.050 [0.313]	0.010 [0.150]	−0.002 [0.124]	0.020 [0.199]	−0.014 [0.145]	0.019 [0.181]	**0.170 [0.837]**
Δmp_{t-4}	0.074 [0.458]	−0.031 [0.257]	0.006 [0.130]	0.004 [0.184]	0.009 [0.145]	0.005 [0.139]	−0.016 [0.182]	0.001 [0.114]	0.004 [0.111]	−0.010 [0.137]	−0.003 [0.115]
ECM_{t-1}	−0.002 [0.595]	−0.001 [0.504]	**0.012 [0.680]**	−0.004 [0.195]	−0.001 [0.556]	−0.001 [0.142]	−0.003 [0.594]	−0.011 [0.383]	−0.009 [0.480]	**−0.121 [0.992]**	**−0.019 [0.965]**
Δp_t	**−1.396 [1.000]**	**−1.035 [1.000]**	**−0.843 [1.000]**	**−0.894 [1.000]**	**−0.703 [0.999]**	−0.055 [0.189]	**−0.717 [0.999]**	**−0.334 [0.817]**	−0.187 [0.222]	**−1.348 [0.993]**	**−0.853 [0.990]**
Δp_{t-1}	−0.035 [0.159]	0.011 [0.135]	0.022 [0.151]	**0.736 [0.988]**	0.022 [0.151]	−0.009 [0.120]	0.002 [0.134]	0.330 [0.639]	−0.379 [0.345]	0.009 [0.103]	0.030 [0.145]
Δp_{t-2}	−0.083 [0.255]	0.057 [0.237]	0.092 [0.329]	0.086 [0.427]	0.023 [0.160]	−0.024 [0.140]	−0.010 [0.163]	−0.225 [0.615]	−0.073 [0.148]	−0.161 [0.293]	0.009 [0.109]
Δp_{t-3}	−0.015 [0.135]	0.179 [0.466]	0.002 [0.101]	0.033 [0.236]	0.030 [0.182]	0.060 [0.203]	−0.013 [0.164]	−0.079 [0.302]	0.052 [0.131]	−0.042 [0.143]	0.020 [0.129]
Δp_{t-4}	−0.003 [0.124]	0.037 [0.209]	0.008 [0.120]	0.059 [0.332]	0.008 [0.124]	0.002 [0.113]	−0.010 [0.143]	−0.002 [0.131]	0.041 [0.127]	**−0.625 [0.739]**	0.000 [0.101]
Δy_t	0.031 [0.195]	0.112 [0.366]	0.145 [0.527]	0.077 [0.242]	**0.215 [0.753]**	**1.128 [0.983]**	**0.525 [0.989]**	**0.569 [0.862]**	0.030 [0.128]	0.176 [0.420]	0.037 [0.181]
Δy_{t-1}	0.107 [0.438]	0.002 [0.100]	−0.054 [0.254]	0.183 [0.419]	0.011 [0.149]	−0.048 [0.176]	0.018 [0.158]	0.030 [0.168]	0.012 [0.115]	0.003 [0.110]	−0.050 [0.203]
Δy_{t-2}	−0.004 [0.116]	0.003 [0.119]	0.017 [0.150]	0.111 [0.318]	−0.003 [0.113]	−0.004 [0.114]	**0.371 [0.892]**	0.009 [0.124]	0.011 [0.115]	−0.041 [0.180]	0.025 [0.145]
Δy_{t-3}	0.006 [0.119]	0.004 [0.117]	0.004 [0.113]	0.047 [0.226]	−0.001 [0.114]	0.094 [0.272]	**−0.340 [0.898]**	0.016 [0.139]	0.108 [0.218]	−0.024 [0.141]	−0.196 [0.516]
Δy_{t-4}	0.007 [0.116]	−0.006 [0.114]	**0.261 [0.783]**	0.058 [0.268]	0.006 [0.119]	−0.017 [0.124]	0.006 [0.119]	0.245 [0.594]	0.065 [0.168]	0.010 [0.111]	−0.112 [0.337]
ΔR_t	−0.100 [0.217]	−0.072 [0.205]	−0.110 [0.259]	**−1.228 [1.000]**	0.023 [0.230]	0.014 [0.158]	**−0.708 [0.999]**	**−0.817 [0.853]**	−0.036 [0.116]	−0.034 [0.194]	0.079 [0.181]
ΔR_{t-1}	−0.438 [0.579]	−0.226 [0.330]	−0.356 [0.540]	0.132 [0.414]	0.035 [0.394]	**−0.419 [0.674]**	−0.009 [0.152]	0.051 [0.207]	−0.088 [0.130]	−0.319 [0.431]	0.317 [0.340]
ΔR_{t-2}	0.018 [0.171]	0.051 [0.164]	−0.162 [0.348]	0.048 [0.265]	−0.099 [0.424]	−0.052 [0.303]	**−0.125 [0.676]**	0.237 [0.320]	−0.025 [0.106]	0.023 [0.116]	−0.010 [0.122]
ΔR_{t-3}	−0.057 [0.200]	−0.071 [0.198]	−0.148 [0.326]	−0.027 [0.202]	0.063 [0.291]	−0.052 [0.309]	−0.024 [0.214]	0.058 [0.179]	−0.160 [0.163]	0.002 [0.114]	−0.003 [0.120]
ΔR_{t-4}	−0.012 [0.132]	−0.052 [0.190]	0.090 [0.244]	0.114 [0.512]	−0.001 [0.137]	0.005 [0.120]	−0.001 [0.121]	−0.053 [0.211]	−0.006 [0.104]	0.018 [0.113]	0.010 [0.118]
$\Delta R08_t$	−0.023 [0.117]	−0.008 [0.108]	**−0.676 [0.957]**	−0.004 [0.152]	−0.119 [0.479]	−0.023 [0.149]	−0.003 [0.112]	−0.042 [0.151]	−0.026 [0.120]	−0.040 [0.169]	**−0.451 [0.787]**
$\Delta R08_{t-1}$	0.040 [0.136]	−0.041 [0.155]	−0.014 [0.120]	0.151 [0.597]	−0.008 [0.119]	−0.002 [0.105]	0.015 [0.148]	0.003 [0.101]	−0.092 [0.184]	−0.031 [0.152]	−0.124 [0.328]
$\Delta R08_{t-2}$	−0.013 [0.106]	**−0.662 [0.853]**	−0.069 [0.218]	**−0.291 [0.850]**	**0.419 [0.950]**	−0.001 [0.105]	0.146 [0.514]	−0.096 [0.232]	−0.004 [0.114]	−0.013 [0.119]	−0.001 [0.110]
$\Delta R08_{t-3}$	0.034 [0.130]	0.007 [0.109]	0.049 [0.186]	0.007 [0.159]	0.005 [0.131]	0.053 [0.221]	0.003 [0.112]	0.194 [0.368]	0.009 [0.103]	0.001 [0.099]	−0.022 [0.158]
$\Delta R08_{t-4}$	−0.044 [0.138]	0.007 [0.103]	−0.064 [0.208]	0.067 [0.371]	−0.059 [0.276]	0.018 [0.134]	−0.025 [0.181]	−0.119 [0.265]	−0.008 [0.107]	0.091 [0.268]	**−0.471 [0.723]**
ΔimR_t	**−0.522 [0.912]**	−0.175 [0.308]	−0.057 [0.177]	−0.004 [0.138]	−0.073 [0.243]	−0.104 [0.480]	**0.127 [0.940]**	0.000 [0.203]	−0.046 [0.114]	**1.090 [0.953]**	0.032 [0.136]
ΔimR_{t-1}	−0.080 [0.359]	**−0.706 [0.710]**	−0.335 [0.469]	**0.486 [0.841]**	−0.239 [0.647]	−0.006 [0.152]	**−0.088 [0.689]**	−0.083 [0.278]	−0.016 [0.105]	−0.351 [0.453]	0.285 [0.387]
ΔimR_{t-2}	0.098 [0.408]	0.005 [0.115]	−0.129 [0.277]	**−0.501 [0.826]**	−0.093 [0.362]	−0.003 [0.125]	**0.079 [0.825]**	0.033 [0.238]	0.014 [0.109]	−0.003 [0.160]	−0.021 [0.148]
ΔimR_{t-3}	−0.057 [0.330]	−0.045 [0.159]	−0.033 [0.159]	0.011 [0.173]	−0.026 [0.217]	−0.003 [0.139]	0.002 [0.169]	−0.134 [0.346]	−0.105 [0.137]	−0.015 [0.112]	0.000 [0.104]
ΔimR_{t-4}	0.003 [0.136]	0.385 [0.583]	−0.015 [0.127]	0.129 [0.396]	0.004 [0.153]	−0.014 [0.170]	0.001 [0.153]	−0.053 [0.262]	0.027 [0.108]	0.020 [0.119]	0.002 [0.111]
$const$	0.005 [0.474]	0.001 [0.455]	**0.127 [0.755]**	−0.034 [0.192]	0.008 [0.514]	−0.010 [0.138]	0.000 [0.507]	−0.097 [0.365]	0.012 [0.459]	**−0.968 [0.987]**	0.002 [0.221]
Cr_Asia97_t								0.006 [0.167]			**0.085 [1.000]**
Cr_Ecu98_t					0.003 [0.205]	**0.150 [0.729]**					
$Cr\_RusArg98_t$					0.002 [0.150]	−0.016 [0.276]					
Cr_Bra99_t					**0.031 [0.669]**	0.001 [0.121]					
Cr_Tur01_t							**0.552 [0.999]**				
Cr_Uru02_t					0.001 [0.119]	0.013 [0.298]					
Cr_Fin_t	0.001 [0.106]	0.000 [0.099]	0.001 [0.113]	**−0.033 [0.816]**	−0.001 [0.139]	**−0.133 [1.000]**	−0.003 [0.134]	**−0.097 [0.900]**	0.004 [0.128]	0.000 [0.102]	**0.081 [1.000]**
Cr_Euro09_t											−0.003 [0.159]
$Cr\_RusBra14_t$				0.000 [0.175]	0.010 [0.432]	0.000 [0.102]					
Cr_Chi15_t	0.000 [0.102]	−0.001 [0.109]	0.001 [0.103]	0.001 [0.270]	−0.001 [0.121]	−0.002 [0.122]	0.003 [0.151]	−0.001 [0.104]	0.000 [0.106]	0.003 [0.141]	−0.001 [0.107]
$UEexpand_t$	0.001 [0.107]	−0.002 [0.124]	0.008 [0.243]								0.001 [0.106]

Posterior inclusion probabilities (PIP) appear in square brackets []. The results with $PIP > 0.66$ are bolded.

is quite likely, which suggests that the level of the nominal interest rate may influence money demand instead of the disparity. In the remaining countries, the interest rates are present in the model specifications, although their probability of occurrence is diversified. For the UK, time distributed $\Delta R08_{t-s}$ in the specifications has a high probability, which is due to a quantitative loosening policy started in 2008. It should be noted that the signs of the parameter for the

Table 7: Mean of the coefficient estimates and the posterior inclusion probabilities for specification (2d)

	CZE	POL	HUN	RUS	MEX	BRA	TUR	IDN	IND	ZAF	UK
Δmp_{t-1}	0.088 [0.473]	0.002 [0.113]	0.103 [0.466]	0.045 [0.247]	**0.436 [0.994]**	0.016 [0.151]	0.077 [0.407]	−0.063 [0.331]	**−0.507 [1.000]**	−0.018 [0.179]	0.001 [0.117]
Δmp_{t-2}	0.119 [0.582]	**0.199 [0.839]**	**0.232 [0.806]**	−0.003 [0.158]	−0.121 [0.546]	0.007 [0.122]	0.035 [0.249]	−0.023 [0.196]	−0.041 [0.238]	0.008 [0.129]	0.002 [0.112]
Δmp_{t-3}	0.023 [0.206]	**0.322 [0.979]**	−0.001 [0.108]	0.027 [0.225]	−0.043 [0.277]	−0.004 [0.116]	**−0.220 [0.808]**	0.003 [0.132]	−0.013 [0.142]	0.007 [0.123]	**0.186 [0.885]**
Δmp_{t-4}	0.009 [0.142]	**−0.164 [0.740]**	−0.003 [0.118]	−0.036 [0.267]	0.008 [0.137]	0.002 [0.116]	0.007 [0.134]	−0.003 [0.123]	0.004 [0.108]	−0.006 [0.122]	−0.007 [0.132]
ECM_{t-1}	**−0.004 [0.712]**	**−0.004 [0.667]**	0.003 [0.546]	−0.038 [0.455]	**−0.003 [0.690]**	−0.003 [0.171]	**−0.014 [0.723]**	−0.047 [0.647]	−0.010 [0.501]	**−0.108 [0.977]**	**−0.017 [0.962]**
Δp_t	**−1.587 [1.000]**	**−1.082 [1.000]**	**−0.819 [1.000]**	**−0.483 [0.893]**	**−0.694 [0.999]**	−0.090 [0.245]	**−0.305 [0.803]**	**−0.365 [0.934]**	−0.208 [0.238]	**−1.303 [0.983]**	**−0.821 [0.984]**
Δp_{t-1}	−0.079 [0.234]	0.006 [0.116]	0.051 [0.213]	0.067 [0.287]	0.041 [0.188]	−0.015 [0.122]	−0.006 [0.135]	0.134 [0.391]	−0.396 [0.357]	0.016 [0.113]	0.028 [0.137]
Δp_{t-2}	−0.108 [0.283]	0.035 [0.179]	0.155 [0.459]	0.040 [0.245]	0.047 [0.223]	−0.009 [0.116]	0.000 [0.130]	**−0.260 [0.708]**	−0.075 [0.149]	−0.154 [0.291]	0.002 [0.103]
Δp_{t-3}	0.000 [0.112]	0.188 [0.477]	0.015 [0.132]	0.147 [0.493]	0.052 [0.244]	0.070 [0.234]	−0.016 [0.163]	−0.059 [0.249]	0.040 [0.131]	−0.019 [0.119]	0.017 [0.119]
Δp_{t-4}	0.013 [0.117]	−0.001 [0.128]	0.029 [0.180]	0.094 [0.385]	0.012 [0.136]	0.003 [0.109]	0.064 [0.286]	0.013 [0.143]	0.038 [0.124]	−0.459 [0.594]	0.000 [0.099]
Δy_t	0.014 [0.130]	0.013 [0.120]	**0.262 [0.739]**	**0.741 [0.888]**	**0.283 [0.879]**	**1.428 [1.000]**	**0.585 [0.985]**	**0.512 [0.891]**	0.029 [0.126]	**0.397 [0.741]**	0.065 [0.242]
Δy_{t-1}	0.032 [0.195]	−0.007 [0.117]	−0.049 [0.237]	**0.511 [0.716]**	−0.001 [0.116]	−0.062 [0.197]	0.026 [0.172]	0.023 [0.166]	0.010 [0.113]	−0.009 [0.119]	−0.036 [0.171]
Δy_{t-2}	−0.009 [0.127]	−0.028 [0.169]	0.009 [0.123]	0.025 [0.192]	−0.013 [0.147]	−0.006 [0.109]	0.027 [0.183]	−0.007 [0.121]	0.010 [0.109]	−0.039 [0.176]	0.039 [0.181]
Δy_{t-3}	0.000 [0.104]	−0.013 [0.123]	−0.002 [0.103]	−0.074 [0.243]	−0.012 [0.147]	0.026 [0.139]	−0.014 [0.136]	−0.006 [0.125]	0.079 [0.183]	−0.035 [0.167]	−0.166 [0.463]
Δy_{t-4}	−0.001 [0.097]	0.004 [0.108]	0.064 [0.311]	−0.025 [0.175]	−0.002 [0.108]	−0.026 [0.140]	−0.006 [0.120]	0.007 [0.110]	0.055 [0.157]	0.016 [0.124]	−0.068 [0.248]
ΔdR_t	**0.702 [1.000]**	0.001 [0.107]	−0.024 [0.112]	−0.148 [0.449]	−0.092 [0.350]	0.014 [0.183]	0.003 [0.187]	−0.004 [0.151]	0.015 [0.105]	**−1.222 [0.929]**	0.002 [0.110]
ΔdR_{t-1}	0.155 [0.497]	−0.071 [0.147]	−0.009 [0.105]	0.063 [0.269]	0.061 [0.261]	0.004 [0.132]	−0.001 [0.210]	**0.372 [0.974]**	−0.039 [0.113]	−0.583 [0.608]	−0.085 [0.180]
ΔdR_{t-2}	−0.206 [0.591]	−0.075 [0.151]	−0.028 [0.122]	0.038 [0.251]	−0.012 [0.125]	0.000 [0.110]	−0.007 [0.226]	0.017 [0.168]	−0.036 [0.109]	0.064 [0.165]	0.049 [0.153]
ΔdR_{t-3}	0.145 [0.516]	−0.353 [0.392]	0.017 [0.119]	−0.007 [0.193]	**0.373 [0.835]**	0.001 [0.107]	−0.002 [0.135]	0.102 [0.538]	−0.008 [0.107]	0.027 [0.119]	0.004 [0.103]
ΔdR_{t-4}	0.003 [0.139]	−0.140 [0.238]	0.324 [0.583]	−0.001 [0.163]	0.006 [0.119]	0.004 [0.127]	0.013 [0.340]	−0.003 [0.123]	−0.035 [0.111]	−0.013 [0.111]	0.040 [0.127]
$\Delta R08_t$	−0.030 [0.119]	−0.022 [0.115]	**−0.747 [0.973]**	**−0.244 [0.684]**	−0.132 [0.500]	−0.028 [0.161]	−0.015 [0.127]	−0.015 [0.107]	−0.025 [0.113]	−0.035 [0.158]	**−0.436 [0.778]**
$\Delta R08_{t-1}$	0.037 [0.128]	−0.045 [0.155]	−0.041 [0.172]	0.078 [0.331]	−0.005 [0.113]	−0.009 [0.112]	0.002 [0.107]	0.003 [0.099]	−0.080 [0.170]	−0.045 [0.182]	−0.091 [0.269]
$\Delta R08_{t-2}$	−0.024 [0.114]	**−0.529 [0.712]**	−0.077 [0.221]	−0.227 [0.584]	**0.386 [0.902]**	0.001 [0.107]	0.006 [0.113]	−0.117 [0.258]	−0.004 [0.106]	−0.012 [0.113]	−0.007 [0.113]
$\Delta R08_{t-3}$	0.057 [0.146]	0.041 [0.148]	0.024 [0.135]	0.039 [0.231]	−0.003 [0.114]	0.089 [0.301]	0.032 [0.176]	0.163 [0.316]	0.011 [0.111]	0.005 [0.112]	−0.076 [0.222]
$\Delta R08_{t-4}$	−0.009 [0.101]	0.023 [0.115]	−0.050 [0.180]	0.214 [0.643]	−0.036 [0.203]	0.022 [0.145]	−0.011 [0.120]	−0.131 [0.275]	−0.008 [0.104]	0.143 [0.360]	**−0.668 [0.921]**
$const$	−0.008 [0.459]	−0.010 [0.488]	0.042 [0.612]	−0.357 [0.454]	−0.010 [0.489]	−0.025 [0.173]	−0.109 [0.611]	−0.429 [0.626]	0.013 [0.468]	**−0.863 [0.968]**	0.001 [0.183]
Cr_Asia97_t								0.009 [0.209]			**0.087 [1.000]**
Cr_Ecu98_t					0.001 [0.131]	0.010 [0.237]					
$Cr\_RusArg98_t$					−0.001 [0.112]	−0.002 [0.116]					
Cr_Bra99_t					0.005 [0.255]	−0.001 [0.108]					
Cr_Tur01_t							**0.077 [0.691]**				
Cr_Uru02_t					0.001 [0.125]	0.005 [0.160]					
Cr_Fin_t	0.000 [0.100]	0.000 [0.099]	0.000 [0.099]	−0.021 [0.486]	−0.001 [0.123]	**−0.135 [0.999]**	−0.003 [0.127]	**−0.084 [0.841]**	0.004 [0.128]	−0.002 [0.116]	**0.079 [1.000]**
Cr_Euro09_t											−0.005 [0.207]
$Cr\_RusBra14_t$				0.000 [0.186]	0.009 [0.390]	0.000 [0.103]					
Cr_Chi15_t	0.000 [0.099]	−0.001 [0.105]	0.001 [0.101]	0.002 [0.166]	−0.001 [0.134]	−0.002 [0.113]	0.003 [0.137]	−0.001 [0.105]	0.000 [0.103]	0.003 [0.141]	0.000 [0.107]
$UEexpand_t$	0.001 [0.123]	−0.002 [0.122]	0.001 [0.115]								0.001 [0.109]

Posterior inclusion probabilities (PIP) appear in square brackets []. The results with $PIP > 0.66$ are bolded.

interest rates are typically negative, although the lag structure is negative and positive signs can be noticed.

Among the dummies considered for the different countries, only the one for the financial crisis in 2008 is highly probable for the UK, Indonesia and Brazil. The crisis had a negative impact on money demand in Indonesia and Brazil and a positive impact in the UK. Moreover, the Asian Crisis in 1997 is highly probable for the UK with positive coefficients in all specifications. In the analyzed specifications, the crisis in 2001 increased the demand for money in Turkey, which resulted in the devaluation of the lira and increased foreign debt (see Feridun 2012). The analysis of the individual probabilities of the error correction term (ECM) presented in table 3 is more important from the perspective of the stability of the entire monetary system. Another advantage of this analysis is its distinction from the Baumol-Tobin and Friedman specifications for the long run.

The main finding is that in such countries as Brazil, Russia, Indonesia and India, we cannot confirm the stability of the monetary systems measured in terms of aggregate M1 because the values of *ECM* are usually negative but rather unlikely (although the *PIP* for the *ECM* variable for Russia equals 0.641 and for Indonesia, equals 0.647). For Hungary, the sign of the *ECM* is positive, which excludes it from consideration. In the remaining countries, stability was fully confirmed. The highest level of stability observed across all specifications (apart from 1a and 2a) is for South Africa, where the probability exceeds 0.88. For the Czech Republic and the UK, six specifications are confirmed. For Poland and Turkey, four specifications were valid: were 1c, 1d, 2c, and 2d. For Mexico, specifications 1d and 2d confirmed the stability of the monetary system. When the long-run specifications are compared, one can notice that specification 2 (Friedman model) outperformed specification 1 (Baumol-Tobin model).

In summary, for five cases, we cannot fully confirm the stability of the monetary system measured in terms of aggregate M1, although, the valued for Russia and Indonesia are close to the limit value of *PIP*. The monetary systems represented by narrow money are stable in the transitional economies: the Czech Republic, Poland, Mexico, Turkey and South Africa. Stability is also confirmed for the UK (see table 3).

In this paper, two types of economies were analyzed: Central European countries such as the Czech Republic, Poland and Hungary as well as developing countries from other continents. The expected and estimated signs of the parameters in the best model specifications are in line with money demand theory. Some differences might arise when the impact of particular variables is distributed over time. The stability of the monetary systems, as measured by the negative sign of the parameters related to the error-correction term with high probability, was confirmed in 6 cases out of the 11 (including the UK). The presence of such determinants as $\Delta p_t < 0$, $\Delta y_t > 0$ and $\Delta dR_t < 0$ (or their respective lags) in the short-run equation can be empirically confirmed only for South Africa. It is worth noting that $\Delta p_t < 0$ is present in all valid specifications in both transitional economies and in the UK. This result means that the monetary authorities are highly focused on inflationary processes and that the monetary system controlled for inflation using money demand-supply instruments. In the short run, the dynamics of income do not always determine the money demand function. These were present in four countries (Hungary, Turkey, Mexico and Indonesia), but Hungary is not considered due to the highly instable demand for money in the analyzed period. This result suggests that in the short run, real income does not change much (the permanent income hypothesis), and it is not present when narrow money is considered. The interest rate, represented mainly by the interest rate premium dynamics, acts as the monetary instrument, limiting or activating the demand for money. In the estimated models, the results of applying BACE show that it played such a role only for South Africa. For Russia, the dynamics of the three-month interest rate determined the demand for narrow money. This may have occurred because the period of financial crisis and economic recession observed globally since 2008 has different intensities in the analyzed economies. Generally, in a period of recession, low interest rates could not act as an instrument of monetary policy, which explains why fiscal policy was applied. The consequences of this process have lasted until now in most of the economies. This result is confirmed by an analysis of the dummy variables related to the financial crisis, which is very likely in Russia, Brazil, Indonesia and the UK. The other dummies such as as a crisis in Turkey, Asia and Ecuador acted locally in specified periods.

A further analysis is conducted on the concomitance of the factors in different specifications (jointness). The results with $J \geq 2$ are presented graphically in figure 2. An analysis of the jointness results leads to the following conclusions:

1. There are no complementary pairs for India.

2. For Indonesia, Δp_{t-s} coexists with the interest rate and Δmp_{t-s}; in Poland, Δp_{t-s} with Δmp_{t-s}; and in Brazil, the 2008 financial crisis coexists with Δy_{t-s}.

3. For Turkey, the dummy Cr_Tur01_t coexists with Δy_{t-s}, Δp_{t-s}, R_{t-s} and imR_{t-s}.

4. For the UK, the following variables have individual impacts: ECM_{t-1} with Δp_{t-s}, Cr_Fin_t and Cr_Asia97_t. On the other hand, in each specification, 3 variables occur together: Δp_{t-s}, Cr_Fin_t, Cr_Asia97_t. It can be easily seen that $R08_{t-s}$, R_{t-s}, imR_{t-s}, and Δy_{t-s} remained unrelated with the other variables.

5. The variable Δp_{t-s} always pairs with other variables, with the exception of Brazil.

6. The most pairs can be observed for the UK, Mexico and Turkey.

7. ECM_{t-1} coexists in pairs in the Czech Republic, South Africa and the UK.

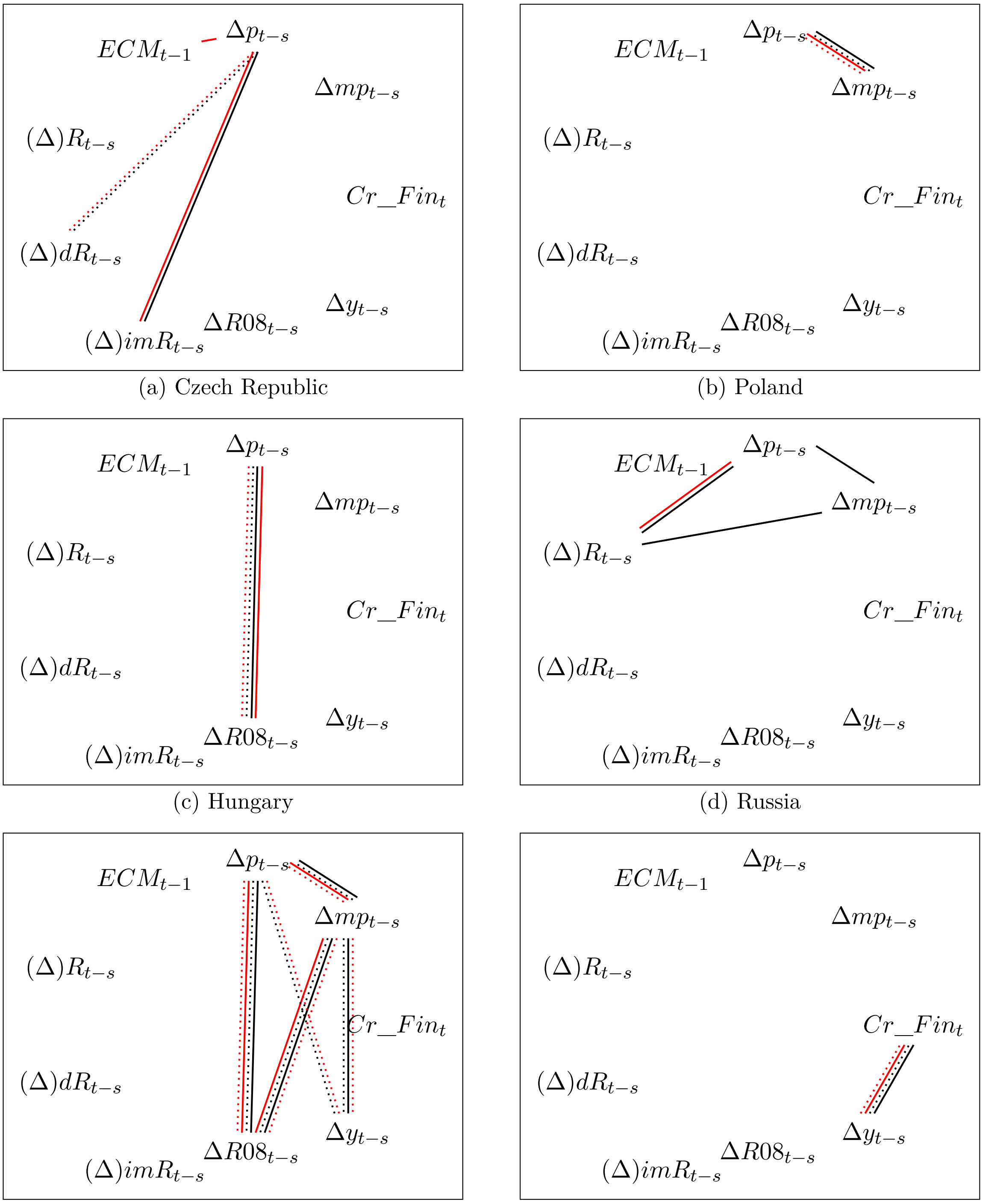
In the cases where complementary pairs of variables are detected, the joint explanatory power of such pairs is greater than if they are considered individually. This type of analysis supports the interpretation of the results of the short-run model. For example, for Russia Δp_{t-s}, Δmp_{t-s}, and ΔR_{t-s} appear in specification 1b, which is most likely. This result means that that three factors are responsible for the short-run dynamics of the demand for narrow money in Russia. The results are similar for the Czech Republic, Poland, Indonesia, Mexico, Turkey, South Africa and the UK. The results for India and Brazil show that the relations between the variables are dubious, which confirms the results from the BACE. For Hungary, this occurs for only one pair of complementary variables, but this result is not stable in the long run, when one of the complementary variables is a dummy variable and the results show occasional relationships.

5 Robustness analysis

To confirm the empirical findings, we performed a robustness check. Since the analysis addresses variable and model selection issues, we decided to apply Ockham's razor rule. In our analysis, the prior average model size was set to $\mathrm{E}(\Xi) = k/2$ (where k is the number of variables in a given GUM). This means that we do not prefer any specification, so all possible models are equally probable. For the BACE approach, the use of Ockham's razor rule is very simple, and the only change we have to make is to set the prior average model size to a reasonably small value to penalize the large models (in terms of the number of variables). If the resulting average size of the posterior model is similar for both normal and small values of $\mathrm{E}(\Xi)$, the empirical results are robust. Table 8 presents the values of the average size of the posterior model for different specifications in the two cases of the prior average model size: normal ($\mathrm{E}(\Xi) = k/2$) and small ($\mathrm{E}(\Xi) = k/4$).

In all cases, for $\mathrm{E}(\Xi) = k/2$ (uniform prior on model space), the values of the average size of the posterior model are smaller than the corresponding values of the average size of the previous model. This result means that the most parsimonious specifications are preferred, and the BACE results are in line with Ockham's razor rule. Moreover, the differences between the values of the average size of the posterior model for different $\mathrm{E}(\Xi)$ are small. The maximum

Figure 2: Pairs of complementary variables across specifications and countries



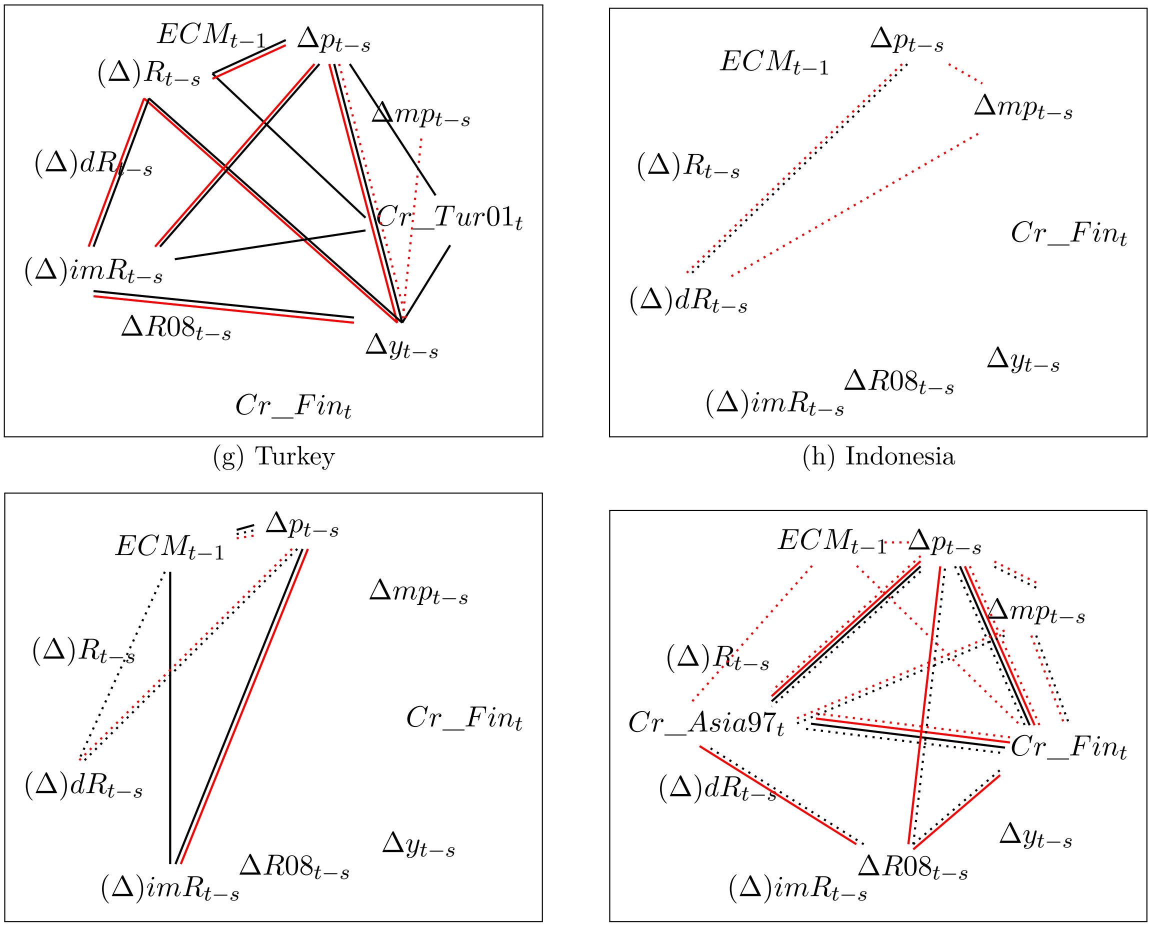
(a) Czech Republic (b) Poland

(c) Hungary (d) Russia

(e) Mexico (f) Brazil

difference is equal to to 2.76, but the median difference is equal to 0.92 and the mode difference is 0.68. When the values of Pearson's correlation coefficients between the corresponding values of *PIP* in normal and small values of E(Ξ) are compared, they are very close to 1 in all cases. The same conclusions are true for the means of the parameters' estimates in the same models. This means that the empirical results are strongly robust.

Figure 2: Pairs of complementary variables. . . (cont.)



(g) Turkey (h) Indonesia

(i) South Africa (j) United Kingdom

pairs of complementary variables in 1a or 2a

pairs of complementary variables in 1b or 2b

pairs of complementary variables in 1c or 2c

pairs of complementary variables in 1d or 2d

$(\Delta)x_{t-s}$ means x_{t-s} or Δx_{t-s} depending on specification defined in 10

6 Conclusions

The aim of the study was to verify the stability of monetary systems, as measured by aggregate narrow money (M1), in the selected transition economies. To do so, the BACE method was applied. Two alternative theoretical theories models, that is, the Baumol-Tobin model and the Friedman model, were used to determine the long-run equation. In the paper, model specifications followed the money demand model proposed by Hendry and Ericsson. The model was based on co-integration and error-correction specifications. Determinants of money demand such as the price level, TFEs and the interest rate were included in the model specifications. As four variables were used to represent interest rates, four model specifications were developed, and these were considered together with two long-run relations, which resulted in specifications for eight models. Additionally, a set of country-specific dummies was introduced to addressed shocks observed in some periods of time.

The main finding is that in countries such as Hungary, Russia Brazil, Indonesia and India, we

Table 8: Values for the prior and posterior average model size for selected specifications

	E(Ξ)		CZE	POL	HUN	RUS	MEX	BRA	TUR	IDN	IND	ZAF	UK
1a	k/2	*prior*	17.00	17.00	17.00	17.50	19.00	19.00	17.00	17.00	17.00	16.50	18.00
		posterior	9.93	10.76	10.67	13.10	12.41	8.71	13.42	12.07	6.45	10.16	12.45
	k/4	*prior*	8.50	8.50	8.50	8.75	9.50	9.50	8.50	8.50	8.50	8.25	9.00
		posterior	9.00	9.56	9.44	10.58	10.57	6.56	12.79	10.81	5.32	8.88	11.22
1b	k/2	*prior*	17.00	17.00	17.00	17.50	19.00	19.00	17.00	17.00	17.00	16.50	18.00
		posterior	9.86	10.66	11.30	14.50	12.63	9.28	13.70	11.46	6.33	9.75	12.04
	k/4	*prior*	8.50	8.50	8.50	8.75	9.50	9.50	8.50	8.50	8.50	8.25	9.00
		posterior	8.79	9.45	9.76	12.72	10.59	7.04	13.02	10.00	5.43	8.75	11.03
1c	k/2	*prior*	14.50	14.50	14.50	15.00	16.50	16.50	14.50	14.50	14.50	14.00	15.50
		posterior	9.11	8.70	8.70	11.14	10.65	6.74	8.43	8.26	5.72	8.65	11.20
	k/4	*prior*	7.25	7.25	7.25	7.50	8.25	8.25	7.25	7.25	7.25	7.00	7.75
		posterior	8.59	8.16	8.03	9.49	9.65	5.92	7.79	7.62	5.20	8.01	10.62
1d	k/2	*prior*	14.50	14.50	14.50	15.00	16.50	16.50	14.50	14.50	14.50	14.00	15.50
		posterior	8.78	8.78	9.22	11.04	10.98	6.83	8.57	9.87	5.64	8.74	11.06
	k/4	*prior*	7.25	7.25	7.25	7.50	8.25	8.25	7.25	7.25	7.25	7.00	7.75
		posterior	8.28	8.26	8.54	9.37	10.03	5.94	7.84	9.13	5.16	8.25	10.50
2a	k/2	*prior*	17.00	17.00	17.00	17.50	19.00	19.00	17.00	17.00	17.00	16.50	18.00
		posterior	10.40	10.75	10.66	12.98	12.36	8.60	13.50	12.18	6.28	10.30	12.09
	k/4	*prior*	8.50	8.50	8.50	8.75	9.50	9.50	8.50	8.50	8.50	8.25	9.00
		posterior	9.53	9.54	9.35	10.22	10.41	6.46	12.82	10.85	5.26	9.11	10.80
2b	k/2	*prior*	17.00	17.00	17.00	17.50	19.00	19.00	17.00	17.00	17.00	16.50	18.00
		posterior	9.80	10.71	11.28	14.54	12.66	9.25	13.79	11.51	6.21	9.68	11.48
	k/4	*prior*	8.50	8.50	8.50	8.75	9.50	9.50	8.50	8.50	8.50	8.25	9.00
		posterior	8.71	9.51	9.78	12.88	10.71	7.05	13.11	10.04	5.36	8.78	10.38
2c	k/2	*prior*	14.50	14.50	14.50	15.00	16.50	16.50	14.50	14.50	14.50	14.00	15.50
		posterior	9.06	8.84	8.71	11.16	10.69	6.52	8.59	8.55	5.58	9.12	10.58
	k/4	*prior*	7.25	7.25	7.25	7.50	8.25	8.25	7.25	7.25	7.25	7.00	7.75
		posterior	8.50	8.29	8.04	9.50	9.70	5.78	7.90	7.87	5.11	8.56	9.98
2d	k/2	*prior*	14.50	14.50	14.50	15.00	16.50	16.50	14.50	14.50	14.50	14.00	15.50
		posterior	8.65	8.97	9.19	10.96	11.11	6.58	8.74	10.06	5.52	9.04	10.54
	k/4	*prior*	7.25	7.25	7.25	7.50	8.25	8.25	7.25	7.25	7.25	7.00	7.75
		posterior	8.07	8.42	8.53	9.09	10.02	5.79	7.98	9.34	5.08	8.65	9.98

cannot confirm the stability of the monetary systems measured in terms of aggregate M1, since the values of the *ECM* estimates are either positive or negative but very unlikely. In Russia and Indonesia, stability was twice as probable as the lack of stability. In the remaining countries, stability was fully confirmed. The value for highest stability observed across all specifications (apart from 1a and 2a) was in South Africa. Here, the probabilities exceeded 0.88. For the Czech Republic and the UK, six specifications were confirmed, while for Poland and Turkey, four specifications were valid. For Mexico, two specifications confirmed the stability of the monetary system. When the long-run specifications were compared, specification 2 (Friedman model) outperformed specification 1 (Baumol-Tobin model). In this paper, two types of economies were analyzed: Central European countries as well as developing countries from different continents. The empirical findings cannot confirm any similarities within the groups when the demand for money is modeled, although in most of the economies, the money demand model holds and exhibits long-run stability.

The expected and estimated signs of the parameters in the best models specifications are in line with money demand theory. This theory was fully confirmed for South Africa. Some differences can be seen when the impacts of particular variables are distributed over time. The results of the jointness analysis showed several pairs of complementary variables across all countries except India.

The results of the robustness check conducted using Okham's razor rule lead us to the conclusion that the BACE approach results in both parsimonious model representations and reasonable parameter estimates with high posterior inclusion probabilities.

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